Bulletin H-IM-FN
JAN 2015

HEATCRAFT™ Worldwide Refrigeration

FN Fluid Coolers
Installation and Maintenance Data

Table of Contents

Nomenclature

F	N	H	S	04	H	2	03
Model	Vintage	Motor	Width	Fans	Tube Diameter	Number of Rows	Coil Slab
F = Fluid Cooler		H = 1140 RPM 1.5 HP L = 830 RPM 1.5 HP Q = 540 RPM 0.5 HP E = VSEC Motor	S = Single D = Double	01 - 12 Fans	H = 1/2” F = 5/8”		

Inspection and Handling

Responsibility should be assigned to a dependable individual at the job site to receive material. Each shipment should be carefully checked against the bill of lading accounting for all items. Shipment should be carefully checked for damage including concealed damage. Any shortage or damages should be reported to the delivering carrier. Damaged material becomes the delivering carrier's responsibility, and should not be returned to the manufacturer unless prior approval is given to do so.

When uncrating, care should be taken to prevent damage. Rough handling, impacts and drops should be avoided. Do not push or pull on unit. Heavy equipment should be left on unit's shipping base until it has been moved to the final location.

System Warranty

This equipment is designed to operate properly and produce rated capacity when installed in accordance with accepted industry standards. Failure to meet the following conditions may result in voiding of the system warranty:

1. System piping must be installed following industry standards for good piping practices.
2. Inert gas must be charged into piping during brazing or welding.
3. System must be thoroughly leak checked before initial charging.
4. Power supply to system must meet the following conditions:
    a. Voltage for 208/230 motors not less than 195 volts or more than 253 volts.
    b. All other voltages must not exceed +/- 10% of nameplate ratings.
    c. Phase imbalance not to exceed 2%.
5. All controls and protection circuits properly connected per wiring diagram.
6. Factory installed wiring must not be changed without written factory approval.

System Installation

NOTE: Installation and maintenance to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

CAUTION: Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

Warning: Improper lifting or moving unit can result in severe personal injury or death. Follow rigging and moving instructions carefully.

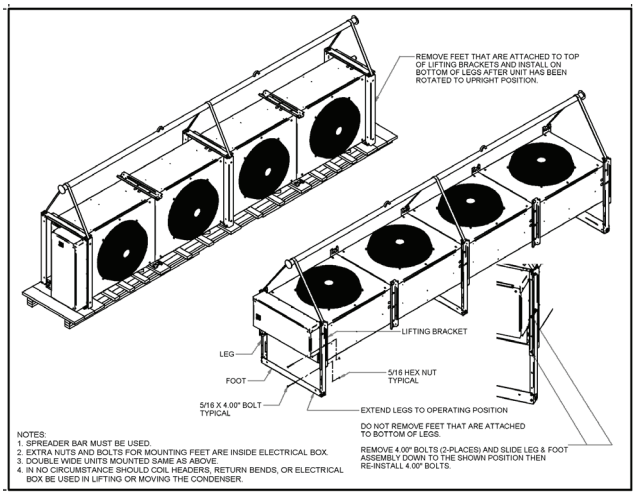
General

1. Unit must be properly located and supported.
2. Level mounting is necessary to assure proper fluid distribution through the coil as well as flooded suction for the pump.
3. Water piping must comply with local codes. Correct pipe sizing and layout will help reduce pumping power and operating costs.
4. In case of doubt, contact factory for the dry cooler fluid pressure drop at the specific conditions on your job.
5. Provide sufficient valves and unions to permit easy access to parts subject to wear and possible repair or replacement.
6. After fluid piping is completed, all joints should be leak tested.
7. Select wire in accordance with nameplate data and local codes.

Unit Rigging

1. Spreader bar must be used for all rigging.
2. Under no circumstance should coil connections, coil headers, return bends, or electrical box be used in lifting or moving the fluid cooler.
3. Under no circumstance should any person be under the fluid cooler.
4. If there are more than four lifting points on the fluid cooler, more than four lifting points should be used.
4. Under no circumstance should the fluid cooler lifting points be used to lift a fluid cooler that has been attached to other equipment, like a steel frame. If fluid cooler has been attached to other equipment, use lifting points provided on other equipment to lift complete assembly.

Figure 1. Rigging Instructions.



Unit Location

Units are designed for outdoor application and may be installed on a roof or at ground level. Roof mounted units should be installed level on steel channels or an I-beam frame to support the unit above the roof. Provide suitable flashing of the roof. Use of vibration pads or isolators is recommended. Ground mounted units should be installed on concrete slabs that are level and properly supported to prevent settling. A one-piece concrete slab with footings extending below the frost line is recommended. Structure supporting unit must be designed to support the weight of both the unit and the fluid. **Table 1** provides weight of fluid per gallon. **Tables 4 thru 7** provide unit weight and volume data. The unit needs to be secured in its final location. Holes are provided in the base runner for this purpose.

The most important considerations which must be taken into account when deciding upon the location of air-cooled equipment are the provision for a supply of ambient air to the fluid cooler and the removal of heated air from the fluid cooler area. Failure to meet these requirements will result in loss of capacity and possible eventual failure of equipment. Units must not be located in the vicinity of steam, hot air or fume exhausts. Also keep unit fan discharge away from any building air intakes. Do not attach ductwork to the coil inlet or fan outlet. The dry cooler should be located far enough away from any wall or other obstruction to provide sufficient clearance for air entrance. Care should be taken to avoid air recirculation conditions that can be caused by sight screening, walls, etc. See page 4 for space and location requirements.

Table 1. Fluid Weight Per Gallon

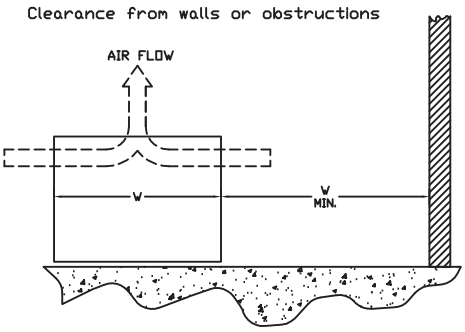
0% Glycol	Fluid Type	Lbs. Per Gallon
0	Water	8.22
10		8.36
20		8.49
30	Ethylene Glycol	8.61
40		8.73
50		8.84
10		8.32
20		8.40
30	Propylene Glycol	8.45
40		8.50
50		8.54

Sound Vibration

Units should be installed away from occupied spaces to reduce the transmission of sound or vibration into the occupied space. Units should be installed above or outside non occupied spaces like utility areas, corridors and auxiliary spaces to reduce sound and vibration transmission to occupied spaces. The fluid piping should be flexible enough to prevent the transmission of noise and vibration from the unit into the building. If the fluid lines are to be suspended from the structure of the building, isolation hangers should be used to prevent the transmission of vibration. Where piping passes through a wall, it is advisable to pack fiberglass and sealing compound around the lines to minimize vibration and retain flexibility in the lines.

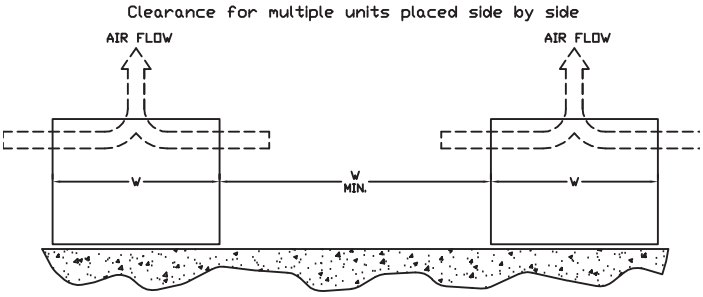
Walls or Obstructions

The unit should be located so that air may circulate freely and not be re-circulated. For proper air flow and access all sides of the unit should be a minimum of “W” away from any wall or obstruction. It is preferred that this distance be increased whenever possible. Care should be taken to see that ample room is left for maintenance work through access doors and panels. Overhead obstructions are not permitted. When the unit is in an area where it is enclosed by three walls the unit must be installed as indicated for units in a pit.



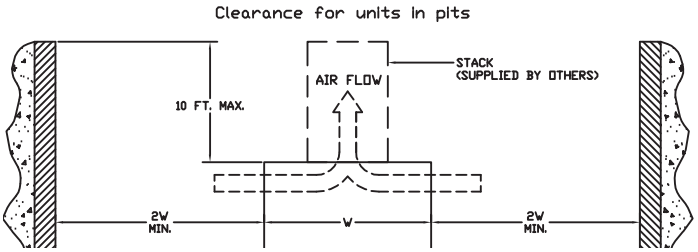
Multiple Units

For units placed side by side, the minimum distance between units is the width of the largest unit. If units are placed end to end, the minimum distance between units is 4 feet



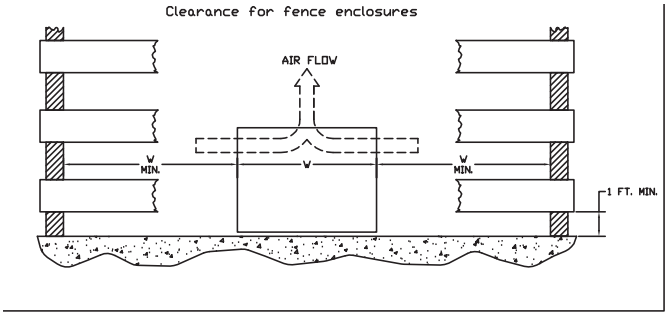
Units in Pits

The top of the unit should be level with the top of the pit, and side distance increased to “2W”. If the top of the unit is not level with the top of pit, dis- charge cones or stacks must be used to raise discharge air to the top of the pit. This is a minimum requirement.



Decorative Fences

Fences must have 50% free area, with 1 foot undercut, a “W” minimum clearance, and must not exceed the top ofunit. If these requirements are not met, unit must be installed as indicated for “Units in pits".



