

AC Series
Bulletin: AC-490
Supersedes: AC188

KRACK

Direct Drive Remote Air Cooled Condensers

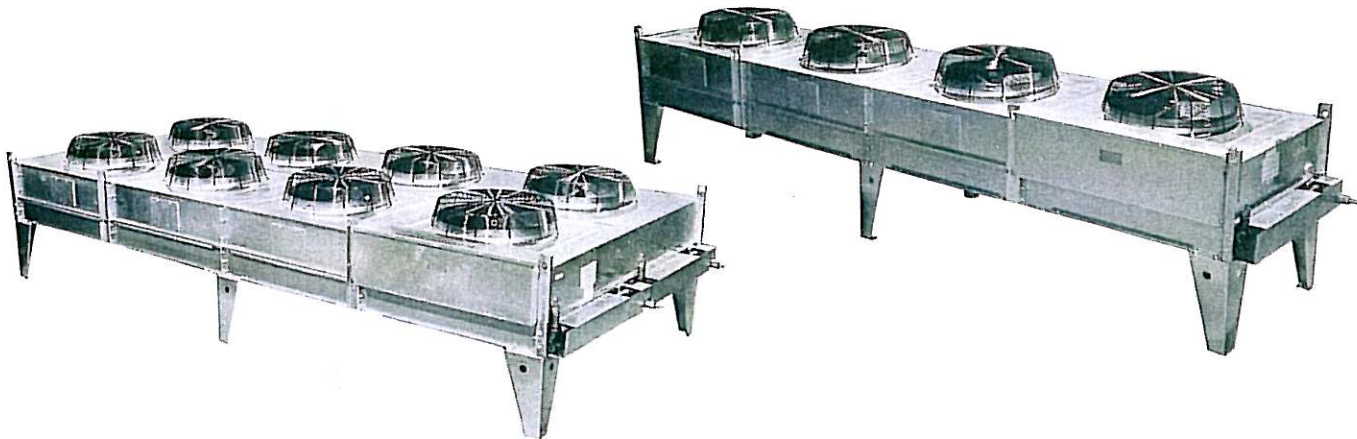


*UL Listed
8, 10 and 12 Fins/Inch
Vertical and Horizontal Air Discharge
Low Ambient Fan Cycling or Flooding Controls
10,000 to 2,000,000 BTUH*



FEATURES

Versatile, Dependable, Serviceable



Modular Design

Arranged for vertical and horizontal air discharge. Multi-fan sections compartmented to allow individual fan cycling while preventing off-fan "windmilling". All modules have access doors for coil cleaning, except A.

Corrosion Resistant Construction

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. Fan guards are vinyl coated.

High Efficiency Coil

Copper tubes are mechanically expanded into corrugated full collared aluminum plate fins spaced 8, 10 or 12 per inch. Tube sheets are aluminum with tube collars preventing tube wear due to uneven thermal expansion. 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 polyester coated aluminum. Multi-circuited coils are optional. Liquid sub-cooling circuits are available.

Direct Driven Propeller Fans

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

Weather Resistant Fan Motors

Outdoor condenser motor design employs sealed ball bearings; inherent overheat protection in each phase; shaft slingers; enclosure, hardware, and insulation for all weather conditions. Each motor lead is wired to terminals in a junction box or control panel.

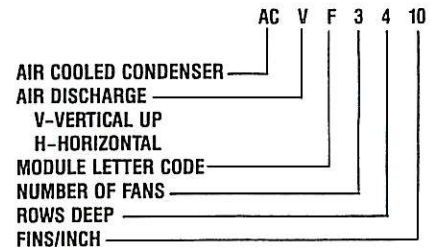
Versatile Head Pressure Control Fan Cycling Control Methods:

- Thermal Fantrol
- Pressure Fantrol
- Thermal Pressure Fantrol
- Variable Speed Fantrol
- Refrigerant Circuit Fantrol
- Fantrol with Gravity Dampers

Refrigerant Flooding Control Methods:

- Holdback
- Dual Holdback
- Combination Fantrol Holdback

MODEL KEY



MODULE LETTER CODE						
ONE FAN WIDE	HP	RPM	FAN SUR- FACE DIA	FACE	TUBES	
A	1/4	1140	18	3/8	22	
B	1/2	1140	24	3/8	32	
F	1	850	30	3/8	36	
G	1	850	30	1/2	30	
TWO FANS WIDE						
V	1	850	30	3/8	2 x 36	
W	1	850	30	1/2	2 x 30	

Please Specify:

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

We reserve the right to change or revise specifications and product design in connection with any feature of our products. Such changes do not entitle the buyer to corresponding changes, improvements, additions or replacements for equipment previously sold or shipped.

