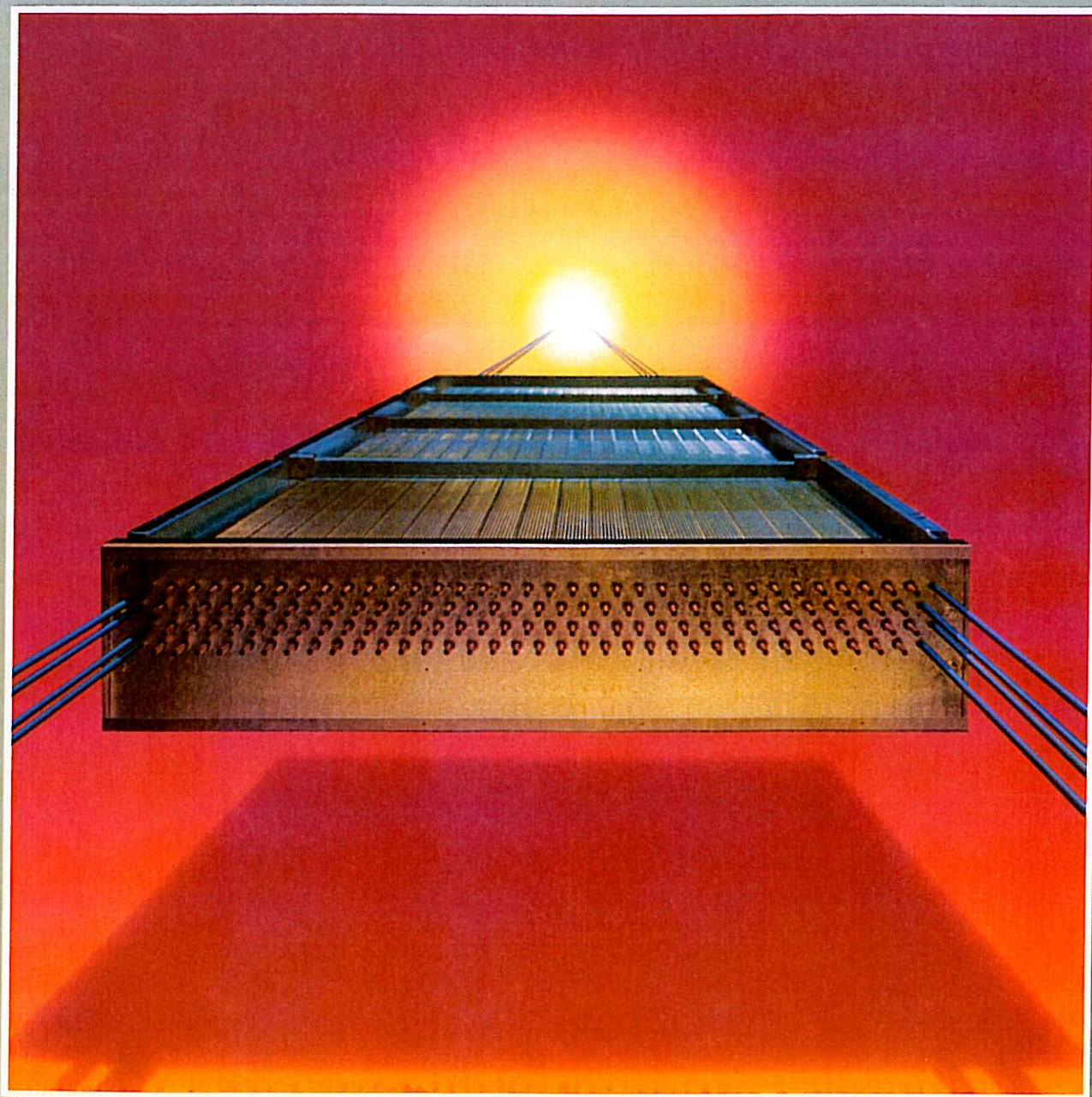


# HLC Series LEVITOR™ Suspended Coil System

(for direct drive remote air-cooled condensers)

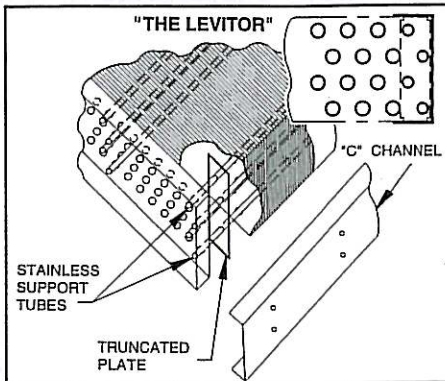


UL listed with 8, 10, 12 fins/inch in vertical and horizontal air discharge models. Low ambient fan cycling.

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**HUSSMANN®**

# The LEVTOR™ system addresses the problem of refrigerant coil wear and leaks due to vibration and thermal stress.



Roof-top condensers have to operate in some of the toughest conditions imaginable. Temperature extremes result in constant expansion and contraction of refrigerant tubes as fans cycle and loads vary. The consequences are costly: rapid tube wear results in leaks, system breakdown and loss of costly refrigerant.

We have the answer.

## LEVITOR Coil Design Eliminates Refrigerant Tube Wear

Environmental concerns and spiraling costs of refrigerants have led to the development of direct drive remote air-cooled condensers with the LEVTOR coil support system. This innovative design uses dedicated stainless steel tubes and a unique coil support system to isolate refrigerant tubes from the unit. Coil support is transferred from the fins to the stainless tubes and truncated tube plates which ride freely in "C" channels. Tubes expand and contract without interference. The result: contact and friction wear is eliminated.

## Quiet by Design

LEVITOR coil design does more than just eliminate tube wear. Sound reduction is an added benefit. Unlike traditional air-cooled condensers, fan and coil vibration is isolated from the cabinet, so it is not transmitted to the unit frame and building supports.

## Exclusive 3-year Limited Warranty

We're so confident about our new suspended coil design that it is protected by a 3-year limited warranty on workmanship and material. It gives you extra protection from premature tube wear. See bulletin W-1 for complete warranty.

## Computerized Circuiting

How do you keep pace with the new refrigerants and environmental regulations? We can help. Our computerized coil circuiting program is designed to minimize the condenser refrigerant charge and maximize sub-cooling. Every condenser will be custom circuiting to precisely meet your application needs. See order requirements.

## Modular Design

Arranged for vertical and horizontal air discharge. Multi-fan sections compartmented to allow individual fan cycling while preventing off-fan "windmilling." Large clean-out access doors standard.

