FORM 195.21-EG2 (191)

YORK®

REMOTE AIR COOLED CONDENSERS

MODEL VCB

56 MODELS
REFRIGERANTS R-12, R-22, R-502
NOMINAL HEAT REJECTION CAPACITY 260 MBH-3650 MBH

MECHANICAL SPECIFICATIONS

YORK Model VCB22 through 336 Air Cooled Condensers are available in 56 model sizes for air conditioning and refrigeration applications, and may be used with any type of compressor for halocarbon refrigerants. Standard unit (with fan cycling) will operate to 40°F minimum ambient. These units are also available for industrial fluid cooling. Consult factory for capacity data, and other special applications.

Air cooled condensers operate dry (requiring a minimum of maintenance) and do not require installation of pump and water piping. Vertical air flow units are standard design for low silhouette applications.

LEGS – Heavy gauge galvanized steel with foot pads and mounting holes on the bottom of each leg.

FRAME – Tube sheets are heavy gauge galvanized steel, with extruded tube holes for wide bearing surface to minimize wear.

COIL – Seamless copper tubes are expanded into full collar aluminum fins. Fins have corrugated surface to create high air-side heat transfer. Fin edges are rippled to work harden and stiffen material for resistance to mechanical damage. Return bends and headers are soldered with highly ductile silver bearing copper alloy. Coils are designed for 450 psig DWP, tested, dehydrated, evacuated, pressurized with an inert gas, and sealed. A separate circuit provides subcooling for chiller applications.

HEADERS – Heavy wall copper tube headers are adequately sized for low pressure loss and proper refrigerant distribution. Multiple circuit condensers feature completely separate headers for each circuit so there is no danger of refrigerant leaking between circuits. Gas inlet and liquid outlet connections are provided. The subcooling section (for chiller applications) includes liquid inlet and outlet connections.

HOUSING – Heavy gauge galvanized steel panels assembled with high tensile fasteners. Fan panels have long smooth radius outlet orifices to assure high efficiency and low noise level.

FAN GUARDS – Heavy gauge OSHA accepted wire and rod are treated to resist rust and corrosion.

FANS – High efficiency steel hub, steel blade fans are used on all units. Fans turn at slow speed for low noise level and long durable life.

DRIVE ASSEMBLIES – Are belt drive, oversized for long trouble-free operation. Variable pitch drive pulleys are standard.

MOTORS – Open, drip-proof motors with built-in thermal overload protection. Can be started or cycled from a contactor. Wired to common location.

Belt Drive – 2 hp., 3 hp. and 5 hp. 1750 RPM, 208V or 230/460V, 60 Hz, 3 phase and 1450 RPM, 380V, 50 Hz, 3 phase. Located in well protected area to prevent rain or snow entering motor.

MOTOR MOUNTS – Motor mounts are slotted to allow belt tension adjustment.

ACCESS DOORS – Are easily removed, allowing easy access to motors and belt adjustment.

MULTIPLE CIRCUITS – Available at no extra cost.

BEARINGS – Mounted on rigidly braced support rail, bearings have special grease seals and slinger for weather protection.

QUIET OPERATION – Low speed, high efficiency fans for quiet operation.

ENERGY EFFICIENT – Optimum number of rows at low face velocity means low horsepower required to give maximum BTU per hp.

ELECTRICAL PANELS – Completely factory wired for fan cycle control. They include motor fuses, contactors, and thermostats or pressure switches. Control voltage is 115V, supplied by integral transformer. Control package is mounted in UL-listed NEMA 12 weather resistant enclosure. Control packages may be shipped separately if shipping width limitation is exceeded when mounted.

FAN WIRING – Standard on all models, wired to common location.

ACCESSORIES & MODIFICATIONS

0°F LOW AMBIENT OPTION – This option uses a fan cycling control panel with pressure and temperature switches to extend operation to 0°F minimum ambient. *No use of receivers required.*

YORK COAT – This is a gold-colored polyester corrosion-resistant coating, typically applied to units subjected to a salt water type atmosphere.

EXTENDED LUBRICATION LINES – Lubrication lines terminate in grease fittings next to access doors for ease of maintenance.

QUICK RELEASE LATCHES – Latches can be furnished on access doors, allowing quick, easy access to motors and belt adjustment.

COPPER FINNED COILS – Copper finned coils are available on extended delivery basis (contact YORK factory).

SEALTITE CONDUIT – All fan wiring enclosed in sealed conduit.

MANIFOLD KIT – Ties dual inlet and outlet connections together for single field connection (factory mounted). Typically used with single circuit chillers.

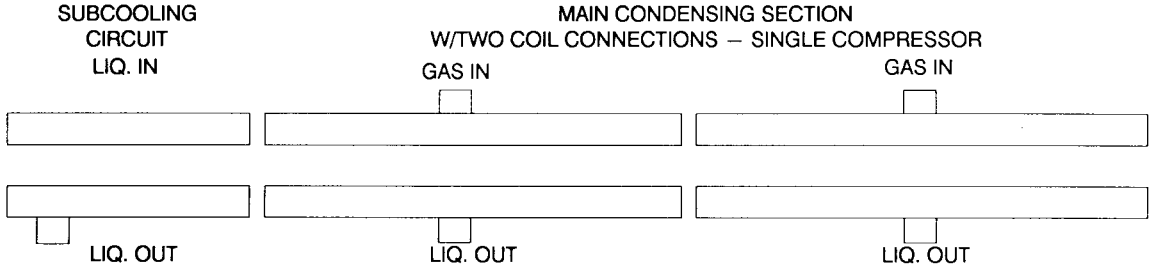
EXTRA HEAVY ALUMINUM FINS – Condenser coils can be furnished with .010" thick aluminum fins in lieu of standard fins.

TOGGLE SWITCHES – Toggle switch, sealed with water-tight rubber boot, allows isolation of individual fans for servicing. Eliminates need to shut down entire unit. Switches are numbered to match controlled fans. One required per fan (factory mounted).

