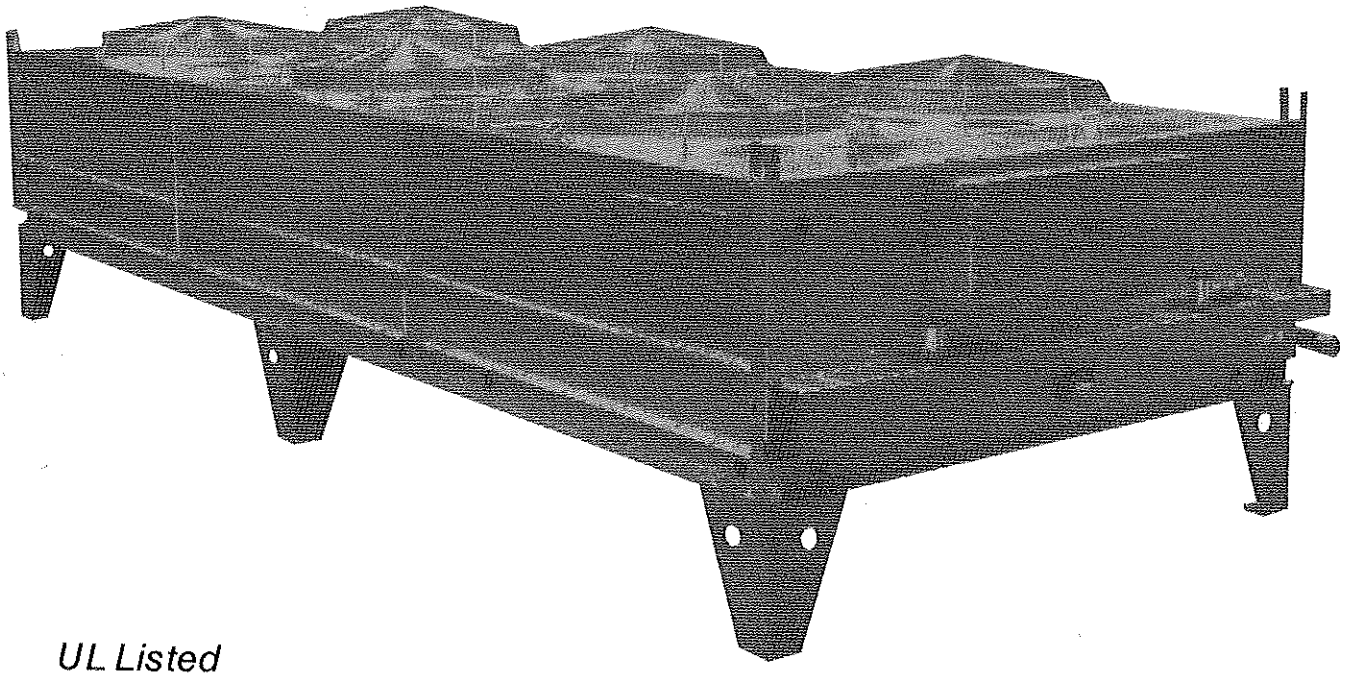
Bulletin: KACD-780
Supersedes: KACD-278

KRACK

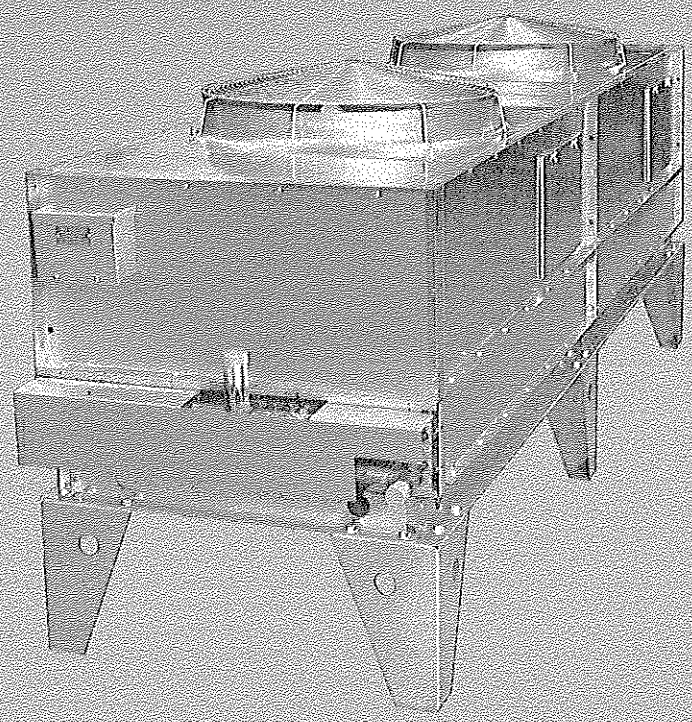
KACD Series Remote Air-Cooled Condensers



UL Listed
Direct Drive
Vertical Air Flow
8, 10 and 12 Fins/Inch
Halocarbon Refrigerants
Fluid Cooling

KRACK®

KACD REMOTE AIR COOLED CONDENSERS



FEATURES

Housing and legs are constructed of heavy mill galvanized steel. Extra heavy channels are located under coil sections. Fan panels have deep spun orifices for added rigidity and more efficient fan performance.

Divider baffles are located between each fan on 1 thru 5 fan units and between each bank of two fans on larger units. 2 x 2 thru 2 x 5 fan units also have a baffle between the two fan sections at the connection end. Each compartment of 1 or 2 fans has an access door to facilitate coil cleaning.

Coil. The coil is constructed of copper tubes and aluminum fins spaced by collars at 8, 10, or 12 fins/inch. One thru five fan units have one coil as standard. 2 x 2 thru 2 x 5 units have two coils. Coil return bends are protected by heavy removable covers.

Brass ferrules are inserted in the steel end plates and intermediate tube support sheets. This unique feature protects individual tubes from wear when the tube bundle expands and contracts.

Fans & Motors. Aluminum bladed fans are direct driven by 850 RPM motors. Low tip speeds result in quiet operation. Large 30 inch diameter fans insure full coil air coverage eliminating a shortage of air and resultant uneven expansion of the outboard tubes.

Fans are arranged for vertical air discharge. Horizontal air discharge is not available.

Motors are ¾ or 1 HP with three phase inherent overheat protection and sealed ball bearings. Electrical characteristics are 208-230/3/60 or 460/3/60 at 850 RPM and 380/3/50 at 710 RPM.

Motor stator, rotor, and hardware are moisture resistant treated for condenser duty.

Electrical. Motors are factory wired to a weather resistant junction box with a moisture resistant wiring harness. Each motor lead (3 per motor) in the junction box will be numbered in sequence as shown on page 10. One contactor, provided by others, can be used to start all motors. Disconnect switches must also be provided when required. Factory mounted weather resistant control panels are provided with low ambient head pressure controls, otherwise all motor leads are brought to a junction box.

SAMPLE SPECIFICATION

Furnish and install (No.) Model KACD (No.) remote air cooled condensers with vertical air discharge. Casing shall be mill galvanized steel with access doors for coil cleaning. Coil shall have copper tubes with (8) (10) (12) aluminum fins per inch. Fans shall be 30 inch diameter, aluminum bladed, direct driven at 850 RPM by 3/4 or 1 HP, (208-230/3/60) (460/3/60), weather protected motors with three phase inherent overload protection and sealed ball bearings. Fan motors shall be factory wired to a weather resistant junction box. Disconnect switches are to be furnished by the electrical contractor. Total heat of rejection shall be _____ MBH. Design TD is _____ °F resulting in a saturated condensing temperature of _____ °F with _____ °F entering air.

OPTIONS

A. Provide low ambient head pressure control (Type).

B. Provide coil multi-circuited as per the schedule shown on drawings.

C. Provide 42 inch high legs and wind bracing.

D. Provide gravity discharge damper over fans that use fan cycling low ambient head pressure control.

E. Provide a liquid sub-cooling section (may increase condenser size—not practical for TD's less than 15°F).

F. Provide individual compartmented fans (2x2, 2x3, 2x4, and 2x5 models).

SELECTION

LOW AMBIENT HEAD PRESSURE CONTROLS

Thermal Fantrol utilizes line voltage thermostats to cycle fan motors in response to entering air temperature.

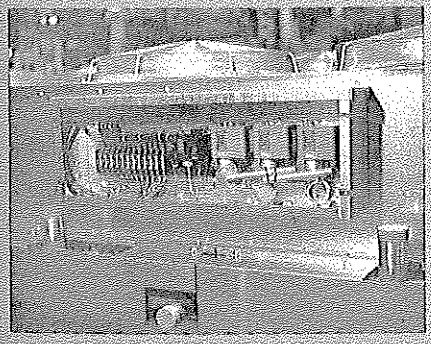
Thermal Pressure Fantrol has refrigerant pressure switch(s) to by-pass fan cycling thermostat(s). This allows some fans to operate in response to head pressure during a peak load, such as pull down.

Pressuretrol utilizes line voltage pressure switches to cycle fan motors in response to head pressure.

Hold-Back Control utilizes a valve in the condenser liquid drain which floods the condenser in response to head pressure.

Dual Hold-Back Control utilizes liquid drain valves with two pressure settings. Heat reclaim systems can have two stages of heat. Hot gas defrost systems need only increase head pressure when defrosting. Saves energy.

Combination Fantrol Hold-Back systems will reduce the refrigerant charge and minimize fan energy.



ELECTRICAL CONTROL PANELS

Factory mounted and wired weather resistant control panels include all necessary line voltage thermostats or pressure switches. A local disconnect means is not included.

1 thru 5 fan unit control panels are located on the left side of the condenser when facing the connection end. 2x2 thru 2x5 fan units have control panels located on the connection end.

Fuses are provided on the line side of each fan cycle control when specified.

