



Air Cooled Condenser Installation

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Angle Leg Models



Channel Legs Models

Air-Cooled Condensers 21 - 212 Tons

Installation and Maintenance Data

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Inspection

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. The shipping receipt should not be signed until all items listed on the bill of lading have been accounted for.

Check carefully for 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. Heavy equipment should be left on units 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 welding.
3. System must be thoroughly leak checked and evacuated before initial charging. High vacuum gauge capable of reading microns is mandatory. Dial indicating pressure gauges are not acceptable.
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 safety switch circuits properly connected per wiring diagram.
6. Factory installed wiring must not be changed without written factory approval.

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.

Unit Location

Units are designed for outdoor application and may be mounted on a roof or concrete slab (ground level installation). Roof mounted units should be installed level on steel channels or an I-beam frame to support the unit above the roof. Use of vibration pads or isolators is recommended. The roof must be strong enough to support the weight of the unit. Concrete slabs used for unit mounting should be installed level and be properly supported to prevent settling. A one-piece concrete slab with footings extending below the frost line is recommended.

The condenser should be located far enough away from any wall or other obstruction to provide sufficient clearance for air entrance. Do not attach ductwork to the coil inlet or fan outlet. Care should be taken to avoid air recirculation conditions that can be caused by sight screening, walls, etc. Also keep unit fan discharge away from any building air intakes. See page 4 for space and location requirements.

Sound Vibration

Units should be installed away from occupied spaces and above or outside of utility areas, corridors and auxiliary spaces to reduce the transmission of sound and vibration to occupied spaces. The refrigerant piping should be flexible enough to prevent the transmission of noise and vibration from the unit into the building. If the refrigerant lines are to be suspended from the structure of the building, isolation hangers should be

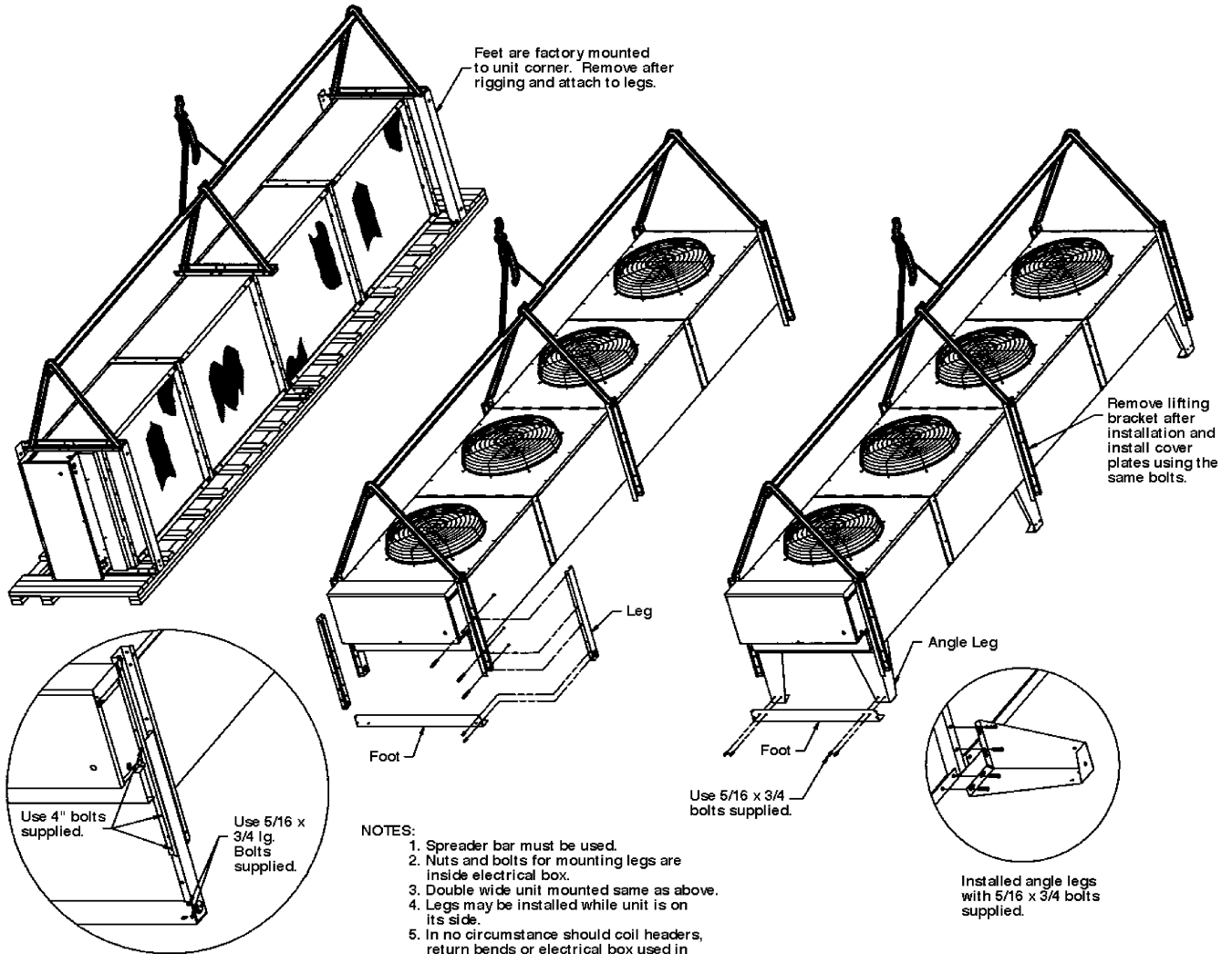
used to prevent the transmission of vibration. Where piping passes through a wall, it is advisable to pack fiberglass and sealing compound around the lines to minimize vibration and retain flexibility in the lines.

