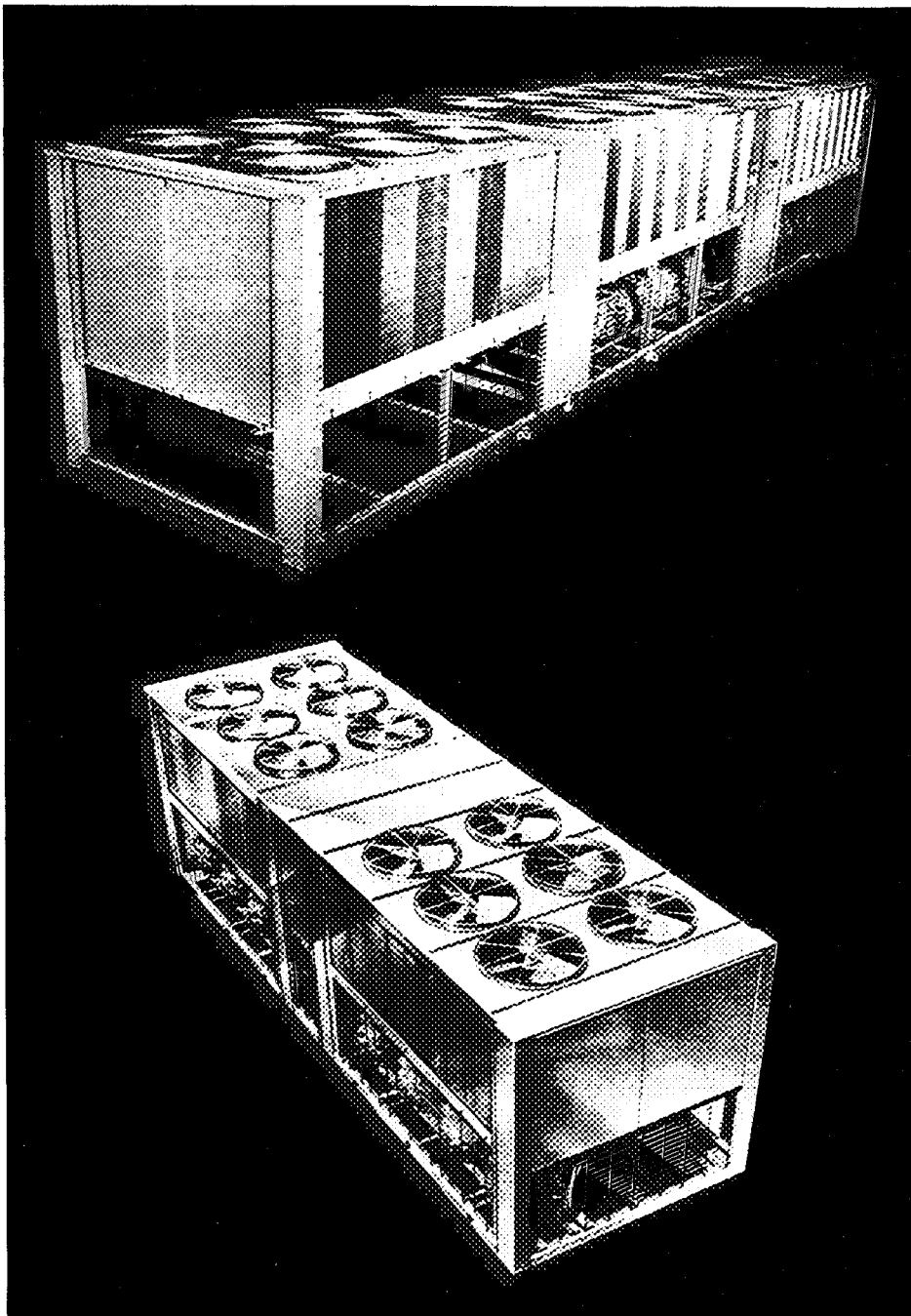




Product Data

30GB,GT Flotronic™ Air-Cooled Reciprocating Liquid Chillers

Nominal Tons: 30GB 40 to 200; 30GT 225 to 280



Highly Advanced Chiller Electronics
For Years of Operating Efficiency

- wider size range
- application versatility
- long range cost savings
- dependability through high efficiency electronics
- factory ready and tested under load

Features/Benefits

Installation Ease

The models 30GB and 30GT Flotronic chillers are fully packaged systems that arrive at the job site completely ready for installation in minimal time. On-site inspection time is also reduced because the units are ETL or UL (208/230- and 460-v) and CSA (208/230-, 460- and 575-v) listed, and meet ASME standards. Important added standard features include: dual refrigerant circuits, pull-down capability from 95 F loop temperature. Installation time is further reduced through provision for single-location electrical and cooler connections.