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

EVAPO-RATOR 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

EVAPO-RATOR 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 3

FEET	ALTITUDE		FEET	FACTOR
	FACTOR			
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 TABULATION

95°F AMBIENT—SUCTION COOLED SEMI-HERMETIC RECIPROCATING COMPRESSORS

COMP NOM HP	DESIGN TD REF	SAT SUCT °F	SAT COND °F	COMP RATED BTUH	TABLE 1 THR FACTOR	CONVERT TO 15°TD R22 BASIS				BTUH PER CIRC	NO CIRC REQ'D	CIRC ASSIGN SYSTEM	SYSTEM NUMBER L TO R	ACTUAL TD °F						
						REF FACTOR	TD FACTOR	SELECTION THR												
5	12	20	20	115	48750	x	1.35	x	1.06	x	0.75	=	52,320	÷	8,938	=	5.8	6	1	19.3
10	22	15	20	110	90200	x	1.33	x	1.00	x	1.00	=	121,770	÷	8,938	=	13.6	12	2	17.0
15	502	10	-20	105	69600	x	1.56	x	1.03	x	1.50	=	167,750	÷	8,938	=	18.8	18	3	10.4
20	502	10	-20	105	86250	x	1.56	x	1.03	x	1.50	=	219,870	÷	8,938	=	24.5	24	4	10.2

Add selection THR. Select model for R22 at 15°TD with THR approximating 561,710 BTUH

Selection

- ACVG-5412 rated at THR of 536,000 BTUH with R22 at 15°TD
- BTUH/Circ = 536,300 ÷ 60 = 8,938 (specifications list 60 available circuits)

- Number of Circ Req'd = Selection THR ÷ BTUH/Circ (8,938)
- Assign Number of Circ/System and System Number Left to Right.
- Actual TD = (Req'd Circ ÷ Assigned Circ) × Design TD

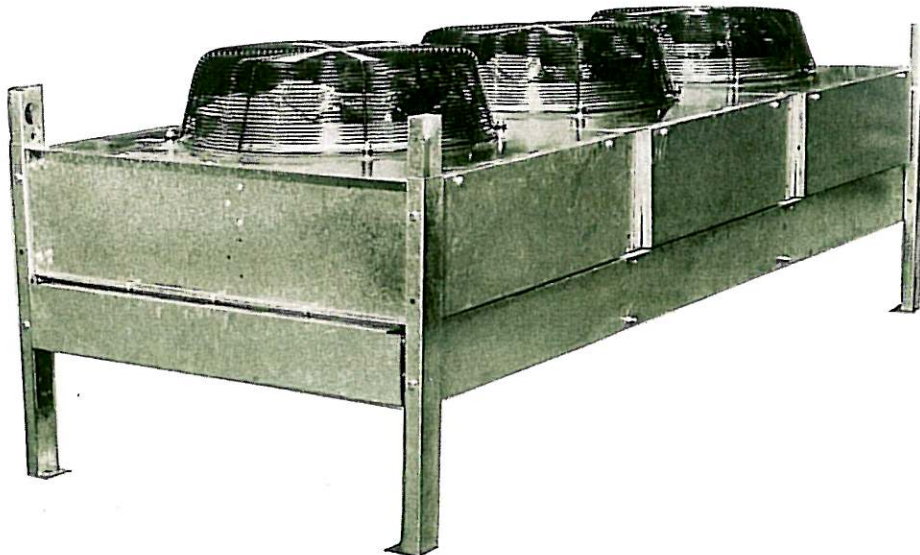
REF FACTOR
R22—1.00
R12—1.06
R502—1.03

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

SPECIFICATIONS

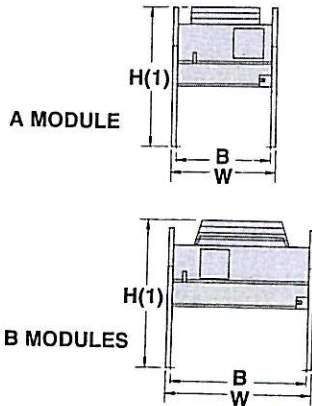
ACV—VERTICAL UP AIR DISCHARGE
ACH—HORIZONTAL AIR DISCHARGE

TOTAL HEAT OF REJECTION CAPACITY—BTUH (000 OMITTED)																
HACV MODEL	QUAN FANS	ROWS DEEP	TOTAL HEAT OF REJECTION—MBH									AIR FLOW CFM	LBS. MAX FLOOD CHARGE	OPERATING WEIGHT	AVAILABLE CIRCUITS	APPROX SHIP WEIGHT LBS.
			R-12			R-22			R502							
			10-TD	15-TD	20-TD	10-TD	15-TD	20-TD	10-TD	15-TD	20-TD					
ONE FAN WIDE																
A-1210	1	2	11.8	17.7	23.7	12.5	18.8	25.5	12.2	18.2	24.3	2722	5	170	4	165
A-1410	1	4	17.0	25.5	34.1	18.0	27.0	36.0	17.5	26.3	35.0	2579	10	200	6	190
B-1210	1	2	28.6	43.0	57.3	30.2	45.4	60.5	29.4	44.2	58.9	6750	10	181	8	185
B-1310	1	3	37.3	56.0	74.6	39.4	59.1	78.9	38.4	57.6	76.7	6400	14	185	12	190
B-1410	1	4	43.0	64.5	85.9	45.4	68.2	90.9	44.2	66.4	88.4	6000	19	200	16	200
B-2210	2	2	57.3	85.8	114.4	60.5	90.7	121.0	58.9	88.3	117.8	13500	19	352	16	350
B-2310	2	3	74.6	111.9	149.3	78.9	118.3	157.8	76.7	115.1	153.5	12800	29	372	24	370
B-2410	2	4	85.9	128.9	171.9	90.9	136.3	181.7	88.4	132.6	176.8	12000	39	400	32	400
B-3310	3	3	111.9	167.9	223.9	118.3	177.6	236.7	115.1	172.7	230.2	19200	43	559	24	560
B-3410	3	4	128.9	193.4	257.8	136.3	204.5	272.6	132.6	199.0	265.2	18000	58	600	32	600
B-4310	4	3	149.3	223.9	298.5	157.8	236.7	315.6	153.5	230.2	307.1	25600	64	840	48	840
B-4410	4	4	171.9	257.8	343.7	181.7	272.6	363.4	176.8	265.2	353.6	24000	86	900	64	985