## Corrosion Resistant

Module A has a textured aluminum housing. Larger capacity models employ mill galvanized steel fan sections and coil side baffles. Legs are heavy mill galvanized steel.

## Optional Hinged Top

It's easy. Just loosen two captive bolts and the condenser opens wide for coil, motor and fan service. Each optional hinged venturi fan panel is secured by convenient locking control rods during cleaning or service work.

## High Efficiency Coil

Copper tubes are mechanically expanded into corrugated full collared aluminum fins spaced 8, 10 or 12 per inch. Coils are pressure tested under water with 400 psig air, evacuated to 500 microns, shipped pressurized with dry nitrogen.

Optional fin materials are copper and heresite or polyester coated aluminum. Multi-circuiting coils are optional. Liquid sub-cooling circuits are available.

## Direct Driven Propeller Fans

Quiet multi-bladed propeller fans provide uniform air distribution through the coil. Venturi fan orifices optimize efficiency.

## Weather Resistant Fan Motors

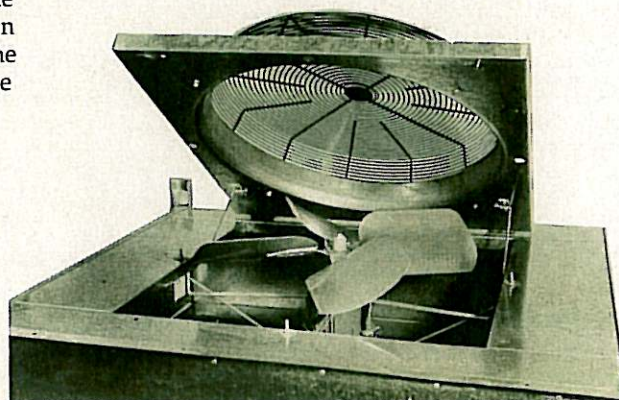
Outdoor condenser motors designed with ball bearings; inherent overheat protection in each phase; shaft slingers; enclosure, hardware, and lubrication for all weather conditions. Each motor lead is wired to terminals in an electrical enclosure.

## Versatile Head Pressure Control Fan Cycling Control Methods:

- Thermal Fantrol
- Pressure Fantrol
- Thermal Pressure Fantrol
- Variable Speed Fantrol
- Gravity Dampers

## Refrigerant Flooding Control Methods:

- Holdback
- Dual Holdback
- Combination Fantrol Holdback



# System Selection

## THR Total Heat of Rejection

Condenser total heat of rejection (BTUH) is the sum of the evaporator refrigeration effect and the heat of compression which varies with compressor type and operating conditions.

## THR Calculation Method

THR = Open Reciprocating Compressor Capacity (BTUH) + (2545 x BHP)

THR = Suction Gas Cooled Hermetic Reciprocating Compressor Capacity (BTUH) + (3413 x KW)

## THR Estimated Method

THR may be estimated by multiplying the rated compressor BTUH capacity by the compressor operating condition factor shown in the proper table. Multiply result by altitude factor when applicable.

Table 1

Evaporator Temp. (F)	Hermetic Compressor					
	Condensing Temperature (F)					
	90	100	110	120	130	140
-40	1.66	1.73	1.80	2.00	*	*
-30	1.57	1.62	1.68	1.80	*	*
-20	1.49	1.53	1.58	1.65	*	*
-10	1.42	1.46	1.50	1.57	1.64	*
0	1.36	1.40	1.44	1.50	1.56	1.62
5	1.33	1.37	1.41	1.46	1.52	1.59
10	1.31	1.34	1.38	1.43	1.49	1.55
15	1.28	1.32	1.35	1.40	1.46	1.52
20	1.26	1.29	1.33	1.37	1.43	1.49
25	1.24	1.27	1.31	1.35	1.40	1.45
30	1.22	1.25	1.28	1.32	1.37	1.42
40	1.18	1.21	1.24	1.27	1.31	1.35
50	1.14	1.17	1.20	1.23	1.26	1.29

\*Beyond the normal limits for single stage compressor application.

Table 2

Evaporator Temp. (F)	Open Compressor					
	Condensing Temperature (F)					
	90	100	110	120	130	140
-30	1.37	1.42	1.47	*	*	*
-20	1.33	1.37	1.42	1.47	*	*
-10	1.28	1.32	1.37	1.42	1.47	*
0	1.24	1.28	1.32	1.37	1.41	1.47
10	1.21	1.24	1.28	1.32	1.36	1.42
20	1.17	1.20	1.24	1.28	1.32	1.37
30	1.14	1.17	1.20	1.24	1.27	1.32
40	1.12	1.15	1.17	1.20	1.23	1.28
50	1.09	1.12	1.14	1.17	1.20	1.24

Table 2

Feet	Altitude		Feet	Factor
	Factor	Feet		
1000	1.02	5000	1.12	
2000	1.05	6000	1.15	
3000	1.07	7000	1.17	
4000	1.10	8000	1.20	

## Multi-Circuit Selection

Condenser coils may be divided into many individual refrigerant circuits or systems; each sized for a specified refrigerant, THR capacity and TD. Systems are tagged for identification from left to right; facing the connection end.

Unless specified, ODS connections will be sized in accordance with Refrigerant Line Capacity Data - Applications Section.

Avoid locating high TD sections next to low TD sections. Add excess circuits to low TD sections next to high TD sections. Add excess circuits to outboard sections.

Thermal Fantrol fan cycling is recommended with multi-circuited condensers. Holdback flooding control kits may be field installed in each system liquid drain.

## Sample Calculation

### 95°F Ambient - Suction Cooled Semi-Hermetic Reciprocating Compressors

COMP NOM HP	DESIGN TD °F	SAT SUCT °F	SAT COND °F	NET BTUH	COMPRESSOR RATING		BASED ON R22 AT 15° TD						SYSTEM ACTUAL					
					MOTOR KW	TOTAL BTUH	REF FACTOR	TD FACTOR	SELECT THR	CIR-CUITS REQ'D	CIR-CUITS	NUMBER L TO R	TD °F					
6	134a	15	20	110	40090	4.3	14676	54766	X	1.06	X	1.0	=	58051	3.84	4	1	14.4
9	404a	10	-20	105	45900	8.1	27645	73545	X	1.03	X	1.5	=	113627	7.52	8	2	9.4
10	404a	10	-20	105	50640	9.6	32765	83405	X	1.03	X	1.5	=	128860	8.52	9	3	9.5
10	22	15	+25	110	104000	9.7	33106	137106	X	1.00	X	1.0	=	137106	9.10	9	4	15.2

UNITS THR REQ'D: 437644

30

## Selection

- LCVB-7410 Rated at THR of 477 MBH with R-22 at 15°TD Having 10 fins/in. Rating for 8 fins/in. is 0.95 x 477 = 453.2 MBH for LCVB-7408.
- LCVB Unit Lists 30 Available Circuits
- From Sample Calculation THR Req'd./Circuit = 437644 ÷ 30 = 14588.
- LCVB-7408 = 453,200 ÷ 30 = 15107 Available THR/Circuit.