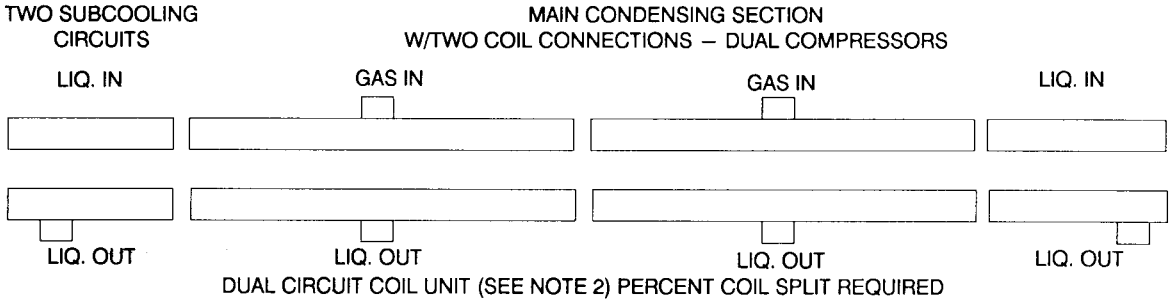
SCHRAEDER FITTINGS – Schraeder fittings can be supplied on each circuit as a service aid. One (1) required per circuit.

ANGLE VALVES – Service access valves (one per circuit) can be factory mounted to allow field installation of pressure switches, etc.

SUBCOOLING INLET PIPING – This piping connects the main condensing section liquid outlet connection to the subcooling inlet connection.



SINGLE CIRCUIT COIL UNIT (SEE NOTE 1) STANDARD 50/50 PERCENT COIL SPLIT.



DUAL CIRCUIT COIL UNIT (SEE NOTE 2) PERCENT COIL SPLIT REQUIRED

NOTES:
1. Standard YORK unit with single circuit coil, used with single compressor units. (VCB22-38 have only one gas inlet and one liquid outlet connection). On units with dual gas inlet and liquid outlet connections, the connections must be interconnected in the field or the unit can be ordered with the optional factory mounted manifold kit.
2. Optional YORK unit with dual circuited coil, use with dual compressor units. Percent split must be specified when unit is ordered.
3. Field piping (by others) must be installed from the compressor discharge lines to the main condensing section gas inlet connections; from the main condensing section liquid outlets to the subcooling circuit liquid inlet connections; and from the subcoolling liquid outlets to the compressor system liquid connections.
4. All subcooler circuits are return bend piped except the seven fan units. The seven fan units have a straight through subcooling circuit. The liquid inlet connection is at the main condensing section liquid outlet end. The subcooler liquid outlet connection is at the opposite end.

FIG. 1 – REFRIGERANT CONNECTIONS

SELECTION DATA

Periodically jobs arise which require the custom matching of components (evaporators, compressors and condensers) for field erected systems. YORK remote air cooled condensers are rated in terms of gross heat rejection (total heat removed from the condensing refrigerant). The capacity is expressed in BTUH.

Compressor manufacturer's published heat rejection ratings should be used whenever possible. However if this information is not available, the correction factors and information in the tables below may be applied to the evaporator load to determine the air condenser heat rejection requirement.

HEAT OF COMPRESSION FACTORS

Condenser load = compressor or evaporator capacity x factor

Table 1
OPEN COMPRESSORS

Evap. Temp. (F)	Condensing Temp. (F)					
	90°	100°	110°	120°	130°	140°
+50°	1.09	1.12	1.14	1.17	1.20	1.24
+40°	1.12	1.15	1.17	1.20	1.23	1.28
+30°	1.14	1.17	1.20	1.24	1.27	1.32
+20°	1.17	1.30	1.24	1.28	1.32	1.37
+10°	1.21	1.24	1.28	1.32	1.36	1.42
0°	1.24	1.28	1.32	1.37	1.41	1.47
-10°	1.28	1.32	1.37	1.42	1.47	*
-20°	1.33	1.37	1.42	1.47	*	*
-30°	1.37	1.42	1.47	*	*	*

* Outside normal limits for single stage compressor applications. For two-stage (open type) applications: Total heat of rejection = compressor capacity + (2545 x BHP).

Table 2
SUCTION COOLED COMPRESSORS

Evap. Temp. (F)	Condensing Temp. (F)					
	90°	100°	110°	120°	130°	140°
+50°	1.14	1.17	1.20	1.23	1.26	1.29
+40°	1.18	1.21	1.24	1.27	1.31	1.35
+30°	1.22	1.25	1.28	1.32	1.37	1.42
+20°	1.26	1.29	1.33	1.37	1.43	1.49
+10°	1.31	1.34	1.38	1.43	1.49	1.55
0°	1.36	1.40	1.44	1.50	1.56	1.62
-10°	1.42	1.46	1.50	1.57	1.64	*
-20°	1.49	1.53	1.58	1.65	*	*
-30°	1.57	1.62	1.68	*	*	*

* Outside normal limits for single stage compressor applications. For two-stage (suction colled hermetic) applications: Total heat of rejection = compressor capacity + (3413 x K.W.).

ALTITUDE CORRECTION FACTOR

Table 3

Altitude (feet)	Corr. Factor
0	1.00
1000	1.02
2000	1.05
3000	1.07
4000	1.10
5000	1.12
6000	1.15
7000	1.17

Multiply total required heat rejection by correction factor to obtain required unit capacity.

NOTE: As a guide to selection of the TD (temperature difference between condensing temperature and ambient temperature), the following are suggested:

Air conditioning ..... 25°TD
High & medium temperature refrigeration ..... 20°TD
Low temperature refrigeration ..... 15°TD

Example: Condenser Selection (Belt driven)

Suction cooled compressor capacity ..... 250,000 BTUH
Evaporator or suction temperature ..... 40°F
Refrigerant R-12
Condensing temperature desired ..... 120°F
Ambient air design temperature ..... 95°F
Temperature difference (TD) ..... 25°F
Altitude ..... 3000 ft.

Solution:

Step 1. From Table 2, opposite 40°F evaporator temperature and under 120°F condensing, select heat of compression factor of 1.27.

Step 2. Multiply compressor or evaporator capacity by factor: 250,000 BTU x 1.27 = 317,500 BTUH.

Step 3. Multiply 317,500 BTUH by altitude correction factor of 1.07 = 339,725 BTUH required unit capacity at sea level conditions.

Step 4. Divide required unit capacity by 25° TD to obtain basic unit rating at 1° TD: 339,725 BTUH ÷ 25° TD = 13,589 BTUH/°F TD.

Step 5. From page 6, Table 6, under R-12 heat rejection, select model VCB-32.

