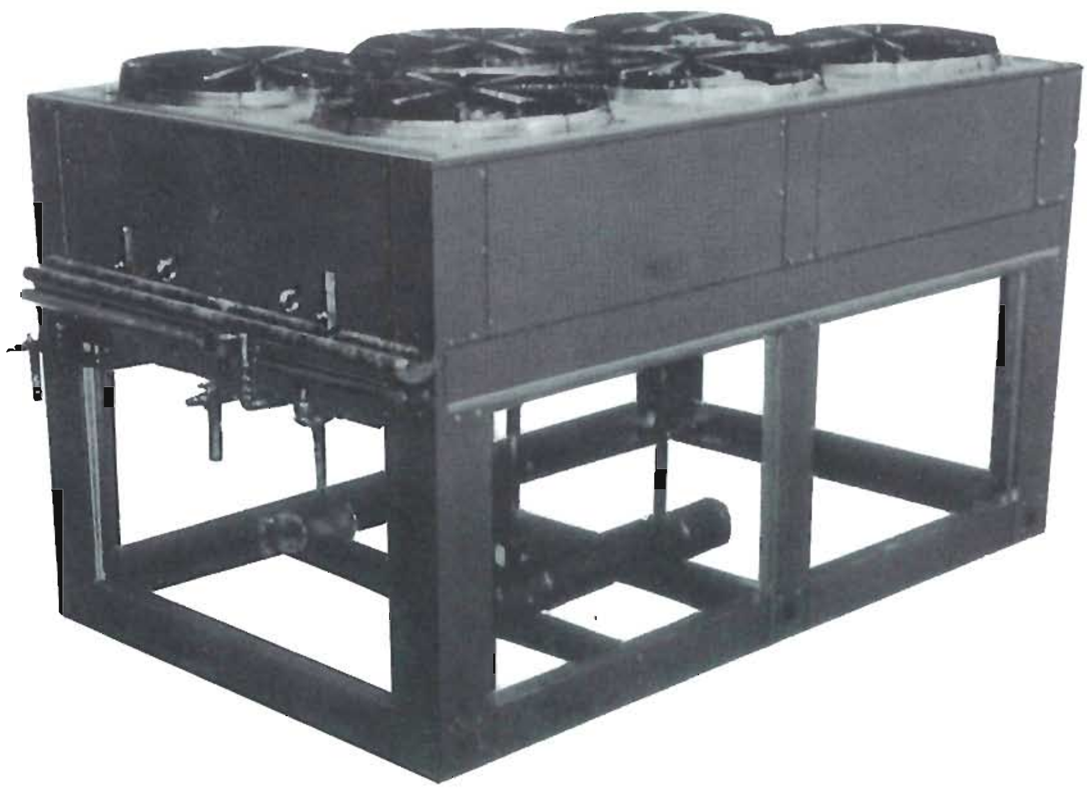
CENTURY REFRIGERATION

PFC Series

Air Cooled Condensers



FOR OUTDOOR USE

QUALITY REFRIGERATION SYSTEMS

ETL

Designed for commercial and industrial applications

SELECTION PROCEDURE

SINGLE CIRCUIT SELECTION

Air cooled condensers must reject not only the heat absorbed at the evaporator, but also the heat of compression added by the compressor. The sum of these is referred to as the total heat of rejection and is the basis for condenser selection. The best accuracy is obtained by using actual compressor data to find the heat of compression. This quantity may be expressed by one of several methods:

a) Some compressor data is published to show directly the total heat of rejection at each operating condition. In this case, this quantity is the basis for selection.

b) Where compressor input is shown in KW, this value must be converted to BTUH and added to the evaporator load to obtain the total heat of rejection:
THR = Evap. Load (BTUH) + (Comp. Input (KW) x 3415)

c) Where compressor input is given in horsepower, the calculation becomes:
THR = Evap. Load (BTUH) + (Comp. Input (HP) x 2545)

d) Where actual compressor data is not available, the total heat of rejection may be obtained with satisfactory accuracy by utilizing the factors from Table A or B. In this case:
THR = Evap. Load (BTUH) x Factor from Table

With the total heat of rejection and the design ΔT (Condensing Temperature - Ambient) both known, the proper condenser may then be selected from the Performance Tables.