The unit needs to be secured in its final location. Holes are provided in the base runner for this purpose.

Warning: This equipment may contain a substance which harms the public health and environment by destroying ozone in the upper atmosphere. Venting of certain refrigerants to the atmosphere is illegal. Refrigerant recovery devices must be used when installing or servicing this product. Consult your local codes for requirements in your location.

Warning: There may be more than one source of electrical current in this unit. Do not service before disconnecting all power supplies.

Drawing 1. Rigging Instructions



- NOTES:**
1. Spreader bar must be used.
 2. Nuts and bolts for mounting legs are inside electrical box.
 3. Double wide unit mounted same as above.
 4. Legs may be installed while unit is on its side.
 5. In no circumstance should coil headers, return bends or electrical box used in lifting or moving the condenser.

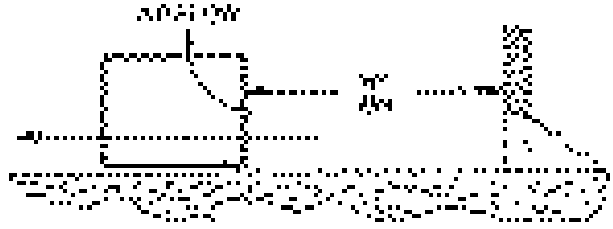
Space and Location Requirements

The most important consideration which must be taken into account when deciding upon the location of air-cooled equipment is the provision for a supply of ambient air to the condenser, and removal of heated air from the condenser area. Where this essential requirement is not adhered to, it will result in higher head pressures, which cause poor operation and possible eventual failure of equipment. Units must not be located in the vicinity of steam, hot air or fume exhausts.

Another consideration which must be taken is that the unit should be mounted away from noise sensitive spaces and must have adequate support to avoid vibration and noise transmission into the building. Units should be mounted over corridors, utility areas, rest rooms and other auxiliary areas where high levels of sound are not an important factor. Sound and structural consultants should be retained for recommendations.

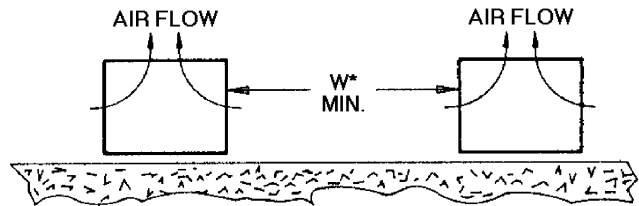
Walls or Obstructions

The unit should be located so that air may circulate freely and not be recirculated. 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

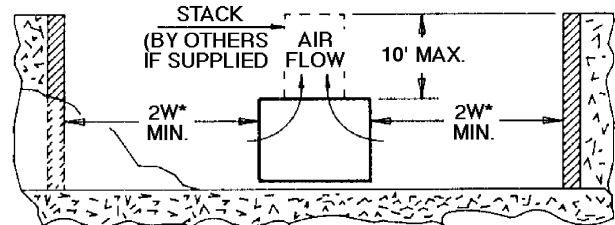
For units placed side by side, the minimum distance between units is the width of the largest unit. If units are placed end to end, the minimum distance between units is 4 feet.



Units in Pits

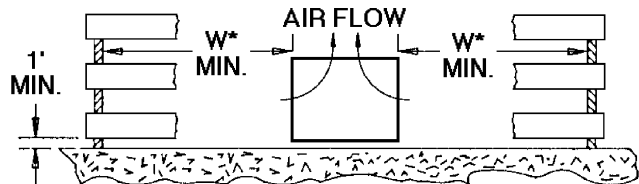
The top of the unit should be level with the top of the pit, and side distance increased to "2W".

If the top of the unit is not level with the top of pit, discharge 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 of unit. If these requirements are not met, unit must be installed as indicated for "Units in pits".



* "W" = Total width of the condenser.

Typical Arrangements

Figure 1 illustrates a typical piping arrangement involving a remote condenser located at a higher elevation, as commonly encountered when the condenser is on a roof and the compressor and receiver are on grade level or in a basement equipment room.