- Circuits Req'd. = Select THR ÷ THR/Circuit. Example: 113627 ÷ 15107 = 7.52 Circuits
- Assign Number of Circuits/System and System Number Left to Right.
- Actual TD = (Circuits Req'd ÷ Assign Circuit) x Design TD. Example: (7.52 ÷ 8) x 10 = 9.4

FIN FACTOR
8-F/in.-0.95
10-F/in.-1.00
12-F/in.-1.04

TD FACTOR
10°-1.50
15°-1.00
20°-0.75
25°-0.60

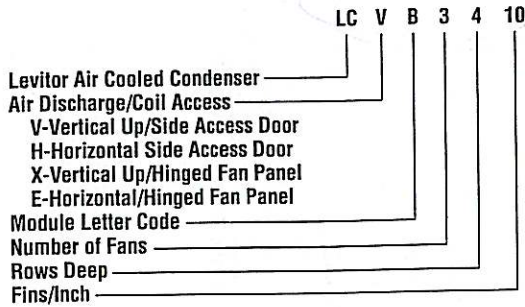
REF. FACTOR
R22-1.00
*R134a-1.06
**R404a-1.03

\*Usable for R12  
\*\*Usable for R502a, R507a

# Specifications 18" & 24" Fans

MODULE LETTER CODE						
ONE FAN WIDE	HP	RPM	FAN DIAM	SUR- FACE	FACE	TUBES
A	¼	1140	18	¾	22	
B	½	1140	24	¾	30	
TWO FANS WIDE						
I	½	1140	24	¾	2 x 30	

## Model Key



## Please Specify:

- Model Number
- Electrical Characteristics
- Total Heat of Rejection—BTUH
- Ambient Temp
- Sat. Cond. Temp or TD
- Refrigerant
- Multi-Circuit Selections

## LCV—VERTICAL UP AIR DISCHARGE LCH—HORIZONTAL AIR DISCHARGE

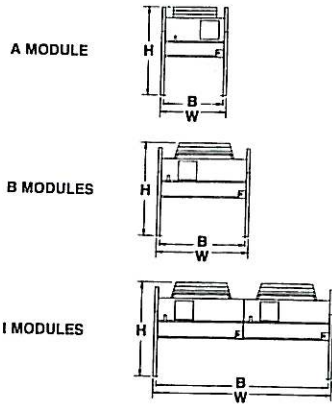
TOTAL HEAT OF REJECTION CAPACITY—BTUH (000 OMITTED)

RATING BASED ON 85-115°F ENTERING AIR TEMPERATURE  
TD IS SATURATED CONDENSING TEMP MINUS ENTERING AIR TEMP

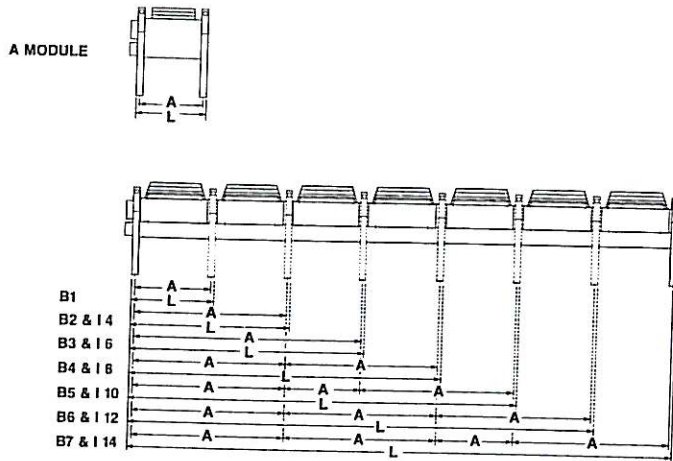
LCV MODEL	QUAN FANS	ROWS DEEP	R22 TD			R404a, R507a TD			AIR FLOW CFM	MAX FLOOD CHARGE LBS.	WEIGHT INCL FLOOD CHARGE LBS.	AVAILABLE CIRCUITS
			10	15	20	10	15	20				
<b>ONE FAN WIDE</b>												
A-1210	1	2	12.5	18.8	25.5	12.2	18.2	24.3	2722	5	170	4
A-1410	1	4	18.0	27.0	36.0	17.5	26.3	35.0	2579	10	200	6
B-1210	1	2	30.2	45.4	60.5	29.4	44.2	58.9	6750	10	181	30
B-1310	1	3	39.4	59.1	78.9	38.4	57.6	76.7	6400	14	185	30
B-1410	1	4	45.4	68.2	90.9	44.2	66.4	88.4	6000	19	200	30
B-2210	2	2	60.5	90.7	121.0	58.9	83.3	117.8	13500	19	352	30
B-2310	2	3	78.9	118.3	157.8	76.7	115.1	153.5	12800	29	372	30
B-2410	2	4	90.9	136.3	181.7	88.4	132.6	176.8	12000	39	400	30
B-3310	3	3	118.3	177.6	236.7	115.1	172.7	230.2	19200	43	559	30
B-3410	3	4	136.3	204.5	272.6	132.6	199.0	265.2	18000	58	600	30
B-4310	4	3	157.8	236.7	315.6	153.5	230.2	307.1	25600	64	840	30
B-4410	4	4	181.7	272.6	363.4	176.8	265.2	353.6	24000	86	900	30
B-5310	5	5	197.2	295.9	394.5	191.9	287.8	383.3	32000	62	861	30
B-5410	5	4	227.1	340.7	454.3	221.0	331.5	441.9	30000	97	950	30
B-6310	6	3	236.7	355.0	473.3	230.2	345.5	460.5	38400	86	1070	30
B-6410	6	4	272.6	408.8	545.1	265.2	397.8	530.4	36000	116	1150	30
B-7310	7	3	276.1	414.2	552.2	268.6	403.0	537.3	44800	107	1349	30
B-7410	7	4	318.0	477.0	636.0	309.4	464.1	618.8	42000	144	1450	30
<b>TWO FANS WIDE</b>												
I-4210	4	2	121.0	181.5	242.0	117.8	176.5	235.4	27000	38	654	60
I-4310	4	4	157.8	236.7	315.6	153.5	230.2	307.1	25600	64	865	60
I-4410	4	4	181.7	272.6	363.4	176.8	265.2	353.6	24000	86	925	60
I-6310	6	3	236.7	355.0	473.3	230.2	345.5	460.6	38400	86	1118	60
I-6410	6	4	272.6	408.8	545.1	265.2	397.8	530.4	36000	116	1225	60
I-8310	8	3	315.6	473.3	631.1	307.1	460.6	614.1	51200	128	1705	60
I-8410	8	4	363.4	545.1	726.8	353.6	530.4	707.1	48000	172	1825	60
I-10310	10	3	394.5	591.7	788.9	383.8	575.7	767.6	64000	124	1722	60
I-10410	10	4	454.3	681.4	908.5	441.9	663.0	884.0	60000	194	1925	60
I-12310	12	3	473.3	710.0	946.7	460.6	690.8	921.2	76800	172	2095	60
I-12410	12	4	545.1	817.7	1090.2	530.4	795.6	1060.8	72000	232	2225	60
I-14310	14	3	552.2	828.3	1104.5	537.3	806.0	1074.7	89600	214	2725	60
I-14410	14	4	636.0	953.9	1271.9	618.8	928.2	1237.5	84000	288	2925	60