EXAMPLE: Select a condenser for an R-22 system at the following design:

Ambient: 100°F
Condensing Temperature: 125°F
Evap. Capacity: 180,000 BTUH @ 45°F
Compressor Type: Hermetic

1) The design temperature difference is 125-100 or 25°F.
2) The total heat of rejection can be calculated by using the factor from the Table A at 45°F evaporator and 125°F condensing, or 1.275.
3) Therefore, THR = 180,000 x (1.275), or 229,000 BTUH.
4) From the performance table, the correct condenser is Model PFC-21 with a capacity of 262,800 BTUH at 100°F ambient and 125°F condensing temperature.

MULTI–CIRCUIT SELECTION

It is sometimes desirable to use a multi-circuited condenser with several independent compressor systems. Such condensers are readily available from Century. The total heat of rejection for each circuit is determined as for a single condenser. From this point, the selection process is as follows in the example.

Select a single condenser for use with the following circuits:

CKT	Total Heat of Rejection	Cond. Temp.	Ambient Temp
A	39,000	110	95
B	75,000	120	95
C	90,000	125	95

1) Find the temperature differential for each circuit.
Circuit A) 110-95 = 15
Circuit B) 120-95 = 25
Circuit C) 125-95 = 30

2) Determine the BTUH load per degree F differential for each circuit by dividing the required rejection by the ΔT.
Circuit A) 39,000 ÷ 15 = 2,600
Circuit B) 75,000 ÷ 25 = 3,000
Circuit C) 90,000 ÷ 30 = 3,000

3) Determine the total load per degree F required by adding each circuit load.

2,600
3,000
3,000
8,600 BTUH/°F

4) Using this value, select the proper condenser from the 1°F column on the performance data.
5) The proper condenser for the example would be a PFC-18 with a capacity of 8,701 BTUH per 1°F Temperature Difference.
6) Be sure, on order write-up, to provide the loading of each circuit to enable proper coil circuiting.

TABLE A
SUCTION COOLED COMPRESSORS
(Hermetic or Semi-Hermetic)

EVAP. TEMP. °F	CONDENSING TEMP. °F						
	105	110	115	120	125	130	135
-40	1.76	1.79	1.83	1.85	-	-	-
-30	1.67	1.71	1.73	1.77	1.79	-	-
-20	1.59	1.63	1.65	1.67	1.71	1.73	-
-10	1.51	1.53	1.56	1.59	1.61	1.63	1.66
0	1.43	1.45	1.48	1.50	1.52	1.56	1.58
10	1.37	1.39	1.41	1.46	1.47	1.49	1.51
20	1.31	1.33	1.35	1.37	1.39	1.42	1.44
30	1.26	1.27	1.29	1.32	1.35	1.37	1.39
40	1.20	1.23	1.25	1.27	1.29	1.31	1.33
50	1.18	1.20	1.22	1.25	1.26	1.29	1.30

TABLE B
OPEN TYPE COMPRESSORS

EVAP. TEMP. °F	CONDENSING TEMP. °F						
	105	110	115	120	125	130	135
-40	1.52	1.55	1.58	1.60	-	-	-
-30	1.46	1.49	1.51	1.54	1.55	-	-
-20	1.40	1.43	1.45	1.47	1.50	1.52	-
-10	1.35	1.37	1.40	1.42	1.44	1.46	1.49
0	1.30	1.32	1.35	1.37	1.39	1.42	1.44
10	1.26	1.28	1.30	1.32	1.35	1.37	1.39
20	1.23	1.24	1.26	1.28	1.30	1.33	1.35
30	1.19	1.20	1.22	1.25	1.27	1.29	1.31
40	1.15	1.17	1.19	1.21	1.23	1.25	1.27
50	1.14	1.15	1.17	1.20	1.21	1.24	1.25

Average values only. To be used only when actual compressor data is not available.

APPLICATIONS

Century Refrigeration Air Cooled Condensers are designed for commercial and industrial applications. The PFC Series, for outdoor applications, utilizes R-22 refrigerant. It comes completely piped and wired, featuring a low profile and vertical air discharge. It also utilizes a unique horizontal condenser coil design and high volume condenser fans. The Century design is unaffected by wind direction or extreme weather conditions.

STANDARD FEATURES

Cabinet is constructed entirely of mill galvanized sheet steel panels and formed structural members. All panels are removable for access and service.

Motors are industrial duty 1140 RPM, ball bearing, weather resistant, three phase with inherent electrical protection.

Fans are of heavy gauge steel with a corrosion resistant coating.

Condenser Coils are of seamless copper tube with die stamped aluminum plate fins, galvanized steel frames and tube sheets.

