KeepRite® REFRIGERATION

KCS-Line Air Cooled Condensers

50 Hz

PRODUCT DATA & INSTALLATION

Bulletin K50-KCS-PDI-50-1

1085695-50

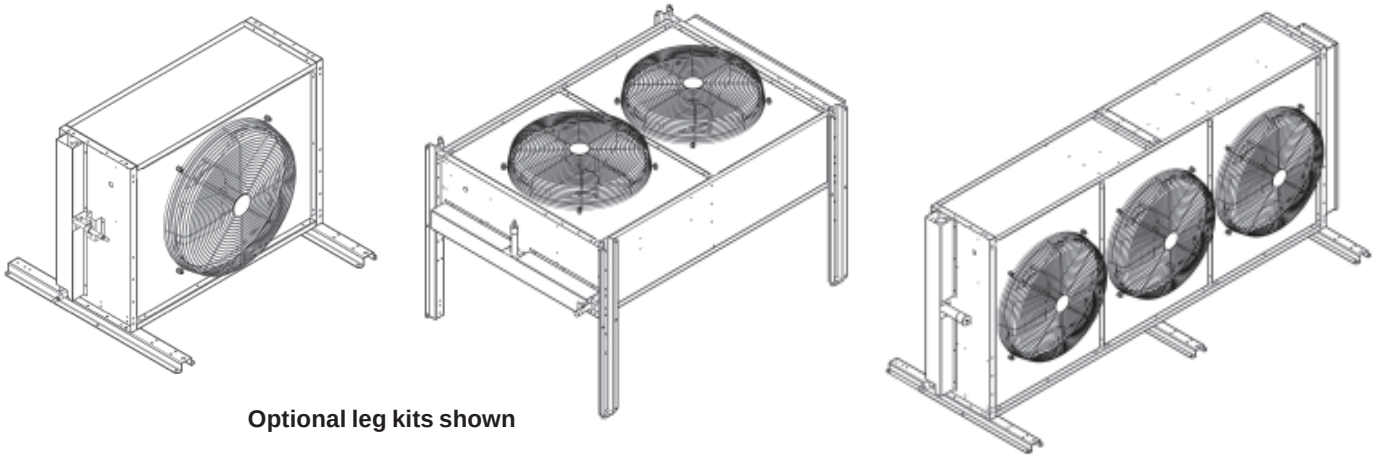
For 60Hz see Bulletin K50-KCS-PDI-60

We are on the Internet
www.keepriterefrigeration.com

Refrigerant: R404A, R507, R22

NEW

Electrical Power:
200-220/1/50, 200-220/3/50,
380-400/3/50



Optional leg kits shown

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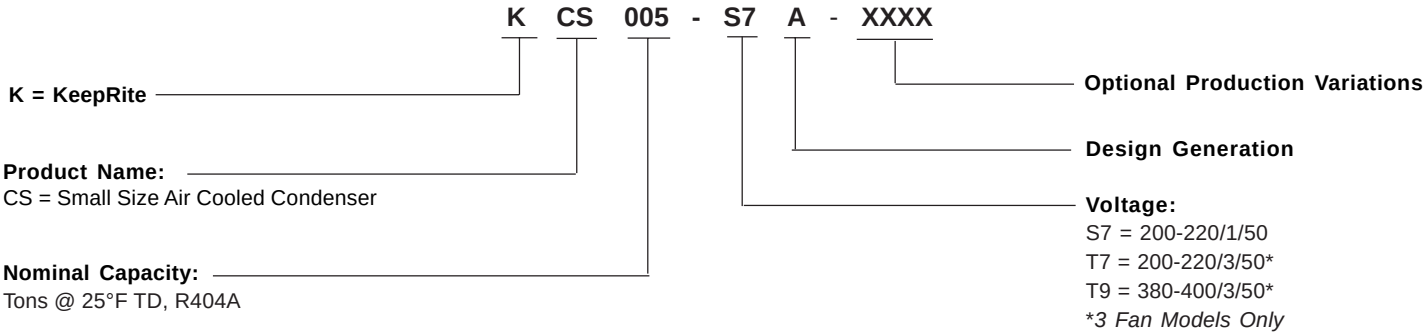
NOMENCLATURE



STANDARD FEATURES

- Horizontal or Vertical Air Discharge
- Heavy Gauge Galvanized Steel Cabinet
- ThermoSpan™ Coil Design eliminates tube failures on tube sheet
- Internally Enhanced Tubing with Enhanced Fin optimizes coil performance
- Energy Efficient PSC Motors with Internal Overload Protection
- Unit shipped with Nitrogen Holding Charge

OPTIONAL FEATURES

- Optional leg kits for horizontal and vertical configurations
- Multiple Refrigeration Circuits
- Ambient or Pressure Fan Cycling Control with Contactor
- Johnson P66 Variable Fan Speed Control
- Non-Fused Disconnect
- Individual Fan Motor Fusing
- Receiver with or without Heater and Insulation
- Adjustable Flooded Head Pressure Control (Factory mounted if ordered with receiver option)
- Optional Fin Materials and Coatings
- Voltages for 60 Hz and 50 Hz

CAPACITY DATA

50Hz

R404A Models

MODEL	TOTAL HEAT OF REJECTION MBH *(KW)*				
	1°F *(0.56°C)*	**10°F** *(5.56°C)*	**15°F** *(8.3°C)*	**20°F** *(11.1°C)*	**30°F** *(16.7C)*
002	1.22 *(0.36)*	12.2 *(3.56)*	18.2 *(5.35)*	24.3 *(7.13)*	36.5 *(10.7)*
003	1.51 *(0.44)*	15.1 *(4.43)*	22.7 *(6.64)*	30.2 *(8.85)*	45.3 *(13.3)*
005	2.55 *(0.75)*	25.5 *(7.46)*	38.2 *(11.2)*	50.9 *(14.9)*	76.4 *(22.4)*
006	3.05 *(0.90)*	30.5 *(8.95)*	45.8 *(13.4)*	61.1 *(17.9)*	91.6 *(26.9)*
008	3.80 *(1.11)*	38.0 *(11.1)*	57.0 *(16.7)*	76.0 *(22.3)*	114 *(33.4)*
010	5.00 *(1.46)*	50.0 *(14.6)*	74.9 *(22.0)*	99.9 *(29.3)*	150 *(43.9)*
012	6.05 *(1.77)*	60.5 *(17.7)*	90.8 *(26.6)*	121 *(35.5)*	182 *(53.2)*
014	6.89 *(2.02)*	68.9 *(20.2)*	103 *(30.3)*	138 *(40.4)*	207 *(60.6)*
016	7.57 *(2.22)*	75.7 *(22.2)*	114 *(33.3)*	151 *(44.4)*	227 *(66.6)*
019	9.00 *(2.64)*	90.0 *(26.4)*	135 *(39.6)*	180 *(52.8)*	270 *(79.2)*
024	11.3 *(3.31)*	113 *(33.1)*	170 *(49.7)*	226 *(66.2)*	339 *(99.4)*

For 50 Hz units, multiply capacity by 0.92

R22 Models

MODEL	TOTAL HEAT OF REJECTION MBH *(KW)*				
	1°F *(0.56°C)*	**10°F** *(5.56°C)*	**15°F** *(-8.3°C)*	**20°F** *(11.1°C)*	**30°F** *(16.7°C)*
002	1.24 *(0.36)*	12.4 *(3.64)*	18.6 *(5.45)*	24.8 *(7.27)*	37.2 *(10.9)*
003	1.54 *(0.45)*	15.4 *(4.51)*	23.1 *(6.77)*	30.8 *(9.03)*	46.2 *(13.5)*
005	2.60 *(0.76)*	26.0 *(7.61)*	38.9 *(11.4)*	51.9 *(15.2)*	77.9 *(22.8)*
006	3.12 *(0.91)*	31.2 *(9.13)*	46.7 *(13.7)*	62.3 *(18.3)*	93.5 *(27.4)*
008	3.87 *(1.14)*	38.7 *(11.4)*	58.1 *(17.0)*	77.5 *(22.7)*	116 *(34.1)*
010	5.10 *(1.49)*	51.0 *(14.9)*	76.4 *(22.4)*	102 *(29.9)*	153 *(44.8)*
012	6.17 *(1.81)*	61.7 *(18.1)*	92.6 *(27.1)*	124 *(36.2)*	185 *(54.3)*
014	7.03 *(2.06)*	70.3 *(20.6)*	105 *(30.9)*	141 *(41.2)*	211 *(61.8)*
016	7.72 *(2.26)*	77.2 *(22.6)*	116 *(33.9)*	154 *(45.3)*	232 *(67.9)*
019	9.18 *(2.69)*	91.8 *(26.9)*	138 *(40.4)*	184 *(53.8)*	276 *(80.7)*
024	11.5 *(3.38)*	115 *(33.8)*	173 *(50.7)*	231 *(67.6)*	346 *(101)*

For 50 Hz units, multiply capacity by 0.92

ELECTRICAL DATA

MODEL	MOTOR HP	MOTOR Qty.	200-220/1/50 (200-220/3/50)			380-400/3/50		
			FLA	MCA	MOP	FLA	MCA	MOP
002	1/6	1	1.1	1.4	15	0.6	0.8	15
003	1/6	1	1.1	1.4	15	0.6	0.8	15
005	1/3	1	2.1	2.7	15	1.1	1.4	15
006	1/3	1	2.1	2.7	15	1.1	1.4	15
008	1/3	1	2.1	2.7	15	1.1	1.4	15
010	1/3	2	4.2	4.8	15	2.2	2.5	15
012	1/3	2	4.2	4.8	15	2.2	2.5	15
014	1/3	2	4.2	4.8	15	2.2	2.5	15
016	1/3	2	4.2	4.8	15	2.2	2.5	15
019	1/3	3	6.3 (3.6)	6.9 (4.6)	15	1.9	2.4	15
024	1/3	3	6.3 (3.6)	6.9 (4.6)	15	1.9	2.4	15