In this case, the design of the discharge line is very critical. If properly sized for full load condition, the gas velocity might be too low at reduced loads to carry oil up through the discharge line and condenser coil. Reducing the discharge line size would increase the gas velocity sufficiently at reduced load conditions; however, when operating at full load, the line would be greatly undersized, and thereby create an excessive refrigerant pressure drop. This condition can be overcome in one of two following ways:

1. The discharge line may be properly sized for the desired pressure drop at full load conditions and an oil separator installed at the bottom of the trap in the discharge line from the compressor.
2. A double riser discharge line may be used as shown in Figure 2. Line "A" should be sized to carry the oil at minimum load conditions and the line "B" should be sized so that at the full load conditions both lines would have sufficient flow velocity to carry the oil to the condenser.

For more complete information, refer to the ASHRAE Handbook on Systems.

Figure 1

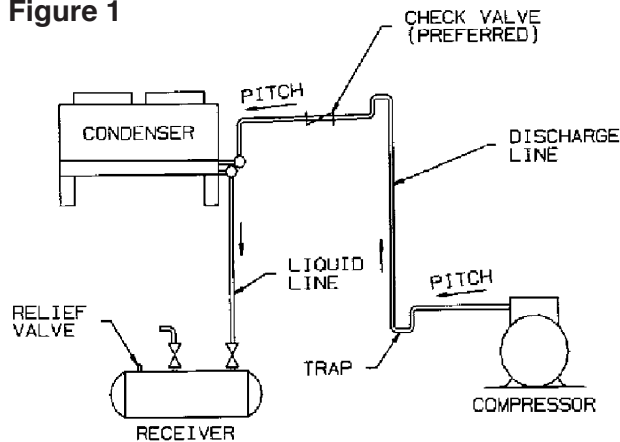
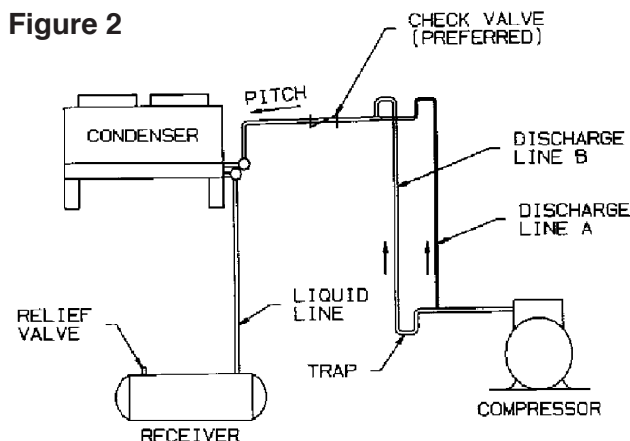


Figure 2



Notes:

1. All oil traps are to be as short in radius as possible. Common practice is to fabricate the trap using three 90 degrees ells.
2. Pressure relief valves are recommended at the condenser for protection of the coil.
3. A drain line check valve is recommended for applications where the condenser may be at a lower temperature than the receiver.

Installation, Refrigerant Piping

Install piping according to standard accepted refrigeration practice. The following recommendations should be adhered to:

1. See Tables 1 and 2 for discharge and liquid drain line sizes for remote condenser connections.
2. Use only refrigeration grade copper tubing.
3. Soft solder joints are not acceptable.
4. Put dry nitrogen through lines while brazing.
5. Do not leave dehydrated piping or components open to the atmosphere any longer than is absolutely necessary.

Discharge Lines

The proper design of discharge lines involves two objectives:

1. To minimize refrigerant pressure drop, since high pressure losses cause increased compressor horsepower per ton of refrigerant.
2. To maintain sufficiently high gas velocity to carry oil through to the condenser coil and receiver at all loading conditions.

Table 1. Tons of Refrigeration

Line Size Type L Copper OD	Discharge Line						Drain Line	
	R-22			R-404A/R-507			Velocity 100 FPM	
	Sat. Suction Temp (°F)			Sat. Suction Temp (°F)			Refrigerant	
	-40	0	40	-40	0	40	R-22	R-502
1/2	0.75	0.8	0.85	0.56	0.63	0.7	2.3	1.5
5/8	1.4	1.5	1.6	1.0	1.2	1.3	3.7	2.3
7/8	3.7	4.0	4.2	2.7	3.1	3.4	7.8	4.9
1 1/8	7.5	8.0	8.5	5.5	6.3	7.0	13.2	8.3
1 3/8	13.1	14.0	14.8	9.6	10.9	12.1	20.2	12.6
1 5/8	20.7	22.0	23.4	15.2	17.2	19.1	28.5	17.9
2 1/8	42.8	45.7	48.5	31.4	35.6	39.5	49.6	31.1
2 5/8	75.4	80.4	85.4	55.3	62.8	69.5	76.5	48.0
3 1/8	120.2	128.2	136.2	87.9	99.8	110.5	109.2	68.4
3 5/8	178.4	190.3	202.1	130.5	148.1	164.0	147.8	92.6
4 1/8	251.1	267.8	284.4	183.7	208.4	230.9	192.1	120.3

Source: ASHRAE Refrigeration Handbook:

1. Line sizes based on pressure drop equivalent to 1°F per 100 equivalent feet.
2. Values in Table are based on 105°F condensing temperature. Multiply Table capacities by the factors in Table 2 for other condensing temperatures.
3. If subcooling is substantial or the line is short, a smaller line size may be used. Applications with very little subcooling or very long lines may require larger sizes

Table 2. Condensing Temperature Correction Factor

Condensing Temperature	Discharge Line	
	R-22	R-404A/R-507
90	0.88	0.91
100	0.95	0.97
110	1.04	1.02
120	1.10	1.08
130	1.18	1.16

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.