* “W” = Total width of the fluid cooler

Electrical Wiring

The electrical installation should be in accordance with National Electrical Code, local codes and regulations. Proper overcurrent protection should be provided for the fan motors. Wiring diagrams shown are only basic and do not show fuses, additional disconnect switches, etc., which must be provided in the field.

Units have a through the door disconnect mounted in the electrical box.
All standard motors have internal inherent overload protectors. Therefore, contactors can be used instead of starters requiring thermal protectors, eliminating the problem of furnishing the proper heating elements.
Electrical leads from each motor terminate at the unit junction box. Field connections must be made from these leads in accordance with local, state and national codes.

Three-phase motors must be connected to three-phase power of voltage to agree with motor and unit data plate.
The motors are wired into a common junction box. The motors must be checked for proper rotation. Be sure to check that motor voltage and control connection agree with electric services furnished.

Piping Installation

The piping system should provide maximum leak prevention. Weld or sweat joints should be used where possible or either tightly drawn Teflon tape threaded pipe joints or properly gasketed flanged connections should be made if needed. Flange gaskets should be compatible with fluid being used.

The glycol system should not employ a pressure reducing valve. This is because a slight leak would lead to dilution of the mixture. Any refill should be controlled so as to maintain the proper glycol-to-water ratio.

Table 2 shows pressure drops for various pipe sizes at flow rates commonly used with a typical dry cooler. These pipe sizes are not necessarily always correct for the run from the condenser to the dry cooler. Proper pipe size will depend on available pump head. This can be determined by subtracting from the total available pump head at design flow, the process equipment pressure drop and the dry cooler pressure drop. Allow some safety factor for pipe fittings added to the system and for eventual fouling of the system.

a. Glycol piping requires no insulation except when fluid temperature will be below ambient dewpoint temperatures.

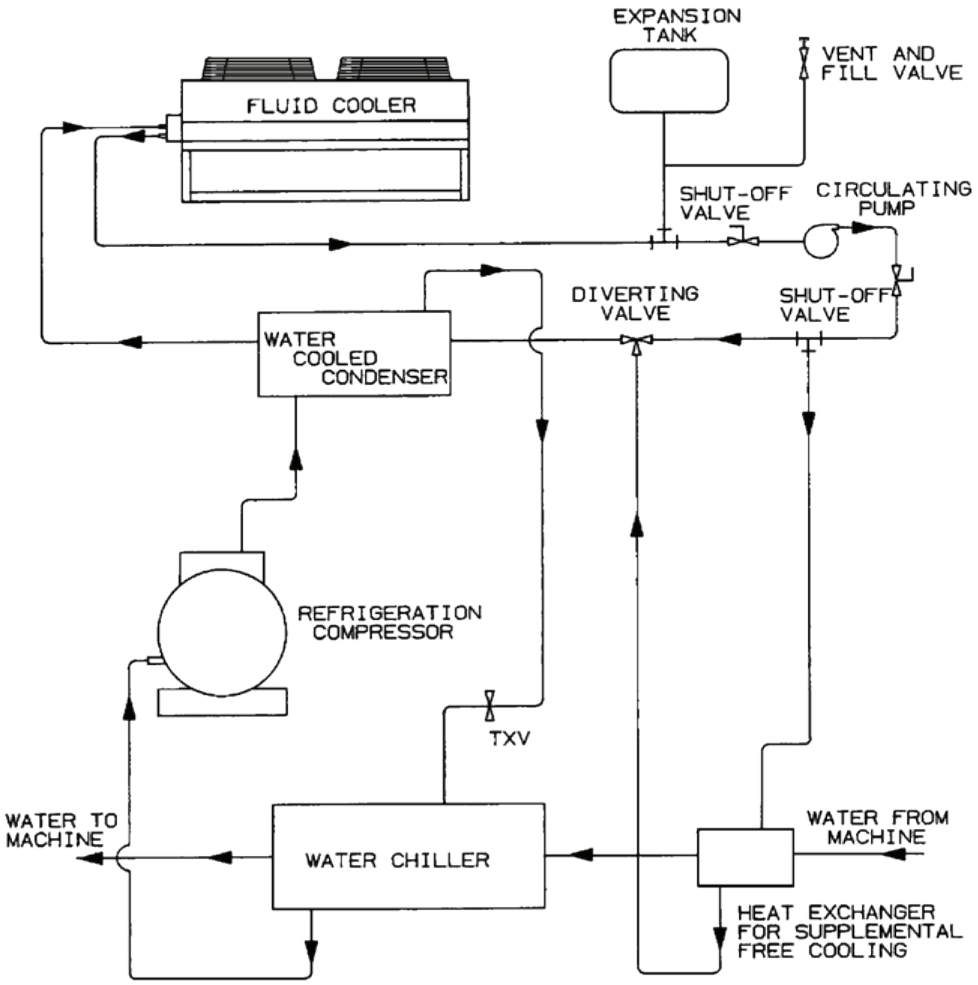
b. Vents are required at all high points in the piping to bleed air when filling the system. If fluid coolers are at high points, vent valves should be installed at each fluid cooler.

c. It is recommended that gate valves be installed on both sides of the pump to prevent loss of fluid in the event the pump should require repair or replacement. Shut-off valves are also recommended at the process equipment in case the equipment is to be moved or requires maintenance involving the coolant system.

Table 2. Pressure Loss in Feet of Water

Flow GPM	Pipe Size Steel	Type "L" O.D. Copper	Schedule 40 Steel Head Ft./100 Ft. Equiv. Length	Copper Tube Head Head Ft./100 Ft. Equiv. Length
15 20 25	1 1 1	1 1/8 1 1/8 1 1/8	17.6 30.2 —	15.0 23.1 34.6
25 30 35 40	1 1/4 1 1/4 1 1/4 -	1 3/8 1 3/8 1 3/8 1 3/8	11.5 16.3 21.8	12.6 17.4 23.0 26.3
40 45 60	1 1/2 1 1/2	1 5/8 1 5/8 1 5/8	13.0 16.5 —	12.9 15.7 26.3
60 80	2 2	2 1/8 2 1/8	7.9 13.7	7.0 12.0
100 150 200 250	2 1/2 2 1/2 3 3	2 5/8 2 5/8 3 1/8 3 1/8	8.5 18.6 10.7 16.5	6.1 12.9 9.1 13.7
300	3 1/2	3 5/8	11.1	9.2
300 350 400	4 4 4	4 1/8 4 1/8 4 1/8	5.9 7.9 10.2	4.9 6.5 8.2

Diagram 1. Typical Piping



Glycol Charge

The amount of glycol required depends upon the following:

a. The holding volume of the system which includes the holding capacity of the process equipment, the holding capacity of the interconnecting piping and the holding capacity of the dry cooler.(see Table4-7)

b. Percentage of glycol required by volume to provide protection at the design minimum outside temperature (see Table 3).

Table 3. Freeze Protection - Percentage of Glycol to be Added by Volume.

Percent %	20%	30%	40%	45%	50%
Glycol Type	Minimum Outside Design Temperature °F				
Ethylene	+16	+4	-13	-23	-35
Propylene	+18	+8	-7	-17	-29

Table 3 is intended to be used as a guide only. Proper precautions need to be taken to prevent freeze damage during low ambients. Consult glycol vendor recommendations for specific freeze protection for your location.

Mixing Glycol and Water

Regardless of the strength of the mixture, you **MUST** pre-mix the glycol and water prior to adding it to the system. The chemical reaction between the two will release oxygen, which is extremely undesirable in a close-loop system.

WARNING: For dry coolers operating without glycol mixture, adequate freeze protection is necessary during ambients below 32°F.

Glycol Sludge Prevention

Glycol systems may be subject to sludge formation in coils, due to one or more of the following causes:

1. Reaction of the corrosion inhibitor with galvanized piping (zinc).

2. Reaction of the glycol with chromate type water additives.

3. Reaction of the glycol with pipe dope, cutting oils, solder flux, and other system dirt.

Glycol manufacturers offer a specially inhibited glycol (formulated for snow melting systems) which does not react with zinc. This glycol is also suitable for heat transfer systems. Glycol manufacturers also provide inhibitor check services on a regular basis.
Consequently, good glycol system design requires the following precautions:

1. No galvanized piping is to be used.

2. System piping must be thoroughly cleaned and flushed before filling with the water/glycol mixture.

3. No chromate inhibitor treatment must be used.

4. The glycol manufacturer should provide inhibitor check service and supply additional inhibitor as required.

Fluid Circulating Pump

Mechanical seal type pumps must be used for glycol systems. Gland type pumps would cause glycol waste and, if used with a pressure reducing valve, will lead to dilution of the glycol mixture and eventual freeze-up.

Pump is selected for piping friction loss plus fluid pressure drop through the dry cooler coil, plus pressure drop through the heat source. No allowance for vertical lift is made since in a closed system a counterhead acts on the pump suction. Pumps motor should be non overloading where possible. Paralleled pumps can also be used for good power economy and continuous and automatic standby operation. Properly applied parallel pumps will guard against system breakdown caused by a simple pump failure.

Start-up

Prestart:

1. Check that power supplies match unit nameplate.

2. Check all electrical and fluid connections to make sure the connections are tight.

3. Check that fans and motor mount connections are securely tightened.

4. Check for correct fan rotation. Fans should draw air thru the coil surface. Be sure that the fans run freely.

5. Thoroughly leak check all system piping.

6. Check for correct pump rotation.

7. Check fan controls and adjust if necessary.

Filling and Purging the System

The system should be pressure tested before adding glycol. The system can be tested with air or water, however if the ambient temperature is at or below freezing the use of air is recommended. Test pressure should not exceed 60 PSIG.

a. Roof Mounted Fluid Cooler
To fill the system, pour the premixed water and glycol into the expansion tank. Fill the system until the expansion tank is half full and then purge the air from ALL vents. Operate the system for a minute, then purge ALL vents again and add glycol as required. Repeat the purging of all vents after the first hour of operation and again after several hours of operation.