GENERAL SPECIFICATIONS

50Hz

MODEL	FAN CONFIGURATION	AIR FLOW		AVAILABLE CIRCUITS	CONNECTION SIZES		APPROX. WEIGHT	
		CFM	*(l/s)*		INLET	OUTLET	LBS	*(kg)*
002	1 x 1	1809	*(854)*	1	5/8	3/8	127	*(58)*
003	1 x 1	1619	*(764)*	2	5/8	1/2	131	*(59)*
005	1 x 1	3793	*(1790)*	3	7/8	5/8	150	*(68)*
006	1 x 1	3386	*(1598)*	4	7/8	5/8	157	*(71)*
008	1 x 1	3793	*(1790)*	5	1 1/8	7/8	197	*(89)*
010	1 x 2	7586	*(3580)*	6	1 1/8	7/8	254	*(115)*
012	1 x 2	6773	*(3196)*	9	1 1/8	7/8	269	*(122)*
014	1 x 2	7810	*(3686)*	9	1 3/8	7/8	305	*(138)*
016	1 x 2	7586	*(3580)*	9	1 3/8	7/8	325	*(147)*
019	1 x 3	10159	*(4794)*	15	1 5/8	1 1/8	381	*(173)*
024	1 x 3	11371	*(5366)*	15	1 5/8	1 1/8	447	*(203)*

REFRIGERANT CHARGES

MODEL	FAN CONFIG.	R22 REFRIGERANT CHARGE				R404A REFRIGERANT CHARGE			
		NORMAL **		90% FULL †		NORMAL **		90% FULL †	
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*
002	1 x 1	0.7	*(0.3)*	3.0	*(1.4)*	0.6	*(0.3)*	2.6	*(1.2)*
003	1 x 1	1.1	*(0.5)*	4.8	*(2.2)*	1.0	*(0.4)*	4.2	*(1.9)*
005	1 x 1	1.5	*(0.7)*	6.7	*(3.1)*	1.3	*(0.6)*	5.8	*(2.6)*
006	1 x 1	2.2	*(1.0)*	9.8	*(4.5)*	1.9	*(0.9)*	8.5	*(3.9)*
008	1 x 1	3.3	*(1.5)*	14.7	*(6.6)*	2.9	*(1.3)*	12.8	*(5.8)*
010	1 x 2	3.2	*(1.5)*	14.4	*(6.5)*	2.8	*(1.3)*	12.5	*(5.7)*
012	1 x 2	4.6	*(2.1)*	20.6	*(9.3)*	4.0	*(1.8)*	17.9	*(8.1)*
014	1 x 2	6.2	*(2.8)*	27.9	*(12.7)*	5.4	*(2.4)*	24.3	*(11.0)*
016	1 x 2	6.2	*(2.8)*	27.9	*(12.7)*	5.4	*(2.4)*	24.3	*(11.0)*
019	1 x 3	7.1	*(3.2)*	31.8	*(14.4)*	6.2	*(2.8)*	27.7	*(12.5)*
024	1 x 3	9.3	*(4.2)*	41.8	*(19.0)*	8.1	*(3.7)*	36.4	*(16.5)*

** Normal Charge is the refrigerant charge for warm ambient or summer operation

† 90% full is the liquid refrigerant weight at 90% of the internal volume and is for reference ONLY

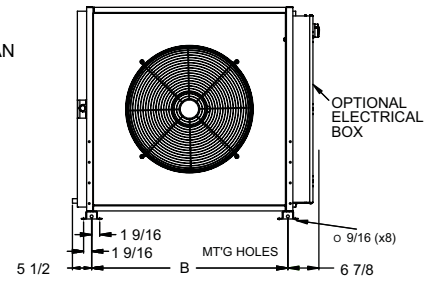
SOUND LEVEL DATA

MODEL	FANS LONG	SOUND LEVEL @ 10 ft *(3m)* - dBA	
		VERTICAL DISCHARGE	HORIZONTAL DISCHARGE
002, 003	1	52	54
005 through 024	1	57	58
	2	59	61
	3	60	62

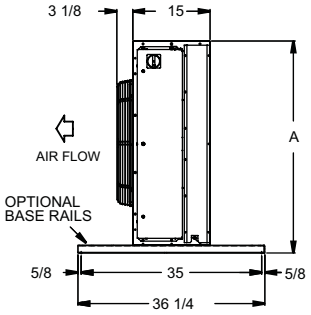
DIMENSIONAL DATA
HORIZONTAL AIR DISCHARGE UNITS

50Hz

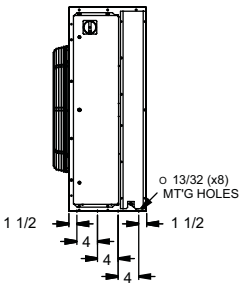
1 FAN



FRONT VIEW

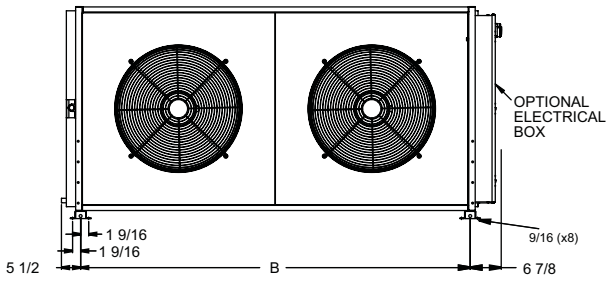


TYPICAL END VIEW
ELECT. BOX END



MOUNTING DIMENSIONS
WITHOUT OPTIONAL
BASE RAILS.

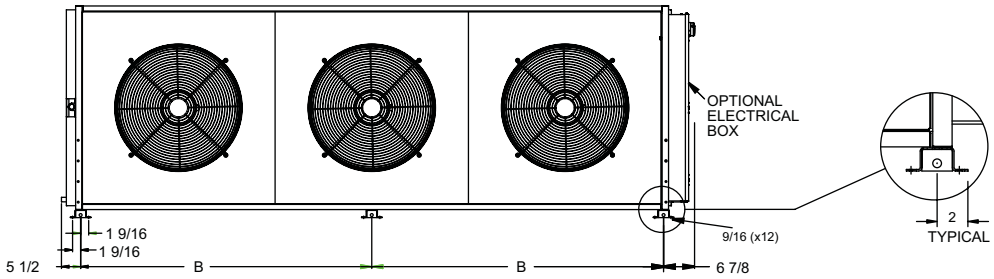
2 FAN



ELECTRICAL CONNECTION 7/8”

UNITS ARE SHIPPED IN HORIZONTAL AIR FLOW CONFIGURATION LESS OPTIONAL MOUNTING LEGS AS STANDARD.

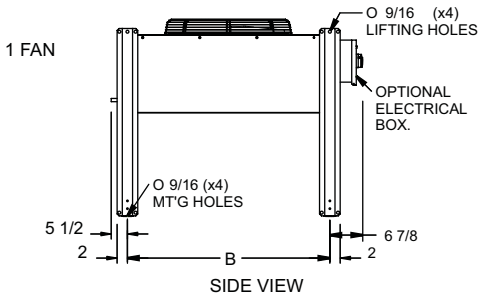
3 FAN



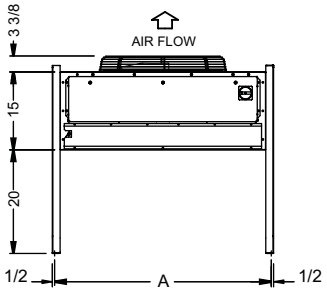
MODEL	FAN CONFIG.	MOUNTING DIMENSIONS			
		A		B	
		INCHES	*(mm)*	INCHES	*(mm)*
002	1 x 1	23 5/8	*(600)*	25 1/2	*(648)*
003	1 x 1	23 5/8	*(600)*	25 1/2	*(648)*
005	1 x 1	31 1/8	*(791)*	38	*(965)*
006	1 x 1	31 1/8	*(791)*	38	*(965)*
008	1 x 1	41 1/8	*(1045)*	38	*(965)*
010	1 x 2	41 1/8	*(1045)*	55 1/2	*(1410)*
012	1 x 2	41 1/8	*(1045)*	55 1/2	*(1410)*
014	1 x 2	41 1/8	*(1045)*	75 1/2	*(1918)*
016	1 x 2	41 1/8	*(1045)*	75 1/2	*(1918)*
019	1 x 3	41 1/8	*(1045)*	41 1/2	*(1054)*
024	1 x 3	41 1/8	*(1045)*	56 1/2	*(1435)*

DIMENSIONAL DATA
VERTICAL AIR DISCHARGE UNITS

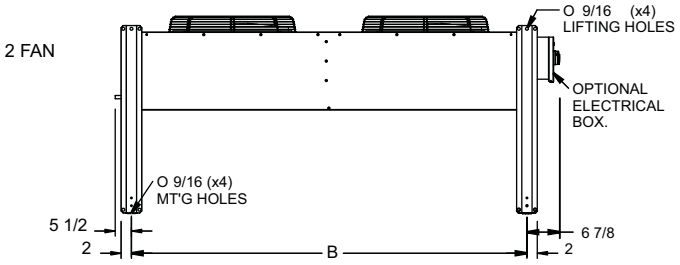
50Hz

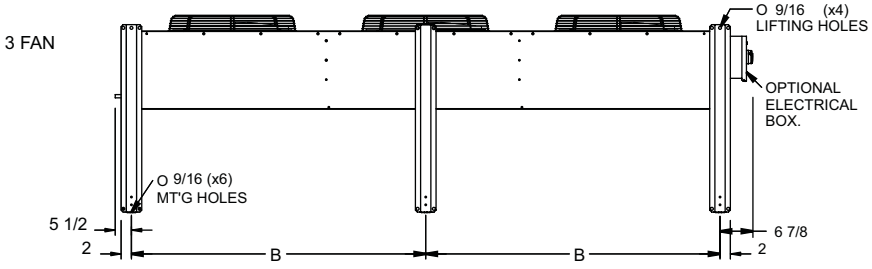


SIDE VIEW



TYPICAL END VIEW
ELECT. BOX END

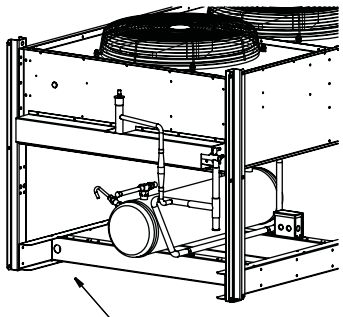


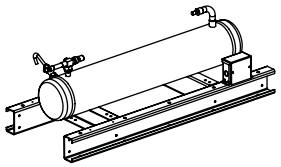


ELECTRICAL CONNECTION 7/8”

UNITS ARE SHIPPED IN HORIZONTAL AIR FLOW CONFIGURATION LESS OPTIONAL MOUNTING LEGS AS STANDARD. VERTICAL AIR DISCHARGE MODELS REQUIRE LEG KIT OPTION SHIPPED LOOSE AND SOLD SEPARATELY .