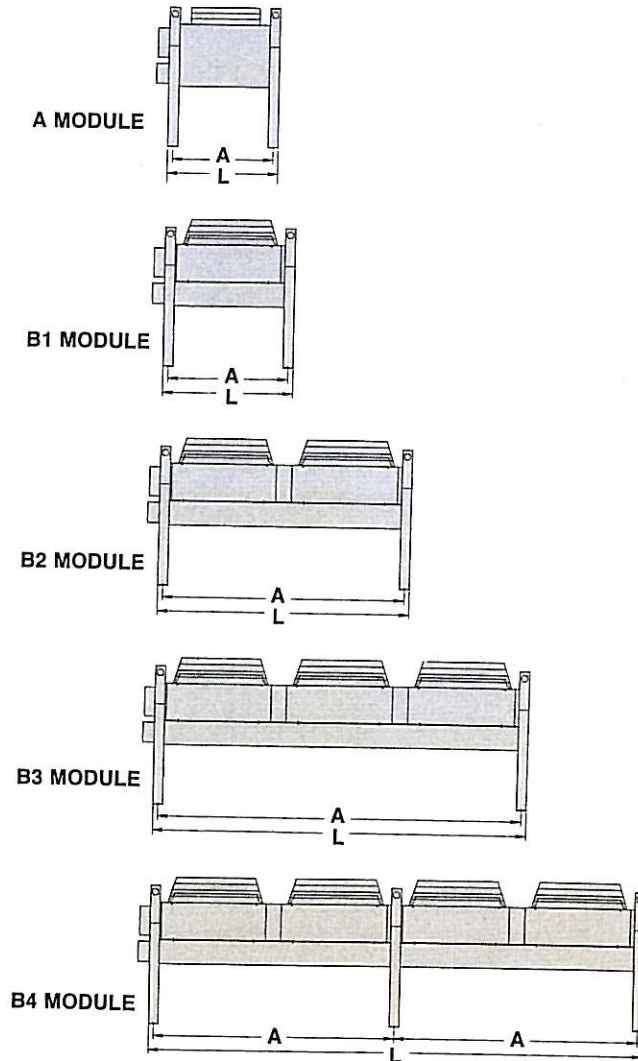


PHYSICAL DATA

HEADER END VIEW



SIDE VIEWS



MODEL	DIMENSIONAL DATA						ELECTRICAL DATA (2)						CONNECTIONS	SOUND LEVEL DECIBELS (A) SCALE 6 FT DISTANT	
	OVERALL INCHES			¾ ANCHOR HOLE CENTERS			FAN MOTOR HP	1140 RPM 60 Hz							
	L	W	H(1)	A	B	TOTAL RATED FULL LOAD AMPS									
MODULE NO FANS							208/1	230/1	460/1	200/3	230/3	460/3			
A1	33	31	41	30	28 ³ / ₈	¼	1.5	1.5	0.9	—	—	—	7/8 - 7/8	66	
B1	39	45 ³ / ₄	44	36	43	½	3.2	3.0	1.5	2.8	2.6	1.3	1 1/8 - 1 1/8	69	
B2	75	45 ³ / ₄	44	72	43	½	6.4	6.0	3.0	5.6	5.2	2.6	1 1/8 - 1 1/8	72	
B3	111	45 ³ / ₄	44	108	43	½	9.6	9.0	4.5	8.4	7.8	3.9	1 3/8 - 1 3/8	74	
B4	147	45 ³ / ₄	44	72	43	½	12.8	12.0	6.0	11.2	10.4	5.2	1 3/8 - 1 3/8	76	

(1) Includes 18 inch leg extension. For optional 11 inch extension, leave legs in shipping position.

(2) Min. unit circuit amps = 1.25 x FLA of one motor + FLA of any remaining motors.

(2) Max unit overload protection = 2.25 x FLA of one motor + FLA of any remaining motors.

(2) Variable speed motors and control—contact factory.

ACH (horiz. air disch.) dimensions and support—contact factory.