Capacity of a remote air cooled condenser is based on total heat rejected (THR) at the condenser. This is the sum of the evaporator refrigeration effect and the heat of compression created by the compressor. The heat of compression will vary with operating conditions and the type of compressor design.

Whenever possible, use the compressor manufacturer's heat of rejection ratings. Basic formulas which apply to reciprocating compressors are:

Open Compressors:
THR = Compressor Capacity (BTUH) + (2545 × BHP input)
Suction Gas Cooled Hermetic Compressors:
THR = Compressor Capacity (BTUH) + (3413 × KW input)

Use manufacturer's ratings for screw compressors and internally compounded compressors.

Required THR may be estimated by using the factors shown in the tables. Altitude will also affect condenser performance, and should be taken into consideration. Multiply the compressor(s) capacity by the proper factors to obtain required condenser THR.

Condenser capacity is directly proportional to the TD. TD is defined as the difference in degrees Fahrenheit between saturated condensing temperature and entering air temperature. Dependent on condenser location, entering air temperature may be higher than ambient.

Once a selection has been made, the ACTUAL TD can be calculated by dividing the required THR by the selected condenser THR at 1°TD.

FLUID COOLING

Contact the factory for selections to cool various liquids such as glycols and oils.

HEAT OF COMPRESSION AND ALTITUDE FACTORS

THR CONDENSER LOAD = COMPRESSOR CAPACITY × FACTOR

OPEN COMPRESSORS

EVAPORATOR TEMP. (F)	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

SUCTION COOLED HERMETIC COMPRESSORS

EVAPORATOR TEMP. (F)	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.

ALTITUDE

FEET	FACTOR
1000	1.02
2000	1.05
3000	1.07
4000	1.10
5000	1.12
6000	1.15
7000	1.17

CAPACITY DATA

KACD MODEL	FINS INCH	NO.-HP FANS	ROWS DEEP	TOTAL HEAT REJECTION—BTUH (000)									
				R-12					R-22				
				1° TD	10° TD	15° TD	20° TD	25° TD	1° TD	10° TD	15° TD	20° TD	25° TD
11	10	1—¾	3	5.2	52	78	104	130	5.5	55	82	110	138
13	12	1—1	3	5.7	57	86	115	143	6.0	60	90	120	150
15	12	1—1	4	6.7	67	101	135	168	7.1	71	106	141	176
23	10	2—¾	3	10.5	105	158	210	263	11.0	110	164	220	275
25	12	2—1	3	11.5	115	172	229	288	12.1	121	181	242	301
30	12	2—1	4	13.6	136	204	272	340	14.3	143	214	285	356
33	10	3—¾	3	15.7	157	236	314	393	16.5	165	246	330	413
38	12	3—1	3	17.3	173	260	347	433	18.2	182	273	364	455
44	12	3—1	4	20.3	203	304	405	508	21.3	213	319	425	531
45	10	4—¾	3	20.9	209	314	418	523	22.0	220	330	440	550
50	12	4—1	3	23.1	231	347	463	578	24.3	243	364	486	606
57	12	4—1	4	26.9	269	404	539	673	28.3	283	424	565	706
56	10	5—¾	3	26.2	262	393	524	655	27.5	275	413	550	688
61	12	5—1	3	28.9	289	433	577	722	30.3	303	455	606	758
73	12	5—1	4	33.8	338	507	676	844	35.5	355	532	710	887
46	10	2 x 2—¾	3	20.9	209	314	418	523	22.0	220	330	440	550
51	12	2 x 2—1	3	23.1	231	347	463	578	24.3	243	364	486	606
58	12	2 x 2—1	4	26.9	269	404	539	673	28.3	283	424	565	706
69	10	2 x 3—¾	3	31.4	314	471	628	785	33.0	330	492	660	825
76	12	2 x 3—1	3	34.6	346	519	692	865	36.3	363	545	727	909
88	12	2 x 3—1	4	40.5	405	607	809	1013	42.5	425	638	851	1064
92	10	2 x 4—¾	3	41.8	418	627	836	1045	44.0	440	656	880	1100
101	12	2 x 4—1	3	46.1	461	692	923	1153	48.5	485	727	969	1211
118	12	2 x 4—1	4	53.9	539	808	1077	1348	56.6	566	849	1132	1415
115	10	2 x 5—¾	3	52.4	524	786	1048	1310	55.0	550	825	1100	1375
127	12	2 x 5—1	3	57.7	577	865	1153	1443	60.6	606	909	1212	1515
148	12	2 x 5—1	4	67.5	675	1013	1351	1688	70.9	709	1064	1419	1774
10	8	1—¾	3	4.7	47	71	94	118	5.0	50	75	100	125
12	8	1—¾	4	5.5	55	83	110	138	5.9	59	88	118	147
14	8	1—1	6	6.2	62	93	124	155	6.6	66	99	132	165
21	8	2—¾	3	9.5	95	142	190	238	10.0	100	150	200	250
24	8	2—¾	4	11.2	112	168	224	280	11.8	118	177	236	295
27	8	2—1	6	12.7	127	190	254	318	13.2	132	198	264	330
31	8	3—¾	3	14.3	143	214	286	358	15.0	150	225	300	375
37	8	3—¾	4	16.9	169	253	338	423	17.7	177	265	354	442
41	8	3—1	6	18.9	189	283	378	473	19.8	198	297	396	495
43	8	4—¾	3	19.0	190	285	380	475	20.0	200	300	400	500
48	8	4—¾	4	22.5	225	337	450	563	23.6	236	354	479	590
54	8	4—1	6	25.0	250	375	500	625	26.4	264	396	528	660
52	8	5—¾	3	23.8	238	357	476	595	25.0	250	375	500	625
59	8	5—¾	4	28.1	281	422	562	703	29.5	295	443	590	738
66	8	5—1	6	31.4	314	471	628	785	33.0	330	495	660	825
42	8	2 x 2—¾	3	19.0	190	285	380	475	20.0	200	300	400	500
49	8	2 x 2—¾	4	22.5	225	337	450	563	23.6	236	354	479	590
55	8	2 x 2—1	6	25.0	250	375	500	625	26.4	264	396	528	660
63	8	2 x 3—¾	3	28.5	285	427	570	713	30.0	300	450	600	750
74	8	2 x 3—¾	4	33.7	337	505	674	843	35.4	354	531	708	885
82	8	2 x 3—1	6	37.7	377	565	754	943	39.6	396	594	792	990
83	8	2 x 4—¾	3	38.0	380	570	760	950	40.0	400	600	800	1000
98	8	2 x 4—¾	4	45.0	450	675	900	1125	47.2	472	708	944	1180
110	8	2 x 4—1	6	50.2	502	753	1004	1255	52.8	528	792	1056	1320
104	8	2 x 5—¾	3	47.6	476	714	952	1190	50.0	500	750	1000	1250
123	8	2 x 5—¾	4	56.2	562	843	1124	1405	59.0	590	885	1180	1475
138	8	2 x 5—1	6	62.8	628	942	1256	1570	66.0	660	990	1320	1650

TOTAL HEAT REJECTION—BTUH (000)					MULTI-CIRCUIT DATA				ROWS	NO.-HP	FINS/	KACD
R-502					AVAILABLE CIRCUITS	CIRCUIT CAPACITY BTUH/1° TD			DEEP	FANS	INCH	MODEL
1° TD	10° TD	15° TD	20° TD	25° TD		R-12	R-22	R-502				
5.3	53	80	107	134	18	289	306	294	3	1—¾	10	11
5.9	59	88	117	146	18	317	333	328	3	1—1	12	13
6.9	69	103	137	171	24	279	296	288	4	1—1	12	15
10.7	107	160	213	266	18	583	611	595	3	2—¾	10	23
11.8	118	177	236	295	18	639	672	656	3	2—1	12	25
14.0	140	209	279	349	24	567	596	583	4	2—1	12	30
16.1	161	241	321	401	18	872	917	894	3	3—¾	10	33
17.8	178	266	355	444	18	961	1011	989	3	3—1	12	38
20.8	208	311	415	519	24	846	888	867	4	3—1	12	44
21.4	214	321	428	535	21	995	1048	1019	3	4—¾	10	45
23.7	237	355	473	591	21	1100	1157	1129	3	4—1	12	50
27.6	276	414	552	690	28	961	1011	986	4	4—1	12	57
26.8	268	402	536	670	21	1248	1310	1276	3	5—¾	10	56
29.6	296	444	591	739	21	1376	1443	1410	3	5—1	12	61
34.6	346	519	692	865	56	606	634	618	4	5—1	12	73
21.4	214	321	428	535	2 x 18	581	611	595	3	2 x 2—¾	10	46
23.7	237	355	473	591	2 x 18	641	675	659	3	2 x 2—1	12	51
27.6	276	414	552	690	2 x 24	561	589	575	4	2 x 2—1	12	58
32.1	321	481	641	801	2 x 18	872	917	892	3	2 x 3—¾	10	69
35.5	355	532	709	886	2 x 18	961	1008	986	3	2 x 3—1	12	76
41.6	416	623	831	1039	2 x 24	844	885	867	4	2 x 3—1	12	88
42.7	427	641	855	1069	2 x 21	995	1048	1017	3	2 x 4—¾	10	92
47.4	474	710	947	1184	2 x 21	1098	1155	1129	3	2 x 4—1	12	101
55.3	553	829	1105	1381	2 x 28	963	1011	988	4	2 x 4—1	12	118
53.6	536	804	1072	1340	2 x 21	1248	1310	1276	3	2 x 5—¾	10	115
59.1	591	887	1182	1478	2 x 21	1374	1443	1407	3	2 x 5—1	12	127
69.2	692	1038	1384	1730	2 x 56	603	633	618	4	2 x 5—1	12	148
4.8	48	72	96	120	18	261	278	267	3	1—¾	8	10
5.7	57	86	114	143	24	229	246	238	4	1—¾	8	12
6.4	64	96	128	160	24	258	275	267	6	1—1	8	14
9.7	97	146	194	243	18	528	556	539	3	2—¾	8	21
11.5	115	173	230	288	24	467	492	479	4	2—¾	8	24
13.0	130	195	260	325	24	529	550	542	6	2—1	8	27
14.6	146	219	292	365	18	794	833	811	3	3—¾	8	31
17.4	174	261	348	435	24	704	738	725	4	3—¾	8	37
19.3	193	290	386	483	24	788	825	804	6	3—1	8	41
19.5	195	293	390	488	21	905	952	929	3	4—¾	8	43
23.1	231	347	462	578	28	804	843	825	4	4—¾	8	48
25.7	257	386	514	643	28	893	943	918	6	4—1	8	54
24.4	244	366	487	609	21	1133	1190	1162	3	5—¾	8	52
28.8	288	432	576	720	28	1004	1054	1029	4	5—¾	8	59
32.2	322	483	643	804	42	748	786	767	6	5—1	8	66
19.5	195	293	390	488	2 x 18	528	556	542	3	2 x 2—¾	8	42
23.1	231	347	462	578	2 x 24	469	492	481	4	2 x 2—¾	8	49
25.7	257	386	514	643	2 x 24	521	550	535	6	2 x 2—1	8	55
29.2	292	438	584	730	2 x 18	792	833	811	3	2 x 3—¾	8	63
34.6	346	519	692	865	2 x 24	702	738	721	4	2 x 3—¾	8	74
38.7	387	581	774	968	2 x 24	785	825	806	6	2 x 3—1	8	82
38.8	388	582	776	970	2 x 21	905	952	924	3	2 x 4—¾	8	83
46.2	462	693	924	1155	2 x 28	804	843	825	4	2 x 4—¾	8	98
51.4	514	771	1028	1285	2 x 28	896	943	918	6	2 x 4—1	8	110
48.7	487	731	974	1218	2 x 21	1133	1190	1160	3	2 x 5—¾	8	104
57.6	576	864	1152	1440	2 x 28	1004	1054	1029	4	2 x 5—¾	8	123
64.3	643	965	1286	1608	2 x 42	748	786	765	6	2 x 5—1	8	138