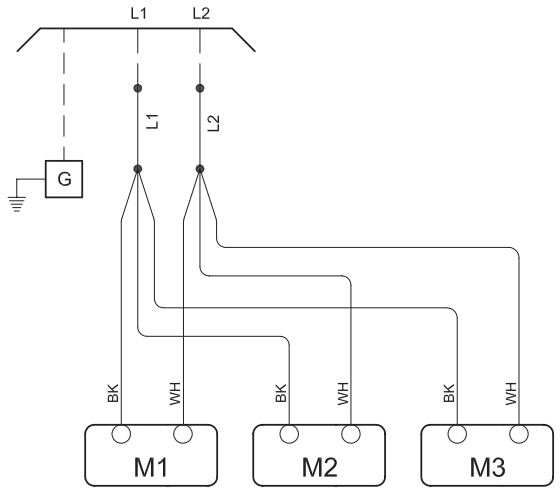
MODEL	FAN CONFIG.	MOUNTING DIMENSIONS			
		A		B	
		INCHES	*(mm)*	INCHES	*(mm)*
002	1 x 1	24 1/8	*(613)*	25 1/2	*(648)*
003	1 x 1	24 1/8	*(613)*	25 1/2	*(648)*
005	1 x 1	31 5/8	*(803)*	38	*(965)*
006	1 x 1	31 5/8	*(803)*	38	*(965)*
008	1 x 1	41 5/8	*(1057)*	38	*(965)*
010	1 x 2	41 5/8	*(1057)*	55 1/2	*(1410)*
012	1 x 2	41 5/8	*(1057)*	55 1/2	*(1410)*
014	1 x 2	41 5/8	*(1057)*	75 1/2	*(1918)*
016	1 x 2	41 5/8	*(1057)*	75 1/2	*(1918)*
019	1 x 3	41 5/8	*(1057)*	41 1/2	*(1054)*
024	1 x 3	41 5/8	*(1057)*	56 1/2	*(1435)*


Optional Factory Mounted
Receiver kits fit within standard
unit leg configuration.
Legs included with receiver option.


OPTIONAL REMOTE
RECEIVER KITS.

WIRING DIAGRAM
(STANDARD WITHOUT OPTIONS)

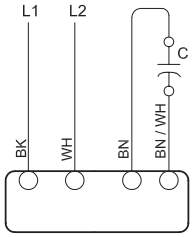
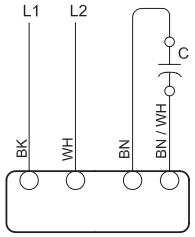
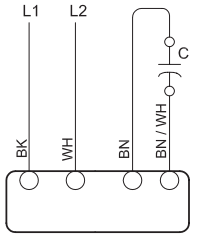
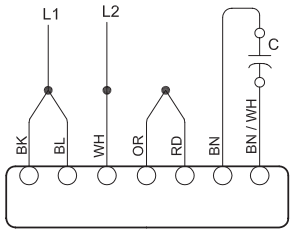
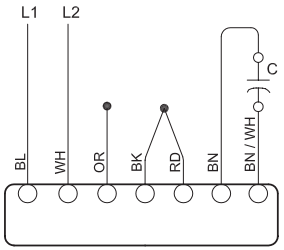
REFER TO DATAPLATE FOR
ELECTRICAL REQUIREMENTS.



FAN MOTORS

SEE BELOW FOR APPLICABLE
MOTOR WIRING DETAILS

MOTOR WIRING DETAIL

208-230 (200-220) VOLT	460 (380-400) VOLT	575 VOLT
Models 002 and 003	Models 002 and 003	All Models
		
Models 005 to 024	Models 005 to 024	
		

LEGEND

C - CAPACITOR

M - FAN MOTOR

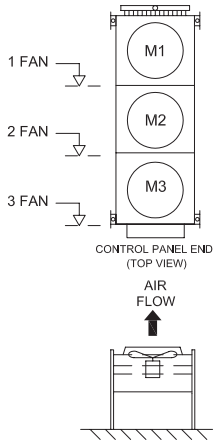
NOTES

1. USE COPPER CONDUCTORS ONLY
2. USE 75°C WIRE (OR HIGHER)
3. OPTIONAL COMPONENTS -FACTORY OR INSTALLED BY OTHERS
4. CONDUCTORS/WIRNG

   ———— FACTORY WIRING
   — — — WIRING BY OTHERS

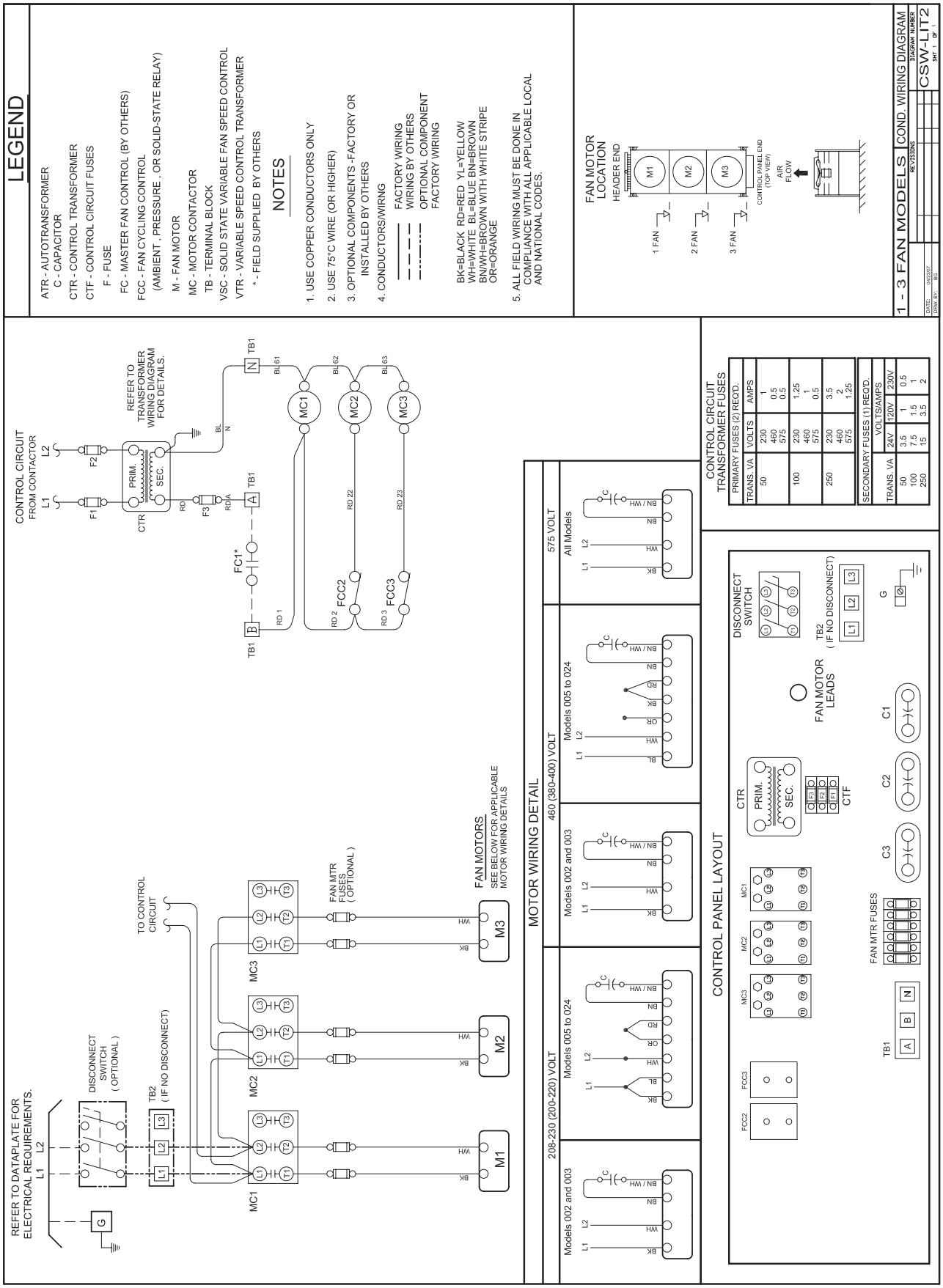
   BK=BLACK RD=RED YL=YELLOW
   WH=WHITE BL=BLUE BN=BROWN
   BN/WH=BROWN WITH WHITE STRIPE
   OR=ORANGE
5. ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

FAN MOTOR
LOCATION



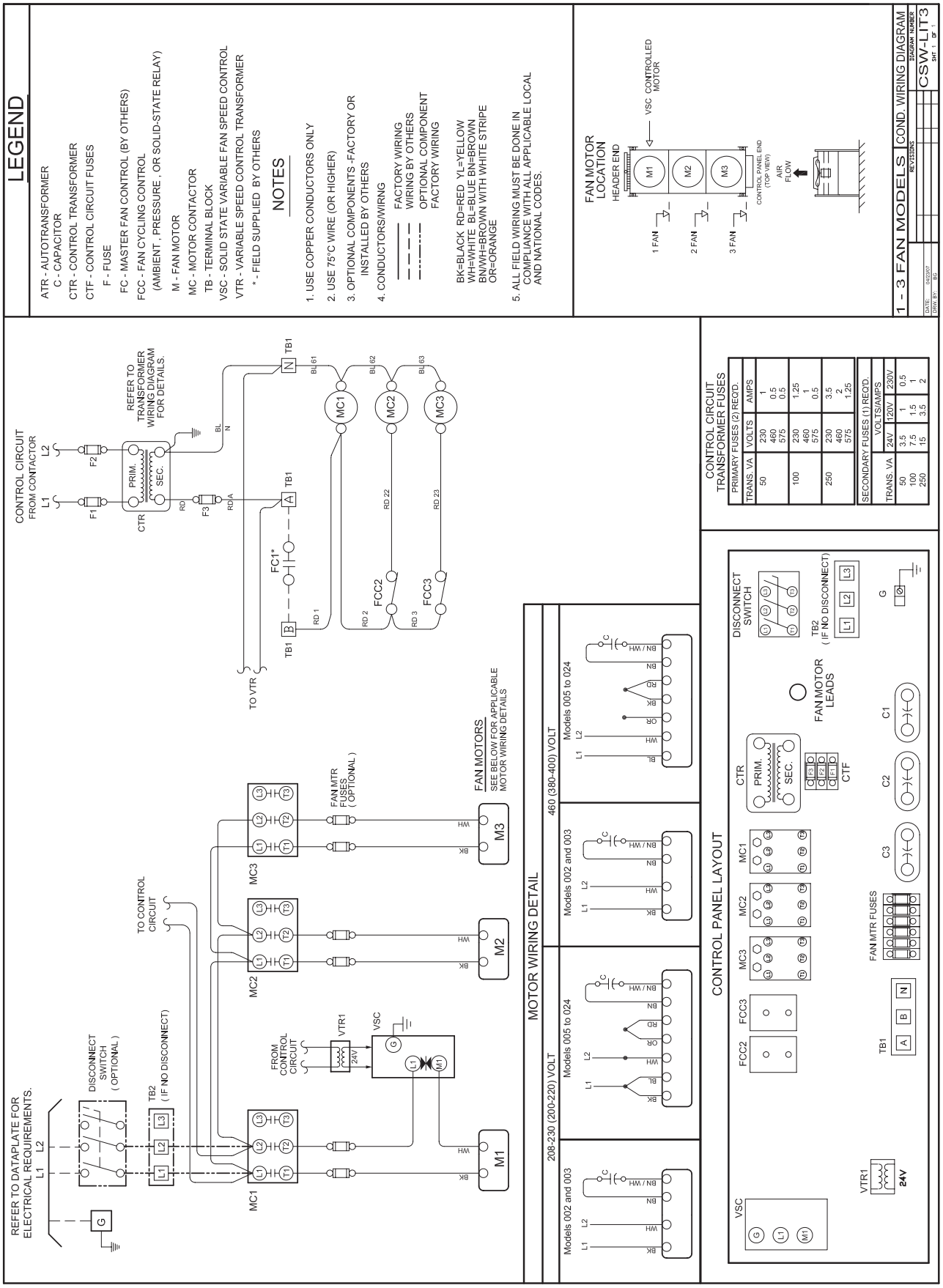
1 - 3 FAN MODELS	COND. WIRING DIAGRAM
REVISIONS	DIAGRAM NUMBER
DATE: 04/23/07 DRW. BY: BG	CSW-LIT1 SHT 1 OF 1