USE CERTIFIED DRAWINGS FOR CONSTRUCTION

SPECIFICATIONS

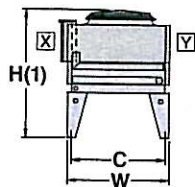
ACV—VERTICAL UP AIR DISCHARGE ACH—HORIZONTAL AIR DISCHARGE

TOTAL HEAT OF REJECTION CAPACITY—BTUH (000 OMITTED)

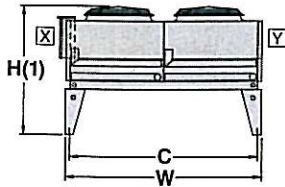
MODEL MODULE NO FANS	RATINGS BASED ON 85-115°F ENTERING AIR TEMPERATURE TD IS SATURATED CONDENSING TEMP MINUS ENTERING AIR TEMP												AIR FLOW CFM	MAX FLOOD CHARGE LBS.	WEIGHT INCL FLOOD CHARGE LBS.	AVAILABLE CIRCUITS
	R12 TD				R22 TD				R502 TD							
	10	15	20	25	10	15	20	25	10	15	20	25				
ONE FAN WIDE																
F2310	107.8	161.8	215.7	269.6	114.0	171.0	228.0	285.0	110.9	166.4	221.8	277.3	21938	48	988	27
F2312	114.0	171.0	228.0	285.0	120.5	180.8	241.0	301.3	117.2	175.9	234.5	293.1	21600	48	1003	27
F2408	119.7	179.5	239.3	299.2	126.5	189.8	253.0	316.3	123.1	184.6	246.2	307.7	20925	64	1051	36
F2410	125.8	188.7	251.6	314.5	133.0	199.5	266.0	332.5	129.4	194.1	258.8	323.5	20250	64	1066	36
F2412	131.0	196.5	262.0	327.6	138.5	207.8	277.0	346.3	134.8	202.1	269.5	336.9	19744	64	1081	36
F3310	161.8	242.6	323.5	404.4	171.0	256.5	342.0	427.5	166.4	249.6	332.8	416.0	32906	72	1411	54
F3312	171.2	256.8	342.5	428.1	181.0	271.5	362.0	452.5	176.1	264.2	352.2	440.3	32400	72	1441	54
F3408	179.7	269.6	359.5	449.3	190.0	285.0	380.0	475.0	184.9	277.3	369.7	462.2	31388	96	1514	72
F3410	188.7	283.1	377.5	471.8	199.5	299.3	399.0	498.8	194.1	291.2	388.2	485.3	30375	96	1544	72
F3412	196.8	295.2	393.5	491.9	208.0	312.0	416.0	520.0	202.4	303.6	404.8	506.0	29616	96	1574	72
F4310	215.7	323.5	431.4	539.2	228.0	342.0	456.0	570.0	221.8	332.8	443.7	554.6	43875	96	1973	54
F4312	228.0	342.0	456.0	570.0	241.0	361.5	482.0	602.5	234.5	351.7	469.0	586.2	43200	96	2021	54
F4408	239.3	359.0	478.7	598.3	253.0	379.5	506.0	632.5	246.2	369.3	492.3	615.4	41850	128	2144	72
F4410	251.6	377.5	503.3	629.1	266.0	399.0	532.0	665.0	258.8	388.2	517.6	647.0	40500	128	2192	72
F4412	262.5	393.8	525.0	656.3	277.5	416.3	555.0	693.8	270.0	405.0	540.0	675.0	39488	128	2240	72
G5408	305.1	457.6	610.2	772.7	322.5	483.8	645.0	806.3	313.8	470.7	627.6	784.5	53156	237	2805	60
G5410	326.4	489.6	652.7	815.9	345.0	517.5	690.0	862.5	335.7	503.5	671.4	839.2	52734	237	2910	60
G5412	338.2	507.3	676.4	845.5	357.5	536.3	715.0	893.8	347.8	521.8	695.7	869.6	52313	237	3020	60
G6408	366.1	549.2	732.2	915.3	387.0	580.5	774.0	967.5	376.6	564.8	753.1	941.4	63788	285	3370	60
G6410	391.6	587.5	783.3	979.1	414.0	621.0	828.0	1035.0	402.8	604.2	805.6	1007.1	63281	285	3460	60
G6412	405.8	608.8	811.7	1014.6	429.0	643.5	858.0	1072.5	417.4	626.1	834.8	1043.5	62775	285	3555	60
TWO FANS WIDE																
V4310	215.7	323.5	431.4	539.2	228.0	342.0	456.0	570.0	221.8	332.8	443.7	554.6	43875	96	1816	54
V4312	228.0	342.0	456.0	570.0	241.0	361.5	482.0	602.5	234.5	351.7	469.0	586.2	43200	96	1846	54
V4408	239.3	359.0	478.7	598.3	253.0	379.5	506.0	632.5	246.2	369.3	492.3	615.4	41850	128	1941	72
V4410	251.6	377.5	503.3	629.1	266.0	399.0	532.0	665.0	258.8	388.2	517.6	647.0	40500	128	1971	72
V4412	262.0	393.1	524.1	655.1	277.0	415.5	554.0	692.5	269.5	404.3	539.0	673.8	39488	128	2001	72
V6310	323.5	485.3	647.1	808.8	342.0	513.0	684.0	855.0	332.8	499.1	665.5	831.9	65813	144	2601	108
V6312	342.5	513.7	684.9	856.1	362.0	543.0	724.0	905.0	352.2	528.3	704.5	880.6	64800	144	2661	108
V6408	359.5	539.2	719.0	898.7	380.0	570.0	760.0	950.0	369.7	554.6	739.5	924.4	62775	191	2769	144
V6410	377.5	566.2	754.9	943.6	399.0	598.5	798.0	997.5	388.2	582.3	776.5	970.6	60750	191	2829	144
V6412	393.5	590.3	787.1	983.8	416.0	624.0	832.0	1040.0	404.8	607.2	809.5	1011.9	59231	191	2889	144
V8310	431.4	647.1	826.8	1078.4	456.0	684.0	912.0	1140.0	443.7	665.5	887.4	1109.2	87750	191	3289	108
V8312	456.0	684.0	911.9	1139.9	482.0	723.0	964.0	1205.0	469.0	703.5	938.0	1172.5	86400	191	3369	108
V8408	478.7	718.0	957.4	1196.7	506.0	759.0	1012.0	1265.0	492.3	738.5	984.7	1230.8	83700	255	3573	144
V8410	503.3	754.9	1006.5	1258.2	532.0	798.0	1064.0	1330.0	517.6	776.5	1035.3	1294.1	81000	255	3653	144
V8412	525.0	787.5	1050.1	1312.6	555.0	832.5	1110.0	1387.5	540.0	810.0	1080.0	1350.0	78975	255	3733	144
W10408	610.2	915.3	1220.3	1525.4	645.0	967.5	1290.0	1612.5	627.6	941.4	1255.2	1569.0	106313	474	4680	120
W10410	652.7	979.1	1305.5	1631.9	690.0	1035.0	1380.0	1725.0	671.4	1007.1	1342.7	1678.4	105469	474	4855	120
W10412	676.4	1014.6	1352.8	1691.0	715.0	1072.5	1430.0	1787.5	695.7	1043.5	1391.4	1739.2	104625	474	5020	120
W12408	732.2	1098.3	1464.4	1830.5	774.0	1161.0	1548.0	1935.0	753.1	1129.7	1506.2	1882.8	127575	570	5585	120
W12410	783.3	1174.9	1566.6	1958.2	828.0	1242.0	1656.0	2070.0	805.6	1208.5	1611.3	2014.1	126563	570	5805	120
W12412	811.7	1217.5	1623.3	2029.2	858.0	1287.0	1716.0	2145.0	834.8	1252.3	1669.7	2087.1	125550	570	6030	120