# Physical Data 18" & 24" Fans

## HEADER END VIEW



## SIDE VIEWS



## ELECTRICAL DATA

MODEL	DIMENSIONAL DATA					FAN MOTOR TOTAL RATED FULL LOAD AMPS (2)						CONNECTIONS OD IN. (3)	
	L	W	H	A	B	208-1	230-1	460-1	208-3	230-3	460-3	INLET	OUTLET
<b>ONE FAN WIDE</b>													
A-1	33	31	41	30	28 <sup>3</sup> / <sub>8</sub>	1.5	1.5	0.9	—	—	—	7 <sup>1</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>8</sub>
B-1	39	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	36	43	3.2	3.0	1.5	2.8	2.6	1.3	1 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>8</sub>
B-2	75	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	72	43	6.4	6.0	3.0	5.6	5.2	2.6	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>
B-3	111	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	108	43	9.6	9.0	4.5	8.4	7.8	3.9	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>
B-4	147	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72	43	12.8	12.0	6.0	11.2	10.4	5.2	1 <sup>5</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
B-5	183	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	72/36/72	43	16.0	15.0	7.5	14.0	13.0	6.5	2 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>
B-6	219	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72/72	43	19.2	18.0	9.0	16.8	15.6	7.8	2 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>
B-7	262	45 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72/36/72	43	22.4	21.0	10.5	19.6	18.2	9.1	2 <sup>5</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>
<b>TWO FANS WIDE</b>													
I-4	75	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	72	85 <sup>5</sup> / <sub>8</sub>	12.8	12.0	6.0	11.2	10.4	5.2	(2) 1 <sup>3</sup> / <sub>8</sub>	(2) 1 <sup>1</sup> / <sub>8</sub>
I-6	111	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	108	85 <sup>5</sup> / <sub>8</sub>	19.2	18.0	9.0	16.8	15.6	7.8	(2) 1 <sup>3</sup> / <sub>8</sub>	(2) 1 <sup>3</sup> / <sub>8</sub>
I-8	147	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72	85 <sup>5</sup> / <sub>8</sub>	25.6	24.0	12.0	22.4	20.8	10.4	(2) 1 <sup>5</sup> / <sub>8</sub>	(2) 1 <sup>5</sup> / <sub>8</sub>
I-10	183	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	72/36/72	85 <sup>5</sup> / <sub>8</sub>	32.0	30.0	15.0	28.0	26.0	13.0	(2) 2 <sup>1</sup> / <sub>8</sub>	(2) 2 <sup>1</sup> / <sub>8</sub>
I-12	219	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72/72	85 <sup>5</sup> / <sub>8</sub>	38.4	36.0	18.0	33.6	31.2	15.6	(2) 2 <sup>1</sup> / <sub>8</sub>	(2) 2 <sup>1</sup> / <sub>8</sub>
I-14	255	88 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	72/72/36/72	85 <sup>5</sup> / <sub>8</sub>	44.8	42.0	21.0	39.2	36.4	18.2	(2) 2 <sup>5</sup> / <sub>8</sub>	(2) 2 <sup>5</sup> / <sub>8</sub>

#Includes Standard 22" Legs

(2) Minimum Unit Circuit Amps = 1.25 x FLA Of One Motor + FLA Of All Remaining Motors

(2) Maximum Unit Overload Protection = 2.25 + FLA Of All Remaining Motors

(3) Connections are approximate. Exact size is determined by computerized circuiting program.



# Specifications

## 30" Fans

### High Efficiency Models

MODULE LETTER CODE					
ONE FAN WIDE	HP	RPM	FAN DIAM	SUR- FACE	FACE TUBES
F	1	850	30	¾	34
G	1	850	30	½	28
TWO FANS WIDE					
V	1	850	30	¾	2 x 34
W	1	850	30	½	2 x 28

### LCV—VERTICAL UP AIR DISCHARGE

### LCH—HORIZONTAL AIR DISCHARGE

TOTAL HEAT OF REJECTION CAPACITY—BTUH (000 OMITTED)