WIRING DIAGRAM
(MODELS WITH FAN CYCLING CONTROL)



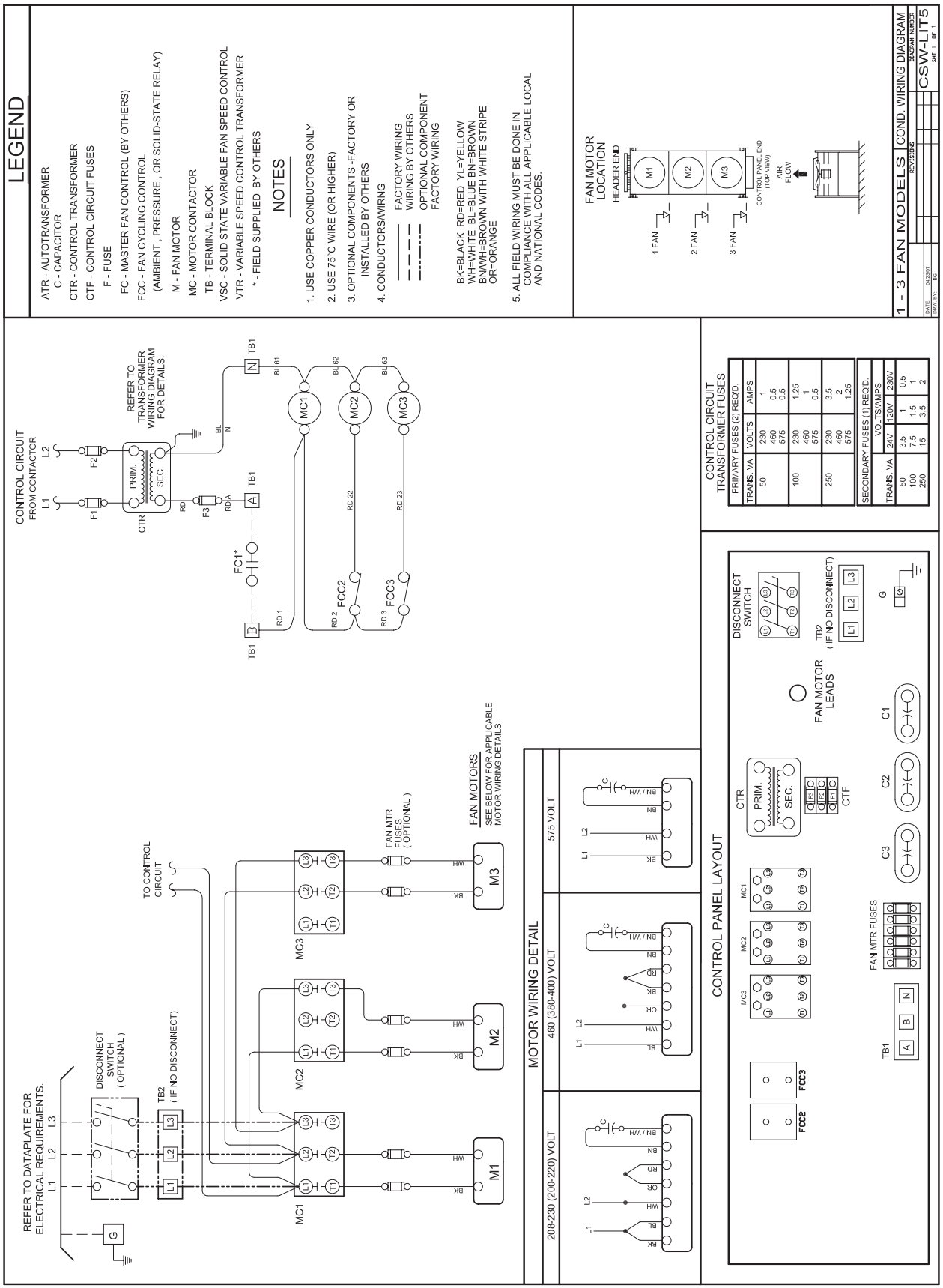
WIRING DIAGRAM

(VARIABLE FAN SPEED CONTROL 200-220V AND 380-400V MODELS)



WIRING DIAGRAM

(THREE PHASE WIRING MODELS 019 - 024)



RECEIVER OPTIONS

Option #1

MODEL	FANS LONG	REFRIGERANT CHARGE - 90% FULL LIQUID				OPTION 1							
						CAPACITY *				DIAMETER		LENGTH	
		R22		R404A / R507		R22		R404A / R507					
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	IN	*(mm)*	IN	*(mm)*
002	1	3.0	*(1.4)*	*2.6*	*(1.2)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
003	1	4.8	*(2.2)*	*4.2*	*(1.9)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
005	1	6.7	*(3.1)*	*5.9*	*(2.7)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
006	1	9.8	*(4.5)*	*8.5*	*(3.9)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
008	1	14.7	*(6.6)*	*12.7*	*(5.8)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
010	2	14.4	*(6.5)*	*12.5*	*(5.7)*	18	*(8.2)*	*15.7*	*(7.1)*	5	*(127)*	28	*(711)*
012	2	20.6	*(9.3)*	*17.9*	*(8.1)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
014	2	27.9	*(12.7)*	*24.3*	*(11.0)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
016	2	27.9	*(12.7)*	*24.3*	*(11.0)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
019	3	31.8	*(14.4)*	*27.7*	*(12.5)*	43.5	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*
024	3	41.8	*(19.0)*	*36.4*	*(16.5)*	43.5	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*

Option #2

MODEL	FANS LONG	REFRIGERANT CHARGE - 90% FULL LIQUID				OPTION 2							
						CAPACITY *				DIAMETER		LENGTH	
		R22		R404A / R507		R22		R404A / R507					
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	IN	*(mm)*	IN	*(mm)*
002	1	3.0	*(1.4)*	*2.6*	*(1.2)*	---	---	---	---	---	---	---	---
003	1	4.8	*(2.2)*	*4.2*	*(1.9)*	---	---	---	---	---	---	---	---
005	1	6.7	*(3.1)*	*5.9*	*(2.7)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
006	1	9.8	*(4.5)*	*8.5*	*(3.9)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
008	1	14.7	*(6.6)*	*12.7*	*(5.8)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
010	2	14.4	*(6.5)*	*12.5*	*(5.7)*	28.5	*(12.9)*	*24.8*	*(11.2)*	6	*(152)*	30	*(762)*
012	2	20.6	*(9.3)*	*17.9*	*(8.1)*	43.5	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*
014	2	27.9	*(12.7)*	*24.3*	*(11.0)*	43.5	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*
016	2	27.9	*(12.7)*	*24.3*	*(11.0)*	43.5	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*
019	3	31.8	*(14.4)*	*27.7*	*(12.5)*	70	*(31.8)*	*60.9*	*(27.6)*	8 5/8	*(218)*	36	*(914)*
024	3	41.8	*(19.0)*	*36.4*	*(16.5)*	70	*(31.8)*	*60.9*	*(27.6)*	8 5/8	*(218)*	36	*(914)*

Option #3

MODEL	FANS LONG	REFRIGERANT CHARGE - 90% FULL LIQUID				OPTION 3							
						CAPACITY *				DIAMETER		LENGTH	
		R22		R404A / R507		R22		R404A / R507					
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	IN	*(mm)*	IN	*(mm)*
002	1	3.0	*(1.4)*	*2.6*	*(1.2)*	---	---	---	---	---	---	---	---
003	1	4.8	*(2.2)*	*4.2*	*(1.9)*	---	---	---	---	---	---	---	---
005	1	6.7	*(3.1)*	*5.9*	*(2.7)*	---	---	---	---	---	---	---	---
006	1	9.8	*(4.5)*	*8.5*	*(3.9)*	---	---	---	---	---	---	---	---
008	1	14.7	*(6.6)*	*12.7*	*(5.8)*	---	---	---	---	---	---	---	---
010	2	14.4	*(6.5)*	*12.5*	*(5.7)*	44	*(19.7)*	*37.8*	*(17.2)*	6 5/8	*(168)*	38	*(965)*
012	2	20.6	*(9.3)*	*17.9*	*(8.1)*	70	*(31.8)*	*60.9*	*(27.6)*	8 5/8	*(218)*	36	*(914)*
014	2	27.9	*(12.7)*	*24.3*	*(11.0)*	70	*(31.8)*	*60.9*	*(27.6)*	8 5/8	*(218)*	36	*(914)*
016	2	27.9	*(12.7)*	*24.3*	*(11.0)*	70	*(31.8)*	*60.9*	*(27.6)*	8 5/8	*(218)*	36	*(914)*
019	3	31.8	*(14.4)*	*27.7*	*(12.5)*	119	*(54.0)*	*103.5*	*(47.0)*	8 5/8	*(218)*	60	*(1524)*
024	3	41.8	*(19.0)*	*36.4*	*(16.5)*	119	*(54.0)*	*103.5*	*(47.0)*	8 5/8	*(218)*	60	*(1524)*

*** Based on 90% full**

LOW AMBIENT OPERATION

GENERAL

When a remote air cooled condenser is installed outdoors, it will be subjected to varying temperatures. Within many areas, winter to summer annual temperatures swings can be as high as **120 ºF** *(48.9 ºC)* which will have a major impact on the performance of the condenser. As the ambient temperature drops, the condenser capacity increases due to the wider temperature difference between ambient and condensing. As this happens, the condensing temperature also drops as the system finds a new balance point. Although the overall system capacity will be higher at lower condensing temperatures, other problems can occur. The capacity of an expansion valve is affected by both the liquid temperature entering the valve and the pressure drop across it. As the condensing temperature decreases, the pressure drop across the metering device also decreases. A lower pressure drop decreases the capacity of the valve. Although lower liquid temperatures increase the capacity of the metering device, the increase is not large enough to offset the loss due to the lower pressure drop.