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.

All air-cooled condensers are furnished with either single-phase or three-phase fan motors which are identified by the unit dataplate.

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 dataplate.

The motors are wired into a common junction box. Where fan cycling is furnished and factory installed, the motors are completely wired through the control and to the contactors. The motors must be checked for proper rotation. Be sure to check that motor voltage and control connection agree with electric services furnished.

WARNING: There may be more than one source of electrical current in this unit. Do not service before disconnecting all power supplies.

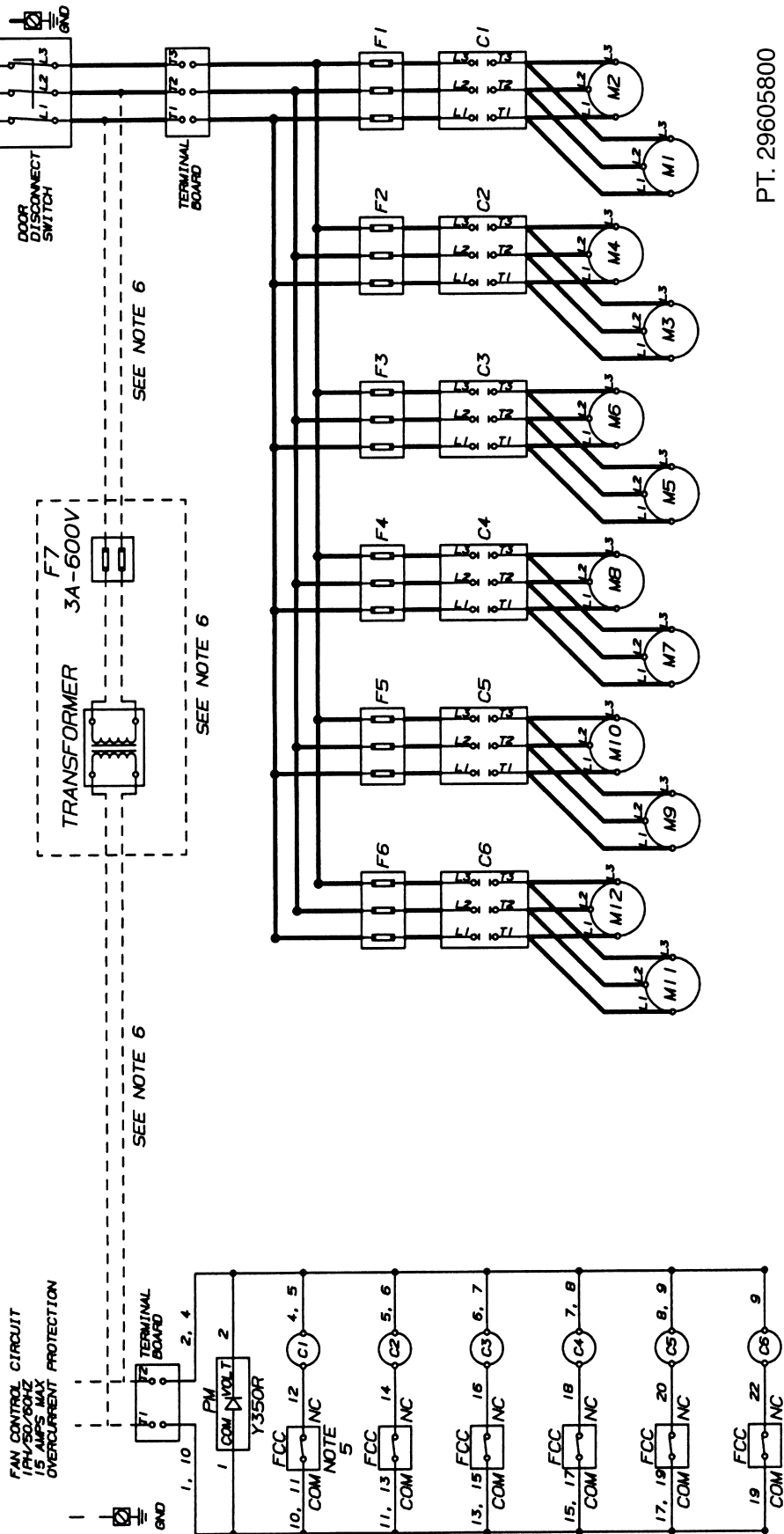
Diagram 1. Typical Wiring Diagram for Standard Fan Cycling.