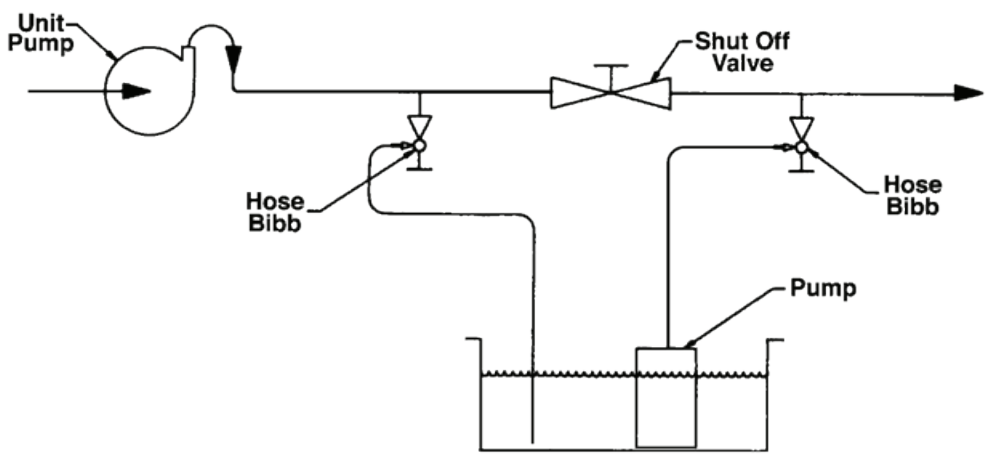
b. Ground Mounted Fluid Cooler
The fluid cooler may be lowest point in the system; consequently the premixed water and glycol will have to be pumped into the system. Close the shut off valve and open the two hose bibbs installed in the piping run on the leaving side of the pump, see piping diagram. Connect a pump and hose to the hose bibb away from the pump and a hose to the hose bibb closest to the pump. Begin pumping the glycol mixture into the system at FULL PRESSURE. For the return hose you should close the hose bibb so that you get only a small flow of fluid or air. This is necessary so you will build a head of fluid which will force the air from the system. Once all the air is out you will have a steady flow of only fluid. At this point you should close off the two hose bibbs and open the shut off valve. See Diagram 2.

Flow Adjustment Procedure:

Once the system is completely full of fluid, start the fluid circulating pump. To assure proper fluid flow, adjust the shut-off valve for required GPM by checking pump curve and observing gauge pressure, or by using an in-line flow meter.

Instruction Envelope:
Keep wiring diagrams and installation/operation manual, in an envelope within easy reach of the installed dry cooler.

Diagram 2.



Operation

Optional Fan Cycling Control (FNH, FNL and FNQ Models)

Fixed speed FN series fluid coolers are available with an optional electronic fan cycling control package that cycles fans off in response to leaving fluid temperature. Control package consists of an electronic SPDT temperature controller, power module, temperature sensor and additional staging controls as necessary. As ambient temperature drops or process load requirements reduce, the leaving fluid temperature will start to drop. The electronic fluid temperature controller will cycle fans to try to maintain temperature set point. The optional control panel is typically set up to cycle fans individually on single wide units and in pairs on double wide units. Temperature set point is adjusted using the set point dial on the front of the control. Differential adjustments are made using the differential potentiometer that can be accessed after removing thermostat cover. Each additional staging control has its own offset and differential set point adjustment potentiometers. Control set points should be field adjusted to meet project's application and process parameters. Please consult control manufacturer's literature for additional troubleshooting and control details.

FNE Series

E Series Motors with Integrated Variable Speed

E Series units use an EC motor/fan blade combination to provide variable speed condenser control. All components required to run the motor at variable speeds are built into the motor.

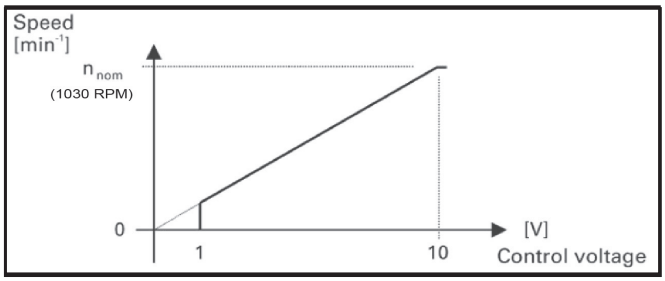
Warning! When connecting the unit to the supply power, dangerous voltages occur. Do not open the motor within the first 5 minutes after disconnection of all phases.
Be sure that the unit is isolated.

Warning! Dangerous external voltages can be present at terminal KL2 even with the unit turned off.

Warning! With a control voltage fed in or a set speed value being saved, the motor will restart automatically after a power failure.

Speed Adjustment Characteristics

The EC motor varies it's speed linearly based on a 0-10V input signal. At 10 VDC, the motor runs at full speed. At 0 VDC, the motor turns off. A chart of the speed control curve is shown below.



The input control signal can be supplied from any controller that outputs a 0-10 VDC signal. For units with a control signal supplied from a rack control or other external controller, the unit is provided with a terminal board for control signal wiring. Units with factory installed proportional pressure controls require no installation wiring.

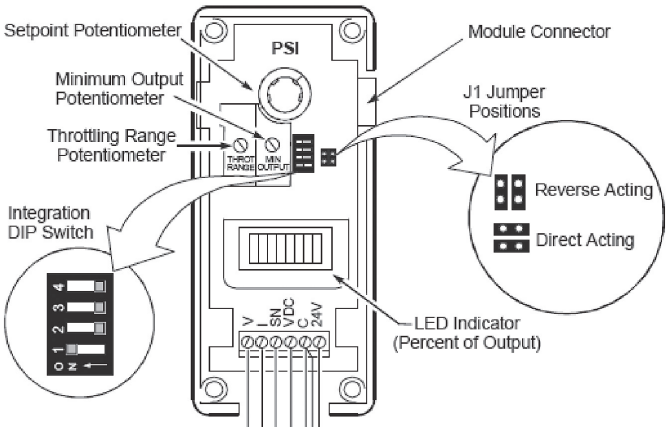
External Control Signal

Contact control manufacturer for setup of external controller to provide 0-10 VDC control signal. Wire the control signal to terminal board in unit control box. See Diagram #1 for typically external signal control.

Proportional Temperature Control

Units with factory installed proportional temperature controls use a PI controller to vary the motor speed in order to maintain a constant desired leaving fluid temperature. The PI controller has five user adjustable features:

- Leaving Fluid Setpoint
- Minimum output
- Throttling range
- Integration constant
- Reverse acting or direct acting mode of operation



Leaving Fluid Temperature Setpoint

The leaving fluid temperature setpoint potentiometer is adjustable from -30 to 130F. Typical setpoints are from 40 to 120F. Note: Very low setpoints may cause the fan motors to run full speed continuously if the fluid cooler is not properly sized. The fans will turn off if the leaving fluid temperature falls below the desired setpoint.

Minimum Output

The minimum output potentiometer controls the minimum signal sent to the motor. It is adjustable from 0-60%. If this is adjusted to 60%, the motors will not start running until 6V is applied to the motor. The motor will start running at 60% of full speed. To maximize sound reduction and energy savings and to provide the most stable control, it is recommended this setting be left at 0%.

Throttling Range

The throttling range potentiometer controls how far the leaving fluid temperature must deviate from the control setpoint to generate a 100% output signal from the control. It is adjustable from 2 to 30F. The throttling range determines how quickly them motor will reach full speed when detecting a change in leaving fluid temperature. For example, if the setpoint is 110F and the throttling range is 5F, when the leaving fluid temperature is below 110F, the fans will be off. When the leaving fluid temperature reaches 115F, the fans will be at full speed (See Chart 1 below). To make the fans ramp more slowly the throttling range should be increased (See Chart 2 below). To maximize sounds reduction and energy savings and to provide the most stable control, it is recommended this setting be left at 15F

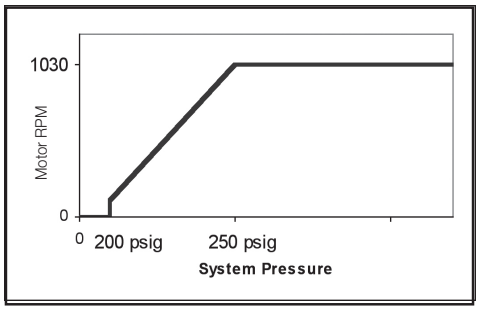


Chart 1. Ramp characteristics with 200 psig setpoint and 50 psig throttling range

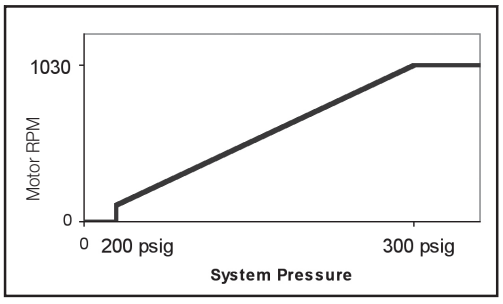
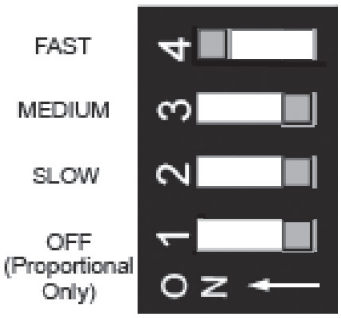


Chart 2. Ramp characteristics with 200 psig setpoint and 100 psig throttling range

Integration constant
The integration constant switch provides ability to change controller from a proportional only control to a proportional plus integral control. To provide the most responsive system to maintain a stable leaving fluid temperature, it is recommended this setting be left on “fast.”