AVAILABLE OPTIONS

Exterior paint to blend with adjacent structures. Gray is the standard color. Galvanized surfaces are first cleaned of contaminants, then the surface is textured. A vinyl etching primer is used prior to the final top coat of silicone alkyd enamel.

Copper fin coils are available for use in toxic atmospheres where like metals are required.

Epoxy coating of the condenser surface, electrostatically applied, thermosetting is also available for use in toxic or salt water atmospheres.

Multiple circuiting of the condenser coils to allow use of multiple compressors on a single housing air cooled condenser.

Acrycoat 3 fin coating for corrosive or coastal environments. Acrycoat 3 meets ASTM B117 1500 hour salt spray testing.

Receivers with isolation valves are available mounted and piped. They are also available as a ship loose item. Receivers 6" in diameter and larger are ASME stamped. Eight inch receivers and larger are provided with a safety relief valve.

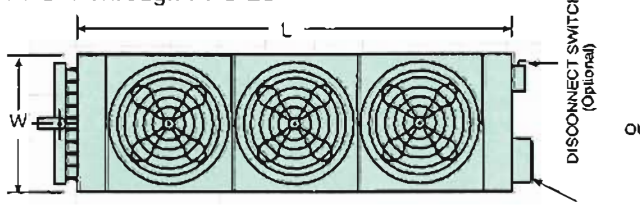
Fused fan motor contactors provides the necessary wiring from the motor to the contactors, fuses and terminal strip according to the number of fans on the unit. A single point incoming power connection (3 phase) and contactor control voltage are the only connections required.

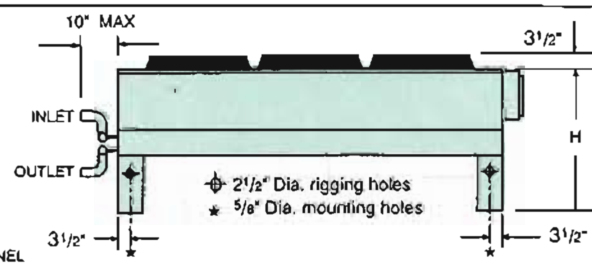
Fused or non-fused disconnect switches are provided as an option. Switches are mounted and wired inside the contactor electrical panel and includes fused fan motor contactors.

Circuit breakers (unit) are available mounted and wired inside the electrical panel. This option also includes the fused fan motor contactors.

DIMENSIONS

PFC-4 Through PFC-28





NOTES: Refrigeration Connections ODS Copper

Model No.	L	W	H	Inlet	Outlet	Shipping Weight
PFC-4	32	34	40	5/8	1/2	315
PFC-5	32	34	40	5/8	5/8	325
PFC-6	32	34	40	5/8	5/8	345
PFC-8	51	34	40	7/8	7/8	395
PFC-9	51	34	40	7/8	7/8	415
PFC-10	51	34	40	7/8	7/8	425
PFC-11	51	34	40	7/8	7/8	455
PFC-14	86 1/2	34	40	1 1/8	1 1/8	590
PFC-18	86 1/2	34	40	1 1/8	1 1/8	640
PFC-21	110	34	40	1 1/8	1 1/8	760
PFC-28	110	34	40	1 3/8	1 3/8	875

LOW AMBIENT TEMPERATURE

Due to the necessity of maintaining sufficient pressure drop across an expansion valve, air cooled condensers require some method of decreasing their capacity during operation at reduced ambient temperature. Two basic methods are in general use, and are offered on our equipment. These methods will maintain head pressure after operation is established. Additional control may be necessary on compressor circuit to insure starting.

Fan cycling of condenser fans for operation to +20°F is accomplished by providing a pressure monitoring control for each compressor (limited to 1 compressor on single fan units and two compressors on multiple fan units). This option also provides the fused fan motor contactors, mounted for ease of field installation. The fan arrangement, and pressure settings are as shown. Also shown is the position of the electrical connection area.