Step 6. To determine actual TD at which unit will operate, divide 339,725 BTUH by basic unit rating of 14,602 BTUH/°F TD = 23.3 TD.

SELECTION DATA

AIR COOLED CONDENSERS FOR RECIPROCATING CHILLER APPLICATIONS

YORK air cooled condensers are available with matched reciprocating liquid chillers for air conditioning or process applications.

Table on page 8 lists reciprocating chillers cooling chilled water from 54°F to 44°F, while using R-22 and operating at 121°F saturated discharge temperature (SDT). They have been matched with an air cooled condenser selected at 120° CT (this allows 1°F temperature difference to overcome discharge piping pressure losses), providing 10°F subcooled R-22 refrigerant to the chiller and 95°F outdoor design ambient temperature. The following example is presented to help you select an air cooled condenser for an operating condition other than the nominal ARI 590 reciprocating chiller rating.

Example: YCRJ56Røø operating at 60 HZ, 125° SDT & 46° LWT (from 150.24-EG1 for chillers): 143.5 TONS; 154.4 compressor KW; 2248 MBH of heat rejection; cooling 344 GPM of water from 56°F to 46°F; with 10°F subcooled R-22 from the air cooled condenser with 124° CT and 95° design ambient.

A. Corrected MBH for subcooling – since the chiller ratings are based on 10°F of subcooled R-22 from the air cooled condenser, increase the actual chiller heat rejection by dividing it by 0.9 to get the corrected MBH. This will permit selecting the proper sized condenser which will include a separate subcooling circuit.

$$\frac{2248 \text{ MBH}}{0.9} = 2498 \text{ corrected MBH}$$

B. Air cooled condenser TD – subtract the design ambient from the condensing temperature.

$$\text{TD} = 124° \text{ CT} - 95° \text{ ambient} = 29° \text{ TD}$$

C. Calculate the BTUH/°F TD

$$\frac{2498 \times 1000}{29 \text{ °F TD}} = 86{,}138 \text{ corrected BTUH/°F TD}$$

D. Select an air cooled condenser – using the corrected 86,138 BTUH/°F, enter Table on page 6 and pick the proper condenser.