USE COPPER CONDUCTORS ONLY

FAN MOTOR IDENTIFICATION

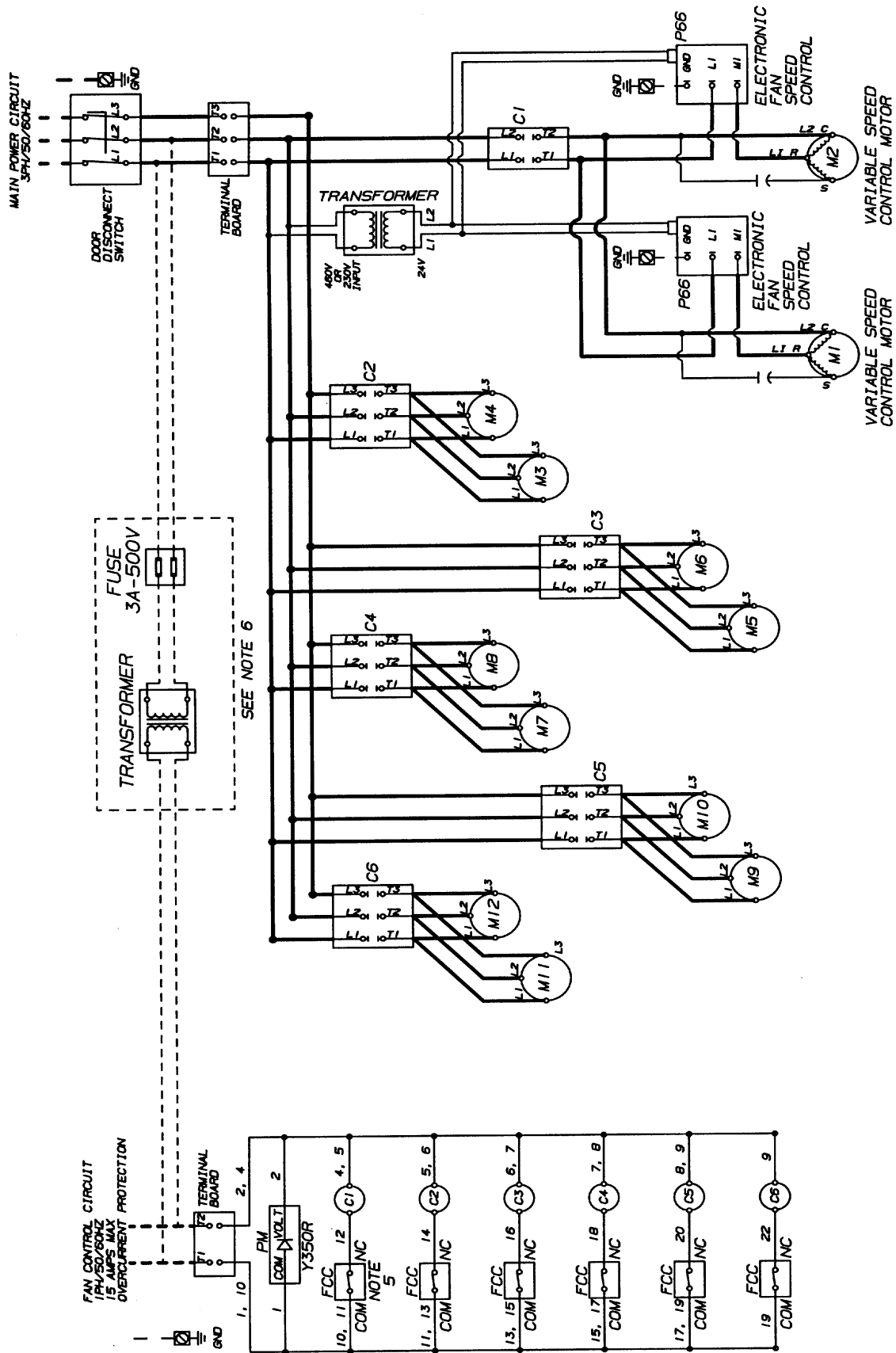
12	10	8	6	4	2
11	9	7	5	3	1

- NOTE:
- UNIT MUST BE GROUNDED TO BE FIELD FUSED. REFER TO UNIT DATA PLATE FOR VOLTAGE.
 - ALL MOTORS ARE INHERENTLY PROTECTED.
 - USE 60° C WIRE.
 - FCC 1 WIRED ONLY WITH PRESSURE FAN CYCLE FOR ALL FANS OPTION
 - WIRED ONLY WITH CONTROL CIRCUIT TRANSFORMER OPTION
- LEGEND:
- CI-C6 FAN CONTACTOR
 - MI-M12 FAN MOTOR
 - PM POWER MODULE USED ONLY W/ SYSTEM 350 COMPONENTS
 - FCC FAN CYCLE CONTROL OR PRESSURE STAT
 - F1-F7 FUSES "OPTIONAL" (REFER TO LABEL ADJACENT TO FUSE HOLDER FOR REPLACEMENT REQUIRED FOR 230V 8, 10, 12 FAN UNITS)



PT. 29605800

Diagram 2. Typical Wiring Diagram for Variable Speed Motor with Fan Cycling.