PHYSICAL DATA

KACD	FANS	TOTAL	TOTAL FULL LOAD AMPS			CONNECTIONS		MAX. ① OPERATING WT. LBS.	100% FLOODING CHARGE LBS. @ 60° F AMBIENT		
MODEL	NO.-HP	CFM	208V	230V	460V	INLET	OUTLET		R-12	R-22	R-502
10	1—¾	9,350	3.5	3.2	1.6	1⅜	1⅛	485	35	32	33
11	1—¾	9,150	3.5	3.2	1.6	1⅜	1⅛	495	35	32	33
12	1—¾	8,900	3.5	3.2	1.6	1⅝	1⅜	527	47	43	44
13	1—1	8,750	4.4	4.0	2.0	1⅝	1⅜	505	35	32	33
14	1—1	8,100	4.4	4.0	2.0	1⅝	1⅜	611	71	64	66
15	1—1	8,100	4.4	4.0	2.0	1⅝	1⅜	557	47	43	44
21	2—¾	18,700	7.0	6.4	3.2	2⅛	1⅝	973	68	62	64
23	2—¾	18,300	7.0	6.4	3.2	2⅛	1⅝	988	68	62	64
24	2—¾	17,800	7.0	6.4	3.2	2⅛	1⅝	1041	91	83	85
25	2—1	17,500	8.8	8.0	4.0	2⅛	1⅝	1003	68	62	64
27	2—1	16,200	8.8	8.0	4.0	2⅛	1⅝	1226	136	124	127
30	2—1	16,200	8.8	8.0	4.0	2⅛	1⅝	1081	91	83	85
31	3—¾	28,100	10.5	9.6	4.8	2⅛	2⅛	1381	101	92	94
33	3—¾	27,500	10.5	9.6	4.8	2⅝	2⅛	1411	101	92	94
37	3—¾	26,700	10.5	9.6	4.8	2⅝	2⅛	1494	134	123	126
38	3—1	26,200	13.2	12.0	6.0	2⅝	2⅛	1441	101	92	94
41	3—1	24,300	13.2	12.0	6.0	2⅝	2⅛	1732	202	185	189
44	3—1	24,300	13.2	12.0	6.0	2⅝	2⅛	1574	134	123	126
43	4—¾	37,400	14.0	12.8	6.4	2⅝	2⅛	1925	135	123	125
45	4—¾	36,600	14.0	12.8	6.4	2⅝	2⅛	1973	135	123	125
48	4—¾	35,600	14.0	12.8	6.4	2⅝	2⅝	2105	179	164	168
50	4—1	35,000	17.6	16.0	8.0	2⅝	2⅝	2021	135	123	125
54	4—1	32,400	17.6	16.0	8.0	2⅝	2⅝	2536	269	245	251
57	4—1	32,400	17.6	16.0	8.0	2⅝	2⅝	2240	179	164	125
52	5—¾	46,800	17.5	16.0	8.0	2⅝	2⅝	2384	167	153	157
56	5—¾	45,800	17.5	16.0	8.0	2⅝	2⅝	2480	167	153	157
59	5—¾	44,500	17.5	16.0	8.0	2⅝	2⅝	2608	223	204	209
61	5—1	43,700	22.0	20.0	10.0	2⅝	2⅝	2540	167	153	157
66	5—1	40,500	22.0	20.0	10.0	3⅛	2⅝	3149	334	306	313
73	5—1	40,500	22.0	20.0	10.0	3⅛	2⅝	2799	223	204	209
42	2 x 2—¾	37,400	14.0	12.8	6.4	2—2⅛	2—1⅝	1786	136	124	127
46	2 x 2—¾	36,600	14.0	12.8	6.4	2—2⅛	2—1⅝	1816	136	124	127
49	2 x 2—¾	35,600	14.0	12.8	6.4	2—2⅛	2—1⅝	1911	181	166	170
51	2 x 2—1	35,000	17.6	16.0	8.0	2—2⅛	2—1⅝	1846	136	124	127
55	2 x 2—1	32,400	17.6	16.0	8.0	2—2⅛	2—1⅝	2302	272	249	255
58	2 x 2—1	32,400	17.6	16.0	8.0	2—2⅛	2—1⅝	2001	181	166	170
63	2 x 3—¾	56,100	21.0	19.2	9.6	2—2⅛	2—2⅛	2571	201	184	189
69	2 x 3—¾	54,900	21.0	19.2	9.6	2—2⅝	2—2⅛	2601	201	184	189
74	2 x 3—¾	53,400	21.0	19.2	9.6	2—2⅝	2—2⅛	2769	269	246	251
76	2 x 3—1	52,500	26.4	24.0	12.0	2—2⅝	2—2⅛	2661	201	184	189
82	2 x 3—1	48,600	26.4	24.0	12.0	2—2⅝	2—2⅛	3325	405	370	379
88	2 x 3—1	48,600	26.4	24.0	12.0	2—2⅝	2—2⅛	2889	269	246	251
83	2 x 4—¾	74,800	28.0	25.6	12.8	2—2⅝	2—2⅛	3209	269	246	251
92	2 x 4—¾	73,200	28.0	25.6	12.8	2—2⅝	2—2⅛	3289	269	246	251
98	2 x 4—¾	71,200	28.0	25.6	12.8	2—2⅝	2—2⅝	3508	358	328	336
101	2 x 4—1	70,000	35.2	32.0	16.0	2—2⅝	2—2⅝	3369	269	246	251
110	2 x 4—1	64,800	35.2	32.0	16.0	2—2⅝	2—2⅝	4227	537	491	503
118	2 x 4—1	64,800	35.2	32.0	16.0	2—2⅝	2—2⅝	3733	358	328	336
104	2 x 5—¾	93,500	35.0	32.0	16.0	2—2⅝	2—2⅝	3974	334	306	313
115	2 x 5—¾	91,500	35.0	32.0	16.0	2—2⅝	2—2⅝	4134	334	306	313
123	2 x 5—¾	89,000	35.0	32.0	16.0	2—2⅝	2—2⅝	4346	446	408	417
127	2 x 5—1	87,500	44.0	40.0	20.0	2—2⅝	2—2⅝	4234	334	306	313
138	2 x 5—1	81,000	44.0	40.0	20.0	2—3⅛	2—2⅝	5248	668	611	626
148	2 x 5—1	81,000	44.0	40.0	20.0	2—3⅛	2—2⅝	4666	446	408	417

① OPERATING WT. INCLUDES 100% FLOODING CHARGE

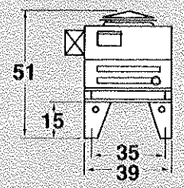
NECTIONS OUTLET	MAX. ① OPERATING WT. LBS.	100% FLOODING CHARGE LBS. @ 60° F AMBIENT R-12	R-22	R-502
1⅛	485	35	32	33
1⅛	495	35	32	33
1⅜	527	47	43	44
1⅜	505	35	32	33
1⅜	611	71	64	66
1⅜	557	47	43	44
1⅝	973	68	62	64
1⅝	988	68	62	64
1⅝	1041	91	83	85
1⅝	1003	68	62	64
1⅝	1226	136	124	127
1⅝	1081	91	83	85
2⅛	1381	101	92	94
2⅛	1411	101	92	94
2⅛	1494	134	123	126
2⅛	1441	101	92	94
2⅛	1732	202	185	189
2⅛	1574	134	123	126
2⅛	1925	135	123	125
2⅛	1973	135	123	125
2⅛	2105	179	164	168
2⅛	2021	135	123	125
2⅛	2536	269	245	251
2⅛	2240	179	164	125
2⅛	2384	167	153	157
2⅛	2480	167	153	157
2⅛	2608	223	204	209
2⅛	2540	167	153	157
2⅛	3149	334	306	313
2⅛	2799	223	204	209
2⅛	1786	136	124	127
2⅛	1816	136	124	127
2⅛	1911	181	166	170
2⅛	1846	136	124	127
2⅛	2992	272	249	255
2⅛	1991	181	166	170
2⅛	2061	201	184	189
2⅛	2061	201	184	189
2⅛	2961	269	246	251
2⅛	2061	201	184	189
2⅛	4405	405	370	379
2⅛	3009	269	246	251
2⅛	3009	269	246	251
2⅛	3858	358	246	251
2⅛	4227	269	328	336
2⅛	3733	537	246	251
2⅛	3974	358	491	503
2⅛	4134	334	328	336
2⅛	4346	334	306	313
2⅛	4234	446	306	313
2⅛	5248	334	408	417
2⅛	4666	668	306	313
		445	611	626
			408	417