PHYSICAL DATA

HEADER END VIEW

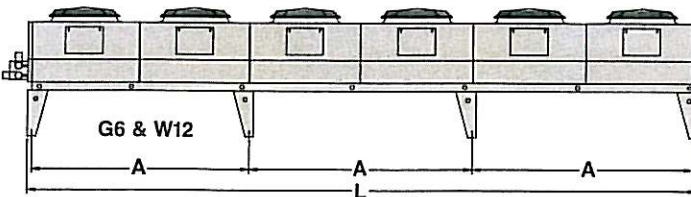
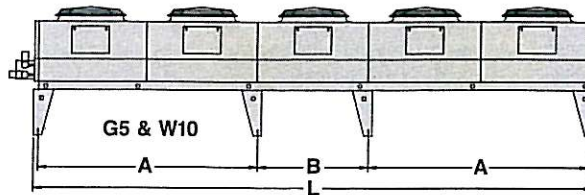
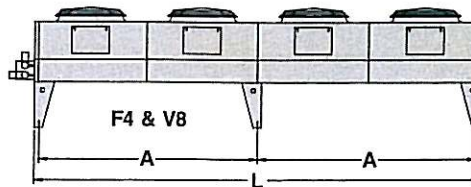
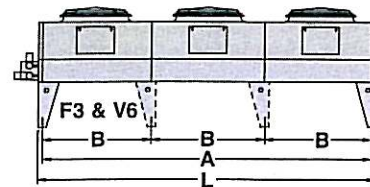
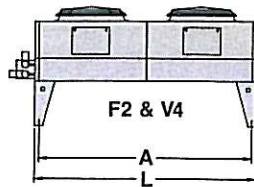


F & G MODULES



V & W MODULES

SIDE VIEWS



MODEL	DIMENSIONAL DATA			ELECTRICAL DATA (3)					CONNECTIONS		SOUND LEVEL			
	OVERALL INCHES			3/4" LEG ANCHOR BOLT HOLE CENTERS			FAN MOTORS 1 HP 850 RPM 3PH 60Hz TOTAL RATED FULL LOAD AMPS					OD INCHES		DECIBELS (A) SCALE 6 FT DISTANT
MODULE NO FANS	L	W	H(1)	A	B	C	200	230	460	575	380/50	INLET-	OUTLET	
F2	112	48	55	108	—	44	8.8	8.0	4.0	3.6	4.6	1 5/8 -	1 5/8	77
F3 (2)	166	48	55	162	—	44	13.2	12.0	6.0	5.4	6.9	2 1/8 -	2 1/8	79
F4	220	48	55	108	—	44	17.6	16.0	8.0	7.2	9.2	2 1/8 -	2 1/8	80
G5	274	48	58	108	54	44	22.0	20.0	10.0	9.0	11.5	2 5/8 -	2 5/8	81
G6	328	48	58	108	—	44	26.4	24.0	12.0	10.8	13.8	2 5/8 -	2 5/8	82
V4	112	96	55	108	—	92	17.6	16.0	8.0	7.2	9.2	(2) 1 5/8 -	1 5/8	78
V6 (2)	166	96	55	—	54	92	26.4	24.0	12.0	10.8	13.8	(2) 2 1/8 -	2 1/8	80
V8	220	96	55	108	—	92	35.2	32.0	16.0	14.4	18.4	(2) 2 1/8 -	2 1/8	82
W10	274	96	58	108	54	92	44.0	40.0	20.0	18.0	23.0	(2) 2 5/8 -	2 5/8	83
W12	328	96	58	108	—	92	52.8	48.0	24.0	21.6	27.6	(2) 2 5/8 -	2 5/8	84