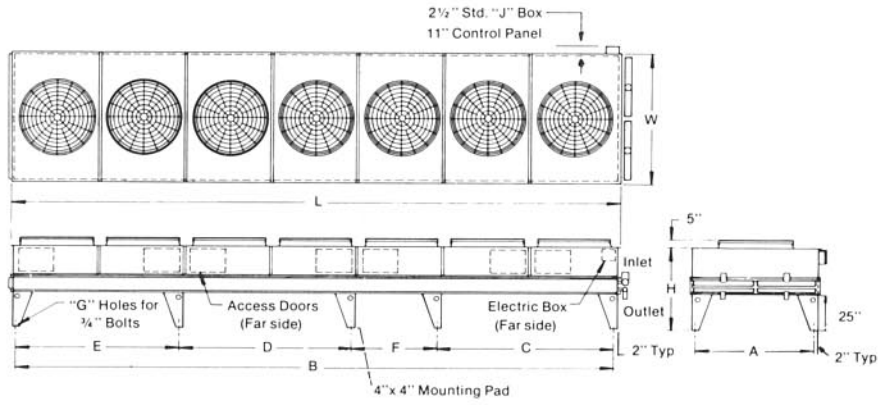
A VCB 181 will be satisfactory

RATINGS & ENGINEERING DATA

Model #	Heat Rejection BTUH/°F TD			Fan	CFM	MOTORS						Int. Vol. Cu. Ft.	Approx. Weight (lbs.)
						No.	HP	Total Amps					
	R-12	R-22	R-502					208-3-60	230-3-60	380-3-50	460-3-60		
VCB 22	9,861	10,354	10,108	1	22,350	1	2	6.6	7.0	3.8	3.5	1.03	755
27	12,323	12,939	12,631	1	21,650	1	2	6.6	7.0	3.8	3.5	1.03	850
32	14,602	15,332	14,967	1	20,850	1	2	6.6	7.0	3.8	3.5	1.37	950
34	15,762	16,550	16,156	1	20,250	1	2	6.6	7.0	3.8	3.5	2.06	1050
38	17,164	18,022	17,593	1	23,085	1	3	11.4	10.0	5.1	5.0	2.06	1056
43	19,722	20,708	20,215	2	44,700	2	2	13.2	14.0	7.5	7.0	2.06	1375
48	21,753	22,841	22,297	2	44,700	2	2	13.2	14.0	7.5	7.0	2.06	1420
54	24,646	25,879	25,263	2	43,300	2	2	13.2	14.0	7.5	7.0	2.06	1525
57	26,137	27,444	26,791	2	43,300	2	2	13.2	14.0	7.5	7.0	2.74	1893
61	28,007	29,408	28,707	2	58,455	2	5	32.0	29.2	17.0	14.6	2.06	1620
64	29,204	30,664	29,934	2	41,700	2	2	13.2	14.0	7.5	7.0	2.74	1715
65	29,575	31,054	30,315	2	56,295	2	5	32.0	29.2	17.0	14.6	2.06	1755
67	31,365	32,933	32,149	2	56,295	2	5	32.0	29.2	17.0	14.6	2.74	1765
69	31,524	33,100	32,312	2	40,500	2	2	13.2	14.0	7.5	7.0	4.12	1900
75	34,329	36,046	35,187	2	46,170	2	3	22.8	20.0	10.2	10.0	4.12	1912
78	35,823	37,615	36,719	2	54,675	2	5	32.0	29.2	17.0	14.6	4.12	1950
81	36969	38,818	37,893	3	64,950	3	2	19.8	21.0	11.3	10.5	3.09	2200
86	39,206	41,166	40,186	3	64,950	3	2	19.8	21.0	11.3	10.5	4.12	2066
92	42,011	44,112	43,061	3	87,683	3	5	48.0	43.8	25.5	21.9	3.09	2215
96	43,806	45,996	44,901	3	62,550	3	2	19.8	21.0	11.3	10.5	4.12	2475
101	47,047	49,400	48,223	3	82,013	3	5	48.0	43.8	25.5	21.9	4.12	2401
103	47,286	49,650	48,468	3	60,750	3	2	19.8	21.0	11.3	10.5	6.18	2750
104	47,398	49,768	48,583	4	69,255	4	3	45.6	40.0	20.4	20.0	4.12	2537
107	48,765	51,203	49,984	3	69,255	3	3	34.2	30.0	15.3	15.0	6.18	2634
108	49,292	51,757	50,524	4	86,600	4	2	26.4	28.0	15.0	14.0	4.12	2885
113	51,494	54,069	52,782	3	98,724	3	3	34.2	30.0	15.3	15.0	6.18	2768
121	55,078	57,832	56,455	4	86,600	4	2	26.4	28.0	15.0	14.0	5.49	3156
124	56,743	59,580	58,162	3	116,910	3	5	48.0	43.8	25.5	21.9	6.18	2798
128	58,408	61,329	59,868	4	83,400	4	2	26.4	28.0	15.0	14.0	5.49	3290
131	59,980	62,979	61,480	4	95,076	4	3	45.6	40.0	20.4	20.0	5.49	3224
138	63,048	66,200	64,624	4	81,000	4	2	26.4	28.0	15.0	14.0	8.23	3650
142	65,020	68,271	66,646	4	92,340	4	3	45.6	40.0	20.4	20.0	8.23	3765
145	66,094	69,399	67,747	4	109,350	4	5	64.0	58.4	34.0	29.2	5.49	3329
153	70,089	73,594	71,841	4	109,350	4	5	64.0	58.4	34.0	29.2	5.49	3370
155	70,900	74,445	72,673	5	81,000	5	2	33.0	35.0	18.8	17.5	6.86	3941
160	73,010	76,661	74,835	5	104,250	5	2	33.0	35.0	18.8	17.5	6.86	4090
162	73,647	77,330	75,488	4	140,738	4	5	64.0	58.4	34.0	29.2	8.23	3560
169	77,241	81,104	79,172	5	118,845	5	3	57.0	50.0	25.5	25.0	6.86	4033
172	78,810	82,751	80,780	5	101,250	5	2	33.0	35.0	18.8	17.5	10.29	4500
176	80,515	84,541	82,528	6	101,250	6	2	39.6	42.0	22.5	21.0	8.23	4650
181	82,618	86,749	84,684	6	101,250	6	2	39.6	42.0	22.5	21.0	8.23	4873
191	87,612	91,993	89,802	5	136,688	5	5	80.0	73.0	42.5	36.5	6.86	4190
192	87,612	91,993	89,802	6	125,100	6	2	39.6	42.0	22.5	21.0	8.23	4800
197	89,971	94,470	92,221	6	142,614	6	3	68.4	60.0	30.6	30.0	8.23	5014
207	94,572	99,301	96,936	6	121,500	6	2	39.6	42.0	22.5	21.0	12.35	5325
209	95,409	100,180	97,794	6	138,510	6	3	68.4	60.0	30.6	30.0	8.23	4836
223	10,137	107,244	104,728	6	164,025	6	5	96.0	87.6	51.0	43.8	8.23	4998
224	10,214	107,325	104,770	7	145,950	7	2	46.2	49.0	26.3	24.5	9.60	5600
231	10,411	110,682	108,047	7	166,383	7	3	79.8	70.0	35.7	35.0	9.60	6177
241	11,334	115,851	113,093	7	141,750	7	2	46.2	49.0	26.3	24.5	14.40	6215
242	11,471	115,995	113,233	6	191,363	6	5	96.0	87.6	51.0	43.8	12.35	5314
248	11,486	119,960	116,323	6	191,363	6	5	96.0	87.6	51.0	43.8	12.35	5445
258	118,039	123,941	120,990	7	161,600	7	3	79.8	70.0	35.7	35.0	14.40	6522
272	124,079	130,283	127,181	7	190,688	7	5	112.0	102.2	59.5	51.1	14.40	6322
303	138,515	145,441	141,978	7	158,760	7	3	79.8	70.0	35.7	35.0	17.90	7250
336	153,751	161,439	157,595	7	187,337	7	5	112.0	102.2	59.5	51.1	17.90	7362

NOTES: Standard motors inherently protected and factory wired to the Control Panel. Motor amps may vary slightly depending upon motor manufacturer. Fans compartmented for fan cycle head pressure control. (Control steps equal number of fans). Mulitple circuits available at no extra cost.

DIMENSIONS



NOTE: York recommends the minimum distance between the condenser and walls be 8'. The minimum distance between adjacent condensers should be 12'. This will prevent condenser air recirculation and faulty operation.