MODEL MODULE NO FANS ROW DEPTH FINS/INCH	RATING BASED ON 85-115°F ENTERING AIR TEMPERATURE TD IS SATURATED CONDENSING TEMP MINUS ENTERING AIR TEMP								AIR FLOW CFM	MAX FLOOD CHARGE LBS.	WEIGHT INCL FLOOD CHARGE LBS.	AVAILABLE CIRCUITS
	R22 TD				R404a, R507a TD							
	10	15	20	25	10	15	20	25				
<b>ONE FAN WIDE</b>												
F-2310	114.0	171.0	228.0	285.0	110.9	166.4	221.8	277.3	21,938	44	605	34
F-2312	120.5	180.8	241.0	301.3	117.2	175.9	234.5	293.1	21,600	44	645	34
F-2408	126.5	189.8	253.0	316.3	123.1	184.6	246.2	307.7	20,925	60	710	34
F-2410	133.0	199.5	266.0	332.5	129.4	194.1	258.8	323.5	20,250	60	730	34
F-2412	138.5	207.8	277.0	346.3	134.8	202.1	269.5	336.9	19,774	60	770	34
F-3310	171.0	256.5	342.0	427.5	166.4	249.6	332.8	416.0	32,906	66	920	34
F-3312	181.0	271.5	362.0	452.5	176.1	264.2	352.2	440.3	32,400	66	950	34
F-3408	190.0	285.0	380.0	475.0	184.9	277.3	369.7	462.2	31,388	90	1,020	34
F-3410	199.5	299.3	399.0	498.8	194.1	291.2	388.2	485.3	30,375	90	1,050	34
F-3412	208.0	312.0	416.0	520.0	202.4	303.6	404.8	506.0	29,616	90	1,080	34
F-4310	228.0	342.0	456.0	570.0	221.8	332.8	443.7	554.6	43,875	88	1,190	34
F-4312	241.0	361.5	482.0	602.5	234.5	351.7	469.0	586.2	43,200	88	1,220	34
F-4408	253.0	379.5	506.0	632.5	246.2	369.3	492.3	615.4	41,850	120	1,360	34
F-4410	266.0	399.0	532.0	665.0	258.8	388.2	517.6	647.0	40,500	120	1,400	34
F-4412	277.5	416.3	555.0	693.8	270.0	405.0	540.0	675.0	39,488	120	1,440	34
G-5408	322.5	483.8	645.0	806.3	313.8	470.7	627.6	784.5	53,156	220	2,170	28
G-5410	345.0	517.5	690.0	862.5	335.7	503.5	671.4	839.2	52,734	220	2,270	28
G-5412	357.5	536.3	715.0	893.8	347.8	521.8	695.7	869.6	52,313	220	2,330	28
G-6408	387.0	580.5	774.0	967.5	376.6	564.8	753.1	941.4	63,788	266	2,610	28
G-6410	414.0	621.0	828.0	1,035.0	402.8	604.2	805.6	1,007.1	63,281	266	2,660	28
G-6412	429.0	643.5	858.0	1,072.5	417.4	626.1	834.8	1,043.5	62,775	266	2,720	28
<b>TWO FANS WIDE</b>												
V-4310	228.0	342.0	456.0	570.0	221.8	332.8	443.7	554.6	43,875	88	1,190	68
V-4312	241.0	361.5	482.0	602.5	234.5	351.7	469.0	586.2	43,200	88	1,230	68
V-4408	253.0	379.5	506.0	632.5	246.2	369.3	492.3	615.4	41,850	120	1,360	68
V-4410	266.0	399.0	532.0	665.0	258.8	388.2	517.6	647.0	40,500	120	1,400	68
V-4412	277.0	415.5	554.0	692.5	269.5	404.3	539.0	673.8	39,488	120	1,440	68
V-6310	342.0	513.0	684.0	855.0	332.8	499.1	665.5	831.9	65,813	132	1,810	68
V-6312	362.0	543.0	724.0	905.0	352.2	528.3	704.5	880.6	64,800	132	1,040	68
V-6408	380.0	570.0	760.0	950.0	369.7	554.6	739.5	924.4	62,775	180	2,769	68
V-6410	399.0	598.5	798.0	997.5	388.2	582.3	776.5	970.6	60,750	189	2,100	68
V-6412	416.0	624.0	832.0	1,040.0	404.8	607.2	809.5	1,011.9	59,231	189	2,160	68
V-8310	456.0	684.0	912.0	1,140.0	443.7	665.5	887.4	1,109.2	87,750	176	2,380	68
V-8312	482.0	723.0	964.0	1,205.0	469.0	703.5	938.0	1,172.5	86,400	176	2,460	68
V-8408	506.0	759.0	1,012.0	1,265.0	492.3	738.5	984.7	1,230.8	83,700	240	2,670	68
V-8410	532.0	798.0	1,064.0	1,330.0	517.6	776.5	1,035.3	1,294.1	81,000	240	2,800	68
V-8412	555.0	832.5	1,110.0	1,387.5	540.0	810.0	1,080.0	1,350.0	78,975	240	2,880	68
W-10408	645.0	967.5	1,290.0	1,612.5	627.6	941.4	1,255.2	1,569.0	106,313	440	4,340	56
W-10410	690.0	1,035.0	1,380.0	1,725.0	671.4	1,007.1	1,342.7	1,678.4	105,469	440	4,540	56
W-10412	715.0	1,072.5	1,430.0	1,787.5	695.7	1,043.5	1,391.4	1,739.2	104,625	440	4,700	56
W-12408	774.0	1,161.0	1,548.0	1,935.0	753.1	1,129.7	1,506.2	1,882.8	127,575	532	5,240	56
W-12410	828.0	1,242.0	1,656.0	2,070.0	805.6	1,208.5	1,611.3	2,014.1	126,563	532	5,350	56
W-12412	858.0	1,287.0	1,716.0	2,145.0	834.8	1,252.3	1,669.7	2,087.1	125,550	532	5,470	56

# Specifications

## 30" Fans

### High Performance Models

MODULE LETTER CODE					
ONE FAN WIDE	HP	RPM	FAN DIAM	TUBE DIAM	FACE TUBES
J	1½	1140	30	¾	34
Y	1½	1140	30	½	28
TWO FANS WIDE					
K	1½	1140	30	¾	2 x 34
Z	1½	1140	30	½	2 x 28

#### LCV—VERTICAL UP AIR DISCHARGE

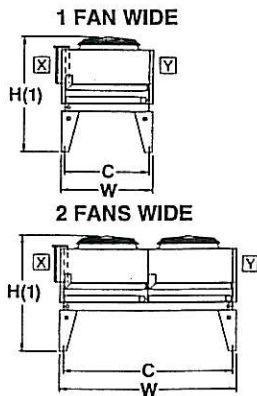
#### LCH—HORIZONTAL AIR DISCHARGE

TOTAL HEAT OF REJECTION CAPACITY—BTUH (000 OMITTED)