(1) H dimension includes 22" field assembled legs. Add 20" for optional 42" legs.

(2) Module—F3 has 4 legs—V6 has 8 legs.

(3) Min unit circuit amps = 1.25 x FLA of one motor + FLA of remaining motors.

(3) Max unit overload protection = 2.25 x FLA of one motor + FLA of remaining motors.

(3) Variable speed motors and control—contact factory.

ACH (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

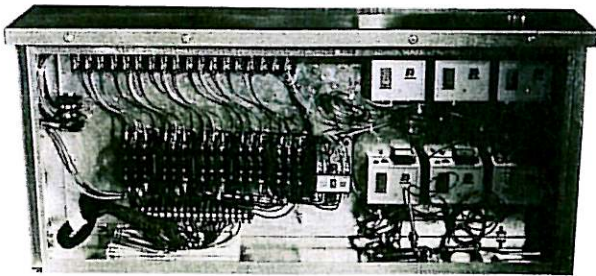
LOW AMBIENT HEAD PRESSURE CONTROL

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.

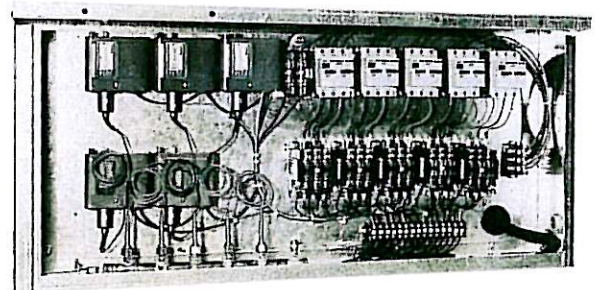
Condenser coil surface must be reduced to maintain head pressure. Cycling fan motors, flooding the coil with refrigerant, isolating part of the coil surface, or a combination of the above will maintain minimum head pressure.

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

FAN CYCLING CONTROL PANEL ARRANGEMENTS



Thermal Pressure Fantrol with Fuses TP-G5-F2



Pressure Fantrol with Circuit Breakers PT-G5-B2

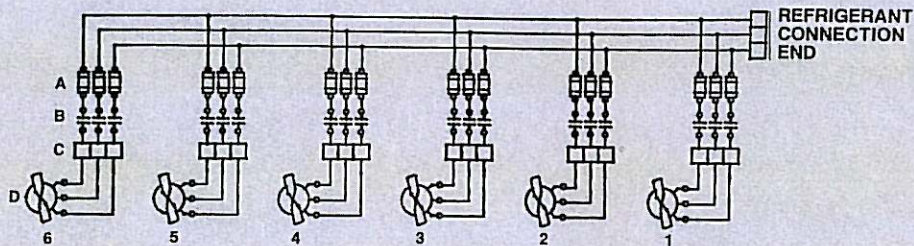
- Thermal Fantrol—Thermostats cycle all except header end fans in response to entering air temperature. Use with multi-circuit applications usually requiring holdback controls in each liquid drain to individual receivers.
- Pressure Fantrol—Pressurestats cycle all fans in response to head pressure.
- Thermal Pressure Fantrol—Thermostats cycle all except header end fans which are cycled by a pressurestat.
- Sequencer Option—4 thru 6 individual stats are replaced by a sequencer sensing pressure or temperature with 9 psi or 4°F fixed differential.
- Variable Speed Fantrol—No. 1 or No. 1 and 2 fan motors variable speed controlled in response to head pressure. Other fans pressurestat controlled. 200-230 volts. 460 requires transformer.
- Weather Resistant Control Panel Location—ACV Models—Left side header end when facing refrigerant connections—right side optional. ACH Models—Contact factory.
- Fan Cycling Sequence Single fan width models—fans cycled individually—the last operating fan at the header end. Double fan width models—fans cycled in banks of two—header end fans operating last.
- Two-in-One Control—Each side of double fan width models is controlled as a single fan width model. Specify two single width control panels—one each side.
- Half-Off Control—Right side of double fan width models is arranged to be manually isolated in winter. Manual switch and relay or fan motor circuit breakers isolate right side electrical power.
- Pilot Control Voltage Either 115 or 230 volts. A control transformer will be provided for 115V and when fan motor power is other than 200/230/3/60.
- Branch Circuit Protection Fan motors have three phase inherent overheat protection. Branch circuits to each motor or bank of two motors are protected by fuses or optional circuit breakers.
- Main Power Disconnect As required by codes, disconnects are not included.