① OPERATING WT. INCLUDES 100% FLOODING CHARGE

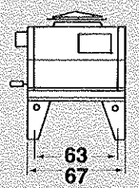
DIMENSIONAL DATA

END VIEW

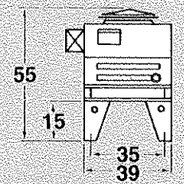
1 FAN UNITS



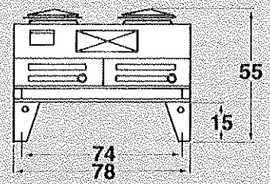
SIDE VIEW

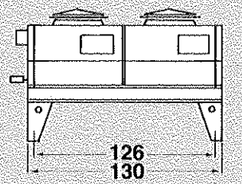


2 FAN UNITS

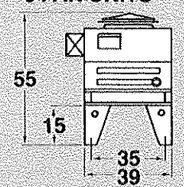


2x2 FAN UNITS

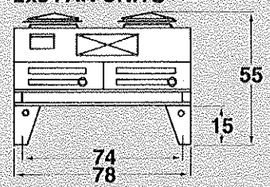


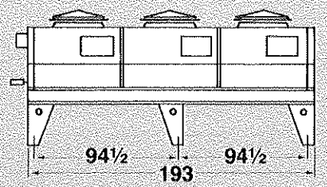


3 FAN UNITS

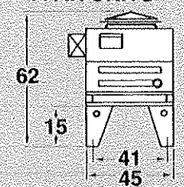


2x3 FAN UNITS

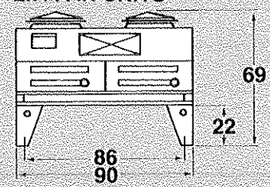


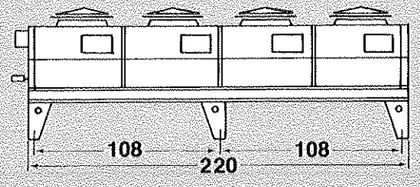


4 FAN UNITS

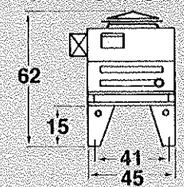


2x4 FAN UNITS

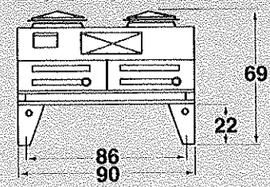


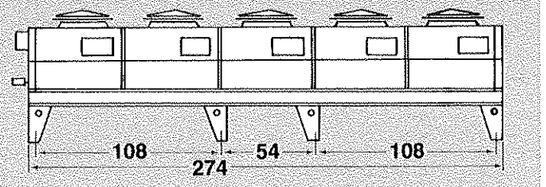


5 FAN UNITS



2x5 FAN UNITS





DIMENSIONS ARE FOR GENERAL REFERENCE ONLY - DO NOT USE FOR CONSTRUCTION PURPOSES

NOTES

- Dimensions are in inches
- Leg dimensions, inside overall dimensions are ¾ inch hold down bolt hole centers

Standard junction box location

Optional fan cycle control panel location

APPLICATION

Condenser Location. Condensers should be no closer than the width of the unit from walls or other condensers. Entering air temperatures will be lower at the building perimeter than in the middle of the roof. Avoid locations near exhaust fans, flues, chimneys, incinerators, and plumbing vents.

Condenser Charge. Summer time operating refrigerant charge will approximate 30% of the fully flooded charge as shown on Page 5. Low ambient head pressure controls require an additional charge to flood the condenser. Difficult to predict, the amount of extra charge depends upon the lowest winter temperature, design TD, prevailing winds, winter compressor load, use of heat reclaim and hot gas defrost systems.

Receiver Capacity. The minimum refrigerant capacity, when 80% full, should include "low-side" pump-out charge consisting of unit cooler and liquid line operating charges PLUS the extra winter condenser flooding charge which must be stored in the receiver in the summer.

Heat reclaim coil operating charges must also be stored in the receiver during summer.

Receiver Location. In temperate climates, using fan cycling controls, locate the receiver under the condenser - in the condenser shade and air stream.

In cold climates, an indoor location (60°F min.) is best. Hold-back control valves require a static head for summertime flows. This requires the receiver to be three or more feet below the condenser outlet.

By keeping the receiver as high as possible, liquid line static head penalties are minimized.

Condenser Piping Refer to the ASHRAE Guide for a complete discussion.

Compressor discharge lines should be sized to minimize pressure drop and maintain oil return gas velocities. Discharge lines should be looped to the top of the condenser.

Liquid drain lines, from the condenser to the receiver, should have liquid velocities below 100 fpm. These gravity drains must allow gas and non-condensibles to flow from the receiver to the condenser. Traps and long horizontal runs must be avoided.

Receiver vent or equalizer lines, when used, must be free of traps and be connected to the top of the condenser liquid outlet - not the inlet. Vent lines should not be used with Hold-Back Controls.

Parallel Condensers. When two or more condensers are used in parallel, select the same model numbers. This results in equal pressure drops. Also the compressor discharge lines should have equal pressure drops to each condenser circuit. Unequal pressure drops may cause liquid to back-up in one condenser reducing its capacity.

Purging Non-condensibles. Being lighter than refrigerants, air will eventually move to the high point of a non-operating system. When operating, the best place to trap air is at the condenser outlet. Purge valves should be located at both places on each condenser circuit.

WINTER FLOODING CHARGE	% OF FULLY FLOODED CHARGE SHOWN ON PAGE 5						
	TYPE OF HEAD PRESSURE CONTROL						
% LOAD	FAN CYCLING	FLOODING			COMBINATION FAN/FLOODING		
	Above 40°F	Above 40°F	40 to 0°F	0 to -10°F	Above 40°F	40 to 0°F	0 to -10°F
100	35	50	85	90	30	50	55
50	45	60	90	95	40	55	60
25	55	70	95	95	50	60	65
Heat Reclaim	65	80	95	95	65	65	70
Hot Gas Defrost	65	80	95	95	65	65	70

RELATIVE SOUND PRESSURE

Decibles measured on "A" scale, six feet horizontally from center of one side at fan elevation.

NO. FANS	dB(A)	NO. FANS	dB(A)
1	75	2x2	78
2	77	2x3	80
3	79	2x4	82
4	80	2x5	83
5	81	—	—

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							
	—40	+40	—40	+40	—40	+40	R12	R22	R502	R12	R22	R502
⅝	1.0	1.3	2.1	2.4	1.7	2.1	3.2	3.6	2.6	12.6	11.3	11.7
⅞	2.8	3.4	5.6	6.3	4.4	5.6	6.6	7.4	5.3	26.1	23.4	24.2
1⅛	5.8	6.8	11.2	12.7	8.8	11.2	11.2	12.7	9.1	44.8	40.0	41.5
1⅜	9.7	11.7	19.5	22.1	15.4	19.5	17.1	19.2	13.9	67.6	60.5	62.8
1⅝	16	19	29	34	24	31	24	27	20	95	85	88
2⅛	32	39	64	73	50	63	42	47	34	166	150	155
2⅝	56	68	113	127	88	112	65	73	53	258	232	240
3⅛	91	110	176	199	140	178	93	104	75	366	330	340
3⅝	133	161	262	297	207	264	126	141	102	495	446	461
4⅛	187	228	376	426	291	371	163	183	132	646	584	602

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

MULTI-CIRCUIT SELECTION

Condenser coils can be divided into many individual refrigerant circuits. Each circuit can be sized for a specified refrigerant, capacity and TD. Each circuit has a gas inlet and liquid outlet header and connection sized in accordance with Refrigerant Line Capacity Data. Multiple circuits are available at no extra cost.

Circuits are arranged and tagged for identification from left to right when facing the connection end. The No. 1 system will be at the far left. Inlet and outlet connections are horizontal. Avoid locating high TD circuits next to low TD circuits. When extra circuits are available, add them to the low TD circuit adjacent to a high TD circuit.

2 x 2 thru 2 x 5 fan condensers have two 50% coil sections. Arrange circuits so that one circuit does not overlap both sections.

Thermal Fantrol can be used with multi-circuited condensers. Hold-Back Control can be provided for field installation in each system liquid drain.