The following three sections cover the various options used to control condensing temperatures.

(i) Fan Cycling

Cycling of the condenser fans helps control the condensing temperature. With this approach to solving low ambient problems, fans are taken off-line either one at a time, or in pairs. It is not recommended that multiple fan condensers cycle more than two fans per step. The reason for this is that the pressure in the condenser will increase drastically as several fans are taken off-line at the same time. This will result in erratic operation of the refrigeration system and applies additional stress to the condenser tubes. It is preferable to control the condensing temperature as smoothly as possible. Fans should be cycled independently on a condenser where the fans are all in a single row. On two row condensers, the fans should be cycled in pairs.

Ambient temperature sensing controls can be set to bring on certain fans when the outdoor temperature reaches a predetermined setpoint. Pressure sensing controls are set to bring on certain fans when the condensing pressure reaches the setpoint on the control. Temperature or pressure setpoints and differentials should be set in such a way as to prevent short cycling of the fans. Constant short cycling will produce a volatile condensing pressure while decreasing the life of the fan motors.

For recommended fan cycling switch settings, refer to Table 2. Differential settings on fan cycling temperature controls should be about **5 ºF** *(2.8 ºC)*. On fan cycling pressure controls, a differential of approximately 35 psig is recommended.

Fans closest to the inlet header should be run continuously whenever the compressor is running. If these initial fans are wired through a cycling control, the life of the condenser may be shortened due to the additional stress placed on the tubes and headers. Table 1 shows the fan cycling options available for all condenser models.

(ii) Variable Motor Speed Control

If additional head pressure control is required beyond the last step of fan cycling, variable fan motor speed may be used. Variable motor speed is optional on all condenser models. A varying motor speed may be accomplished using a modulating pressure control. A variable speed controller can be an electronic or solid state device which varies the voltage going to the motor depending on the pressure of the medium being sensed.

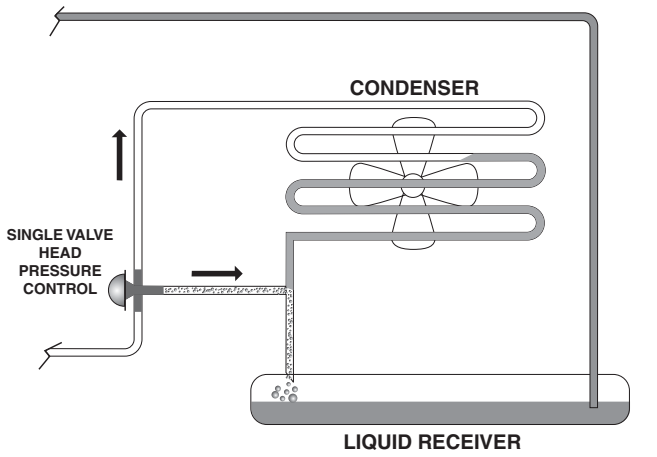
(iii) Refrigerant Regulating Controls

Pressure regulating controls are available from a number of valve manufacturers. The purpose of this control is to regulate the refrigerant flow in such a way as to maintain a pre-selected condensing pressure. In lower ambient temperatures, these valves throttle to maintain the desired pressure and in doing so, flood the condenser with liquid refrigerant.

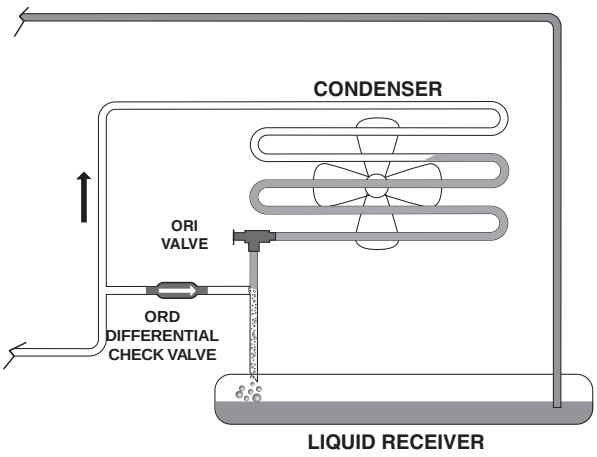
The larger the condenser surface is, the higher its capacity will be. When a condenser is flooded, its useful condensing surface is reduced. This is because the refrigerant occupies the space which would otherwise be used for condensing.

Some control/check valve combinations will regulate refrigerant flow depending on the pressure at the inlet of the condenser.These are often referred to as *inlet regulators.* As the valve closes, hot gas bypasses the condenser through a differential check valve to increase the pressure at the receiver.

LOW AMBIENT OPERATION



SINGLE VALVE CONDENSER PRESSURE CONTROL
(Regulates inlet pressure or outlet pressure depending on valve design)



ORI / ORD CONDENSER PRESSURE CONTROL

This will flood the condenser until the condensing pressure increases to a point which will again open the valve. Other valves regulate the refrigerant at the outlet of the condenser to provide a similar effect. These are commonly referred to as *outlet regulators.* There are also combination inlet/outlet regulators with a differential check valve or other type of condenser bypass arrangement incorporated within the valve.

Controls which regulate the flow of refrigerant based on condenser inlet pressure are typically used in conjuction with a check valve having a minimum opening differential across the condenser. Outlet regulators typically require a check valve with a fixed pressure differential setting of between 20 and 35 psi. The differential is needed to compensate for pressure drop through the condenser during flooding and associated discharge piping.

Systems equipped with a condenser flooding arrangement should always use a receiver having sufficient liquid holding capacity. Additional liquid required for flooding is only required during the winter low ambients and must be stored somewhere in the system at the higher ambients. Failure to use an adequately sized receiver will result in liquid back-up in the condenser during the warmer summer months. This will cause the system to develop very high pressures in the high side resulting in a high pressure safety control trip.

Determining Additional Flooded Refrigerant Charge

Additional charge will vary with the condenser design TD and the coldest expected ambient temperature. Condensers designed for low TD applications (low temperature evaporators) and operating in colder ambients will require more additional charge than those designed for higher TD applications (high temperature evaporators) and warmer ambients.
Refer to tables on pages 15 & 16 to determine the required added refrigerant charge at the selected TD and ambient temperatures.
These charges are based on condensers using Fan Cycling options with their last fan (Single Row Fan Models) running or last pair of fans running (Double Row Fan models).

WARNING: Do not over charge when charging by a sightglass. Liquid lines feeding the TXV at the evaporator must have a solid column of liquid (no bubbles) however bubbles at the sightglass (located adjacient to the receiver) may be normal due to the result of a higher pressure drop at that point. Bubbles could also appear in the glass whenever the regulating valves start to flood the condenser. Always record the number of drums or the weight of refrigerant that has been added or removed in the system. Overcharged systems may result in compressor failure as well as other serious mechanical damage to the system components.

LOW AMBIENT OPERATION

Table 1 - Fan Cycling Control Schedule

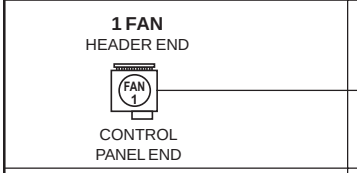
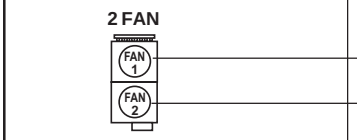
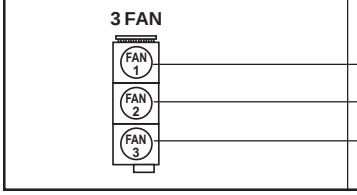
FAN ARRANGEMENT SINGLE ROW	FANS CYCLED	FANS AVAILABLE FOR VARIABLE SPEED CONTROL	FANS IN CONSTANT OPERATION
		●	●
	● 1 STAGE	●	●
	● 2'ND STAGE ● 1'ST STAGE	●	●

Table 2 - Ambient Fan Cycling Thermostat Settings

NUMBER OF FANS ON CONDENSER	**DESIGN T.D. °F** *(°C)*	**THERMOSTAT SETTINGS * °F** *(°C)*	
SINGLE ROW MODELS		**1st STAGE**	**2nd STAGE**
2	**30** *(16.7)* **25** *(13.9)* **20** *(11.1)* **15** *(8.3)* **10** *(5.6)*	**60** *(15.6)* **65** *(18.3)* **70** *(21.1)* **75** *(23.9)* **80** *(26.7)*	
3	**30** *(16.7)* **25** *(13.9)* **20** *(11.1)* **15** *(8.3)* **10** *(5.6)*	**60** *(15.6)* **65** *(18.3)* **70** *(21.1)* **75** *(23.9)* **80** *(26.7)*	**40** *(4.4)* **55** *(12.8)* **60** *(15.6)* **65** *(18.3)* **75** *(23.9)*

* NOTE: These are typical settings. Further adjustments may be necessary to suit actual field conditions.