PERFORMANCE DATA

Capacity - BTUH Rejection

	Approach Temperature (Cond. Temp. - Ambient)					
Model	**1°***	**10°**	**15°**	**20°**	**25°**	**30°**
PFC-4	1,757	17,572	26,358	35,144	43,930	52,716
PFC-5	2,215	22,146	33,218	44,291	55,364	66,437
PFC-6	2,813	28,128	42,191	56,255	70,319	84,383
PFC-8	3,590	35,897	53,845	71,793	89,741	107,690
PFC-9	3,988	39,883	59,825	79,766	99,708	119,649
PFC-10	4,511	45,110	67,664	90,219	112,774	135,329
PFC-11	4,929	49,293	73,940	98,586	123,233	147,879
PFC-14	6,399	63,989	95,983	127,977	159,971	191,966
PFC-18	8,093	80,933	121,400	161,866	202,333	242,799
PFC-21	9,758	97,578	146,366	195,155	243,944	292,733
PFC-28	11,694	116,938	175,407	233,876	292,345	350,814
PFC-34	16,487	164,869	247,303	329,737	412,171	494,606
PFC-37	17,940	179,401	269,101	358,801	448,501	538,202
PFC-42	19,821	198,208	297,312	396,416	495,520	594,624
PFC-47	21,556	215,559	323,338	431,117	538,896	646,676
PFC-55	23,550	235,500	353,249	470,999	588,749	706,499
PFC-68	31,769	317,690	476,535	635,380	794,225	953,070
PFC-76	34,729	347,286	520,928	694,571	868,214	1,041,857
PFC-84	38,784	387,845	581,767	775,689	969,611	1,163,534
PFC-92	42,152	421,516	632,273	843,031	1,053,789	1,264,547
PFC-112	53,208	532,079	798,118	1,064,157	1,330,196	1,596,236
PFC-136	62,857	628,573	942,860	1,257,146	1,571,433	1,885,719
PFC-150	69,244	692,442	1,038,663	1,384,884	1,731,105	2,077,326
PFC-162	74,884	748,841	1,123,262	1,497,682	1,872,103	2,246,523

* For calculation purposes only. Minimum design is 10°F approach.
(1) Capacities shown are for R-22
(2) Capacities shown are for sea level operation.
Derate by 1% for each 500 ft above sea level.

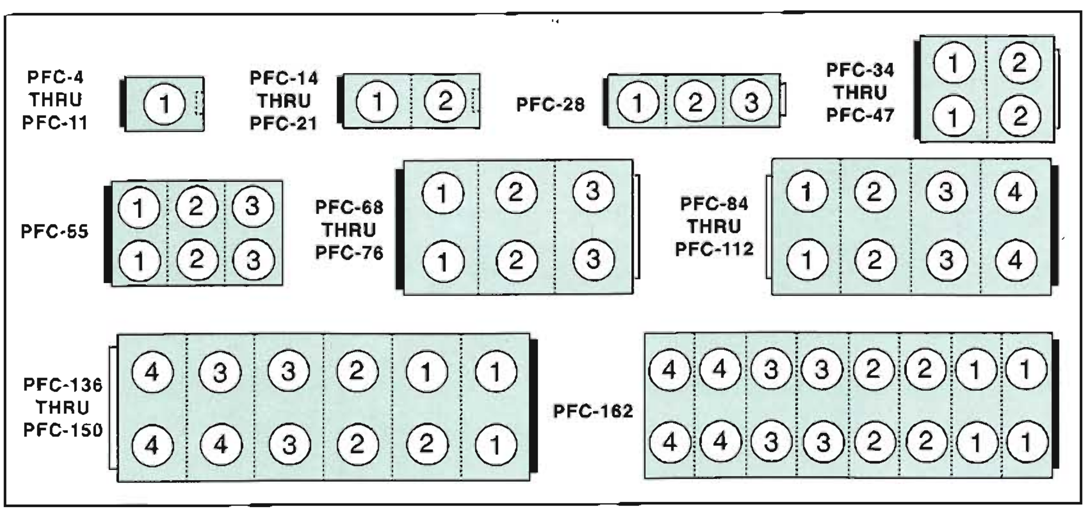
PRESSURE SETTINGS

(PSIG)

	R-22	
	In	Out
Step 1	220	200
Step 2	230	210
Step 3	240	230
Step 4	250	240

FAN CYCLING ARRANGEMENTS

(SINGLE REFRIGERATION CIRCUIT)