Model #	L	W	H	A	B	C	D	E	F	G	Main Condenser Circuit* Inlets Hot Gas	Main Condenser Circuit* Liquid Outlets	Subcooler Liquid Inlet & Outlet
VCB 22	87-1/4	60	52-3/4	52-3/4	80	–	–	–	–	4	2-1/8	1-1/8	1-1/8
27	87-1/4	60	52-3/4	52-3/4	80	–	–	–	–	4	2-1/8	1-1/8	1-1/8
32	87-1/4	60	54	52-3/4	80	–	–	–	–	4	2-1/8	1-3/8	1-3/8
34	87-1/4	60	56-1/2	52-3/4	80	–	–	–	–	4	2-1/8	1-3/8	1-3/8
38	87-1/4	60	56-1/2	52-3/4	80	–	–	–	–	4	2-1/8	1-3/8	1-3/8
43	117	87-1/4	52-3/4	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
48	117	87-1/4	52-3/4	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
54	117	87-1/4	52-3/4	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
57	117	87-1/4	54	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
61	117	87-1/4	52-3/4	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
64	117	87-1/4	54	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-1/8	(2) 1-1/8
65	117	87-1/4	52-3/4	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-3/8	(2) 1-3/8
67	117	87-1/4	54	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-3/8	(2) 1-3/8
69	117	87-1/4	56-1/2	80	109-3/4	–	–	–	–	4	(2) 2-1/8	(2) 1-3/8	(2) 1-3/8
75	117	87-1/4	56-1/2	80	109-3/4	–	–	–	–	4	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
78	117	87-1/4	56-1/2	80	109-3/4	–	–	–	–	4	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
81	174	87-1/4	52-3/4	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
86	174	87-1/4	54	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
92	174	87-1/4	52-3/4	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
96	174	87-1/4	54	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
101	174	87-1/4	54	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
103	174	87-1/4	56-1/2	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-5/8	(2) 1-5/8
104	231	87-1/4	52-3/4	80	223-3/4	114	–	109-3/4	–	6	(2) 2-5/8	(2) 1-3/8	(2) 1-3/8
107	174	87-1/4	56-1/2	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-5/8	(2) 1-5/8
108	231	87-1/4	52-3/4	80	223-3/4	114	–	109-3/4	–	6	(2) 2-5/8	(2) 1-5/8	(2) 1-5/8
113	174	87-1/4	56-1/2	80	166-3/4	114	–	52-3/4	–	6	(2) 2-5/8	(2) 1-5/8	(2) 1-5/8
121	231	87-1/4	54	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
124	174	87-1/4	56-1/2	80	166-3/4	114	–	52-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
128	231	87-1/4	54	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
131	231	87-1/4	54	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
138	231	87-1/4	56-1/2	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
142	231	87-1/4	56-1/2	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
145	231	87-1/4	54	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
153	231	87-1/4	54	80	223-3/4	114	–	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
155	288	87-1/4	54	80	280-3/4	114	57	109-3/4	–	8	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
160	288	87-1/4	54	80	280-3/4	114	57	109-3/4	–	8	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
162	231	87-1/4	56-1/2	80	223-3/4	114	57	109-3/4	–	8	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
169	288	87-1/4	54	80	280-3/4	114	57	109-3/4	–	6	(2) 3-1/8	(2) 1-5/8	(2) 1-5/8
172	288	87-1/4	56-1/2	80	280-3/4	114	57	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
176	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
181	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
191	288	87-1/4	54	80	280-3/4	114	57	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
192	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 21/8	(2) 2-1/8
197	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
207	345	87-1/4	56-1/2	80	337-3/4	114	114	109-3/4	–	8	(2) 3-5/8	(2) 2-1/8	(2) 2-1/8
209	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
223	345	87-1/4	54	80	337-3/4	114	114	109-3/4	–	8	(2) 3-1/8	(2) 2-1/8	(2) 2-1/8
224	402	87-1/4	54	80	394-3/4	114	114	109-3/4	57	10	(2) 3-5/8	(2) 2-1/8	(2) 2-1/8
231	402	87-1/4	54	80	394-3/4	114	114	109-3/4	57	10	(2) 3-5/8	(2) 2-1/8	(2) 2-1/8
241	402	87-1/4	60	80	394-3/4	114	114	109-3/4	57	10	(2) 4-1/8	(2) 2-5/8	(2) 2-5/8
242	345	87-1/4	56-1/2	80	337-3/4	114	114	109-3/4	–	8	(2) 3-5/8	(2) 2-1/8	(2) 2-1/8
248	345	87-1/4	56-1/2	80	337-3/4	114	114	109-3/4	–	8	(2) 3-5/8	(2) 2-1/8	(2) 2-1/8
258	402	87-1/4	60	80	394-3/4	114	114	109-3/4	57	10	(2) 4-1/8	(2) 2-5/8	(2) 2-5/8
272	402	87-1/4	60	80	394-3/4	114	114	109-3/4	57	10	(2) 4-1/8	(2) 2-5/8	(2) 2-5/8
303	402	87-1/4	60	80	394-3/4	114	114	109-3/4	57	10	(2) 4-1/8	(2) 2-5/8	(2) 2-5/8
336	402	87-1/4	60	80	394-3/4	114	114	109-3/4	57	10	(2) 4-1/8	(2) 2-5/8	(2) 2-5/8

* Connection sizes listed are for single circuit coils. (Based on R-12 @ 120°F condensing & 0° suction).
See Fig. 1, page 3 for additional piping details.

MATCHED CHILLER/CONDENSER

The following table of pre-matched YORK chillers and condensers is provided for your convenience. Additional information for YCR Chiller Models can be found in Form 150.24-EG1.

50 HZ

CHILLER													
YCR Model	Tons	Percent Capacity		Compr. KW	Heat Rejection (MBH)			Chiller GPM	Chiller Pres. Drop	Refrigerant Line Sizes			
										Discharge		Liquid	
		Sys. #1	Sys. #2		Cir. #1	Cir. #2	Total			Cir. #1	Cir. #2	Cir. #1	Cir. #2
Z33J00	46.6	50	50	47.6	361	361	722	111.8	6.4 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z44J00	53.2	50	50	58.6	416	416	832	127.7	8.1 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z47J00	58.0	44	56	63.2	401	511	912	139.2	9.3 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z77J00	63.4	50	50	69.2	498	499	997	152.2	10.9 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z88L00	81.2	50	50	85.5	633	633	1266	194.9	10.6 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z88R00	84.6	50	50	86.7	655	656	1311	203.0	5.4 FT	1-5/8	1-5/8	1-1/8	1-1/8
J56P00	122.1	45	55	123.0	857	1028	1885	293.2	10.4 FT	2-5/8	2-5/8	1-3/8	1-3/8
J67R00	141.8	46	54	147.7	1018	1188	2206	340.5	13.5 FT	2-5/8	2-5/8	1-3/8	1-3/8
J78T00	160.9	47	53	167.1	1167	1334	2501	386.3	18.1 FT	2-5/8	3-1/8	1-5/8	1-5/8
J88V00	180.0	50	50	175.6	1380	1380	2760	432.2	13.9 FT	3-1/8	3-1/8	1-5/8	1-5/8
J99X00	206.4	50	50	222.6	1618	1619	3237	495.6	11.8 FT	3-1/8	3-1/8	1-5/8	1-5/8