LOW AMBIENT OPERATION
WINTER OPERATION CHARGE - FLOODED CONDENSER WITH FAN CYCLING

Design TD = 25

MODEL	FANS LONG	REFRIGERANT CHARGE				ADDITIONAL WINTER CHARGE - USING FAN CYCLING (2 and 3 FAN) and FLOODED CONTROLS									
						AMBIENT TEMP. - ° F *(°C)*									
		90% FULL		SUMMER		40 *(-4.4)*		20 *(-6.7)*		0 *(-18)*		-20 *(-29)*		-40 *(-40)*	
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*
002	1	3.0	*(1.4)*	0.7	*(0.3)*	0.6	*(0.3)*	0.9	*(0.4)*	1.0	*(0.4)*	1.0	*(0.5)*	1.1	*(0.5)*
003	1	4.8	*(2.2)*	1.1	*(0.5)*	1.0	*(0.4)*	1.4	*(0.6)*	1.5	*(0.7)*	1.7	*(0.8)*	1.8	*(0.8)*
005	1	6.7	*(3.1)*	1.5	*(0.7)*	1.3	*(0.6)*	2.0	*(0.9)*	2.2	*(1.0)*	2.4	*(1.1)*	2.5	*(1.1)*
006	1	9.8	*(4.5)*	2.2	*(1.0)*	2.0	*(0.9)*	2.8	*(1.3)*	3.1	*(1.4)*	3.4	*(1.6)*	3.6	*(1.6)*
008	1	14.7	*(6.6)*	3.3	*(1.5)*	2.9	*(1.3)*	4.2	*(1.9)*	4.7	*(2.1)*	5.1	*(2.3)*	5.4	*(2.5)*
010	2	14.4	*(6.5)*	3.2	*(1.5)*	0.0	*(0.0)*	2.4	*(1.1)*	4.2	*(1.9)*	5.0	*(2.3)*	5.8	*(2.6)*
012	2	20.6	*(9.3)*	4.6	*(2.1)*	0.0	*(0.0)*	3.5	*(1.6)*	6.0	*(2.7)*	7.2	*(3.3)*	8.2	*(3.7)*
014	2	27.9	*(12.7)*	6.2	*(2.8)*	0.0	*(0.0)*	4.7	*(2.2)*	8.1	*(3.7)*	9.8	*(4.4)*	11.2	*(5.1)*
016	2	27.9	*(12.7)*	6.2	*(2.8)*	0.0	*(0.0)*	4.7	*(2.2)*	8.1	*(3.7)*	9.8	*(4.4)*	11.2	*(5.1)*
019	3	31.8	*(14.4)*	7.1	*(3.2)*	0.0	*(0.0)*	1.6	*(0.7)*	1.6	*(0.7)*	9.5	*(4.3)*	11.1	*(5.0)*
024	3	41.8	*(19.0)*	9.3	*(4.2)*	0.0	*(0.0)*	2.1	*(0.9)*	2.1	*(0.9)*	12.5	*(5.7)*	14.6	*(6.6)*

NOTES:

To determine Winter Charge, ADD the sum of the Summer Charge and the Additional Winter Charge.
For R404A and R507 use R22 charge x 0.87

Design TD = 20

MODEL	FANS LONG	REFRIGERANT CHARGE				ADDITIONAL WINTER CHARGE - USING FAN CYCLING (2 and 3 FAN) and FLOODED CONTROLS									
						AMBIENT TEMP. - ° F *(°C)*									
		90% FULL		SUMMER		40 *(-4.4)*		20 *(-6.7)*		0 *(-18)*		-20 *(-29)*		-40 *(-40)*	
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*
002	1	3.0	*(1.4)*	0.7	*(0.3)*	0.7	*(0.3)*	1.0	*(0.4)*	1.0	*(0.5)*	1.1	*(0.5)*	1.2	*(0.5)*
003	1	4.8	*(2.2)*	1.1	*(0.5)*	1.2	*(0.5)*	1.5	*(0.7)*	1.7	*(0.8)*	1.8	*(0.8)*	1.9	*(0.8)*
005	1	6.7	*(3.1)*	1.5	*(0.7)*	1.7	*(0.8)*	2.2	*(1.0)*	2.3	*(1.1)*	2.5	*(1.1)*	2.6	*(1.2)*
006	1	9.8	*(4.5)*	2.2	*(1.0)*	2.5	*(1.1)*	3.1	*(1.4)*	3.4	*(1.5)*	3.6	*(1.6)*	3.8	*(1.7)*
008	1	14.7	*(6.6)*	3.3	*(1.5)*	3.7	*(1.7)*	4.7	*(2.1)*	5.1	*(2.3)*	5.4	*(2.5)*	5.6	*(2.6)*
010	2	14.4	*(6.5)*	3.2	*(1.5)*	1.2	*(0.6)*	3.7	*(1.7)*	4.2	*(1.9)*	5.6	*(2.5)*	6.3	*(2.8)*
012	2	20.6	*(9.3)*	4.6	*(2.1)*	1.7	*(0.8)*	5.3	*(2.4)*	6.0	*(2.7)*	8.0	*(3.6)*	8.9	*(4.1)*
014	2	27.9	*(12.7)*	6.2	*(2.8)*	2.4	*(1.1)*	7.3	*(3.3)*	8.1	*(3.7)*	10.9	*(4.9)*	12.1	*(5.5)*
016	2	27.9	*(12.7)*	6.2	*(2.8)*	2.4	*(1.1)*	7.3	*(3.3)*	8.1	*(3.7)*	10.9	*(4.9)*	12.1	*(5.5)*
019	3	31.8	*(14.4)*	7.1	*(3.2)*	0.0	*(0.0)*	6.0	*(2.7)*	6.7	*(3.0)*	11.3	*(5.1)*	12.7	*(5.8)*
024	3	41.8	*(19.0)*	9.3	*(4.2)*	0.0	*(0.0)*	7.9	*(3.6)*	8.8	*(4.0)*	14.8	*(6.7)*	16.7	*(7.6)*

NOTES:

To determine Winter Charge, ADD the sum of the Summer Charge and the Additional Winter Charge.
For R404A and R507 use R22 charge x 0.87

LOW AMBIENT OPERATION
WINTER OPERATION CHARGE - FLOODED CONDENSER WITH FAN CYCLING

Design TD = 15

MODEL	FANS LONG	REFRIGERANT CHARGE				ADDITIONAL WINTER CHARGE - USING FAN CYCLING (2 and 3 FAN) and FLOODED CONTROLS									
						AMBIENT TEMP. - ° F *(°C)*									
		90% FULL		SUMMER		40 *(-4.4)*		20 *(-6.7)*		0 *(-18)*		-20 *(-29)*		-40 *(-40)*	
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*
002	1	3.0	*(1.4)*	0.7	*(0.3)*	0.9	*(0.4)*	1.1	*(0.5)*	1.1	*(0.5)*	1.2	*(0.5)*	1.2	*(0.6)*
003	1	4.8	*(2.2)*	1.1	*(0.5)*	1.5	*(0.7)*	1.7	*(0.8)*	1.8	*(0.8)*	1.9	*(0.9)*	2.0	*(0.9)*
005	1	6.7	*(3.1)*	1.5	*(0.7)*	2.1	*(0.9)*	2.4	*(1.1)*	2.6	*(1.2)*	2.7	*(1.2)*	2.8	*(1.3)*
006	1	9.8	*(4.5)*	2.2	*(1.0)*	3.0	*(1.4)*	3.5	*(1.6)*	3.7	*(1.7)*	3.9	*(1.8)*	4.0	*(1.8)*
008	1	14.7	*(6.6)*	3.3	*(1.5)*	4.5	*(2.1)*	5.2	*(2.4)*	5.6	*(2.5)*	5.9	*(2.7)*	6.0	*(2.7)*
010	2	14.4	*(6.5)*	3.2	*(1.5)*	3.5	*(1.6)*	4.9	*(2.2)*	5.8	*(2.6)*	6.5	*(2.9)*	6.9	*(3.1)*
012	2	20.6	*(9.3)*	4.6	*(2.1)*	4.9	*(2.2)*	7.0	*(3.2)*	8.2	*(3.7)*	9.3	*(4.2)*	9.9	*(4.5)*
014	2	27.9	*(12.7)*	6.2	*(2.8)*	6.7	*(3.0)*	9.5	*(4.3)*	11.2	*(5.1)*	12.6	*(5.7)*	13.4	*(6.1)*
016	2	27.9	*(12.7)*	6.2	*(2.8)*	6.7	*(3.0)*	9.5	*(4.3)*	11.2	*(5.1)*	12.6	*(5.7)*	13.4	*(6.1)*
019	3	31.8	*(14.4)*	7.1	*(3.2)*	5.4	*(2.5)*	9.9	*(4.5)*	12.2	*(5.6)*	14.0	*(6.3)*	14.9	*(6.8)*
024	3	41.8	*(19.0)*	9.3	*(4.2)*	7.1	*(3.2)*	13.0	*(5.9)*	16.1	*(7.3)*	18.4	*(8.3)*	19.7	*(8.9)*

NOTES:

To determine Winter Charge, ADD the sum of the Summer Charge and the Additional Winter Charge.
For R404A and R507 use R22 charge x 0.87

Design TD = 10

MODEL	FANS LONG	REFRIGERANT CHARGE				ADDITIONAL WINTER CHARGE - USING FAN CYCLING (2 and 3 FAN) and FLOODED CONTROLS									
						AMBIENT TEMP. - ° F *(°C)*									
		90% FULL		SUMMER		40 *(-4.4)*		20 *(-6.7)*		0 *(-18)*		-20 *(-29)*		-40 *(-40)*	
		LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*	LBS	*(kg)*
002	1	3.0	*(1.4)*	0.7	*(0.3)*	1.1	*(0.5)*	1.2	*(0.5)*	1.2	*(0.6)*	1.3	*(0.6)*	1.3	*(0.6)*
003	1	4.8	*(2.2)*	1.1	*(0.5)*	1.7	*(0.8)*	1.9	*(0.9)*	2.0	*(0.9)*	2.0	*(0.9)*	2.0	*(0.9)*
005	1	6.7	*(3.1)*	1.5	*(0.7)*	2.4	*(1.1)*	2.6	*(1.2)*	2.8	*(1.3)*	2.8	*(1.3)*	2.9	*(1.3)*
006	1	9.8	*(4.5)*	2.2	*(1.0)*	3.5	*(1.6)*	3.8	*(1.7)*	4.0	*(1.8)*	4.1	*(1.9)*	4.2	*(1.9)*
008	1	14.7	*(6.6)*	3.3	*(1.5)*	5.2	*(2.4)*	5.7	*(2.6)*	6.0	*(2.7)*	6.2	*(2.8)*	6.2	*(2.8)*
010	2	14.4	*(6.5)*	3.2	*(1.5)*	5.3	*(2.4)*	6.5	*(2.9)*	7.1	*(3.2)*	7.6	*(3.5)*	8.1	*(3.7)*
012	2	20.6	*(9.3)*	4.6	*(2.1)*	7.5	*(3.4)*	9.3	*(4.2)*	10.1	*(4.6)*	10.9	*(4.9)*	11.5	*(5.2)*
014	2	27.9	*(12.7)*	6.2	*(2.8)*	10.2	*(4.6)*	12.6	*(5.7)*	13.7	*(6.2)*	14.8	*(6.7)*	15.6	*(7.1)*
016	2	27.9	*(12.7)*	6.2	*(2.8)*	10.2	*(4.6)*	12.6	*(5.7)*	13.7	*(6.2)*	14.8	*(6.7)*	15.6	*(7.1)*
019	3	31.8	*(14.4)*	7.1	*(3.2)*	10.6	*(4.8)*	13.7	*(6.2)*	15.4	*(7.0)*	16.5	*(7.5)*	17.8	*(8.1)*
024	3	41.8	*(19.0)*	9.3	*(4.2)*	14.0	*(6.4)*	18.0	*(8.2)*	20.3	*(9.2)*	21.7	*(9.9)*	23.4	*(10.6)*

NOTES:

To determine Winter Charge, ADD the sum of the Summer Charge and the Additional Winter Charge.
For R404A and R507 use R22 charge x 0.87

INSTALLATION

INSPECTION

A thorough inspection of the equipment, including all component parts and accessories, should be made immediately upon delivery. Any damage caused in transit, or missing parts, should be reported to the carrier at once. The consignee is responsible for making any claim for losses or damage. Electrical characteristics should also be checked at this time to ensure that they are correct.