TYPICAL FAN CYCLE CONTROL WIRING

THREE PHASE PILOT CIRCUIT ELECTRICAL CONTROL

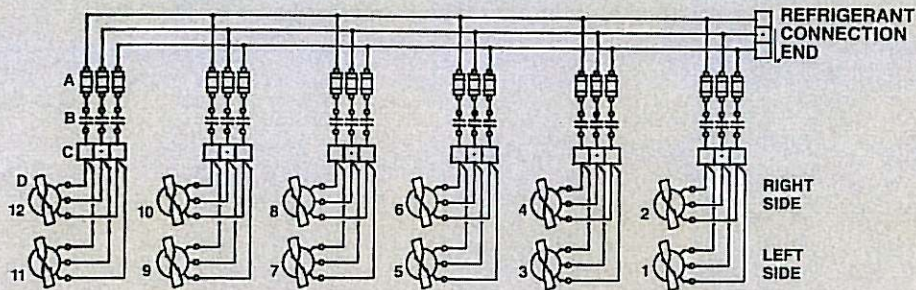
MOTORS INDIVIDUALLY CYCLED

SINGLE FAN WIDTH MODULES A, B, F, & G

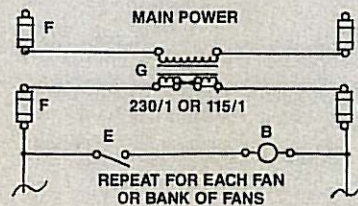


MOTORS CYCLED IN BANKS OF TWO

DOUBLE FAN WIDTH MODULES V & W



- 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 JB terminals

Model Key

FANROL METHODS

TF—THERMAL
PT—PRESSURE
TP—THERMAL PRESSURE
PS—PRESSURE WITH SEQUENCER
VS—VARIABLE SPEED

APPLICABLE MODULE

ALL EXCEPT A1 & B1
ALL
ALL EXCEPT A1 & B1
F4, G5, G6, V8, W10, W12
ALL

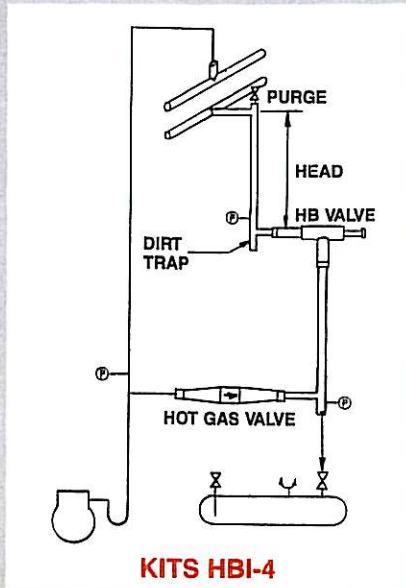
PT - F4 - F1

CONTROL VOLTAGE 1-115V 2-230V
BRANCH CIRCUIT PROTECTION
F—FUSES B—CIRCUIT BREAKER
TOTAL FANS
MODULE LETTER CODE

SPECIFY "TWO-IN-ONE" OR "HALF-OFF" CONTROL IN ADDITION TO MODEL KEY.
APPLICABLE TO DOUBLE WIDTH MODULES V & W ONLY.
INDIVIDUAL MOTOR CIRCUIT PROTECTION FOR V & W MODULES OPTIONAL.

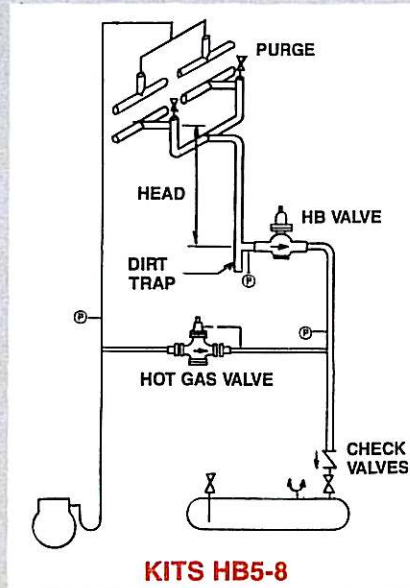
HOLDBACK FLOODING CONTROL SELECTION DATA

TYPICAL PIPING



HB—Holdback

Automatic condenser liquid holdback valve controls minimum head pressure by flooding condenser. Automatic hot gas valve controls pressure differential between compressor discharge and receiver to no less than 30 psi.

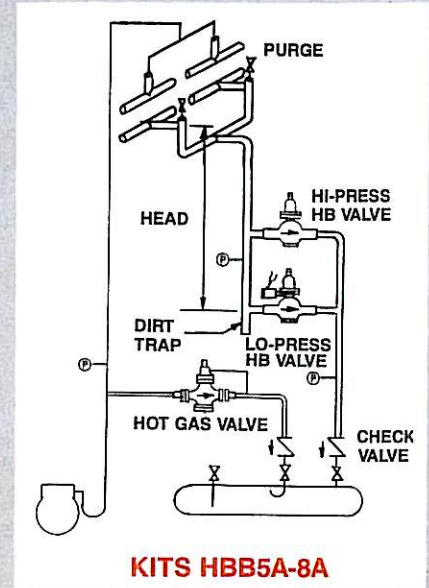


HBB—Dual Holdback

Two automatic holdback valves are utilized.