SAMPLE TABULATION

SUCTION GAS COOLED HERMETIC COMPRESSORS—95°F AMBIENT—SEA LEVEL ALTITUDE (CORRECT FOR ALTITUDE AS REQUIRED)
HC FACT—HEAT OF COMPRESSION FACTOR FOUND ON PAGE 3. CIRC. CAP—CIRCUIT CAPACITY—BTUH/°TD FOUND ON PAGE 4

COMPR MODEL	REF	SAT SUCT	COMP BTUH	×	HC FACT	=	THR BTUH	÷	DESIGN TD	=	BTUH 1° TD	÷	CIRC CAP	=	CIRC REQ'D	CIRC ASSIGN	SYSTEM NO
MRF0500	12	15	27000	×	1.38	=	37260	÷	20	=	1863	÷	1100	=	1.69	2	2
4RA1000	12	20	70000	×	1.35	=	94500	÷	20	=	4725	÷	1100	=	4.30	5	1
4RA1000	12	30	88000	×	1.30	=	114400	÷	20	=	5720	÷	1100	=	5.2	5	3
9RS0760	502	—25	33000	×	1.63	=	53790	÷	15	=	3586	÷	1129	=	3.18	3	5
MRB0500	502	—15	27000	×	1.54	=	41580	÷	15	=	2772	÷	1129	=	2.46	3	4
MRB0500	502	—30	19000	×	1.65	=	31350	÷	10	=	3135	÷	1129	=	2.78	3	6
											21801					21	

SELECT CONDENSER USING 1° TD RATING FOR R12 (PAGE 3)

KACD50 HAVING 21 CIRCUITS IS THE MOST ECONOMICAL SELECTION. SYSTEM 3 AND 5 MUST BE COMPROMISED RESULTING IN 20.8 AND 15.9° TD. SYSTEMS ARE ARRANGED AND TAGGED FROM LEFT TO RIGHT
ALTERNATE SELECTIONS ARE KACD57 WITH 28 CIRCUITS, 2 × 2 MODELS 51 AND 58, AND 8 FIN/INCH MODELS 48, 49, 54 OR 55.

FAN CYCLING

LOW AMBIENT HEAD PRESSURE CONTROL

GENERAL

Remote air cooled condensers are selected for summertime ambient conditions. As the outdoor temperature drops, the saturated condensing temperature and pressure is lowered proportionally. A minimum pressure difference between condensed liquid and evaporator suction is required for proper expansion valve and distributor performance. If saturated condensing temperatures drop below liquid refrigerant temperature, liquid pre-expansion will produce flash gas resulting in poor system performance.

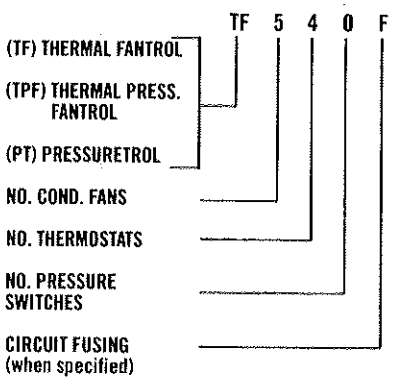
Cycling fan motors reduces the air flow thru the coil, reducing the condenser's capacity. As the capacity is reduced, the TD increases. If the compressor capacity remains the same, and the condenser was selected with a 20° TD to maintain an 80° F saturated condensing temperature with 40° F entering air, one half of the fans would have to be shut off. The TD then becomes 40° F.

Factors such as convection and prevailing winds will create condensing capacity in the fan OFF sections.

Three types of Fan Cycling controls are standard: Thermal Fantrol, Thermal Pressure Fantrol and Pressuretrol.

Special arrangements can be provided upon request.

CONTROL KIT CODE



THERMAL FANTROL–TF

FAN CYCLING HEAD PRESSURE CONTROL

- Line voltage thermostats cycle all but one fan motor individually or in banks of two in response to changes in ambient temperature.
- Thermostat range 50 to 105°F. with 5 to 20°F. adjustable differential between cut-in and cut-out. RANCO 020-7013
- Thermol Fantrol is applicable with multi-circuit condenser and hold-back flooding controls.
- Fuses (Buss FNQ 15 or Economy MEQ 15) provided when specified. (Kit No. has F suffix)
- A fused disconnect is required by N.E.C. and is not provided as part of factory mounted control.
- One contactor is required to cycle all condenser fans with compressor(s) if system cycles during mild weather.

INDIVIDUAL MOTOR FLA			
HP	208/3/60	230/3/60	460/3/60
3/4	3.5	3.2	1.6
1	4.4	4.0	2.0

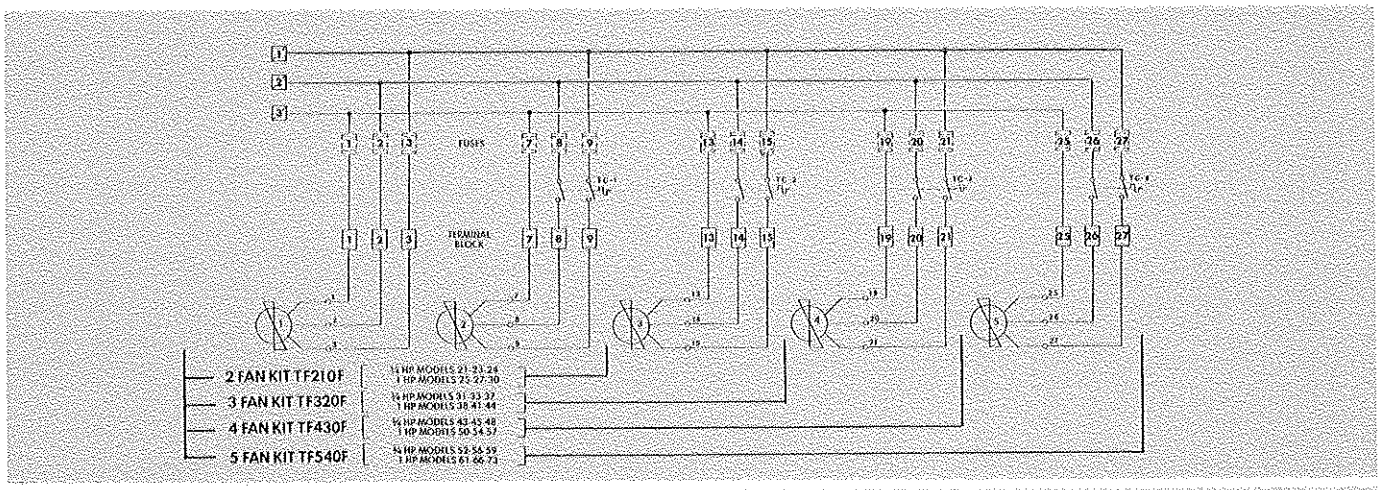
Total FLA = NO. MTRS. x ABOVE

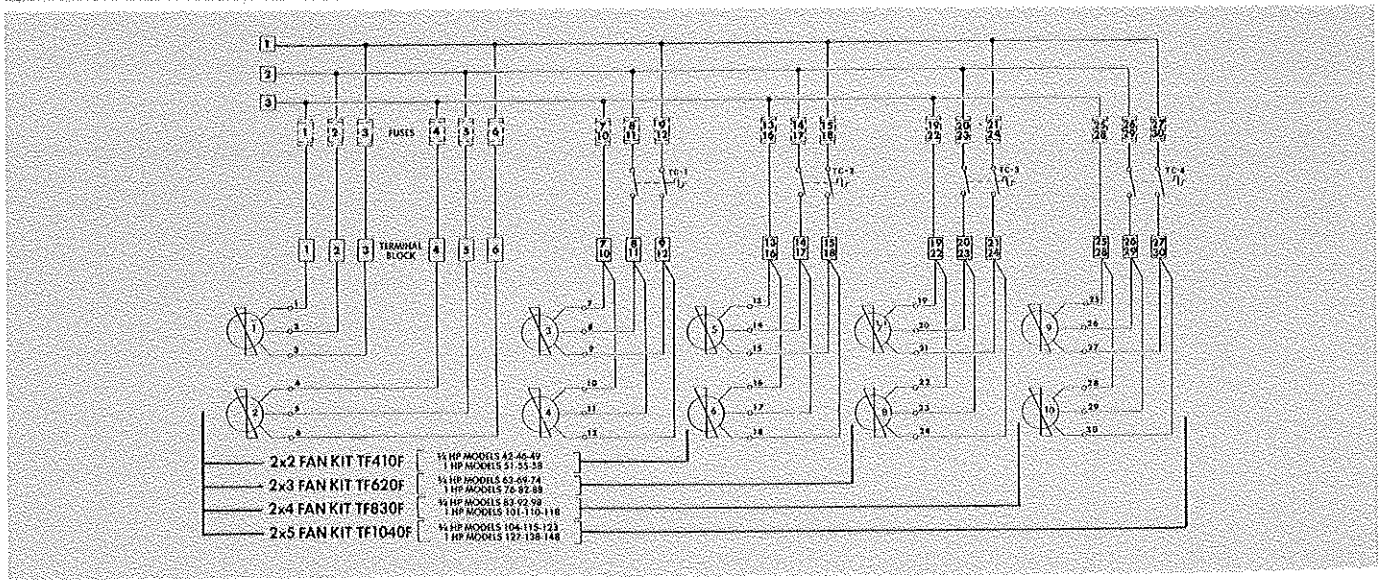
- Motors have inherent overheat protection in all phases.

THERMOSTAT CUT-IN SETTINGS — °F.				
No.	TC-1	TC-2	TC-3	TC-4
1	75	—	—	—
2	68	75	—	—
3	60	70	75	—
4	55	65	71	75

SET CUT-OUT FOR 5° DIFFERENTIAL

- Recommended thermostat settings are for condensers selected with a 12 to 16°TD and may be varied to suit system operating conditions.





THERMAL PRESSURE FANTROL—TPF

FAN CYCLING HEAD PRESSURE CONTROL

- Line voltage thermostats cycle all fan motors individually or in banks of two in response to changes in ambient temperature. One or two line voltage pressure switches by-pass thermostat(s) allowing its controlled fan to operate when high head pressure occurs.
- Thermostat range 50 to 105°F. with 5 to 20°F. adjustable differential between cut-in and cut-out. RANCO 020-7013
- Pressure switch range 100 to 400 psig with 35 to 150 psig adjustable differential between cut-in and cut-out. RANCO 020-7006
- Thermal Pressure Fantrol is recommended for systems with parallel or unloading compressors, hot gas defrost with hold-back flooding controls, and all systems with daily pulldown loads such as batch freezers.
- Fuses (Buss FNQ 15 or Economy MEQ 15) provided when specified. (Kit No. has F suffix)
- A fused disconnect is required by N.E.C. and is not provided as part of factory mounted control.
- One contactor is required to cycle all condenser fans with compressor(s) if system cycles during mild weather.