CHILLER													
YCR Model	Tons	Percent Capacity		Compr. KW	Heat Rejection (MBH)			Chiller GPM	Chiller Ft. Pd.	Refrigerant Line Sizes			
										Discharge		Liquid	
		Sys. #1	Sys. #2		Cir. #1	Cir. #2	Total			Cir. #1	Cir. #2	Cir. #1	Cir. #2
Z33J00	53.4	50	50	57.2	418	418	836	128.2	8.1 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z44J00	60.8	50	50	67.6	480	480	960	145.9	10.1 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z47J00	66.7	44	56	75.2	465	592	1007	160.1	11.9 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z77J00	72.0	50	50	83.4	575	575	1150	172.8	13.5 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z88L00	92.3	50	50	102.6	729	729	1458	221.5	13.5 FT	1-5/8	1-5/8	1-1/8	1-1/8
Z88R00	96.9	50	50	104.4	760	760	1520	232.6	6.9 FT	1-5/8	1-5/8	1-1/8	1-1/8
J45P00	122.1	44	56	122.7	829	1055	1884	293.2	10.4 FT	2-5/8	2-5/8	1-3/8	1-3/8
J56R00	141.9	45	55	148.4	995	1215	2210	340.7	13.5 FT	2-5/8	2-5/8	1-3/8	1-3/8
J67T00	163.1	46	54	174.8	1179	1375	2554	391.6	18.5 FT	2-5/8	2-5/8	1-5/8	1-5/8
J77V00	193.8	50	50	195.2	1496	1496	2992	465.3	16.1 FT	2-5/8	2-5/8	1-5/8	1-5/8
J88X00	216.4	50	50	215.2	1666	1666	3332	519.6	12.8 FT	3-1/8	3-1/8	1-5/8	1-5/8

NOTES:
1. Ambient conditions are 95°F.
2. Water chilled from 54° - 44°F, 0.00025 FF.
3. SDT = 121°F.
4. CT = 120°F with 25°F TD across the air cooled condenser.
5. Models have dual circuits with heat of rejection as listed.
6. Based on 10°F subcooled R-22 from the air cooled condenser.
7. The recommended refrigerant line sizes are based on the typical ASHRAE 1990 Refrigeration Handbook Chapter 3 design parameters (i.e. 1.9 PSI or 1°F line loss per 100 equivalent feet at full load while achieving minimum load requirements for proper oil return).

RECEIVER SELECTION

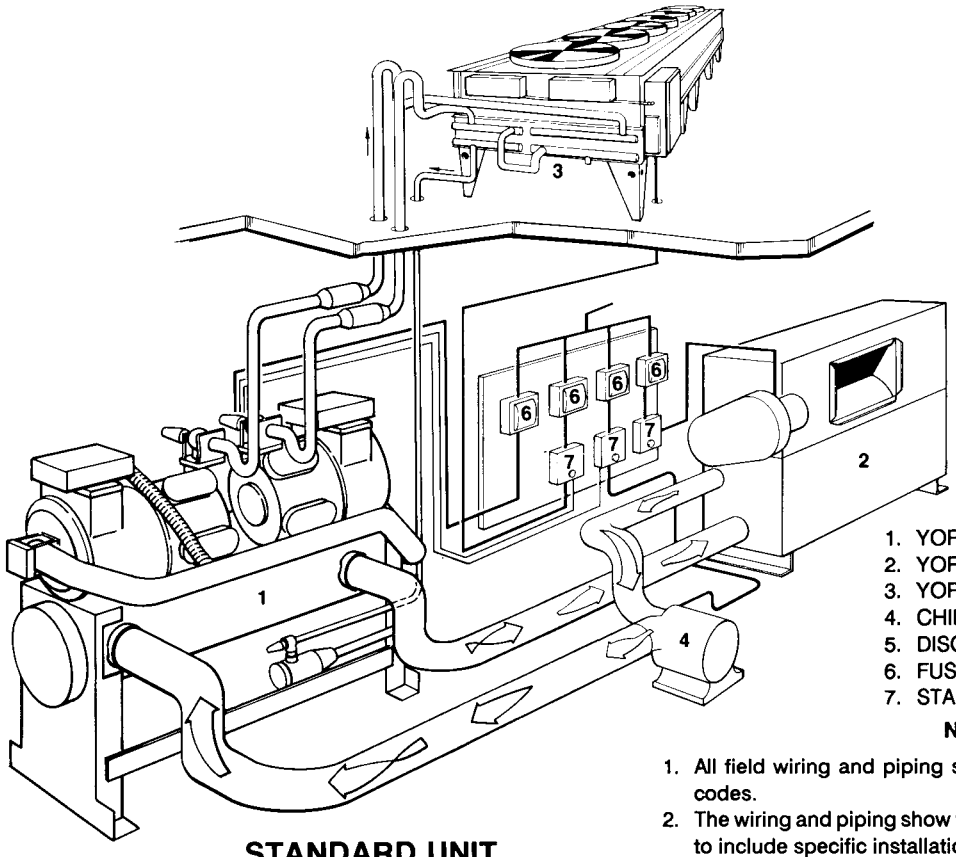
CONDENSER												
Condenser Model No.	Fans			Motors						Refrigerant Charge lbs.[9] Above 40°	Approx. Weight — Lbs.[10]	
						Total Amps						
	No.	Dia.	CFM	No.	HP	208-3-60	230-3-60	380-3-50	460-3-60		Operating	Shipping
VCB-69	2	48	40500	2	2	13.2	14.0	7.5	7.0	71	1971	1900
VCB-81	3	48	64950	3	2	19.8	21.0	11.3	10.5	53	2253	2200
VCB-103	4	48	60750	3	2	19.8	21.0	11.3	10.5	106	2856	2750
VCB-128	4	48	83400	4	2	26.4	28.0	15.0	14.0	95	3385	3290
VCB-142	4	48	92340	4	3	45.6	40.0	20.4	20.0	142	3907	3765
VCB-169	5	48	118845	5	3	57.0	50.0	25.5	25.0	118	4151	4033
VCB-209	6	48	138510	6	3	68.4	60.0	30.6	30.0	142	4978	4836
VCB-231	7	48	166383	7	3	79.8	70.0	35.7	35.0	165	6342	6177
VCB-272	7	48	190688	7	5	112.0	102.2	42.5	51.1	248	6570	6322
VCB-303	7	48	158760	7	3	79.8	70.0	35.7	35.0	308	7558	7250
VCB-303	7	48	158760	7	3	79.8	70.0	35.7	35.0	308	7558	7250