Start-Up

Check for proper fan rotation. Air is drawn through the coil on all units. Be sure the fans turn freely.

Rotation of the motors and blades should be in a "CW" direction looking at the unit from the blade side. On three phase units, it may be necessary to reverse two of the three power leads to the unit.

NOTE: The manifold assembly is not designed to support field piping. Any damages to the condenser due to excessive weight, pressure or vibration will not be covered by our standard warranty.

Discharge Gas Pulsation

Gas pulsations in a refrigeration system are most commonly associated with the compressor and connecting discharge piping. Variations in the system piping configuration, line sizing, operating pressures and compressor and component mounting all contribute to the presence and magnitude of these pulsations.

The vibration and movement of components caused by the pulsations may result in line breakage or damage to the condenser. In order to eliminate discharge pulsations and the potential for related condenser damage, it is recommended that a discharge muffler be installed in the refrigeration piping. In all cases, the recommendations of the compressor or muffler manufacturer must be followed when selecting these components.

Operation

Winter Operation Head Pressure Control

The capacity of an air-cooled condenser varies with the difference between the entering air dry bulb temperature and the condensing temperature of the refrigerant. Since air temperature in some regions varies as much as 100° from summer to winter, some means must be employed to keep the condensing temperature sufficiently high to insure proper operation of the refrigerant expansion valve during low ambient operation, and also allow sufficient capacity so that excessively high condensing temperatures do not result during high ambient conditions.

The low limit of the head pressure is dependent upon the required pressure drop across the thermostatic expansion valve. For normal air conditioning applications, head pressure should be maintained above a condensing temperature corresponding to 90° F. This, in effect, corresponds to a normal lower limit of about 60° F ambient air. Since air conditioning is not normally required at these lower ambient temperatures, condenser head pressure control may not always be necessary. However for those applications which are of such a nature that operation is required below 60° F ambient air temperature, additional head pressure control will be required.

Fan Cycling

A decrease in ambient air temperature results in a capacity increase in the air-cooled condenser. This capacity increase is directly proportional to the temperature difference between the condensing temperature and the temperature of the ambient air entering the condenser. Since air-cooled condensers are often required to operate over a wide range of ambient air temperatures and variable loading conditions, provisions must be made to maintain the overall system balance. Any air-cooled condenser tends to run at a low head pressure when operating in a low ambient air temperature. Low head pressures could result in poor expansion valve operation and poor system operation.

The cycling of condenser fans provides an automatic means of maintaining head pressure control, within reasonable limits, at lower ambient air temperatures. A fan cycling control system allows fans to cycle in sequence by sensing either ambient temperature or condensing pressures. However, care must be used by the engineer or installing contractor in making adjustments to prevent short cycling of the fan motors. Short cycling is normally caused by too close a differential in the control settings or set points. If flooding valves are used with fan cycling, they must be set to follow the fan cycling.

Recommended differential settings for ambient sensing thermostats are 5° F and a minimum of 35 PSIG differential for pressure switches. However, system or climate conditions vary and the controls may require further field adjustment to provide optimum system performance and prevent short cycling.

Any fan cycle that is less than three minutes is considered short cycling, and could be detrimental to the system. Adjust controls accordingly. It is also recommended that the fan closest to the header end of the condenser be wired to run continuously, whenever the compressor(s) is (are) operational. Cycling all of the fans off usually results in rapid, short cycling of the fans and erratic head pressure control.

If additional head pressure control is necessary beyond letting the lead fan run, we recommend adding variable speed or flooding controls. If cycling the header fan is necessary for adequate head pressure control, we recommend cycling on pressure. Ambient sensing thermostats should never be used to cycle the lead fan.

Fans must not cycle in multiples except on double wide single circuit condensers where they may cycle in pairs (one motor on each side). Do not cycle more than two fans at a time on double wide condensers and only one fan at a time on single wide condensers.

Fan Cycling Head Pressure Controls

Condenser fans are cycled to maintain adequate head pressure. Ambient and pressure fan cycling are available as optional equipment.

Ambient fan cycling cycles fans in response to the ambient air temperature. This control is ideal for multi-circuited condensers or for systems operating in mild ambient conditions. See table 3 for minimum ambient temperatures for fan cycling. Set points for thermostats will vary depending on the number of fans and condenser design T.D. See table 4 for recommended set points.

Pressure fan cycling cycles fans in response to condenser pressure. This style of control is more appropriate where the load on the condenser will vary due to multiple compressor operation or stages of unloading or systems incorporating heat reclaim or hot gas defrost.

Variable Speed

Condenser head pressure control is provided by varying the air flow through the condenser by changing the RPM of the condenser fan. This control package is offered in combination with ambient fan cycling. The fan motor next to the header end of the condenser is the variable speed fan.