LOCATION

Before handling and placing the unit into position a review of the most suitable location must be made. This condenser is designed for outdoor installation.
A number of factors must be taken into consideration when selecting a location. Most important is the provision for a supply of ambient air to the condenser, and removal of heated air from the condenser area.
Higher condensing temperatures, decreased performance, and the possibility of equipment failure may result from inadequate air supply.
Other considerations include:

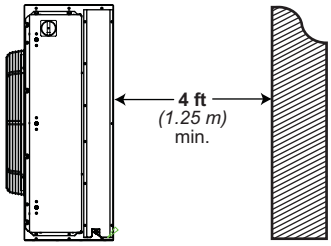
1. Customer requests
2. Loading capacity of the roof or floor.
3. Distance to suitable electrical supply.
4. Accessibility for maintenance.
5. Local building codes.
6. Adjacent buildings relative to noise levels.

Horizontal Air Discharge

(Standard Shipping Configuration)

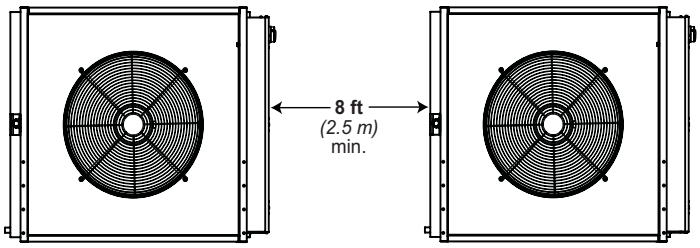
WALLS OR OBSTRUCTIONS

All sides of the unit must be a minimum of **4 feet** *(1.25 m)* away from any wall or obstruction. Overhead obstructions are not permitted. If enclosed by three walls, the condenser must be installed as indicated for units in a pit.



MULTIPLE UNITS

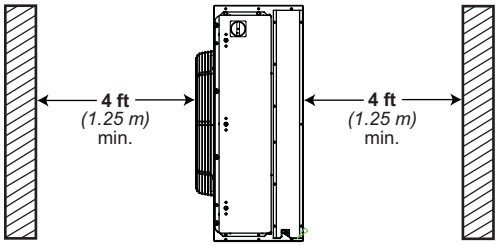
A minimum of **8 feet** *(2.5 m)* is required between multiple units placed side by side. If placed end to end, the minimum distance between units is **4 feet** *(1.25 m)*.



Note: Units shown without optional mounting legs

LOUVERS/FENCES

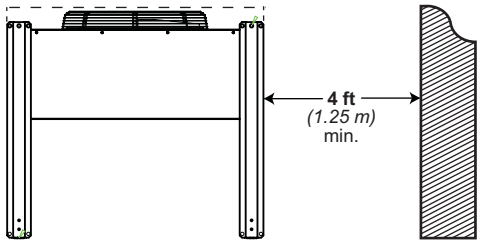
Louvers/fences must have a minimum of 80% free area and **4 feet** *(1.25 m)* minimum clearance between the unit and louvers/fence. Height of louver/fence must not exceed top of unit.



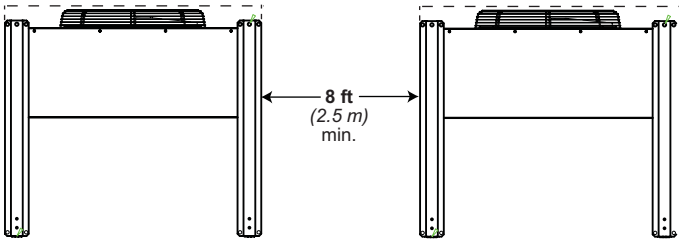
INSTALLATION

Vertical Air Discharge
(Requires Optional Mounting Leg Kit)

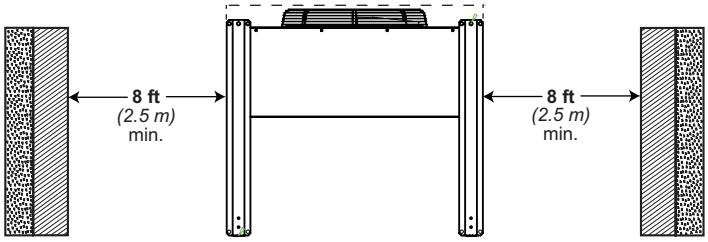
WALLS OR OBSTRUCTIONS
All sides of the unit must be a minimum of **4 feet** *(1.25 m)* away from any wall or obstruction. Overhead obstructions are not permitted. If enclosed by three walls, the condenser must be installed as indicated for units in a pit.



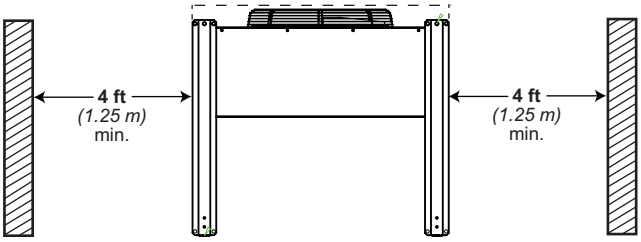
MULTIPLE UNITS
A minimum of **8 feet** *(2.5 m)* is required between multiple units placed side by side. If placed end to end, the minimum distance between units is **4 feet** *(1.25 m)*.



UNITS IN PITS
The top of the condenser must be level with, or above the top of the pit. In addition, a minimum of **8 feet** *(2.5 m)* is required between the unit and the pit walls.



LOUVERS/FENCES
Louvers/fences must have a minimum of 80% free area and **4 feet** *(1.25 m)* minimum clearance between the unit and louvers/fence. Height of louver/fence must not exceed top of unit.



Note: Units shown with optional mounting legs

PLACEMENT
Once a suitable location is selected ensure all the remote mounting parts (legs and hardware) are available. Refer to Fig.1b (P. 19) and the dimensional data on page 6 for the leg mounting locations.

INSTALLATION

Fig. 1 - LIFTING / OPTIONAL LEG INSTRUCTIONS

Fig. 1a - LIFTING POSITIONS FOR HORIZONTAL AIR FLOW CONFIGURATION

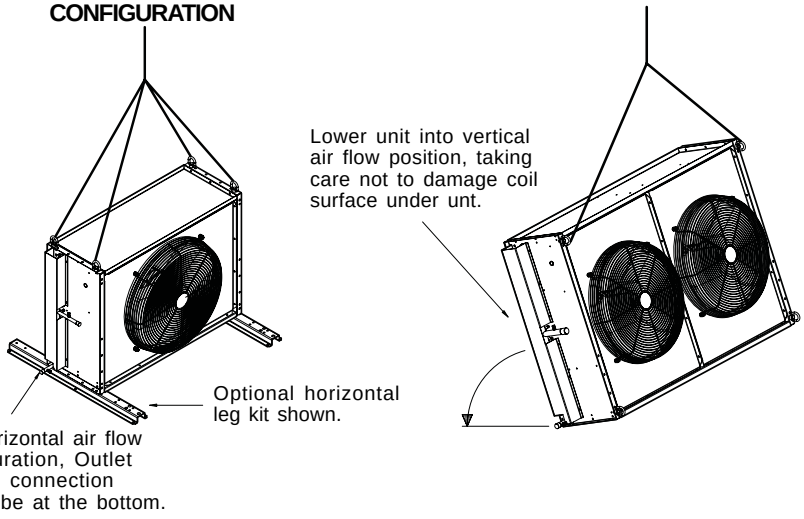
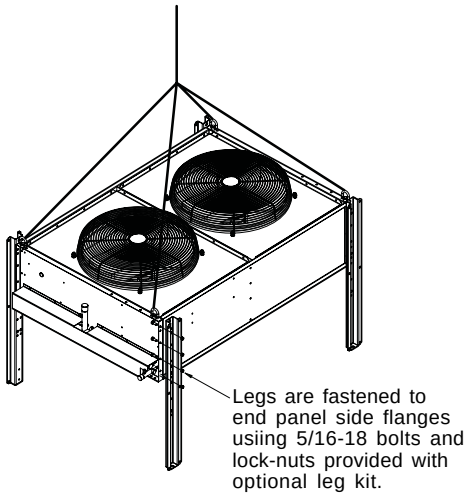


Fig. 1b - LIFTING POSITIONS FOR MOVING INTO VERTICAL AIR FLOW POSITION



Air cooled condensers are large, heavy mechanical equipment and must be handled as such. A fully qualified and properly equipped crew with necessary rigging should be engaged to set the condenser into position. Lifting brackets or holes have been provided at the corners for attaching lifting slings. Spreader bars must be used when lifting so that the lifting force must be applied vertically. **Under no circumstances should the coil headers or return bends be used in lifting or moving the condenser.**

Ensure the unit is placed in a level position (to ensure proper drainage of liquid refrigerant and oil). The legs should be securely anchored to the building structure, sleeper or concrete pad. The weight of the condenser is not enough to hold in place during a strong wind, **the legs must be anchored.**

REFRIGERANT PIPING

All refrigeration piping must be installed by a qualified refrigeration mechanic. The importance of correct refrigerant pipe sizing and layout cannot be over-emphasized. Failure to observe proper refrigerant piping practices can result in equipment failure which may not be covered under warranty.