INDIVIDUAL MOTOR FLA			
HP	208/3/60	230/3/60	460/3/60
3/4	3.5	3.2	1.6
1	4.4	4.0	2.0

Total FLA = NO. MTRS. x ABOVE

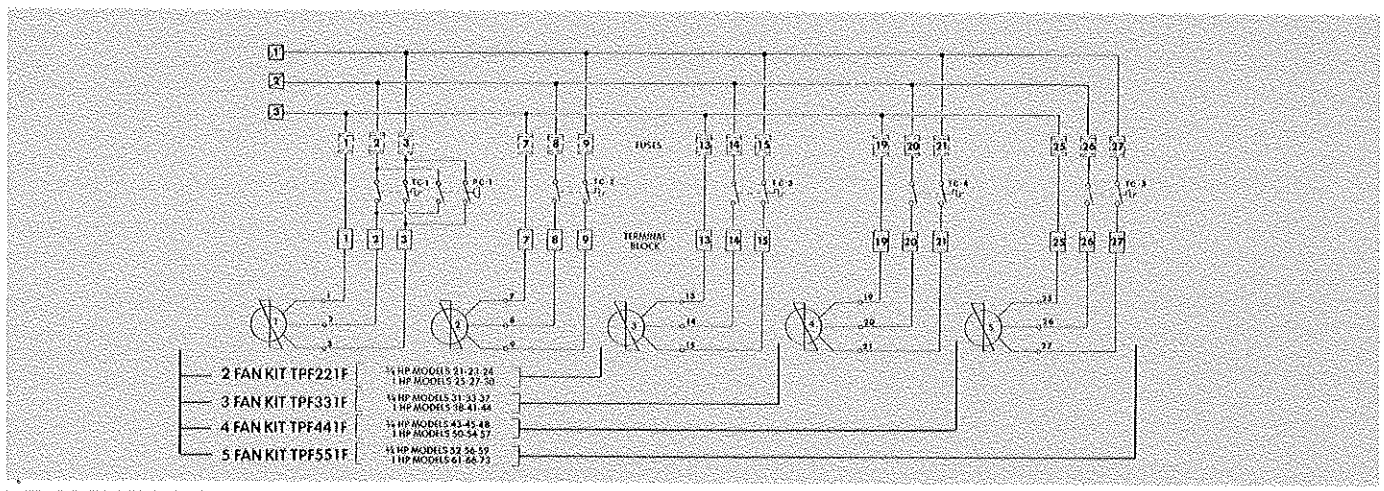
- Motors have inherent overheat protection in all phases.

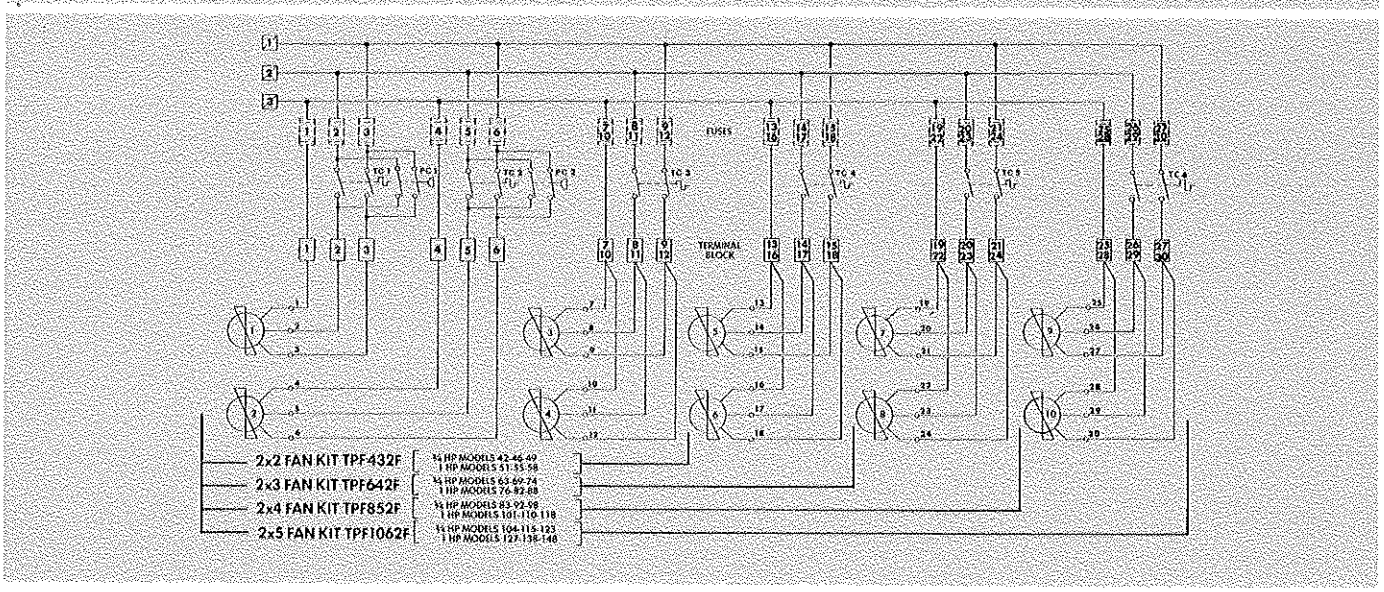
PC-1 and PC-2 SETTINGS—PSIG		
REF	CUT-IN	CUT-OUT
12	158	117
22	260	196
502	283	216

THERMOSTAT CUT-IN SETTINGS—°F						
No.	TC-1	TC-2	TC-3	TC-4	TC-5	TC-6
2	80	75	—	—	—	—
3	80	75	55	—	—	—
4	80	75	65	50	—	—
5	80	75	70	60	50	—
6	80	75	70	65	55	50

SET CUT-OUT FOR 5° DIFFERENTIAL

- Recommended settings are for condensers selected with a 12 to 16°TD and may be varied to suit system operating conditions.





PRESSURETROL—PT

FAN CYCLING HEAD PRESSURE CONTROL

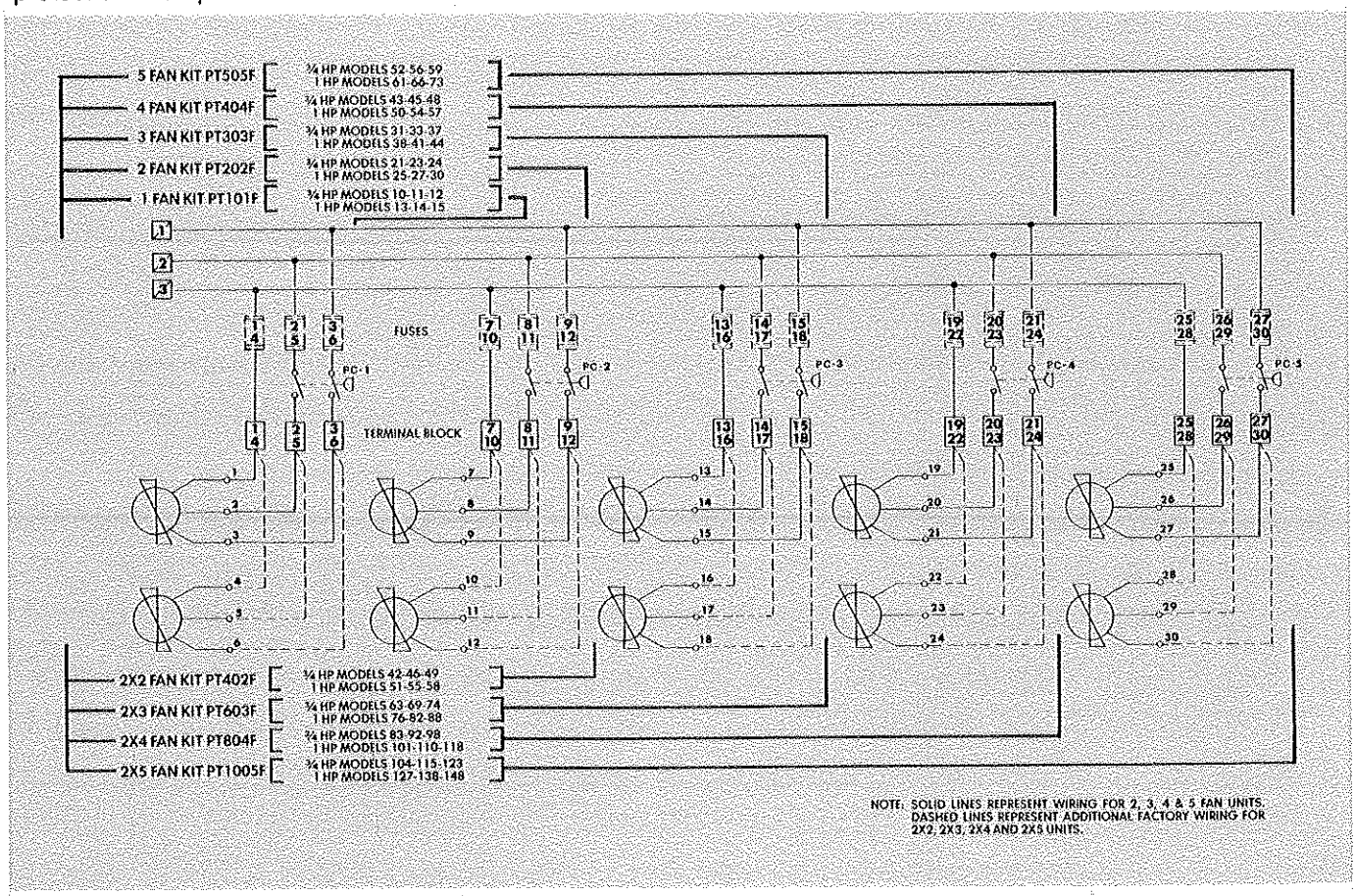
- Line voltage pressure switches cycle all fan motors individually or in banks of two in response to changes in head pressure.
- Pressure switch range 100 to 400 psig with 35 to 150 psig adjustable differential between cut-in and cut-out. RANCO 020-7006
- Pressuretrol is applicable to any system except multi-circuited condensers.
- Fuses (Buss FNQ 15 or Economy MEQ 15) provided when specified. (Kit No. has F suffix)
- A fused disconnect is required by N.E.C. and is not provided as part of factory mounted control.
- Contactor to cycle all condenser fans with compressor(s) can be omitted as fans will cycle automatically with head pressure changes.
- Motors have inherent overheat protection in all phases.