The remainder of the fans are constant speed and are cycled separately using ambient sensing thermostats. On condensers with two rows of fans, two variable speed fans are provided (one per unit) and the remainder of the fans are constant speed and are cycled in pairs.

Splitting Controls

Additional head pressure can be provided by valving off a portion of the condenser circuit and removing that portion from the refrigeration circuit. This is often referred to as splitting a condenser. In addition to providing a means of head pressure control, this control will reduce the amount of refrigerant required to operate the condenser with a flooded head pressure control.

Condenser splitting is recommended as a seasonal adjustment controlled by ambient temperature. An initial setting of 50° to 55° F with a 20° F differential is recommended. A pressure switch is also provided as a backup control to prevent high head pressures from occurring during heavy load conditions.

On condensers with a single row of fans the control package consists of an ambient sensing thermostat, a pressure switch sensing condensing pressure and a splitting relay. The splitting relay provides a set of dry contacts to control the valves required to split the condenser (valves supplied by others).

On condensers with double rows of fans, additional controls and contactors are provided to cycle all of the fans on the side of the condenser which has been split off.

Except as noted above, the splitting packages do not control fan cycling. It is recommended that fan cycling be controlled by combining the splitting package with pressure fan cycling.

Flooding Head Pressure Controls

Another means of head pressure control is to change the condenser capacity by filling the inside of the condenser with liquid refrigerant. Flooding controls are ideal for condensers operating in low ambient conditions (beyond the limits of fan cycling controls) or under partial load conditions. These controls require additional refrigerant charge to flood the condenser. This additional refrigerant charge can often be reduced by incorporating the flooded control with one of the fan cycle controls previously described.

Several styles of flooding valves or combinations of valves are available. Contact the valve manufacturer for specific recommendations.

Refrigerant Charge

The refrigerant charge for summer operation can be found in table 8. This table also contains the additional charge required by flooding style controls.

Table 7 contains the recommended flooding charge required when combining fan cycling with flooding valves.

Table 3. Minimum Ambient for Fan Cycling

Number of Fans		Design T.D.*				
Single Row	Double Row	30	25	20	15	10
2	4	35	45	55	60	70
3	6	15	30	40	55	65
4	8	0	15	30	45	60
5	10	0	10	20	35	55
6	12	0	0	10	30	50

* Based on maintaining 90°F minimum condensing temperature.

Table 4. Mechanical Fan Cycling Thermostat Settings

Number of Fans		Design T.D.	Thermostat Setting				
Single Row	Double Rows		1	2	3	4	5
2	4	30	60				
		25	65				
		20	70				
		15	75				
		10	80				
3	6	30	60	40			
		25	65	55			
		20	70	60			
		15	75	65			
		10	80	65			
4	8	30	60	50	30		
		25	65	55	40		
		20	70	65	50		
		15	75	70	60		
		10	80	75	70		
5	10	30	60	55	45	30	
		25	65	60	50	35	
		20	70	65	60	40	
		15	75	70	65	55	
		10	80	75	70	65	
6	12	30	55	50	40	30	25
		25	65	60	55	45	35
		20	70	65	60	50	40
		15	75	70	65	60	50
		10	80	75	70	65	60

Table 5. Electronic Fan Cycling Thermostat Settings *

Number of Fans		Design T.D.	A350 Set Point	S350 Temperature Stage Modules Offset Settings			
Single Row	Double Rows			2	3	4	5
2	4			30 25 20 15 10	60 65 70 75 80		
3	6	30 25 20 15 10	60 65 70 75 80	20 10 10 10 15			
4	8	30 25 20 15 10	60 65 70 75 80	10 10 5 5 5	30 25 20 15 10		
5	10	30 25 20 15 10	60 65 70 75 80	5 5 5 5 5	15 15 10 10 10	30 30 30 20 15	
6	12	30 25 20 15 10	55 65 70 75 80	5 5 5 5 5	15 10 10 10 10	25 20 20 15 15	30 30 30 25 20

* Johnson Controls Style S350 operation.

5° differential set on all modules. All modules set in the “heating” mode.

Table 6. Pressure Chart

Number of Fans		Design T.D.	Refrigerant	Control Settings Pressure Switch Cut-In Settings				
Single Row	Double Rows			PC1	PC2	PC3	PC4	PC5
2	4			20	R134a R22 R404A	147 215 220		
3	6	20	R134a R22 R404A	147 215 220	155 245 247			
4	8	20	R134a R22 R404A	147 215 220	155 231 238	160 247 255		
5	10	20	R134a R22 R404A	147 215 220	153 225 238	156 236 250	160 247 260	
6	12	20	R134a R22 R404A	147 215 220	150 223 238	153 230 245	157 239 255	160 247 265

Based on 20° T.D.;

For (R404A/R507) set cutout 35 PSIG below cutin; for (R134A) set cutout 25 PSIG below cutin.

Fan on header end to remain on whenever compressor is operating.