SPECIFICATION DATA

Model	CFM	Fans Qty.	Dia.	HP	Amps* 230-60-3	Connections Inlet ODS	Outlet ODS	Dimensions L	W	H	Pumpdown** Capacity	Approx. Shipping Weight
PFC-4	4,410	1	24	½	2.2	⅞	⅝	32	34	40	7.3	315
PFC-5	5,100	1	24	½	2.2	⅞	⅝	32	34	40	14.3	325
PFC-6	5,500	1	24	½	2.2	⅞	⅞	32	34	40	14.3	345
PFC-8	7,800	1	28	1	4.6	1⅛	⅞	51	34	40	18.7	395
PFC-9	5,800	1	24	½	2.2	1⅛	⅞	51	34	40	23.8	415
PFC-10	7,200	1	28	1	4.6	1⅛	⅞	51	34	40	23.8	425
PFC-11	6,300	1	28	1	4.6	1⅛	⅞	51	34	40	27.9	455
PFC-14	14,400	2	28	1	4.6ea	1⅛	⅞	86½	34	40	27.9	590
PFC-18	15,400	2	28	1	4.6ea	1⅜	1⅛	86½	34	40	41.8	640
PFC-21	14,500	2	28	1	4.6ea	1⅜	1⅛	110	34	40	53.9	760
PFC-28	19,500	3	28	1	4.6ea	1⅜	1⅛	110	34	40	70.9	875
PFC-34	27,000	4	28	1	4.6ea	1⅝	1⅜	86½	68	53	83.6	1,280
PFC-37	24,800	4	28	1	4.6ea	1⅝	1⅜	86½	68	53	101.5	1,350
PFC-42	31,000	4	28	1	4.6ea	1⅝	1⅜	110	68	63	106.4	1,520
PFC-47	28,500	4	28	1	4.6ea	2⅛	1⅝	110	68	63	141.8	1,640
PFC-55	40,800	6	28	1	4.6ea	2⅛	1⅝	110	68	63	141.8	1,740
PFC-68	49,000	6	28	1	4.6ea	2⅝	2⅛	144½	88	63	179.2	2,370
PFC-76	46,000	6	28	1	4.6ea	2⅝	2⅛	144½	88	63	238.8	2,570
PFC-84	62,000	8	28	1	4.6ea	2⅝	2⅛	180	88	63	212.8	2,640
PFC-92	57,000	8	28	1	4.6ea	2⅝	2⅛	180	88	63	283.6	2,880
PFC-112	70,400	8	28	1	4.6ea	3⅛	2⅝	264	96	63	356.4	3,990
PFC-136	97,200	12	28	1	4.6ea	3⅛	2⅝	264	96	63	356.4	4,190
PFC-150	90,000	12	28	1	4.6ea	3⅛	2⅝	264	96	63	475.2	4,560
PFC-162	105,000	16	28	1	4.6ea	3⅛	2⅝	264	96	63	475.2	4,960

* Amps shown at 230-60-3. For 460-60-3, multiply by .5

** Pumpdown capacity based on 80% full of R-22.

FLOOD CONTROL

Flood control utilizes a system of valves; mounted, piped and adjusted for the refrigerant being used. This system "floods" the condenser with liquid refrigerant, thereby reducing its effective surface and corresponding capacity. This option requires additional refrigerant charge in the system, and a receiver with sufficient capacity to hold the additional refrigerant during higher ambient operation.

As shown in Figure 1, during a cold start, the valve is closed to the condenser, allowing discharge gas to directly enter the receiver. As the condenser fills with liquid, the head pressure builds to the minimum acceptable level, at which point the valve then allows liquid from the condenser to enter the receiver. The valves continue to modulate in this manner, stabilizing at the required operating pressure.

FLOOD CONTROL CAPACITY SELECTION

MODEL	FC1	FC2	FC3	FC4	FC5	FC6	FC7	FC8
R-22	22T	34T	44T	68T	102T	136T	170T	204T

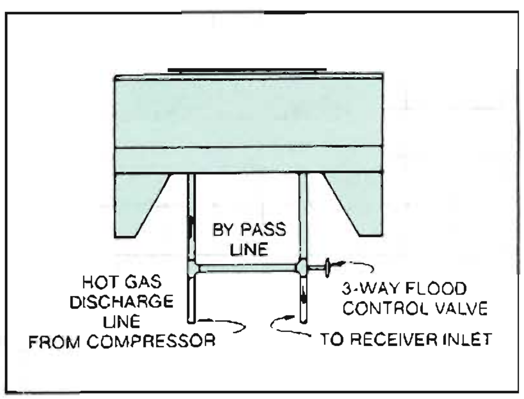
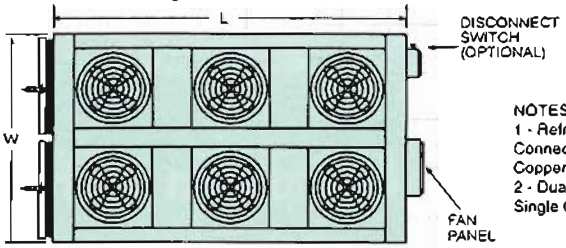