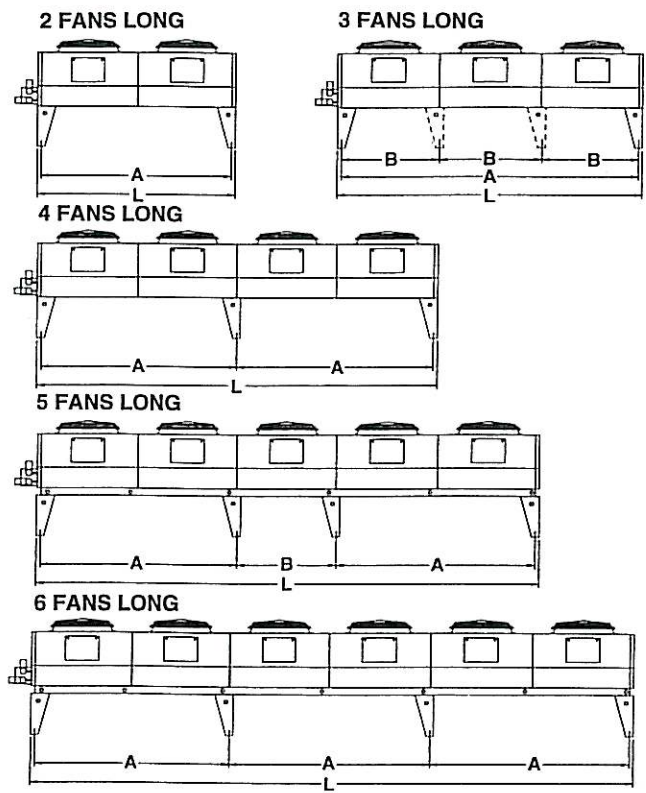
LC MODEL NO FANS ROW DEPTH FINS/INCH	RATING BASED ON 85-115°F ENTERING AIR TEMPERATURE TD IS SATURATED CONDENSING TEMP MINUS ENTERING AIR TEMP								AIR FLOW CFM	MAX FLOOD CHARGE LBS.	WEIGHT INCL FLOOD CHARGE LBS.	AVAILABLE CIRCUITS
	R22 TD				R404a, R507a TD							
	10	15	20	25	10	15	20	25				
<b>ONE FAN WIDE</b>												
J-2310	127.7	191.5	255.3	319.1	124.2	186.3	248.4	310.4	28,688	44	625	34
J-2312	139.2	208.7	278.3	347.9	135.4	203.0	270.7	338.4	28,216	44	645	34
J-2408	146.1	219.1	292.1	365.1	142.1	213.1	284.2	355.2	27,338	60	730	34
J-2410	153.0	229.4	305.9	382.4	148.8	223.2	297.6	372.0	26,494	60	750	34
J-2412	159.9	239.8	319.7	399.6	155.5	233.3	311.0	388.8	25,820	60	770	34
J-3310	196.7	295.0	393.3	491.6	191.3	287.0	382.6	478.3	43,032	66	950	34
J-3312	208.2	312.2	416.3	520.4	202.5	303.7	405.0	506.2	42,324	66	980	34
J-3408	218.5	327.7	437.0	546.3	212.6	318.8	425.1	531.4	41,007	90	1,050	34
J-3410	230.0	345.0	460.0	575.0	223.7	335.6	447.5	559.4	39,741	90	1,080	34
J-3412	239.2	358.8	478.4	598.0	232.7	349.0	465.4	581.7	38,730	90	1,110	34
J-4310	262.2	393.3	524.4	655.5	255.1	382.6	510.1	637.7	57,376	88	1,230	34
J-4312	277.2	415.7	554.3	692.9	269.6	404.4	539.2	674.0	56,432	88	1,260	34
J-4408	291.0	436.4	581.9	727.4	283.0	424.6	566.1	707.6	54,676	120	1,400	34
J-4410	305.9	458.9	611.8	764.7	297.6	446.4	595.2	743.9	52,988	120	1,440	34
J-4412	318.6	477.8	637.1	796.4	309.9	464.8	619.8	774.7	51,640	120	1,480	34
Y-5408	371.5	557.2	742.9	928.6	361.3	542.0	722.7	903.4	68,345	220	2,220	28
Y-5410	396.8	595.1	793.5	991.9	386.0	578.9	771.9	964.9	66,235	220	2,320	28
Y-5412	411.7	617.6	823.4	1,029.2	400.5	600.8	801.0	1,001.3	64,550	220	2,380	28
Y-6408	445.1	667.6	890.1	1,112.6	432.9	649.4	865.9	1,082.4	82,014	266	2,670	28
Y-6410	476.1	714.2	952.2	1,190.3	463.2	694.7	926.3	1,157.9	79,482	266	2,720	28
Y-6412	493.4	740.0	986.7	1,233.4	479.9	719.9	959.9	1,199.8	77,460	266	2,780	28
<b>TWO FANS WIDE</b>												
K-4310	262.2	393.3	524.4	655.5	255.1	382.6	510.1	637.7	57,376	88	1,230	68
K-4312	277.2	415.7	554.3	692.9	269.6	404.4	539.2	674.0	56,432	88	1,270	68
K-4408	291.0	436.4	581.9	727.4	283.0	424.6	566.1	707.6	54,676	120	1,400	68
K-4410	305.9	458.9	611.8	764.7	297.6	446.4	595.2	743.9	52,988	120	1,440	68
K-4412	318.6	477.8	637.1	796.4	309.9	464.8	619.8	774.7	51,640	120	1,480	68
K-6310	393.3	590.0	786.6	983.3	382.6	573.9	765.2	956.5	86,064	132	1,870	68
K-6312	416.3	624.5	832.6	1,040.8	405.0	607.5	810.0	1,012.4	84,648	132	1,930	68
K-6408	427.0	655.5	874.0	1,092.5	425.1	637.7	850.2	1,062.8	82,014	180	2,100	68
K-6410	458.9	688.3	917.7	1,147.1	446.4	669.6	892.7	1,115.9	79,482	189	2,160	68
K-6412	478.4	717.6	956.8	1,196.0	465.4	698.1	930.8	1,163.5	77,460	189	2,220	68
K-8310	524.4	786.1	1,048.8	1,311.0	510.1	765.2	1,020.3	1,275.3	114,752	176	2,460	68
K-8312	554.3	831.5	1,108.6	1,385.7	539.2	808.8	1,078.4	1,348.1	112,864	176	2,540	68
K-8408	581.9	872.9	1,163.8	1,454.8	566.1	849.1	1,132.1	1,415.2	109,352	240	2,750	68
K-8410	611.8	917.7	1,223.6	1,529.5	595.2	892.7	1,190.3	1,487.9	105,976	240	2,880	68
K-8412	638.3	957.4	1,276.5	1,595.6	620.9	931.3	1,241.8	1,552.2	103,280	240	2,960	68
Z-10408	741.8	1,112.6	1,483.5	1,854.4	721.6	1,082.4	1,443.1	1,803.9	136,690	440	4,440	56
Z-10410	793.5	1,190.3	1,587.0	1,983.8	771.9	1,157.9	1,543.8	1,929.8	132,470	440	4,640	56
Z-10412	822.3	1,233.4	1,644.5	2,055.6	799.9	1,199.8	1,599.8	1,999.7	129,100	440	4,700	56
Z-12408	890.1	1,355.2	1,780.2	2,225.3	865.9	1,298.8	1,731.8	2,164.7	164,028	532	5,350	56
Z-12410	952.2	1,428.3	1,904.4	2,380.5	926.3	1,389.5	1,852.6	2,315.8	158,964	532	5,470	56
Z-12412	986.7	1,480.0	1,973.4	2,466.7	959.9	1,439.8	1,919.7	2,399.7	154,920	532	5,580	56