Table 7. Additional Charge for Fan Cycling and Flooded Condenser, R-22*

No. of Fans	No. of Rows	Standard Chg. for Summer Operation	25° TD Minimum Condenser Ambient				20° TD Minimum Condenser Ambient				15° TD Minimum Condenser Ambient				10° TD Minimum Condenser Ambient			
			40	20	0	-20	40	20	0	-20	40	20	0	-20	40	20	0	-20
			2	2	8	3	10	14	17	8	14	17	19	13	17	20	28	18
	3	12	4	15	20	25	12	21	25	28	20	26	30	32	27	32	34	35
	4	15	5	20	28	34	17	28	34	38	26	34	40	42	36	42	45	47
3	3	19	0	7	20	28	0	19	28	35	17	30	38	42	32	41	46	50
	4	22	0	9	26	37	0	25	38	47	22	40	50	56	42	54	61	66
4	3	22	0	0	14	26	0	11	28	38	9	30	42	57	34	49	56	61
	4	27	0	0	18	35	0	15	38	51	11	40	56	67	45	65	75	81
5	3	35	-	-	5	31	-	-	34	58	-	38	70	83	49	79	98	112
	4	43	-	-	8	41	-	-	46	77	-	51	94	111	65	106	130	149
6	4	50	-	-	-	25	-	-	28	74	-	37	85	116	51	111	144	165

Table 8. Additional Refrigerant Charge for Flooded Condenser, No Fan Cycling R-22 *

No. of Fans	No. of Rows	Std. Chg. for Summer Oper.	30°TD Minimum Condenser Ambient					25°TD Minimum Condenser Ambient					20°TD Minimum Condenser Ambient					15°TD Minimum Condenser Ambient					10°TD Minimum Condenser Ambient				
			+60	+40	+20	0	-20	+60	+40	+20	0	-20	+60	+40	+20	0	-20	+60	+40	+20	0	-20	+60	+40	+20	0	-20
			2	2	8	-	9	14	18	19	3	13	17	19	20	7	16	19	21	22	12	19	21	22	23	17	22
	3	12	-	14	21	27	30	4	19	25	29	32	11	24	28	32	34	19	29	32	34	36	27	34	35	37	38
	4	15	-	18	29	36	40	6	25	33	39	42	15	31	38	43	45	26	37	43	46	47	37	43	48	4	51
3	3	19	-	21	33	40	45	6	28	38	44	47	17	35	43	48	51	2	42	49	51	54	42	49	54	56	58
	4	22	-	28	43	54	59	8	38	50	58	62	22	47	57	64	67	38	56	64	68	70	54	66	71	74	76
4	3	22	-	28	43	54	59	8	38	50	58	62	22	48	57	64	67	38	57	64	68	70	54	67	71	74	76
	4	27	-	37	59	71	79	11	50	68	77	84	29	63	77	85	90	50	75	87	91	95	71	88	96	99	102
5	3	35	-	53	83	101	112	27	71	96	110	119	41	89	108	121	128	71	106	122	130	135	101	124	135	140	144
	4	43	-	71	111	135	149	35	95	128	147	158	54	118	144	161	170	95	141	163	173	180	135	166	180	187	192
6	4	50	-	85	133	162	179	43	114	153	176	190	65	142	173	193	205	114	170	196	207	216	162	199	216	224	230

* NOTE: Values are shown for single fan wide condensers. Double these values for condensers that are two fans wide. For R134a multiply charge by 0.99; For R404A multiply charge by 0.91; For R502 multiply charge by 1.04.

Maintenance

Air-cooled condensing units require a minimum of maintenance. The unit coil will require a periodic cleaning and this can be accomplished by a brush, vacuum cleaner, pressurized air stream or a commercially available coil clean-

ing foam. All of the condenser fan motors have sealed ball bearings. The only acceptable service to these bearings is replacement.

Cleaning Instructions

Heatcraft recommends that the finned surface of this unit be cleaned approximately every six months; more frequent cleaning may be required if extreme conditions cause clogging or fouling of air passages through the finned surface.

applied liberally to entering air and leaving air surfaces of the finned area in accordance with the label directions.

Calgon Corporation's CalClean 41352 (or equal) should be acceptable for cleaning this unit. CalClean should be

CAUTION: Under no circumstances should this unit be cleaned with an acid-based cleaner.

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 stamped 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 9. Replacement Parts List

Fan RPM	1140	1140	830	830 (X Models)	540 (Q Models)
Motor HP	1-1/2	3/4 Var. Speed	1-1/2	1	1/2
Fan Motor Part No.	25301801	2530174	25301701	2538000	25302401
Fan Blade Part No.	22900401	2292625	22900301	2293030	2293030
Fan Guard Part No.	23100301	23100301	23100301	23100301	23100301

Contact Customer Service Department for parts to specific condenser models.

Installation Check List

Condenser

Start Up Date

Model #

Serial #

Electrical

Voltage

Amperage

Installer:

Name & Address

Telephone:

Please retain this information with the condenser.

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

Heatcraft Refrigeration Products LLC

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