Figure 1

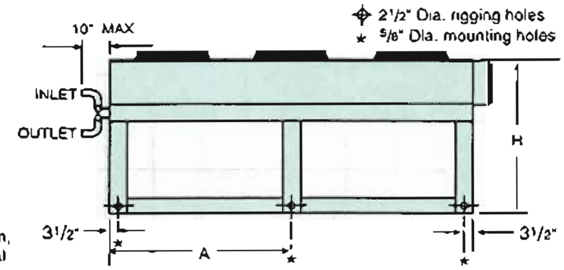
Receiver Selection - A receiver of sufficient capacity is required to hold the excess refrigerant charge during operation at elevated ambient temperatures. For proper receiver capacity, determine operating charge, including flooded charge (if applicable), line capacity and evaporator charge; subtract condenser pumpdown capacity. This will give the holding capacity required of the receiver.

DIMENSIONS

PFC-34 Through PFC-76

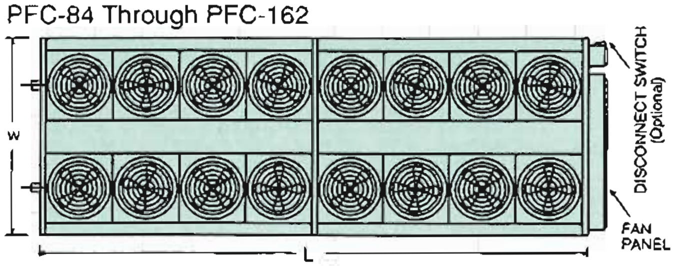


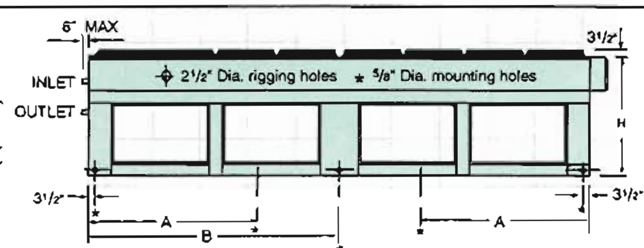
NOTES:
1 - Refrigeration Connections ODS Copper
2 - Dual Circuit Shown, Single Circuit Optional



Model No.	L	W	H	A	Dual Circuit Inlet	Dual Circuit Outlet	Optional Single Circuit Inlet	Optional Single Circuit Outlet	Shipping Weight
PFC-34	87 5/8	67 3/4	63	NA	1 1/8	1 1/8	1 5/8	1 3/8	1280
PFC-37	87 5/8	67 3/4	63	NA	1 1/8	1 1/8	1 5/8	1 3/8	1350
PFC-42	111 1/8	67 3/4	63	55	1 1/8	1 1/8	1 5/8	1 3/8	1520
PFC-47	111 1/8	67 3/4	63	55	1 3/8	1 3/8	2 1/8	1 5/8	1640
PFC-55	111 1/8	67 3/4	63	55	1 3/8	1 3/8	2 1/8	1 5/8	1740
PFC-68	144 1/2	88	63	72 1/4	1 3/8	1 3/8	2 5/8	2 1/8	2370
PFC-76	144 1/2	88	63	72 1/4	1 3/8	1 3/8	2 5/8	2 1/8	2570

PFC-84 Through PFC-162





NOTES. 1 - Refrigeration Connections ODS Copper
2 - Dual Circuit Shown, Single Circuit Optional

Model No.	L	W	H	A	B	Dual Circuit Inlet	Dual Circuit Outlet	Optional Single Circuit Inlet	Optional Single Circuit Outlet	Shipping Weight
PFC-84	180	88	63	60	90	1 5/8	1 5/8	2 5/8	2 1/8	2640
PFC-92	180	88	63	60	90	1 5/8	1 5/8	2 5/8	2 1/8	2880
PFC-112	264	96	63	88	132	2 1/8	2 1/8	3 1/8	2 5/8	3990
PFC-136	264	96	63	88	132	2 1/8	2 1/8	3 1/8	2 5/8	4190
PFC-150	264	96	63	88	132	2 1/8	2 1/8	3 1/8	2 5/8	4560
PFC-162	264	96	63	88	132	2 1/8	2 1/8	3 1/8	2 5/8	4960

Continual engineering and research for product improvement may result in design and specification changes. Consult factory for certified equipment drawings.

CENTURY REFRIGERATION
P.O. Box 1206 • Pryor, OK 74362 • (918) 825-7222 • FAX (918) 825-0723