Reverse acting or direct acting mode of operation
The reverse acting/direct acting jumper is used to ensure the controller responds correctly to maintain desired leaving fluid temperature. In Direct Acting (DA) mode, the motor speed increases as the temperature rises above desired setpoint. For proper fluid cooler operation, this jumper MUST be in Direct Acting (DA) mode. Failure to ensure J1 jumper is in direct acting mode will cause the system to malfunction

See Diagram #4 for typical proportional temperature control wiring.

Standard Wiring Configuration
Standard VSEC units are wired in a Direct Acting Series Wired configuration. This configuration allows for the maximum sound and energy reduction as well as the most stable temperature control. The control signal is delivered to the lead motor (located at the header end of the unit). The lead motor relays the control signal to the adjacent lag motor. This relay is done until the last motor is reached. As each lag relays the control signal, it adjusts the signal so the next lag will run slightly slower than the upstream motor. The end result of this is that when a motor receives a small enough signal, it will turn off. This provides built-in fan cycling.

Protective Features
The EC motors have many built-in protective features.

The EC motors have functions within the motor to protect against:
- over-temperature of electronics
- over-temperature of motor
- incorrect rotor position detection

With any of these failures, the motor stops electronically and the alarm relay is switched. With one of these failures, the motor WILL NOT automatically restart. To reset, the power supply has to be switched off for a minimum 20 seconds once the motor is at standstill.

Locked-rotor protection
As soon as the rotor is blocked, the motor gets switched off electronically and the alarm relay is switched. After de-blocking, the motor WILL restart automatically.

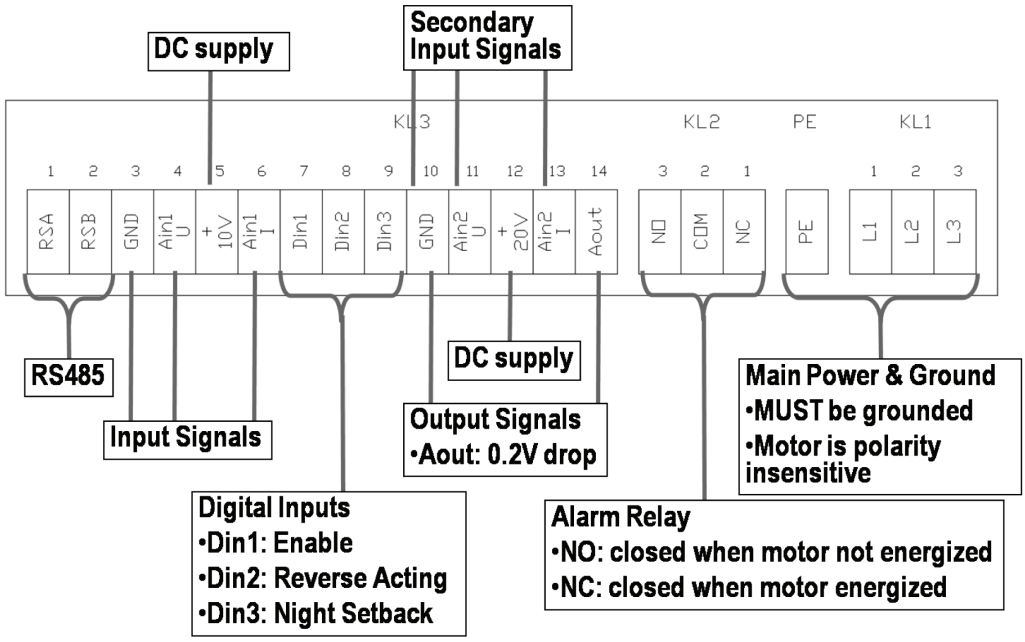
Under-voltage protection
If power supply voltage falls below ~150VAC/3Ø (for 230V motors) or ~290VAC/3Ø (for 460V motors) for 5 seconds minimum, the motor will be switched off electronically and the alarm relay is switched. If power supply voltage returns to correct values, the motor WILL restart automatically.

Phase failure
If 1 phase fails for 5 seconds minimum, the motor will be switched off electronically and the alarm relay is switched. If all 3 phases return to correct values, the motor WILL restart automatically within 10-40 seconds.

EC Motor Wiring

All EC motor wiring is done at the factory. If any motor wiring needs to be done in the field, the diagrams below indicate the terminal pin configurations inside the motor junction box.

Motors with 5 fan blades



Maintenance

As a minimum, a semi-annual inspection and cleaning of the fluid cooler should be performed by qualified service personnel. Inspection may need to be sooner if local conditions cause the air passages through the finned surface to become clogged. The following items should be checked.

1.) Check for excessive or unusual vibration of fans or unit casing when in operation.

2.) Disconnect power supplies to unit.

3.) Check for signs of corrosion on fins, cabinet and piping.

4.) Check fan blades all rotate freely. Please note that fan motors are permanently lubricated and bearings cannot be serviced.

5.) Check fan blade set screws and motor mounts for tightness.

6.) Check all fan blades for signs of wear or stress.

7.) Check electrical components for wear or stress.

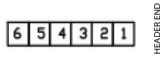
8.) Tighten any loose electrical or fluid connections.

9.) Clean electrical cabinet and take corrective action as required.

10.) Clean coil surface using a soft brush, cool water and a commercially available foam coil cleaner. If foam cleaner is used, it should not be an acid based cleaner. Follow label directions for appropriate use. Rinse until no residue remains.

Diagram 3: Typical Single Wide Fan Cycling

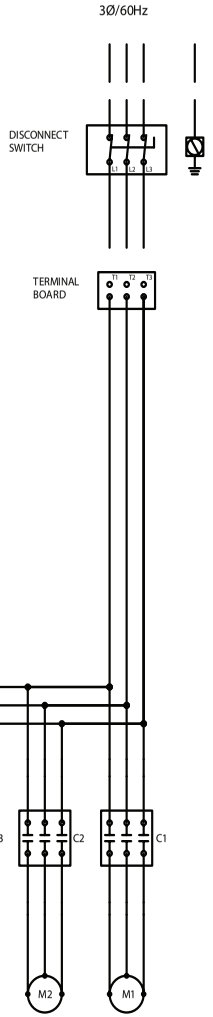
FAN MOTOR IDENTIFICATION



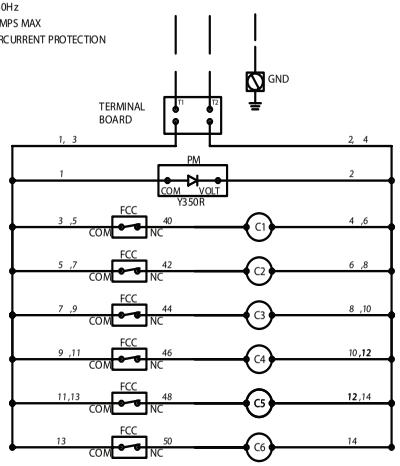
USE COPPER CONDUCTORS ONLY

FACTORY WIRING

FIELD WIRING



FAN CONTROL CIRCUIT
1Ø/60Hz
15 AMPS MAX
OVERCURRENT PROTECTION



LEGEND

C FAN CONTACTOR	MTB MOTOR TERMINAL BOARD
M FAN MOTOR	TB TERMINAL BOARD
F FUSES	CB CIRCUIT BREAKER
R RELAY	R RELAY

FCC FAN CYCLE CONTROL (MAY BE PRESSURE OR TEMPERATURE)
PM POWER MODULE (USED ONLY W/SYSTEM 350 COMPONENTS)
A319 THERMOSTAT FAN CYCLE CONTROL
PE PROTECTIVE EARTH GROUND

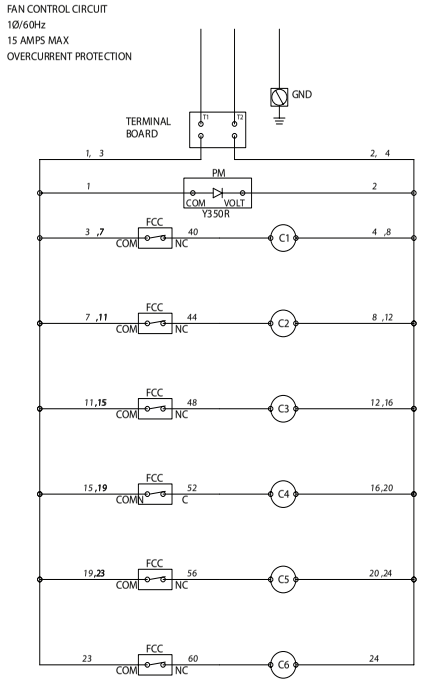
NOTE:
1. UNIT MUST BE GROUNDED.
2. TO BE FIELD FUSED, REFER TO UNIT DATAPLATE FOR VOLTAGE.
3. ALL MOTORS ARE INHERENTLY PROTECTED.
4. USE 60°C WIRE.
5. REFER TO LABEL ADJACENT FUSE HOLDER FOR REPLACEMENT.
6. STANDARD WIRE COLORS:
L1 - BLACK/BROWN, L2 - RED/ORANGE, L3 - BLUE/YELLOW