HI-PRESS—HB valve controls heat reclaim or hot gas defrost pressure.

LO-PRESS—HB valve controls minimum head pressure when the 120V pilot solenoid is energized.



Combination Fantrol/Holdback

Combining any FANTROL with flooding controls will reduce flooding charge and save fan motor energy. One or more fans may be forced to run when dual holdback LO-PRESS valves are energized.

HOLDBACK KITS—1 RECEIVER INLET					TONS CAPACITY—2, 6, & 16 FT. HEAD ABOVE HB VALVES								
KIT NO.	LIQ. DRAIN	HB VALVE	HG VALVE	CK4A CHECK	R-12			R-22			R-502		
					2	6	16	2	6	16	2	6	16
HB1	5/8	5/8 ORI-6	5/8 ORD4	NA	6	11	19	8	14	24	5	9	15
HB2	7/8	7/8 ORI-6	5/8 ORD4	NA	6	11	19	8	14	24	5	9	15
HB3	1 1/8	1 1/8 ORI-10	5/8 ORD4	NA	12	22	37	16	29	48	10	17	29
HB4	1 3/8	1 3/8 ORI-10	5/8 ORD4	NA	12	22	37	16	29	48	10	17	29
HB5	1 5/8	1 3/8 A81	7/8 A81	1 1/8	—	36	59	—	49	80	—	27	44
HB6	2 1/8	1 3/8 A81	7/8 A81	1 3/8	—	40	65	—	54	88	—	30	49
HB7	2 5/8	1 5/8 A72	1 3/8 A81L	1 5/8	—	66	108	—	88	144	—	48	78
HB8	3 1/8	2 1/8 A72	1 3/8 A81L	2 1/8	—	98	160	—	130	212	—	72	118

DUAL HOLDBACK KITS—2 RECEIVER INLETS					TONS CAPACITY—HEAD ABOVE HB VALVES									
KIT NO.	LIQ. DRAIN	LO-PRESS HB VALVE	HI-PRESS HB VALVE	HG VALVE	CK4A CHECKS		R-12			R-22			R-502	
					LIQ.	HG	6	16	6	16	6	16		
HBB5A	1 5/8	1 3/8 A81S	7/8 A8A	5/8 A8AL	1 1/8	5/8	36	59	49	80	27	44		
HBB6A	2 1/8	1 3/8 A81S	7/8 A8A	5/8 A8AL	1 3/8	5/8	40	65	54	88	30	49		
HBB7A	2 5/8	1 5/8 A72S	1 3/8 A81	5/8 A8AL	1 5/8	5/8	66	108	88	144	48	78		
HBB8A	3 1/8	2 1/8 A72S	1 3/8 A81	1 3/8 A81L	2 1/8	1 1/8	98	160	130	212	72	118		

Notes:

- Select kit for available liquid head above HB valve to allow coil to completely drain for maximum summer capacity.
- Receiver to coil outlet equalizing vents should not be used with holdback controls.
- Separate hot gas connections on receivers with up-turned elbow or baffle reduces HG flow and builds pressure faster.
- Add liquid drain line charge above HB valve to receiver capacity.
- Valve sizes are ODS connections.

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.

REFRIGERANT LINE CAPACITY DATA

LINE SIZE TYPE L OD INCHES	CAPACITY IN EVAPORATOR OR COMPRESSOR TONS						WEIGHT OF REFRIGERANT					
	DISCHARGE LINE CONDENSER INLET CONNECTION COMPRESSOR SAT SUCT. TEMP. °F						LIQUID DRAIN LINE CONDENSER TO RECEIVER CONDENSER OUTLET CONNECTION—100 FPM VEL			LBS. PER 100 LINEAL FEET LIQUID LINE 110°F		
	R12		R22		R502		R12	R22	R502	R12	R22	R502
	-40	+40	-40	+40	-40	+40						
5/8	1.0	1.3	2.1	2.4	1.7	2.1	3.2	3.6	2.6	12.6	11.3	11.7
7/8	2.8	3.4	5.6	6.3	4.4	5.6	6.6	7.4	5.3	26.1	23.4	24.2
1 1/8	5.8	6.8	11.2	12.7	8.8	11.2	11.2	12.7	9.1	44.8	40.0	41.5
1 3/8	9.7	11.7	19.5	22.1	15.4	19.5	17.1	19.2	13.9	67.6	60.5	62.8
1 5/8	16	19	29	34	24	31	24	27	20	95	85	88
2 1/8	32	39	64	73	50	63	42	47	34	166	150	155
2 3/8	56	68	113	127	88	112	65	73	53	258	232	240
3 1/8	91	110	176	199	140	178	93	104	75	366	330	340
3 3/8	133	161	262	297	207	264	126	141	102	495	446	461
4 1/8	187	228	376	426	291	371	163	183	132	646	584	602

LINES SIZES ARE BASED ON PRESSURE DROPS EQUIVALENT TO 2 DEGREES PER 100 EQUIVALENT FEET



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