CONDENSER												
Condenser Model No.	Fans			Motors						Refrigerant Charge lbs.[9] Above 40°	Approx. Weight — Lbs.[10]	
						Total Amps						
	No.	Dia.	CFM	No.	HP	208-3-60	230-3-60	380-3-50	460-3-60		Operating	Shipping
VCB-69	2	48	40500	2	2	13.2	14.0	7.5	7.0	71	1971	1900
VCB-81	3	48	64950	3	2	19.8	21.0	11.3	10.5	53	2253	2200
VCB-103	4	48	60750	3	2	19.8	21.0	11.3	10.5	106	2856	2750
VCB-128	4	48	83400	4	2	26.4	28.0	15.0	14.0	95	3385	3290
VCB-142	4	48	92340	4	3	45.6	40.0	20.4	20.0	142	3907	3765
VCB-169	5	48	118845	5	3	57.0	50.0	25.5	25.0	118	4151	4033
VCB-209	6	48	138510	6	3	68.4	60.0	30.6	30.0	142	4978	4836
VCB-231	7	48	166383	7	3	79.8	70.0	35.7	35.0	165	6342	6177
VCB-272	7	48	190688	7	5	112.0	102.2	42.5	51.1	248	6570	6322
VCB-303	7	48	158760	7	3	79.8	70.0	35.7	35.0	308	7558	7250
VCB-303	7	48	158760	7	3	79.8	70.0	35.7	35.0	308	7558	7250

NOTES: 9. Based on 25°TP design. VCB models have (2) circuits with operating charge = Internal volume CU FT x 17.2 LBS/CU FT. Pumpdown capacity 70.5 LBS/CU FT x internal CU. FT. x .8.

10. Operating Weight = Shipping Weight + Charge (above 40°).

TYPICAL WIRING AND PIPING ARRANGEMENTS



STANDARD UNIT

LEGEND

1. YORK MODEL YCR CHILLER
2. YORK TYPE CS AIR UNIT
3. YORK VCB AIR COOLED CONDENSER
4. CHILLED LIQUID PUMP
5. DISCHARGE LINE MUFFLER (OPTIONAL)
6. FUSED DISCONNECT SWITCH
7. STARTER

NOTES:

1. All field wiring and piping shall comply with National and local codes.
2. The wiring and piping show typical locations and are not intended to include specific installation details.
3. For specific piping details, refer to the applicable section of the ASHRAE guide.

CONTROL DATA

LOW AMBIENT OPERATION

Since air cooled condensers are often required to operate over a wide range of ambient air temperatures and variable loading conditions, provision must be made to maintain the overall system balance. Any air cooled condenser tends to run at a low head pressure when operating in a low ambient air temperature. Low head pressures will result in poor expansion valve operation and this will in turn cause a poor system operation due to the pressure unbalance.

Air conditioning applications generally allow the operating head pressure to vary with the ambient air temperature within certain limits, without adversely affecting the system operation.

The capacity of an air cooled condenser is directly proportional to the TD, which is the temperature difference between the air temperature entering the condenser and the condensing temperature. A condenser is usually selected to operate on a TD suitable for summer ambient air conditions. The capacity of the condenser is increased when operated at the lower ambient temperature which directly reduces the system head pressure.

The lower limit of this varying head pressure is dependent upon the required pressure drop across the thermostatic expansion valve (TXV) and for normal air conditioning applications, should be maintained high enough to assure the proper feeding of the TXV.

YORK offers the fan cycling method to maintain a desired condensing pressure.

STANDARD FAN CYCLING CONTROL

Individual fan sections are cycled by thermostats to provide satisfactory condenser head pressure control for operation down to 40°F outdoor ambient temperature.

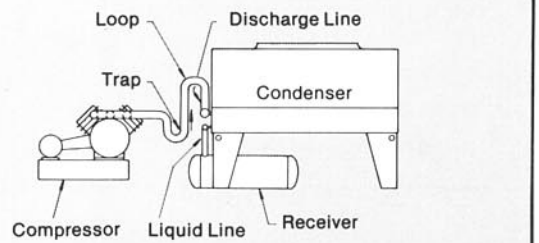
OPTIONAL 0° AMBIENT OPERATION

The condenser fan cycle control package cycles the fans off as the pressure switches react to the falling head pressure and as the ambient temperature drops below the setting of the thermostat(s). Chiller operation will terminate when the maximum range of fan cycling is reached.

APPLICATION DATA

THE FOLLOWING INFORMATION CAN BE USED AS GUIDANCE FOR APPLYING AIR COOLED CONDENSERS IN FIELD ERECTED SYSTEMS WHERE RECEIVERS ARE USED.

FIGURE NO.1

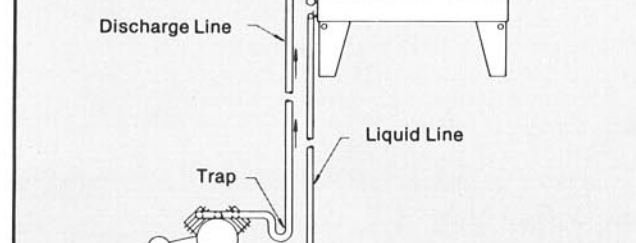


PIPING DIAGRAMS

The above diagram covers a common application where the air cooled condenser is located on basically the same elevation as the compressor and receiver. The discharge line in this case is not too critical. The main problem usually associated with this arrangement is insufficient vertical height to allow free draining of liquid refrigerant from the condenser coil to the receiver.

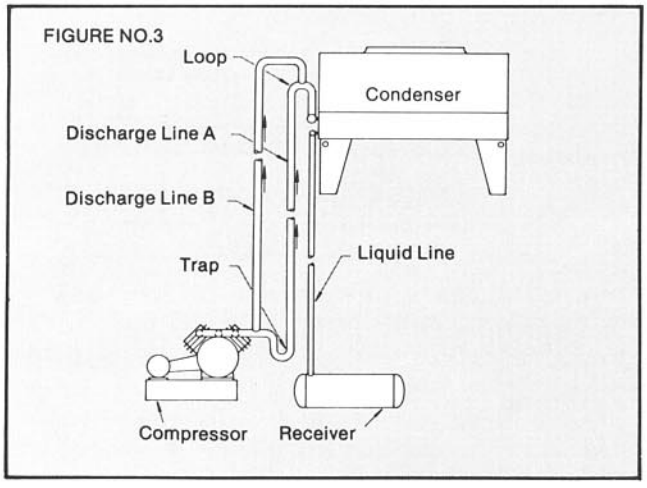
To prevent gas binding in the receiver and liquid build-up in the condenser coil, locate the receiver as far below the condenser outlet as possible. Liquid lines must be free of any loops or traps and horizontal runs pitched toward the receiver.