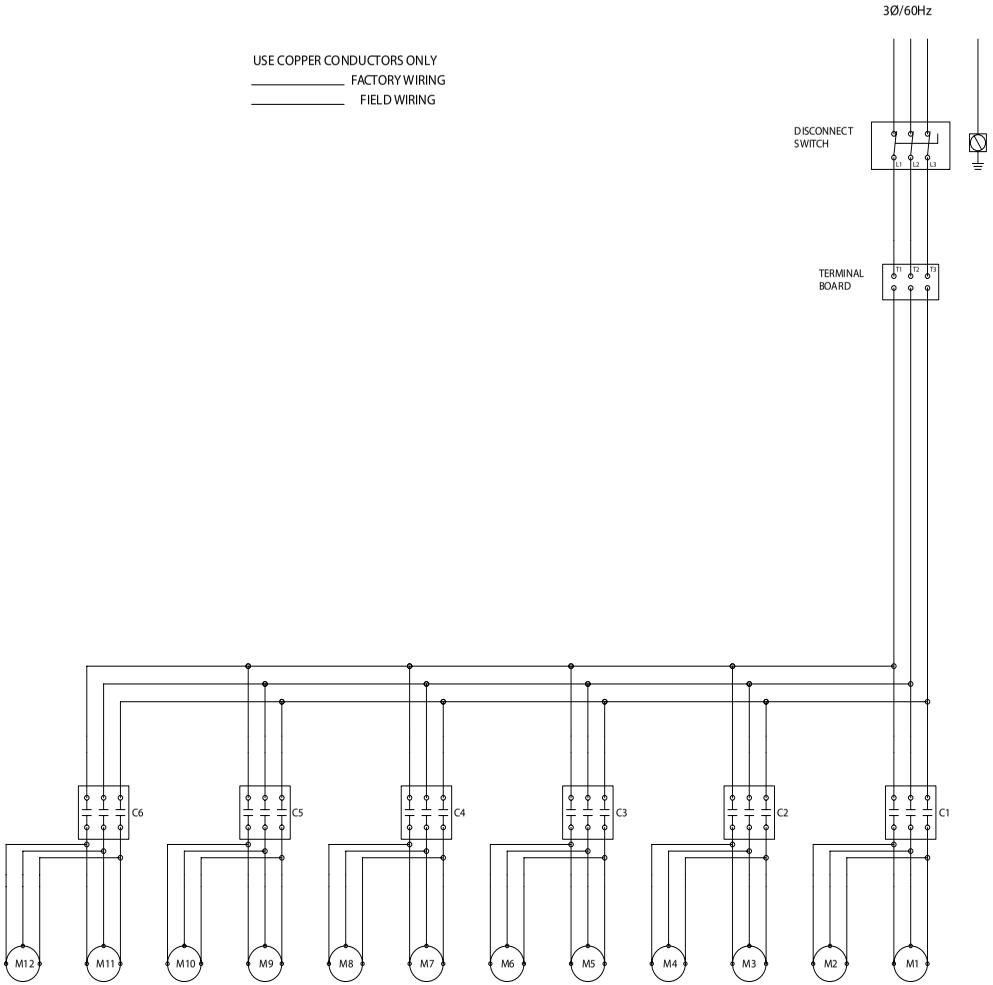
Diagram 4: Typical Double Wide Fan Cycling

FAN MOTOR IDENTIFICATION

12	10	8	6	4	2	HEADER END
11	9	7	5	3	1	

USE COPPER CONDUCTORS ONLY
_____ FACTORY WIRING
_____ FIELD WIRING





LEGEND

C FAN CONTACTOR	MTB MOTOR TERMINAL BOARD
M FAN MOTOR	TB TERMINAL BOARD
F FUSES	CB CIRCUIT BREAKER
R RELAY	R RELAY

FCC FAN CYCLE CONTROL (MAY BE PRESSURE OR TEMPERATURE)
PM POWER MODULE (USED ONLY W/SYSTEM 350 COMPONENTS)
A319 THERMOSTAT FAN CYCLE CONTROL
PE PROTECTIVE EARTH GROUND

NOTE:
1. UNIT MUST BE GROUNDED.
2. TO BE FIELD FUSED, REFER TO UNIT DATAPLATE FOR VOLTAGE.
3. ALL MOTORS ARE INHERENTLY PROTECTED.
4. USE 60°C WIRE.
5. REFER TO LABEL ADJACENT FUSE HOLDER FOR REPLACEMENT.
6. STANDARD WIRE COLORS:
   L1 - BLACK/BROWN, L2 - RED/ORANGE, L3 - BLUE/YELLOW

Diagram 5: Typical Variable Speed Fan Control - Customer Supplied Signal

FAN MOTOR IDENTIFICATION

12	10	8	6	4	2
11	9	7	5	3	1

HEADER END

FAN MOTOR SCHEDULE

MOTOR	ACTION	ADDRESS	MOTOR	ACTION	ADDRESS
1	DIRECT	G1, F1	2	DIRECT	G1, F1
3	DIRECT	G1, F1	4	DIRECT	G1, F1
5	DIRECT	G1, F1	6	DIRECT	G1, F1
7	DIRECT	G1, F1	8	DIRECT	G1, F1
9	DIRECT	G1, F1	10	DIRECT	G1, F1
11	DIRECT	G1, F1	12	DIRECT	G1, F1

DIRECT ACTION: 0V = MOTOR OFF / 10V = FULL SPEED
REVERSE ACTION: 10V = MOTOR OFF / 0V = FULL SPEED

USE COPPER CONDUCTORS ONLY
FACTORY WIRING
FIELD WIRING

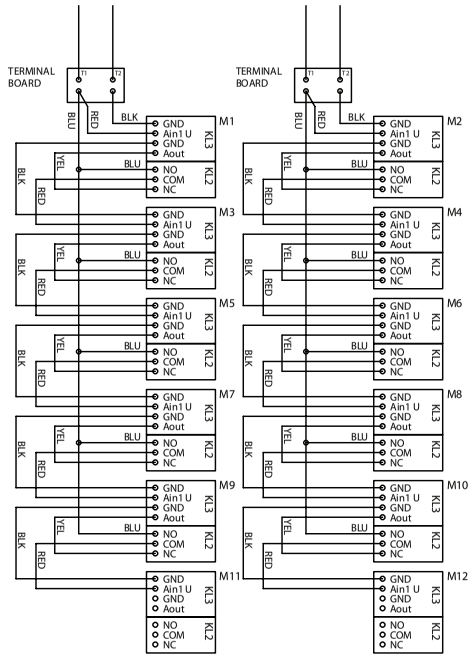
3Ø/60Hz

DISCONNECT SWITCH

TERMINAL BOARD

FAN SPEED CONTROL CIRCUIT 0 TO 10V DC

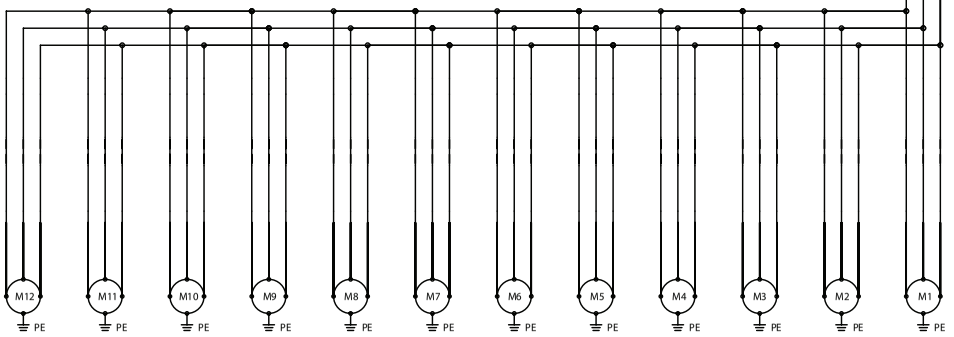
FAN SPEED CONTROL CIRCUIT 0 TO 10V DC



ALL EC MOTORS TO BE PROGRAMMED AS FOLLOWS:

OPERATION MODE: Open Loop, Pulse Width Modulation

PRIORITY: Poti



LEGEND

C FAN CONTACTOR	MTB MOTOR TERMINAL BOARD
M FAN MOTOR	TB TERMINAL BOARD
F FUSES	CB CIRCUIT BREAKER
R RELAY	R RELAY

FCC FAN CYCLE CONTROL (MAY BE PRESSURE OR TEMPERATURE)
PM POWER MODULE (USED ONLY W/SYSTEM 350 COMPONENTS)
A319 THERMOSTAT FAN CYCLE CONTROL

NOTE:
1. UNIT MUST BE GROUNDED.
2. TO BE FIELD FUSED, REFER TO UNIT DATAPLATE FOR VOLTAGE.
3. ALL MOTORS ARE INHERENTLY PROTECTED.
4. USE 60°C WIRE.
5. REFER TO LABEL ADJACENT FUSE HOLDER FOR REPLACEMENT.
6. STANDARD WIRE COLORS:

Diagram 6: Typical Variable Speed Fan Control - Factory Supplied Controller

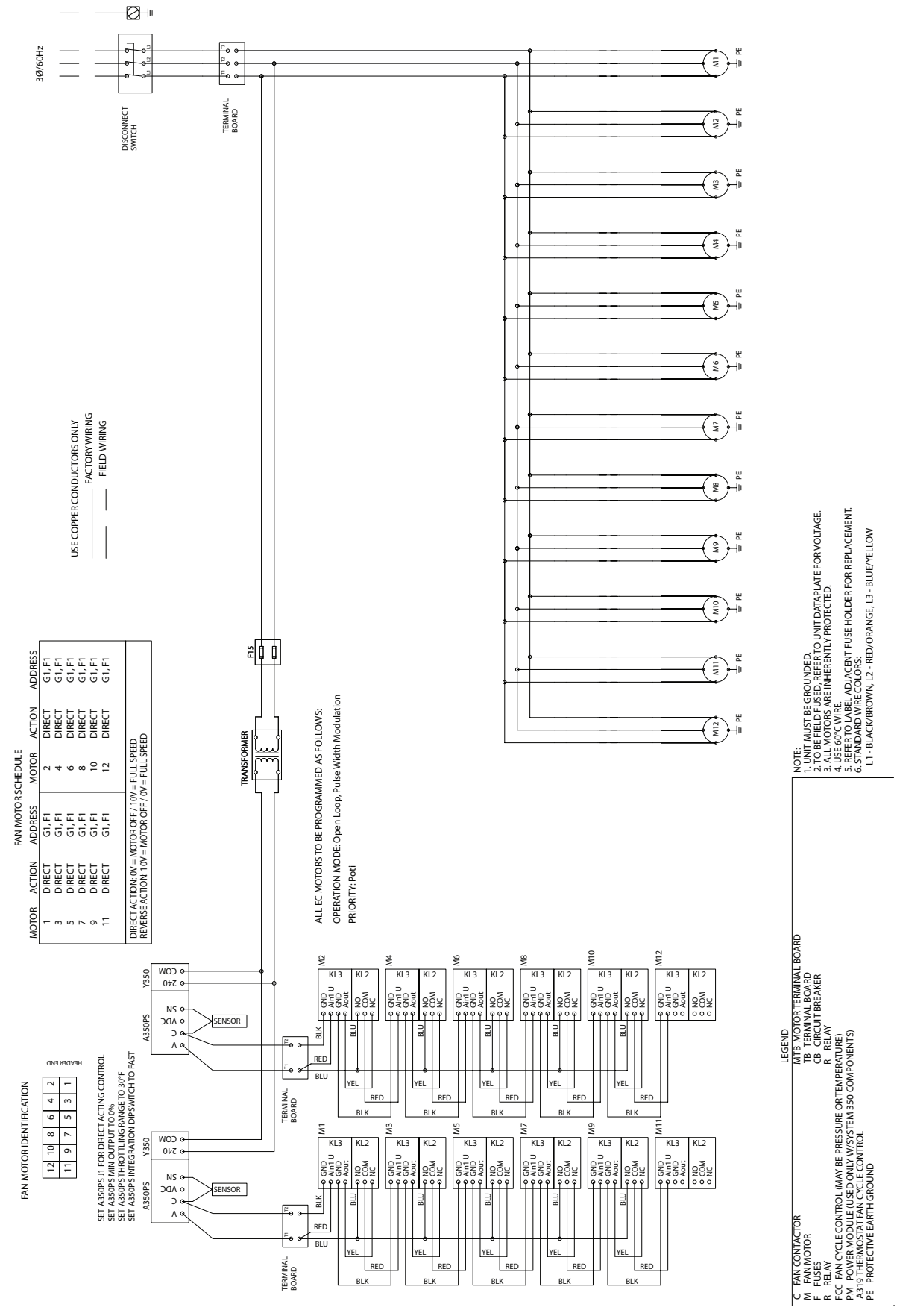


Table 4. FNH Physical and Electrical Data

Model	Fan Data			208-230/3/60			460/3/60			575/3/60			Unit KW	Operating Charge (Gal.)	Approx. Net Weight (lbs.)
	Fan Config.	No. of Fans	CFM	FLA	MCA	MOPD	FLA	MCA	MOPD	FLA	MCA	MOPD			
1/2" Diameter Tube															
FNH-S01-H301	1 x 1	1	9,650	7.0	15.0	25	3.5	15.0	15	2.8	15.0	15	1.9	4.8	345
FNH-S01-H402	1 x 1	1	9,250	7.0	15.0	25	3.5	15.0	15	2.8	15.0	15	1.9	6.4	380
FNH-S02-H203	1 x 2	2	19,980	14.0	20.0	35	7.0	15.0	15	5.6	15.0	15	3.8	6.3	610
FNH-S02-H304	1 x 2	2	19,300	14.0	20.0	35	7.0	15.0	15	5.6	15.0	15	3.8	9.4	650
FNH-S02-H405	1 x 2	2	18,500	14.0	20.0	35	7.0	15.0	15	5.6	15.0	15	3.8	12.6	710
FNH-S03-H306	1 x 3	3	28,950	21.0	22.8	40	10.5	15.0	20	8.4	15.0	15	5.8	14.0	960
FNH-S03-H407	1 x 3	3	27,750	21.0	22.8	40	10.5	15.0	20	8.4	15.0	15	5.8	18.7	1045
FNH-S04-H308	1 x 4	4	38,600	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	18.7	1265
FNH-S04-H409	1 x 4	4	37,000	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	24.9	1365
FNH-S05-H310	1 x 5	5	48,250	35.0	36.8	50	17.5	20.0	25	14.0	15.0	20	9.6	23.3	1585
FNH-S05-H411	1 x 5	5	46,250	35.0	36.8	50	17.5	20.0	25	14.0	15.0	20	9.6	31.0	1710
FNH-D04-H212	2 x 2	4	39,960	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	12.6	1280
FNH-D04-H313	2 x 2	4	38,600	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	18.8	1395
FNH-D04-H414	2 x 2	4	37,000	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	25.1	1515
FNH-D06-H315	2 x 3	6	57,900	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	28.1	2075
FNH-D06-H416	2 x 3	6	55,500	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	37.4	2250
FNH-D08-H317	2 x 4	8	77,200	56.0	57.8	70	28.0	28.9	35	22.4	23.1	30	15.4	37.3	2740
FNH-D08-H418	2 x 4	8	74,000	56.0	57.8	70	28.0	28.9	35	22.4	23.1	30	15.4	49.8	2975
FNH-D10-H319	2 x 5	10	96,500	70.0	71.8	90	35.0	35.9	45	28.0	28.7	35	19.2	46.6	3425
FNH-D10-H420	2 x 5	10	92,500	70.0	71.8	90	35.0	35.9	45	28.0	28.7	35	19.2	62.0	3730
5/8" Diameter Tube															
FNH-S03-F301	1 x 3	3	28,950	21.0	22.8	40	10.5	15.0	20	8.4	15.0	15	5.8	22.2	1020
FNH-S03-F402	1 x 3	3	27,750	21.0	22.8	40	10.5	15.0	20	8.4	15.0	15	5.8	29.5	1125
FNH-S04-F303	1 x 4	4	38,600	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	29.4	1355
FNH-S04-F404	1 x 4	4	37,000	28.0	29.8	45	14.0	15.0	20	11.2	15.0	15	7.7	39.3	1480
FNH-S05-F305	1 x 5	5	48,250	35.0	36.8	50	17.5	20.0	25	14.0	15.0	20	9.6	36.7	1690
FNH-S05-F406	1 x 5	5	46,250	35.0	36.8	50	17.5	20.0	25	14.0	15.0	20	9.6	49.0	1855
FNH-S06-F307	1 x 6	6	57,900	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	44.0	2010
FNH-S06-F408	1 x 6	6	55,500	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	58.7	2230
FNH-D06-F311	2 x 3	6	57,900	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	44.4	2200
FNH-D06-F412	2 x 3	6	55,500	42.0	43.8	60	21.0	21.9	30	16.8	20.0	25	11.5	59.0	2420
FNH-D08-F313	2 x 4	8	77,200	56.0	57.8	70	28.0	28.9	35	22.4	23.1	30	15.4	58.8	2915
FNH-D08-F414	2 x 4	8	74,000	56.0	57.8	70	28.0	28.9	35	22.4	23.1	30	15.4	78.6	3210
FNH-D10-F315	2 x 5	10	96,500	70.0	71.8	90	35.0	35.9	45	28.0	28.7	35	19.2	73.4	3645
FNH-D10-F416	2 x 5	10	92,500	70.0	71.8	90	35.0	35.9	45	28.0	28.7	35	19.2	98.0	4020
FNH-D12-F317	2 x 6	12	115,800	84.0	85.8	100	42.0	42.9	50	33.6	34.3	40	23.1	88.0	4360
FNH-D12-F418	2 x 6	12	111,000	84.0	85.8	100	42.0	42.9	50	33.6	34.3	40	23.1	117.4	4790