# Physical Data 30" Fans

## HEADER END VIEW



## SIDE VIEWS



MODEL	DIMENSIONAL DATA						ELECTRICAL DATA (3)			CONNECTIONS (4)
MODEL NO FANS	OVERALL INCHES			¾" LEG ANCHOR BOLT HOLE CENTERS			FAN MOTORS 1½ HP 1140 RPM 3PH 60Hz TOTAL RATED FULL LOAD AMPS			OD INCHES INLET - OUTLET
	L	W	H(1)	A	B	C	208/230	460	380/50	
J2	112	48	55	108	—	44	14.0	7.0	7.0	1½ - 1½
J3 (2)	166	48	55	162	—	44	21.0	10.5	10.5	2½ - 2½
J4	220	48	55	108	—	44	28.0	14.0	14.0	2½ - 2½
Y5	274	48	58	108	54	44	35.0	17.5	17.5	2½ - 2½
Y6	328	48	58	108	—	44	42.0	21.0	21.0	2½ - 2½
K4	112	96	55	108	—	92	28.0	14.0	14.0	(2) 1½ - 1½
K6 (2)	166	96	55	—	54	92	42.0	21.0	21.0	(2) 2½ - 2½
K8	220	96	55	108	—	92	56.0	28.0	28.0	(2) 2½ - 2½
Z10	274	96	58	108	54	92	70.0	35.0	35.0	(2) 2½ - 2½
Z12	328	96	58	108	—	92	84.0	42.0	42.0	(2) 2½ - 2½

MODEL	DIMENSIONAL DATA						ELECTRICAL DATA (3)					CONNECTIONS (4)
MODEL NO FANS	OVERALL INCHES			¾" LEG ANCHOR BOLT HOLE CENTERS			FAN MOTORS 1 HP 850 RPM 3PH 60Hz TOTAL RATED FULL LOAD AMPS					OD INCHES INLET - OUTLET
	L	W	H(1)	A	B	C	200	230	460	575	380/50	
F2	112	48	55	108	—	44	8.8	8.0	4.0	3.6	4.6	1½ - 1½
F3 (2)	166	48	55	162	—	44	13.2	12.0	6.0	5.4	6.9	2½ - 2½
F4	220	48	55	108	—	44	17.6	16.0	8.0	7.2	9.2	2½ - 2½
G5	274	48	58	108	54	44	22.0	20.0	10.0	9.0	11.5	2½ - 2½
G6	328	48	58	108	—	44	26.4	24.0	12.0	10.8	13.8	2½ - 2½
V4	112	96	55	108	—	92	17.6	16.0	8.0	7.2	9.2	(2) 1½ - 1½
V6 (2)	166	96	55	—	54	92	26.4	24.0	12.0	10.8	13.8	(2) 2½ - 2½
V8	220	96	55	108	—	92	35.2	32.0	16.0	14.4	18.4	(2) 2½ - 2½
W10	274	96	58	108	54	92	44.0	40.0	20.0	18.0	23.0	(2) 2½ - 2½
W12	328	96	58	108	—	92	52.8	48.0	24.0	21.6	27.6	(2) 2½ - 2½

- (1) H dimension includes 22", field assembled legs. Add 20" for optional 42" legs.
  - (2) Model 1 x 3 has 4 legs - 2 x 6 has 8 legs.
  - (3) Min unit circuit amps = 1.25 x FLA of one motor + FLA of remaining motors.
  - (3) Min unit overload protection = 2.25 x FLA of one motor + FLA of remaining motors.
  - (3) Variable speed motors and control—contact factory.
  - (4) Connections are approximate. Exact size is determined by computerized circuiting program.
- H (horiz. air disch.) dimensions, fanrol location, and unit support—contact factory.
- Standard fanrol location.  Optional fanrol location—must be specified.

USE CERTIFIED DRAWINGS FOR CONSTRUCTION



# Application

**Locate Condensers** no closer than their width from walls or other condensers. Avoid locations near exhaust fans, plumbing vents, flues or chimneys.

**Parallel Condensers** should be the same models resulting in the same refrigerant side pressure drops. Compressor discharge lines should have equal pressure drops to each condenser.

**Condenser Charge** will approximate 30% of the maximum flooding charge listed under "Specifications" for summer design conditions. Low ambient head pressure controls require an additional charge which is difficult to predict with fan cycling and is maximized with holdback.

**Receiver Capacity** should be adequate to store the condenser

summer charge, plus the condenser low ambient allowance, plus the evaporator pumpout charge, plus an allowance for piping and heat reclaim coil charges.

**Receiver Equalizer** lines must be free of traps and be connected to the top of condenser liquid outlets—not the inlet. Equalizers should not be used with holdback controls.

**Non-Condensables** in operating systems are best collected at the condenser liquid outlet. Use a tee on the horizontal outlet with a purge valve located on top of a 12-18 inch high, full size, vertical extension.

**Compressor Discharge** lines should be sized to minimize pressure drops and maintain oil return gas velocities. Each connection should be looped to the top of the condenser.

**Gravity Liquid Drain** lines should drop from each outlet as low as possible before headering or running horizontally. Pitch downhill to the receiver.

**Off-The-Line Coil Sections** will have refrigerant pressures corresponding to the ambient. Check valves or isolating valves should be installed in the liquid drains to prevent refrigerant migration and receiver pressure loss.

**Liquid-Sub-Cooling** may be accomplished with a section of circuits in the coil or with a separate coil section under the last operating fans. Liquid outlet temperature will approach the entering air temperature by approximately 5°F. Benefit is not economical unless TD is 15°F or higher.

See Installation & Operating Instructions for piping, holdback and fan cycling details.

REFRIGERANT LINE CAPACITY DATA

COPPER LINE SIZE O.D.	LINE CAPACITY IN TONS						COND TO REC'R LIQUID LINE			LBS OF REFRIG LIQUID PER 100' OF LENGTH		
	COMP. DISCHARGE LINE											
	R 22		R404a		R134a		R 22	R404a	R134a	R22	R404a	R134a
100'	1.5	1.0	1.0	0.5	1.0	0.5	3.6	3	3.7	13	11	13
200'	4	3	3	2	3	2	7.4	6	7.7	25	22	26
1 1/8"	10	6.5	7	4	6.5	4.5	12.7	10.4	13.0	42	36	43
1 3/8"	20	15	15	7	12	7	19.2	16	20	64	55	65
1 5/8"	30	20	20	15	20	11	29	23	28.5	90	78	92
2 1/8"	65	45	45	30	42	28	47	40	46	160	138	163
2 3/8"	90	75	75	45	55	43	73	62	72	245	212	250

- Capacity is compressor suction tons for application between -40° F and +40° F suction at condensing temperatures between 80° F and 120° F sat.
- For multiple or unloading compressor application, the vertical discharge riser from the compressor may need to be one size smaller.
- This table data is only to be used as a guide. For exact values, please calculate to your specific job line lengths and design pressure/temp values using ASHRAE handbook or ARI refrigerant tables.