FIGURE NO.2



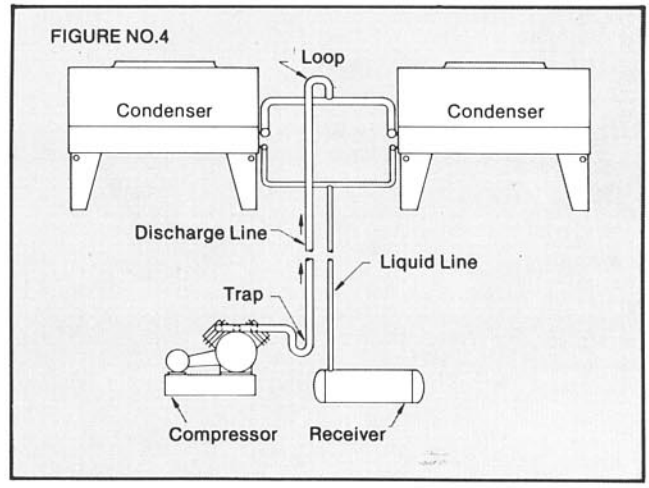
This diagram illustrates a typical piping arrangement where the remote air cooled condenser is located on a higher elevation than the compressor or receiver. In this arrangement the design of the discharge line is very critical and should be modified to the arrangement in diagram Fig. 3, unless a very constant and steady loading is maintained.

FIGURE NO.3



This piping diagram is recommended for applications of capacity controlled systems. Discharge line A is sized for the maximum load conditions at the desired pressure drop, less the minimum load conditions. Discharge line B is sized for the minimum loading conditions at sufficient velocity to carry the oil to the condenser at the reduced capacity.

FIGURE NO.4



This diagram illustrates another common application where two or more separate air cooled condensers are inter-connected to a single compressor. In this case, each condenser must have both equal capacity and equal pressure drop. The piping must also be so arranged as to insure equals lengths to and from each condenser. If unlike piping and/or unequal condensers are used, the unequal pressure drop will cause liquid to build up in one of the condensers reducing its effective capacity.

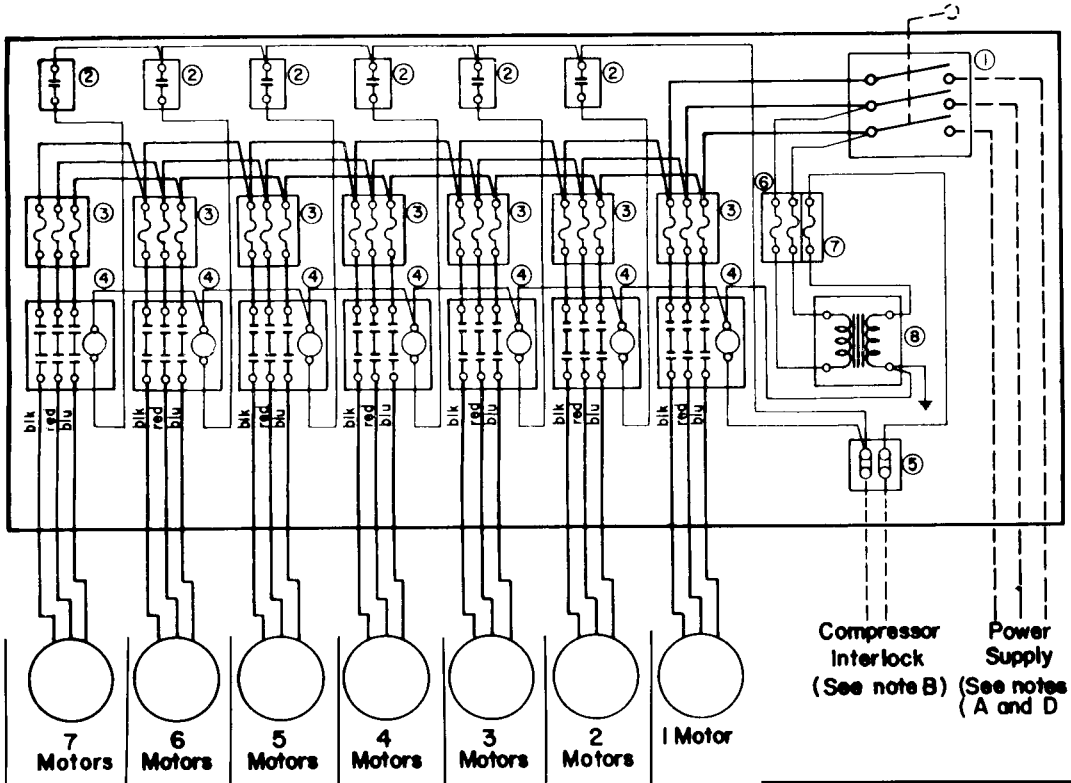
STANDARD FACTORY WIRING
(40°F MINIMUM AMBIENT)

COMPONENT DATA

1. Safety disconnect (handle on door)
2. Control switches (temperature type) – Not included on single fan unit
3. Motor fuses
4. Contactors
5. Terminal blocks
6. Transformer fuse
7. Control circuit fuse
8. Control circuit transformer

NOTES

A) Power supply (by others) to be 3 phase, 60 Hz, 208, 230, or 460 volts, or 3 phase, 50 Hz, 380 volts.
B) Compressor interlock (by others) is 115 volts with 208, 230, 380, or 460 volt supply. To allow the VCB condenser to operate when the chiller compressors start.
C) All motors are 1750 rpm, 3 phase, 60 Hz, and 1450 rpm, 3 phase, 50 Hz with built-in thermal overload protection.
D) Supply voltage MUST be specified on purchase order.
E) See 195.21-NM2 for 0°F option information.
F) All field wiring must meet N.E.C. and local codes.



Power Supply	Wire Color	Motor Leads	
		Contactor	Motor
Line 1	blk	T1	L1
Line 2	red	T2	L2
Line 3	blu	T3	L3

← VCB-22, -27, -32, -34, and -38
← VCB-43, -48, -54, -57, -61, -64, -65, -67, -69, -75, and -78
← VCB-81, -86, -92, -96, -101, -103, -107, -113, and -124
← VCB-104, -108, -121, -128, -131, -138, -142, -145, -153, and -162
← VCB-155, -160, -169, -172, and -191
← VCB-176, -181, -192, -197, -207, -209, -223, -242, and -248
← VCB-224, -231, -241, -258, -272, -303, and -336

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