Table 5. FNL Physical and Electrical Data

Model	Fan Data			208-230/3/60			460/3/60			575/3/60			Unit KW	Operating Charge (Gal.)	Approx. Net Weight (lbs.)
	Fan Config.	No. of Fans	CFM	FLA	MCA	MOPD	FLA	MCA	MOPD	FLA	MCA	MOPD			
1/2" Diameter Tube															
FNL-S01-H321	1 x 1	1	8,200	6.6	15.0	25	3.3	15.0	15	2.6	15.0	15	1.4	4.8	345
FNL-S01-H422	1 x 1	1	7,800	6.6	15.0	25	3.3	15.0	15	2.6	15.0	15	1.4	6.4	380
FNL-S02-H223	1 x 2	2	17,200	13.2	15.0	30	6.6	15.0	15	5.2	15.0	15	2.7	6.3	610
FNL-S02-H324	1 x 2	2	16,400	13.2	15.0	30	6.6	15.0	15	5.2	15.0	15	2.7	9.4	650
FNL-S02-H425	1 x 2	2	15,600	13.2	15.0	30	6.6	15.0	15	5.2	15.0	15	2.7	12.6	710
FNL-S03-H326	1 x 3	3	24,600	19.8	21.5	35	9.9	15.0	15	7.8	15.0	15	4.1	14.0	960
FNL-S03-H427	1 x 3	3	23,400	19.8	21.5	35	9.9	15.0	15	7.8	15.0	15	4.1	18.7	1045
FNL-S04-H328	1 x 4	4	32,800	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	18.7	1265
FNL-S04-H429	1 x 4	4	31,200	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	24.9	1365
FNL-S05-H330	1 x 5	5	41,000	33.0	34.7	50	16.5	20.0	25	13.0	15.0	20	6.8	23.3	1585
FNL-S05-H431	1 x 5	5	39,000	33.0	34.7	50	16.5	20.0	25	13.0	15.0	20	6.8	31.0	1710
FNL-D04-H232	2 x 2	4	34,400	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	12.6	1280
FNL-D04-H333	2 x 2	4	32,800	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	18.8	1395
FNL-D04-H434	2 x 2	4	31,200	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	25.1	1515
FNL-D06-H335	2 x 3	6	49,200	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.1	28.1	2075
FNL-D06-H436	2 x 3	6	46,800	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.1	37.4	2250
FNL-D08-H337	2 x 4	8	65,600	52.8	54.5	70	26.4	27.2	35	20.8	21.5	25	10.8	37.3	2740
FNL-D08-H438	2 x 4	8	62,400	52.8	54.5	70	26.4	27.2	35	20.8	21.5	25	10.8	49.8	2975
FNL-D10-H339	2 x 5	10	82,000	66.0	67.7	80	33.0	33.8	40	26.0	26.7	30	13.5	46.6	3425
FNL-D10-H440	2 x 5	10	78,000	66.0	67.7	80	33.0	33.8	40	26.0	26.7	30	13.5	62.0	3730
5/8" Diameter Tube															
FNL-S03-F321	1 x 3	3	24,600	19.8	21.5	35	9.9	15.0	15	7.8	15.0	15	4.1	22.2	1020
FNL-S03-F422	1 x 3	3	23,400	19.8	21.5	35	9.9	15.0	15	7.8	15.0	15	4.1	29.5	1125
FNL-S04-F323	1 x 4	4	32,800	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	29.4	1355
FNL-S04-F424	1 x 4	4	31,200	26.4	28.1	45	13.2	15.0	20	10.4	15.0	15	5.4	39.3	1480
FNL-S05-F325	1 x 5	5	41,000	33.0	34.7	50	16.5	20.0	25	13.0	15.0	20	6.8	36.7	1690
FNL-S05-F426	1 x 5	5	39,000	33.0	34.7	50	16.5	20.0	25	13.0	15.0	20	6.8	49.0	1855
FNL-S06-F327	1 x 6	6	49,200	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.2	44.0	2010
FNL-S06-F428	1 x 6	6	46,800	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.2	58.7	2230
FNL-D06-F331	2 x 3	6	49,200	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.1	44.4	2200
FNL-D06-F432	2 x 3	6	46,800	39.6	41.3	50	19.8	20.6	25	15.6	20.0	20	8.1	59.0	2420
FNL-D08-F333	2 x 4	8	65,600	52.8	54.5	70	26.4	27.2	35	20.8	21.5	25	10.8	58.8	2915
FNL-D08-F434	2 x 4	8	62,400	52.8	54.5	70	26.4	27.2	35	20.8	21.5	25	10.8	78.6	3210
FNL-D10-F335	2 x 5	10	82,000	66.0	67.7	80	33.0	33.8	40	26.0	26.7	30	13.5	73.4	3645
FNL-D10-F436	2 x 5	10	78,000	66.0	67.7	80	33.0	33.8	40	26.0	26.7	30	13.5	98.0	4020
FNL-D12-F337	2 x 6	12	98,400	79.2	80.9	90	39.6	40.4	45	31.2	31.9	35	16.2	88.0	4360
FNL-D12-F438	2 x 6	12	93,600	79.2	80.9	90	39.6	40.4	45	31.2	31.9	35	16.2	117.4	4790

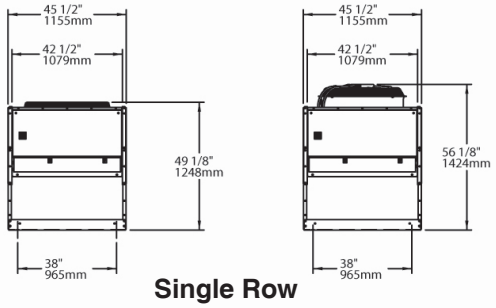
Table 6. FNQ Physical and Electrical Data

Model	Fan Data			208-230/3/60			460/3/60			Unit KW	Operating Charge (Gal.)	Approx. Net Weight (lbs.)
	Fan Config.	No. of Fans	CFM	FLA	MCA	MOPD	FLA	MCA	MOPD			
1/2" Diameter Tube												
FNQ-S01-H341	1 x 1	1	5,375	3.5	15.0	15	1.8	15.0	15	0.4	4.8	345
FNQ-S01-H442	1 x 1	1	5,200	3.5	15.0	15	1.8	15.0	15	0.4	6.4	380
FNQ-S02-H243	1 x 2	2	11,150	7.0	15.0	15	3.6	15.0	15	0.9	6.3	610
FNQ-S02-H344	1 x 2	2	10,750	7.0	15.0	15	3.6	15.0	15	0.9	9.4	650
FNQ-S02-H445	1 x 2	2	10,400	7.0	15.0	15	3.6	15.0	15	0.9	12.6	710
FNQ-S03-H346	1 x 3	3	16,125	10.5	15.0	20	5.4	15.0	15	1.3	14.0	960
FNQ-S03-H447	1 x 3	3	15,600	10.5	15.0	20	5.4	15.0	15	1.3	18.7	1045
FNQ-S04-H348	1 x 4	4	21,500	14.0	15.0	20	7.2	15.0	15	1.7	18.7	1265
FNQ-S04-H449	1 x 4	4	20,800	14.0	15.0	20	7.2	15.0	15	1.7	24.9	1365
FNQ-S05-H350	1 x 5	5	26,875	17.5	20.0	25	9.0	15.0	15	2.2	23.3	1585
FNQ-S05-H451	1 x 5	5	26,000	17.5	20.0	25	9.0	15.0	15	2.2	31.0	1710
FNQ-D04-H252	2 x 2	4	22,300	14.0	15.0	20	7.2	15.0	15	1.7	12.6	1280
FNQ-D04-H353	2 x 2	4	21,500	14.0	15.0	20	7.2	15.0	15	1.7	18.8	1395
FNQ-D04-H454	2 x 2	4	20,800	14.0	15.0	20	7.2	15.0	15	1.7	25.1	1515
FNQ-D06-H355	2 x 3	6	32,250	21.0	21.9	30	10.8	15.0	15	2.6	28.1	2075
FNQ-D06-H456	2 x 3	6	31,200	21.0	21.9	30	10.8	15.0	15	2.6	37.4	2250
FNQ-D08-H357	2 x 4	8	43,000	28.0	28.9	35	14.4	15.0	20	3.5	37.3	2740
FNQ-D08-H458	2 x 4	8	41,600	28.0	28.9	35	14.4	15.0	20	3.5	49.8	2975
FNQ-D10-H359	2 x 5	10	53,750	35.0	35.9	45	18.0	20.0	20	4.4	46.6	3425
FNQ-D10-H460	2 x 5	10	52,000	35.0	35.9	45	18.0	20.0	20	4.4	62.0	3730
5/8" Diameter Tube												
FNQ-S03-F341	1 x 3	3	16,125	10.5	15.0	20	5.4	15.0	15	1.3	22.2	1020
FNQ-S03-F442	1 x 3	3	15,600	10.5	15.0	20	5.4	15.0	15	1.3	29.5	1125
FNQ-S04-F343	1 x 4	4	21,500	14.0	15.0	20	7.2	15.0	15	1.7	29.4	1355
FNQ-S04-F444	1 x 4	4	20,800	14.0	15.0	20	7.2	15.0	15	1.7	39.3	1480
FNQ-S05-F345	1 x 5	5	26,875	17.5	20.0	25	9.0	15.0	15	2.2	36.7	1690
FNQ-S05-F446	1 x 5	5	26,000	17.5	20.0	25	9.0	15.0	15	2.2	49.0	1855
FNQ-S06-F347	1 x 6	6	32,250	21.0	21.9	30	10.8	15.0	15	2.6	44.0	2010
FNQ-S06-F448	1 x 6	6	31,200	21.0	21.9	30	10.8	15.0	15	2.6	58.7	2230
FNQ-D06-F351	2 x 3	6	32,250	21.0	21.9	30	10.8	15.0	15	2.6	44.4	2200
FNQ-D06-F452	2 x 3	6	31,200	21.0	21.9	30	10.8	15.0	15	2.6	59.0	2420
FNQ-D08-F353	2 x 4	8	43,000	28.0	28.9	35	14.4	15.0	20	3.5	58.8	2915
FNQ-D08-F454	2 x 4	8	41,600	28.0	28.9	35	14.4	15.0	20	3.5	78.6	3210
FNQ-D10-F355	2 x 5	10	53,750	35.0	35.9	45	18.0	20.0	20	4.4	73.4	3645
FNQ-D10-F456	2 x 5	10	52,000	35.0	35.9	45	18.0	20.0	20	4.4	98.0	4020
FNQ-D12-F357	2 x 6	12	64,500	42.0	42.9	50	21.6	22.1	25	5.2	88.0	4360
FNQ-D12-F458	2 x 6	12	62,400	42.0	42.9	50	21.6	22.1	25	5.2	117.4	4790

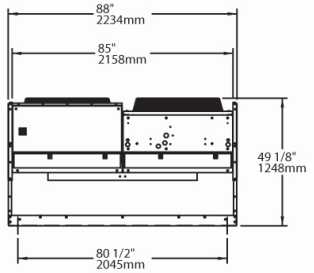
Table 7. FNE Physical and Electrical Data