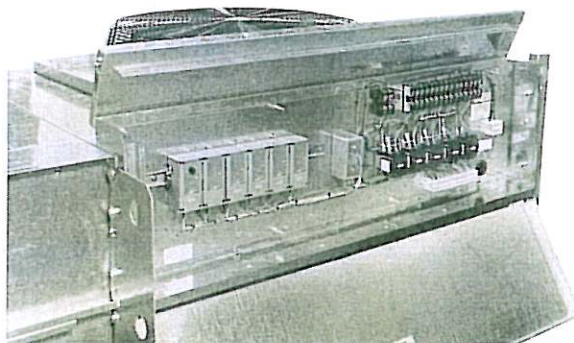
# Low Ambient Head Pressure Control

As the ambient temperature drops, condensing pressure is lowered proportionately. Evaporators require a minimum pressure differential between liquid feed pressure and saturated suction pressure for thermostatic expansion valve and distributor performance.

Condenser coil surface must be reduced to maintain head pressure. Cycling fan motors, flooding the coil with refrigerant, isolation part of the coil surface, or a combination of the above will maintain minimum head pressure.

Excess low ambient refrigerant charge will be minimized by manually isolating and pumping out entire condenser of the right half of double fan width models. Holdback flooding control or gravity discharge dampers may be used on the remaining condensing surface.

## Standard Fan Cycling Control Panel Arrangements



- Thermal Fantrol—Electronic temperature control cycles fans in response to entering air temperature. Set points and differential for each step is adjustable.
- Pressuretrol—Electronic pressure control with single point pressure transducer cycles fans in response to condenser pressure. Set points and differential for each step is adjustable.
- Thermal Pressure Fantrol—Electronic temperature control cycle fans in response to entering air temperature, except for header end fan. Header end fans are controlled by pressure control.
- Variable Speed Control—Header end fan(s) are controlled with a speed controller in response to head pressure. Electronic pressure control cycles the balance of fans.

- Fan Cycling Sequence—Fans are cycled off individually or side by side pairs in sequence from the end opposite the header to the header end. Header end fans run continuously if compressors are operating.

### Control Panel

- Standard weather resistant enclosure is mounted on the left side when looking at the headers. Other locations optional.
- Control power is 115 or 230 volts. A transformer is factory installed when required.
- Fan contactors with branch circuit fuse protection. Each motor or bank of two motors protected by fuses.
- For horizontal airflow applications, consult factory.

- Disconnect not included, but may be required to meet local codes.

### Optional Arrangements

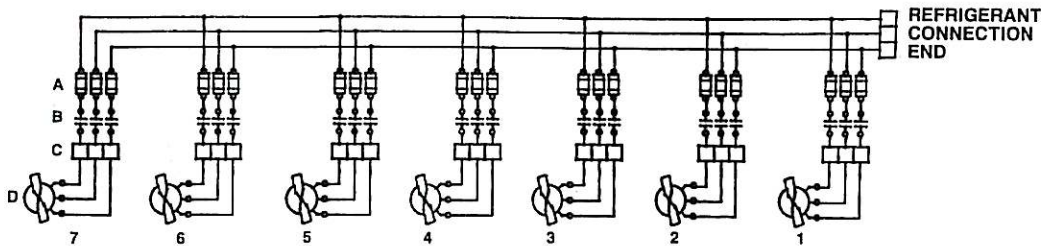
- Fan motor contactor and fuses only.
- Fan motor contactors and fuses only which operate via a customer specified solid state board. Circuit board is factory mounted and wired.
- 50/50 split with two fan wide models. Each side is controlled separately with individual control panels on each side.
- 50% winter reduction with two fan wide models. The right side fans are isolated in winter. Fans are locked out via a relay or switch during shutdown.

# Typical Fan Cycle Control Wiring

## THREE PHASE PILOT CIRCUIT ELECTRICAL CONTROL

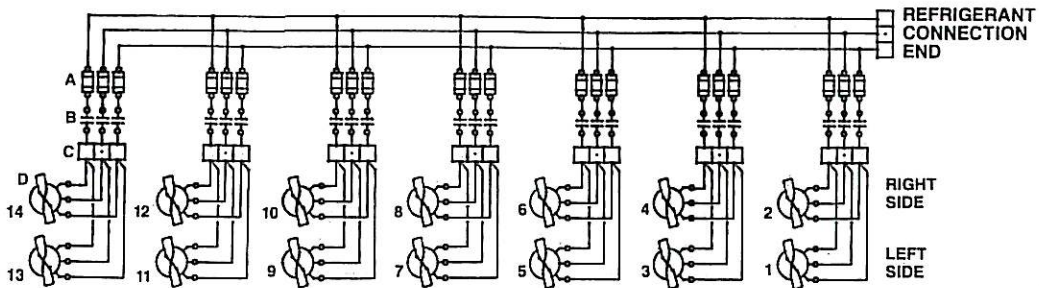
### MOTORS INDIVIDUALLY CYCLED

SINGLE FAN WIDTH MODULES

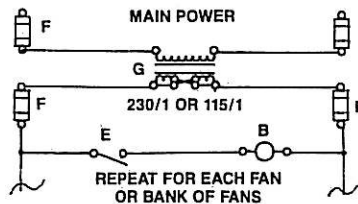


### MOTORS CYCLED IN BANKS OF TWO

DOUBLE FAN WIDTH MODULES



- A. Fuses or Optional Circuit Breaker
- B. Fan Motor Contractor
- C. Terminal Strip
- D. Fan Motor
- E. Pressure or Temperature Control
- F. Control Circuit Fuses
- G. Control Transformer (When Required)



**Control Panel Selection—Unless specified, individual motor leads wired to terminals**

FANROL METHODS	APPLICABLE MODULE
TF—THERMAL	ALL EXCEPT A1 & B1
PT—PRESSURE	ALL
TP—THERMAL PRESSURE	ALL EXCEPT A1 & B1
VS—VARIABLE SPEED	ALL

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