NO. FANS			PRESSURE SWITCH CUT-IN SETTINGS—psig				
SINGLE BANK	DOUBLE BANK	REFRIG.	PC-1	PC-2	PC-3	PC-4	PC-5
1	NA	R-12	143	—	—	—	—
		R-22	215	—	—	—	—
		R-502	236	—	—	—	—
2	2x2	R-12	143	152	—	—	—
		R-22	215	247	—	—	—
		R-502	236	270	—	—	—
3	2x3	R-12	143	147	152	—	—
		R-22	215	231	247	—	—
		R-502	236	253	270	—	—
4	2x4	R-12	143	146	149	152	—
		R-22	215	225	236	247	—
		R-502	236	247	259	270	—
5	2x5	R-12	143	145	148	150	152
		R-22	215	223	231	239	247
		R-502	236	244	253	261	270

INDIVIDUAL MOTOR FLA			
HP	208/3/60	230/3/60	460/3/60
3/4	3.5	3.2	1.6
1	4.4	4.0	2.0

Total FLA=NO. MTRS. x ABOVE

- Set cut-out 35 psig below cut-in on multi-fan units. Single fan unit cut-out settings should be more than 35 psig below cut-in to prevent rapid cycling.
- Recommended settings are for condensers selected with a 12 to 16°TD and may be varied to suit system operating conditions.



NOTE: SOLID LINES REPRESENT WIRING FOR 2, 3, 4 & 5 FAN UNITS. DASHED LINES REPRESENT ADDITIONAL FACTORY WIRING FOR 2X2, 2X3, 2X4 AND 2X5 UNITS.

HOLD-BACK

LOW AMBIENT HEAD PRESSURE CONTROL

When winter temperatures are below 40°F, fan cycling control may not hold head pressures at adequate levels. Two types of field installed liquid hold-back systems are available. These flood the condenser coil with condensed liquid, thereby reducing its capacity for condensing discharge gas.

HB HOLD-BACK

A liquid hold-back valve, which senses head pressure, is field installed in the condenser liquid drain. A minimum head above the valve is required to prevent liquid back-up into the condenser coil during the summer. Select the proper kit from the table on Page 13. Kits are to be sized based on valve capacities with actual liquid heads.

Kits 1 thru 4 use hold-back valves with 100 to 225 psi adjustable ranges. These valves do not allow reverse flow. If the receiver is not sized adequately, it is possible to completely fill the receiver and liquid drain line thru the valve during pumpout of the system. When the contained liquid warms, hydraulic expansion can rupture the bellows in the valve. A small by-pass line with a relief valve or pressure regulator can prevent valve damage. Valve settings should be 50 psi below the receiver relief valve setting.

Kits 5 thru 10 use hold-back valves with 75 to 280 psig adjustable ranges.

A hot gas valve senses the difference in pressure between the receiver and the compressor discharge. In the winter time, the liquid coming from the condenser is sub-cooled to ambient temperature. To build-up receiver pressure, compressor discharge gas is by-passed thru this valve to the receiver.

Kits 1 thru 4 use fixed setting hot gas valves which start to open at 20 psi and are completely open at 30 psi differential. Systems with series flow heat reclaim may require higher differential pressures. These valves can be furnished with higher pressure settings when specified.

Kits 5 thru 10 have hot gas valves with 0 to 150 psi adjustable differential ranges. Normal field setting is 20 to 30 psi. A pilot line from the valve bonnet to the outlet on the receiver side, must be installed in the field.

Kits 5 thru 10 use liquid hold-back and hot gas valves which allow reverse flow. Check valves are required to prevent refrigerant migration from the higher pressure receiver to the condenser during the winter when the compressors are not operating.

On larger systems, it is recommended to have a separate hot gas connection on the receiver with an internal baffle or turned up 180 degree elbow to prevent the mixing of hot gas and sub-cooled liquid. This reduces the amount of hot gas required for pressurizing and receiver pressure is raised more rapidly during start-up because sub-cooled liquid in the receiver is not warmed by the hot gas. Kits for receivers with two inlet connections are shown on page 13. Size one connection for hot gas, the other for liquid.

HBB DUAL HOLD-BACK

Kits 5 thru 8 have two liquid drain hold-back valves. The larger valve has a 120 volt pilot solenoid which allows the valve to control when energized. The control setting should be 20 to 50 psig lower than the smaller valve which controls the higher pressure condition. The pilot solenoid should be energized during the summer and de-energized for maximum heat reclaim or hot gas defrost.

Kits 9 & 10 utilize a dual pressure regulating valve in the condenser liquid drain. The valve regulates at the lower pressure when energized with a 120 volt signal, and at the higher pressure when the pilot solenoid is de-energized.

This system is recommended for two stage heat reclaim systems and hot gas defrost systems. The higher head pressure is available for maximum heat and hot gas defrost. For the remainder of the time, the head pressure can be lowered for energy savings.

HBB systems use hot gas differential valves and check valves as described above for HB systems.

COMBINATION FANTROL/HOLD-BACK

During the winter, combination systems will reduce the condenser flooding charge and save energy by cycling fans.

The following combinations are available:

- Thermal Fantrol/Hold Back
- Thermal Pressure Fantrol/ Hold-Back
- Thermal Fantrol/Dual Hold-Back
- Thermal Pressure Fantrol/Dual Hold-Back

When specifying and ordering, combine the Fantrol and Hold-Back Kit numbers. See Pages 9 and 10 for FANTROL KITS.

EXAMPLE: TPF841F/HBB8

RECEIVER EQUALIZING LINES

Equalizing or vent lines should not be used with hold-back controls. The winter time receiver pressure will be lost to the outdoor condenser thru this vent. Equalizing lines may be required on large systems to reduce the liquid drain size. Locate a service valve in the vent to be closed in the winter.

ELECTRICAL WIRING

Unless a combination system is specified, numbered motor leads will be brought out to a junction box. Combination systems will be provided with a Thermal Fantrol or Thermal Pressure Fantrol control panel.

The 120V pilot solenoid on the HBB liquid drain hold-back valve can be wired to a heat reclaim or hot gas defrost system.

HOLD-BACK

CONTROL KIT SELECTION DATA

HB HBB KIT NO.	LIQ DRAIN SIZE INCHES	CAPACITY IN COMPRESSOR TONS														
		REFRIGERANT 12					REFRIGERANT 22					REFRIGERANT 502				
		LIQ(1) DRAIN	MIN LIQ HEAD (FT) 2	4	6	16	LIQ(1) DRAIN	MIN LIQ HEAD (FT) 2	4	6	16	LIQ(1) DRAIN	MIN LIQ HEAD(FT) 2	4	6	16
1	5/8	3.2	6	9	11	19	3.6	8	12	14	24	2.6	5	7	9	15
2	7/8	6.6	6	9	11	19	7.4	8	12	14	24	5.3	5	7	9	15
3	1 1/8	11.2	12	18	22	37	12.7	16	24	29	48	9.1	10	14	17	29
4	1 3/8	17.1	12	18	22	37	19.2	16	24	29	48	13.9	10	14	17	29
5	1 5/8	24.0	21	29	36	59	27.0	28	40	49	80	20.0	15	22	27	44
6	2 1/8	42.0	23	33	40	65	47.0	31	44	54	88	34.0	17	24	30	49
7	2 5/8	65.0	38	54	66	108	73.0	51	72	88	144	53.0	28	39	48	78
8	3 1/8	93.0	57	80	98	160	104.0	76	106	130	212	75.0	41	59	72	118
9	3 5/8	126.0	104	147	180	294	141.0	139	196	240	392	102.0	75	106	130	212
10	4 1/8	163.0	144	204	250	408	183.0	196	278	340	555	132.0	110	155	190	310

NOTES:

1. Liquid drain line capacities at 100 fpm velocity are shown for reference.
2. Kits 1 thru 4 normally use line size liquid drain valves.
3. Kits 5 thru 10 use smaller than line size liquid drain valves. Drain lines below these valves should be valve outlet size. Larger capacity kits are normally applied with indoor receivers.
4. The liquid drain line above the hold-back valve will flood in the winter. Add its refrigerant charge to the receiver capacity.
5. Kits are sized for a —10°F ambient.