All air cooled condensers are supplied complete with headers and refrigerant connections sized for connecting to standard refrigeration tubing.These connections may not be the same as the actual line sizes required for the field installation. Refer to a recognized source (ASHRAE charts, manufacturer's engineering manuals etc.) for line sizing.

DISCHARGE LINES

Discharge lines should be designed to minimize refrigerant pressure drop, since high pressure losses increase the required compressor horsepower per ton of refrigeration.

Discharge lines must be pitched away from the compressor to ensure proper drainage of oil being carried in the line.

A discharge check-valve at the bottom of a vertical riser will prevent oil (and liquid refrigerant) from draining back to the compressor during the off-cycle. When the vertical lift exceeds **30 feet** *(9 m)*, insert close-coupled traps in the riser at **30 feet** *(9 m)* intervals.

An alternate method of handling the oil problem would be the addition of an oil separator see Figure 3 (b).

A reverse trap should be installed at the top of all vertical risers. The top of the reverse trap should be the highest point in the discharge line and should have an access valve installed to allow the reclaimation of non-condensible gas from the system.

Pulsation of the hot gas in the discharge line is an inherent characteristic of systems utilizing reciprocating compressors. The discharge line must be rigidly supported along its entire length to prevent transmission of vibration and movement of the line.

CONDENSATE LINES

The condensate line must be designed to allow free drainage of refrigerant from the condenser coil to the receiver. Refer to Fig. 4 for typical condensate line piping when utilizing head pressure regulating valves.

INSTALLATION

TYPICAL SYSTEM PIPING

Fig. 2 - 5

Figure 2 - Single Circuit

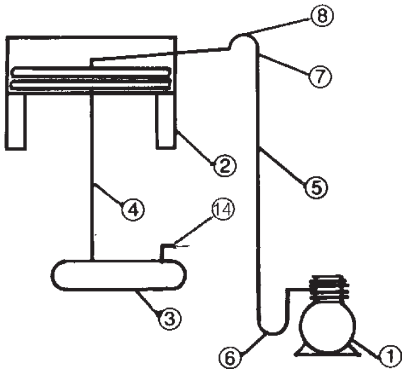


Figure 3(a) - Single circuit with double discharge riser (may be required with capacity control)

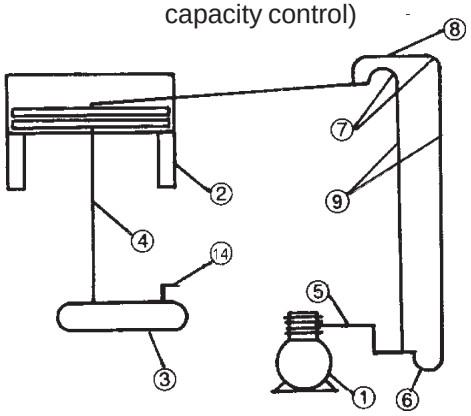


Figure 3(b) - Single circuit with Oil Separator (may be required with capacity control)

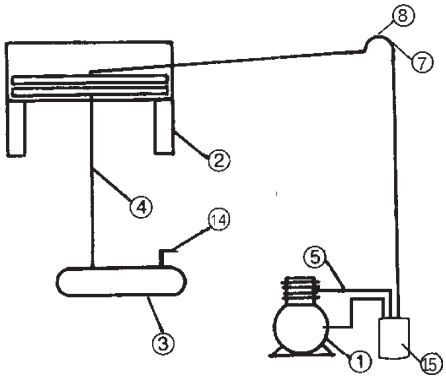


Figure 4 - Single circuit regulator valve head pressure control

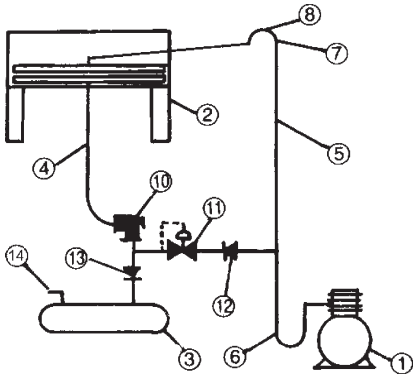
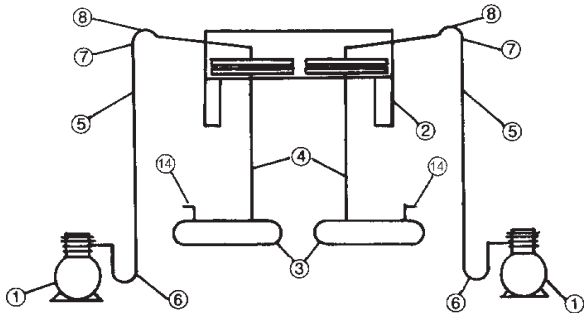


Figure 5 - Multiple circuits



LEGEND
1 - Compressor
2 - Air Cooled Condenser
3 - Receiver
4 - Condensate Line
5 - Discharge Line
6 - Trap-minimum 18" *(157 mm)*
7 - Reverse Trap-minimum 6" *(152 mm)*
8 - Access Schrader Valve
9 - Double Discharge Riser
10 - Head Pressure Regulator (open on rise of inlet)
11 - Receiver Pressure Regulator Valve (opens on rise of differential)
12 - Check Valve "A"
13 - Check Valve "B"
14 - Receiver Relief Valve
15 - Oil Separator

ELECTRICAL WIRING

All wiring and connections to the air cooled condenser must be made in accordance with the National Electrical Code and all local codes and regulations. Any wiring diagrams shown are basic and do not necessarily include electrical components which must be field supplied. (see pages 7-10 for typical wiring diagrams). Refer to the Electrical Specifications table on page 3 for voltage availability and entering service requirements.

SYSTEM START-UP CHECKS

1. Check the electrical characteristics of all components to be sure they agree with the power supply.
2. Check tightness of all fans and motor mounts.
3. Check tightness of all electrical connections.
4. Upon start-up, check fans for correct rotation. Air is drawn through the condenser coil. To change rotation on 3 phase units reverse any two (2) fan motor leads.
5. All system piping must be thoroughly leak checked before a refrigerant charge is introduced.

MAINTENANCE

A semi annual inspection should be carried out by a qualified refrigeration service mechanic. The main power supply must be disconnected.

1. Check electrical components. Tighten any loose connections.
2. Check control capillary tubes and lines for signs of wear due to excessive vibration or rubbing on metal parts. Secure if necessary.
3. Check tightness of all fans and motor mounts. Remove any deposits which could effect fan balance. Note: Fan motors are permanently lubricated and require only visual inspection.
4. Clean the condenser coil using a soft brush or by flushing with cool water or coil cleansers available through NRP (National Refrigeration Products Inc.)
5. Update service log information (back page of service manual)

GENERIC SERVICE PARTS

50Hz

DESCRIPTION	FOR MODEL #	PART #
FAN MOTOR - 200-220/1/50	002 & 003	1084927
FAN MOTOR - 380-400/1/50		1084928
CAPACITOR - RUN 7.5 MFD @ 440V		1042778-001
MOTOR MOUNT		1085052
FAN GUARD		1085053
FAN BLADE		1084884
FAN MOTOR - 200-220 / 380-400 /1/50	005 - 024	1084930
CAPACITOR - RUN 5 MFD @ 440V		1047244
MOTOR MOUNT		1085050
FAN GUARD		1085051
FAN BLADE		1084885
SLINGER	ALL	1085265

OPTIONAL LEG KITS PART NUMBERS

FOR MODEL #	PART NUMBER	
	HORIZONTAL AIR DISCHARGE	VERTICAL AIR DISCHARGE
002 - 016	1085144-002	1085144-004
019 & 024	1085144-003	1085144-006

NOTES

FINISHED GOODS WARRANTY

The terms and conditions as described below in the General Warranty Policy cover all products manufactured by National Refrigeration.

GENERAL WARRANTY POLICY

Subject to the terms and conditions hereof, the Company warrants all Products, including Service Parts, manufactured by the Company to be free of defects in material or workmanship, under normal use and application for a period of one (1) year from the original date of installation, or eighteen (18) months from the date of shipment from the Company, whichever occurs first. Any replacement part(s) so supplied will be warranted for the balance of the product's original warranty. The part(s) to be replaced must be made available in exchange for the replacement part(s) and reasonable proof of the original installation date of the product must be presented in order to establish the effective date of the warranty, failing which, the effective date will be based upon the date of manufacture plus thirty (30) days. Any labour, material, refrigerant, transportation, freight or other charges incurred in connection with the performance of this warranty will be the responsibility of the owner at the current rates and prices then in effect. This warranty may be transferred to a subsequent owner of the product.

THIS WARRANTY DOES NOT COVER

(a) Damages caused by accident, abuse, negligence, misuse, riot, fire, flood, or Acts of God (b) damages caused by operating the product in a corrosive atmosphere (c) damages caused by any unauthorized alteration or repair of the system affecting the product's reliability or performance (d) damages caused by improper matching or application of the product or the product's components (e) damages caused by failing to provide routine and proper maintenance or service to the product (f) expenses incurred for the erecting, disconnecting, or dismantling the product (g) parts used in connection with normal maintenance, such as filters or belts (h) products no longer at the site of the original installation (i) products installed or operated other than in accordance with the printed instructions, with the local installation or building codes and with good trade practices (j) products lost or stolen.

No one is authorized to change this WARRANTY or to create for or on behalf of the Company any other obligation or liability in connection with the Product(s). There is no other representation, warranty or condition in any respect, expressed or implied, made by or binding upon the Company other than the above or as provided by provincial or state law and which cannot be limited or excluded by such law, nor will we be liable in any way for incidental, consequential, or special damages however caused.

The provisions of this additional written warranty are in addition to and not a modification of or subtraction from the statutory warranties and other rights and remedies provided by Federal, Provincial or State laws.

PROJECT INFORMATION

System	
Model Number	Date of Start-Up
Serial Number	Service Contractor
Refrigerant	Phone
Electrical Supply	Fax

“AS BUILT” SERVICE PARTS

Service Parts List
Label
To Be Attached
HERE

KeepRite® REFRIGERATION

NATIONAL REFRIGERATION &
AIR CONDITIONING CANADA CORP.

c UL us

CANADA
159 ROY BLVD., BRANTFORD, ONTARIO, CANADA N3R 7K1
PHONE: 1-800-463-9517 (519)751-0444 FAX (519)753-1140

USA
985 WHEELER WAY, LANGHORNE, PA. 19047 USA
PHONE:1-888-KEEPUS1 OR 1-888-533-7871