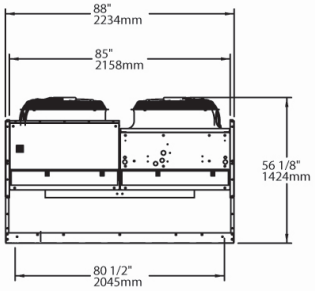
Model	Fan Data			208-230/3/60			460/3/60			Unit KW	Operating Charge (Gal.)	Approx. Net Weight (lbs.)
	Fan Config.	No. of Fans	CFM	FLA	MCA	MOPD	FLA	MCA	MOPD			
1/2" Diameter Tube												
FNE-S01-H361	1 x 1	1	10,650	7.0	15.0	25	3.5	15.0	15	2.0	4.8	345
FNE-S01-H462	1 x 1	1	10,000	7.0	15.0	25	3.5	15.0	15	2.0	6.4	380
FNE-S02-H263	1 x 2	2	22,650	14.0	20.0	35	7.0	15.0	15	4.0	6.3	620
FNE-S02-H364	1 x 2	2	21,300	14.0	20.0	35	7.0	15.0	15	4.0	9.4	660
FNE-S02-H465	1 x 2	2	20,000	14.0	20.0	35	7.0	15.0	15	4.0	12.6	720
FNE-S03-H366	1 x 3	3	31,950	21.0	22.8	40	10.5	15.0	20	6.0	14.0	970
FNE-S03-H467	1 x 3	3	30,000	21.0	22.8	40	10.5	15.0	20	6.0	18.7	1055
FNE-S04-H368	1 x 4	4	42,600	28.0	29.8	45	14.0	15.0	20	8.0	18.7	1275
FNE-S04-H469	1 x 4	4	40,000	28.0	29.8	45	14.0	15.0	20	8.0	24.9	1375
FNE-S05-H370	1 x 5	5	53,250	35.0	36.8	50	17.5	20.0	25	10.0	23.3	1595
FNE-S05-H471	1 x 5	5	50,000	35.0	36.8	50	17.5	20.0	25	10.0	31.0	1720
FNE-D04-H272	2 x 2	4	45,300	28.0	29.8	45	14.0	15.0	20	8.0	12.6	1330
FNE-D04-H373	2 x 2	4	42,600	28.0	29.8	45	14.0	15.0	20	8.0	18.8	1445
FNE-D04-H474	2 x 2	4	40,000	28.0	29.8	45	14.0	15.0	20	8.0	25.1	1565
FNE-D06-H375	2 x 3	6	63,900	42.0	43.8	60	21.0	21.9	30	12.0	28.1	2145
FNE-D06-H476	2 x 3	6	60,000	42.0	43.8	60	21.0	21.9	30	12.0	37.4	2320
FNE-D08-H377	2 x 4	8	85,200	56.0	57.8	70	28.0	28.9	35	16.0	37.3	2840
FNE-D08-H478	2 x 4	8	80,000	56.0	57.8	70	28.0	28.9	35	16.0	49.8	3075
FNE-D10-H379	2 x 5	10	106,500	70.0	71.8	90	35.0	35.9	45	20.0	46.6	3545
FNE-D10-H480	2 x 5	10	100,000	70.0	71.8	90	35.0	35.9	45	20.0	62.0	3850
5/8" Diameter Tube												
FNE-S03-F361	1 x 3	3	31,950	21.0	22.8	40	10.5	15.0	20	6.0	22.2	1030
FNE-S03-F462	1 x 3	3	30,000	21.0	22.8	40	10.5	15.0	20	6.0	29.5	1135
FNE-S04-F363	1 x 4	4	42,600	28.0	29.8	45	14.0	15.0	20	8.0	29.4	1365
FNE-S04-F464	1 x 4	4	40,000	28.0	29.8	45	14.0	15.0	20	8.0	39.3	1490
FNE-S05-F365	1 x 5	5	53,250	35.0	36.8	50	17.5	20.0	25	10.0	36.7	1700
FNE-S05-F466	1 x 5	5	50,000	35.0	36.8	50	17.5	20.0	25	10.0	49.0	1865
FNE-S06-F367	1 x 6	6	63,900	42.0	43.8	60	21.0	21.9	30	12.0	44.0	2020
FNE-S06-F468	1 x 6	6	60,000	42.0	43.8	60	21.0	21.9	30	12.0	58.7	2240
FNE-D06-F371	2 x 3	6	63,900	42.0	43.8	60	21.0	21.9	30	12.0	44.4	2270
FNE-D06-F472	2 x 3	6	60,000	42.0	43.8	60	21.0	21.9	30	12.0	59.0	2490
FNE-D08-F373	2 x 4	8	85,200	56.0	57.8	70	28.0	28.9	35	16.0	58.8	3015
FNE-D08-F474	2 x 4	8	80,000	56.0	57.8	70	28.0	28.9	35	16.0	78.6	3310
FNE-D10-F375	2 x 5	10	106,500	70.0	71.8	90	35.0	35.9	45	20.0	73.4	3765
FNE-D10-F476	2 x 5	10	100,000	70.0	71.8	90	35.0	35.9	45	20.0	98.0	4140
FNE-D12-F377	2 x 6	12	127,800	84.0	85.8	100	42.0	42.9	50	24.0	88.0	4500
FNE-D12-F478	2 x 6	12	120,000	84.0	85.8	100	42.0	42.9	50	24.0	117.4	4930

End Views



Single Row





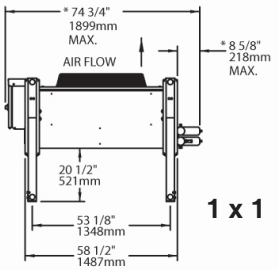
Double Row

Optional Connections

*ADD 2" FOR THREADED CONNECTION

*ADD 1" FOR FLANGE CONNECTION

Side Views



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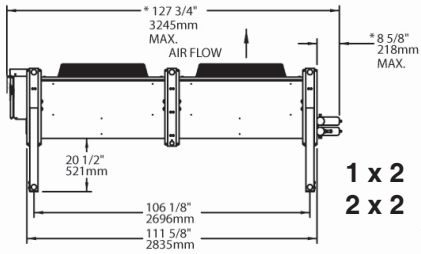

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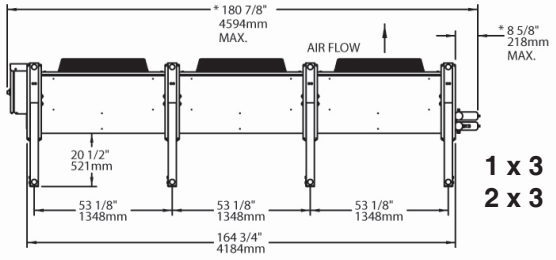

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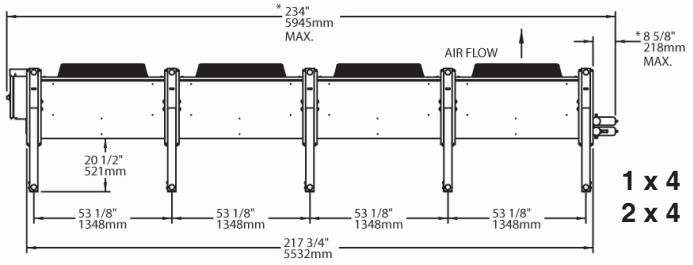

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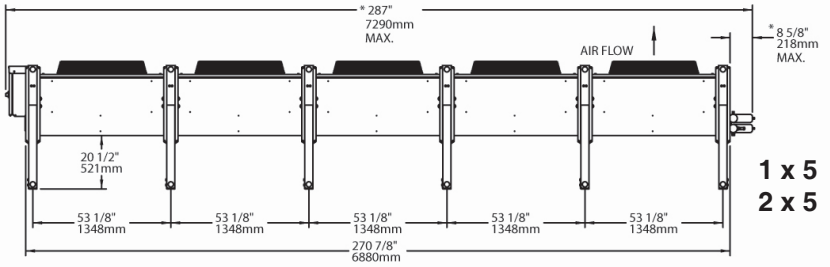

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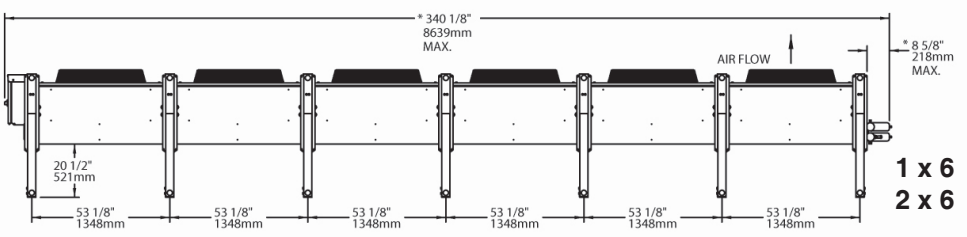

1 x 6
2 x 6

Notes

Notes

In-Warranty Return Material Procedure

Material may not be returned except by permission of authorized factory service personnel of Heatcraft Inc. Refrigeration Products Division in Stone Mountain, Georgia. A “Return Goods” tag will be sent to be included with the returned material. Enter the required information on the tag in order to expedite handling at our factories and prompt issuance of credits. All parts shall be returned to the factory designated on the “Return Goods” tag, transportation charges prepaid.

The return of a part does not constitute an order for replacement. Therefore, a purchase order must be entered through your nearest Heatcraft Refrigeration Products representative. The order should include part number, model number and serial number of the unit involved. Following our careful inspection of the returned part and if it is determined that the failure is due to faulty material or workmanship, credit will be issued on customer’s purchase order.

Replacement Parts

When writing to the factory for service or replacement parts, refer to the model number and serial number of the unit as printed on the serial plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

Table 5. Replacement Parts List

Part Description	Part Number			
	FNH	FNL	FNQ	FNE
Fan Motor 230V	25316401	25316601	25316201	25318802
Fan Motor 460V				25318902
Fan Motor 575V	25316701	25316801	N/A	N/A
High Temp. Fan Motor 230/460V	25328001	N/A	N/A	N/A
Totally Encl. Fan Motor 230/460V	25391101	N/A	N/A	N/A
Fan Blade, 30"	22900401	22929501	22929301	Integral
Fan Guard, 30"	23105701	23105701	23105701	Integral

Contact Customer Service Department for parts to specific fluid cooler models.

Since product improvement is a continuing effort at Heatcraft, we reserve the right to make changes in specifications without notice.

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