VALVE SPECIFICATIONS - FIELD INSTALLED

HB SYSTEMS - ONE RECEIVER INLET

KIT NO.	LIQUID DRAIN		HOT GAS		LIQ. CHECK	
	MODEL	CONN	MODEL	CONN	MODEL	CONN
HB1	ORI-6	5/8	ORD4	5/8	NOT REQ'D	
HB2	ORI-6	7/8	ORD4	5/8	NOT REQ'D	
HB3	ORI-10	1 1/8	ORD4	5/8	NOT REQ'D	
HB4	ORI-10	1 3/8	ORD4	5/8	NOT REQ'D	
HB5	A7A1	1 1/8	A7A1L	1 1/8	CK4A-4	1 1/8
HB6	A7A1	1 3/8	A7A1L	1 1/8	CK4A-4	1 3/8
HB7	A72	1 5/8	A7A1L	1 1/8	CK4A-6	1 5/8
HB8	A72	2 1/8	A72L-1 5/8	1 5/8	CK4A-8	2 1/8
HB9	A4A2	2 5/8	A4AL-1 5/8	2 1/8	CK4A-8	2 5/8
HB10	A4A2 1/2	3 1/8	A4AL2	2 5/8	CK4A-9	3 1/8

HB SYSTEMS - TWO RECEIVER INLETS

KIT NO.	LIQUID DRAIN		HOT GAS		LIQUID CHECK		HOT GAS CHECK	
	MODEL	CONN	MODEL	CONN	MODEL	CONN	MODEL	CONN
HB1A	ORI-6	5/8	ORD4	5/8	NOT REQ'D		NOT REQ'D	
HB2A	ORI-6	7/8	ORD4	5/8	NOT REQ'D		NOT REQ'D	
HB3A	ORI-10	1 1/8	ORD4	5/8	NOT REQ'D		NOT REQ'D	
HB4A	ORI-10	1 3/8	ORD4	5/8	NOT REQ'D		NOT REQ'D	
HB5A	A7A1	1 1/8	A7AL	5/8	CK4A-4	1 1/8	CK4A-2	5/8
HB6A	A7A1	1 3/8	A7AL	5/8	CK4A-4	1 3/8	CK4A-2	5/8
HB7A	A72	1 5/8	A7AL	5/8	CK4A-6	1 5/8	CK4A-2	5/8
HB8A	A72	2 1/8	A7A1L	1 1/8	CK4A-8	2 1/8	CK4A-4	1 1/8
HB9A	A4A2	2 5/8	A7A1L	1 3/8	CK4A-8	2 5/8	CK4A-4	1 3/8
HB10A	A4A2 1/2	3 1/8	A72L	1 5/8	CK4A-9	3 1/8	CK4A-6	1 5/8

HBB SYSTEMS - ONE RECEIVER INLET

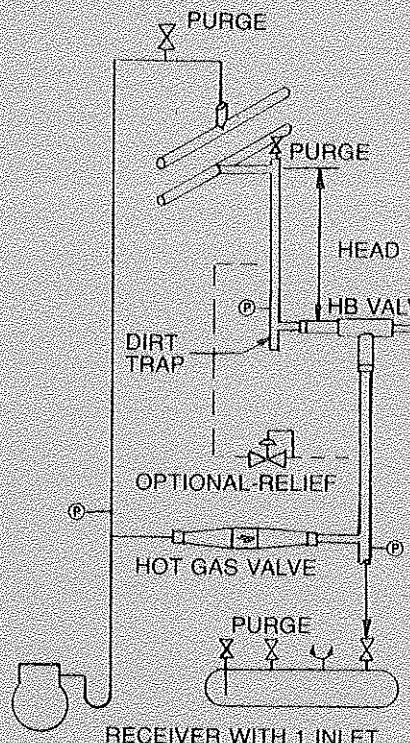
KIT NO.	LO PRESS LIQ		HI PRESS LIQ		HOT GAS		LIQ CHECK	
	MODEL	CONN	MODEL	CONN	MODEL	CONN	MODEL	CONN
HBB5	A7A1S	1 1/8	A7A	7/8	A7A1L	1 1/8	CK4A4	1 1/8
HBB6	A7A1S	1 3/8	A7A	7/8	A7A1L	1 1/8	CK4A4	1 3/8
HBB7	A72S	1 5/8	A7A1	1 1/8	A7A1L	1 1/8	CK4A6	1 5/8
HBB8	A72S	2 1/8	A7A1	1 3/8	A72L-1 5/8	1 5/8	CK4A8	2 1/8
HBB9	A4AD2	2 5/8	DUAL		A4AL-1 5/8	2 1/8	CK4A8	2 5/8
HBB10	A4AD2 1/2	3 1/8	PRESSURE		A4AL2	2 5/8	CK4A9	3 1/8

HBB SYSTEMS - TWO RECEIVER INLETS

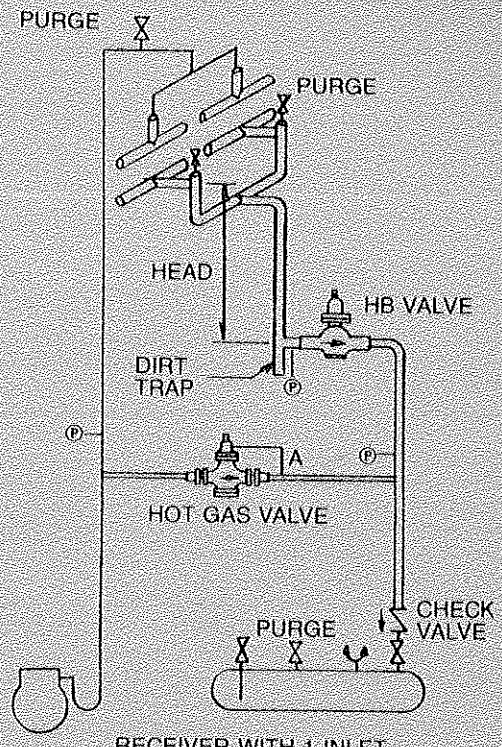
KIT NO.	LO PRESS LIQ		HI PRESS LIQ		HOT GAS		LIQ CHECK		HOT GAS CHECK	
	MODEL	CONN	MODEL	CONN	MODEL	CONN	MODEL	CONN	MODEL	CONN
HBB5A	A7A1S	1 1/8	A7A	7/8	A7AL	5/8	CK4A-4	1 1/8	CK4A-2	5/8
HBB6A	A7A1S	1 3/8	A7A	7/8	A7AL	5/8	CK4A-4	1 3/8	CK4A-2	5/8
HBB7A	A72S	1 5/8	A7A1	1 1/8	A7AL	5/8	CK4A-6	1 5/8	CK4A-2	5/8
HBB8A	A72S	2 1/8	A7A1	1 3/8	A7A1L	1 1/8	CK4A-8	2 1/8	CK4A-4	1 1/8
HBB9A	A4AD2	2 5/8	DUAL		A7A1L	1 3/8	CK4A-8	2 5/8	CK4A-4	1 3/8
HBB10A	A4AD2 1/2	3 1/8	PRESSURE		A72L	1 5/8	CK4A-9	3 1/8	CK4A-6	1 5/8

PIPING ARRANGEMENTS

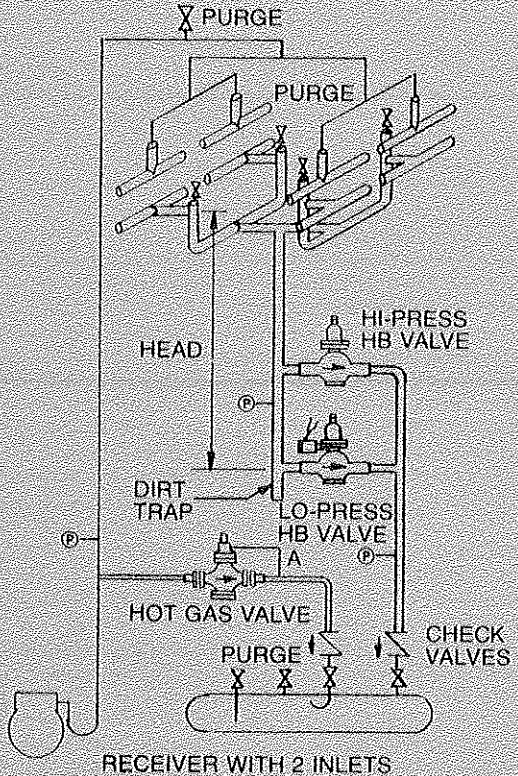
PROVIDE PRESSURE GAUGE FITTINGS AS SHOWN



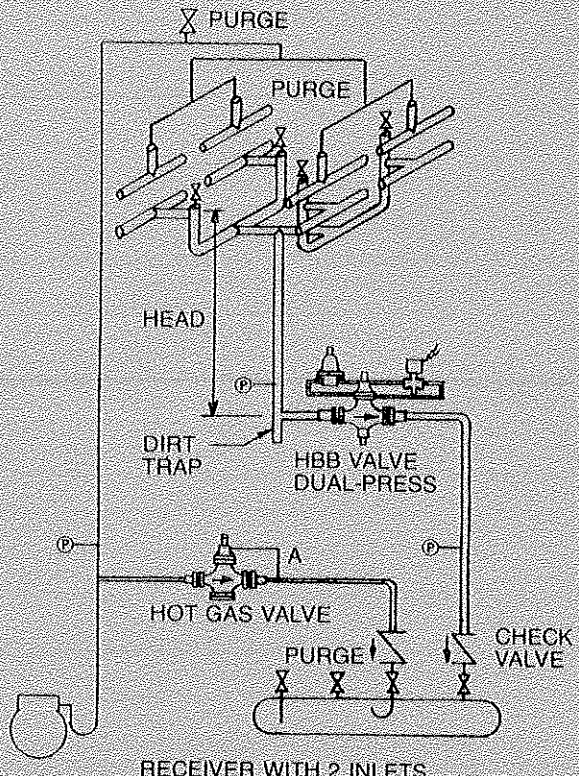
RECEIVER WITH 1 INLET
HB KITS 1-4
OPTIONAL RELIEF—NOT INCLUDED WITH KIT
MAY BE REQUIRED IF RECEIVER IS UNDERSIZED



RECEIVER WITH 1 INLET
HB KITS 5-10
PILOT LINE A—FIELD INSTALLED



RECEIVER WITH 2 INLETS
HBB KITS 5-8
PILOT LINE A—FIELD INSTALLED



RECEIVER WITH 2 INLETS
HBB KITS 9-10
PILOT LINE A—FIELD INSTALLED