Design flexibility

Consulting engineers will appreciate the wide chiller operating range offered by the Flotronic 30GB and 30GT chiller systems. The advanced micro-processor controls enable building operators to select imaginative operating control strategies for their particular needs. In addition, the units offer the best water temperature control through the application of proportional integral derivative (PID) logic with return water temperature compensation. This Carrier exclusive permits variable flow and application flexibility. Applications that require brine, copper fin/copper tube condensers, low ambient temperature operation down to -20 F, temperature reset and 2-step load shedding

(from network or remote source), will find these features available

Serviceability

Ease of service and maintenance add to the long run operating savings benefits which are yours with the Flotronic 30GB, 30GT units. Hinged access panels let the service technician get to the problem fast. A standard 2-digit or optional 8-character (Flotronic II) diagnostic display panel quickly pinpoints the location of the problem. No need to spend costly hours searching. The Flotronic II control option maintains a valuable record of the machine's history, complete with starts and run data for periodic service or maintenance reference. Service technicians find this electronic record system invaluable in efficiency diagnosis and long-term equipment management. Ground current sensing eliminates the need for refrigerant replacement, by preventing compressor motor burnouts that add acids to the refrigerant.

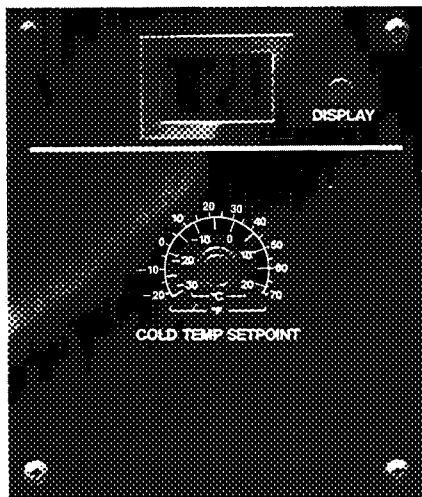
Another advantage is the popular 06E compressor, long recognized by field technicians as easy to maintain.

Quality and reliability

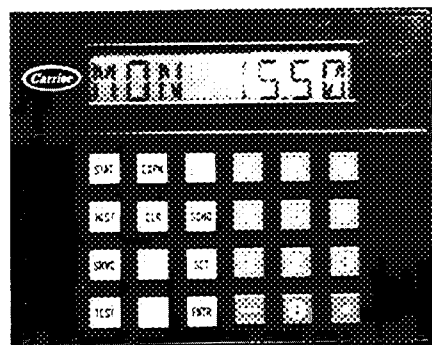
To assure long-life quality performance, every standard unit is factory run tested. The dependable direct drive fans are built to NEMA standards, and the units are equipped with famous 06E Carrier semi-hermetic compressors, built for performance excellence in Carrier equipment worldwide. Refrigerant flow control provided by EXV precision keeps compressor motors cooler while operating at the optimum efficiency. The automatic lead/lag control manages an even distribution of starts and run hours between refrigerant circuits. The superior microprocessor control package requires fewer moving control circuit parts for long-life dependability. The microprocessor controls the full refrigeration cycle (compressors, fans and expansion valve) to assure efficient, synchronized operation.

Operating efficiency

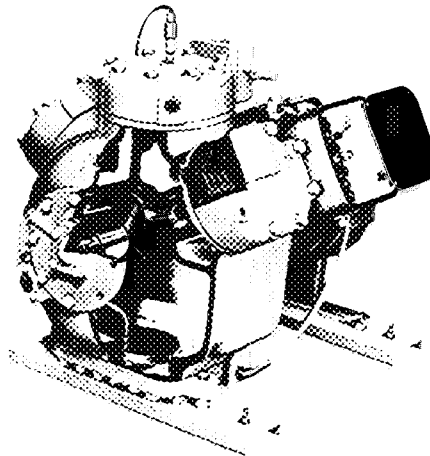
The Flotronic chillers offer outstanding EER's (Energy Efficiency Ratios). Exceptional part-load performance (chillers operate at part load 97% of the time) provides increased operating savings through use of multiple compressors per refrigerant circuit, and suction cutoff unloading. A fully integrated microprocessor control system (another Carrier exclusive) maintains efficient control over the compressors, electronic expansion valve (EXV) and fans, to optimize chiller efficiency. Up to 28% efficiency improvement at part load conditions is achieved over standard competitive chillers. The system integrated subcooler provides an extra measure of unit efficiency. Additional increases in EER up to 15% may result with standard return water temperature reset.



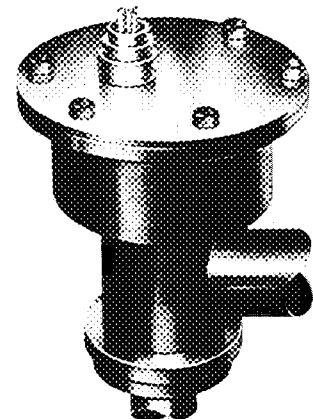
STANDARD 2-DIGIT DISPLAY



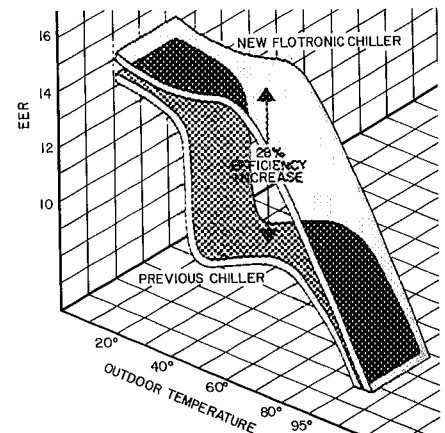
OPTIONAL 8-CHARACTER DISPLAY



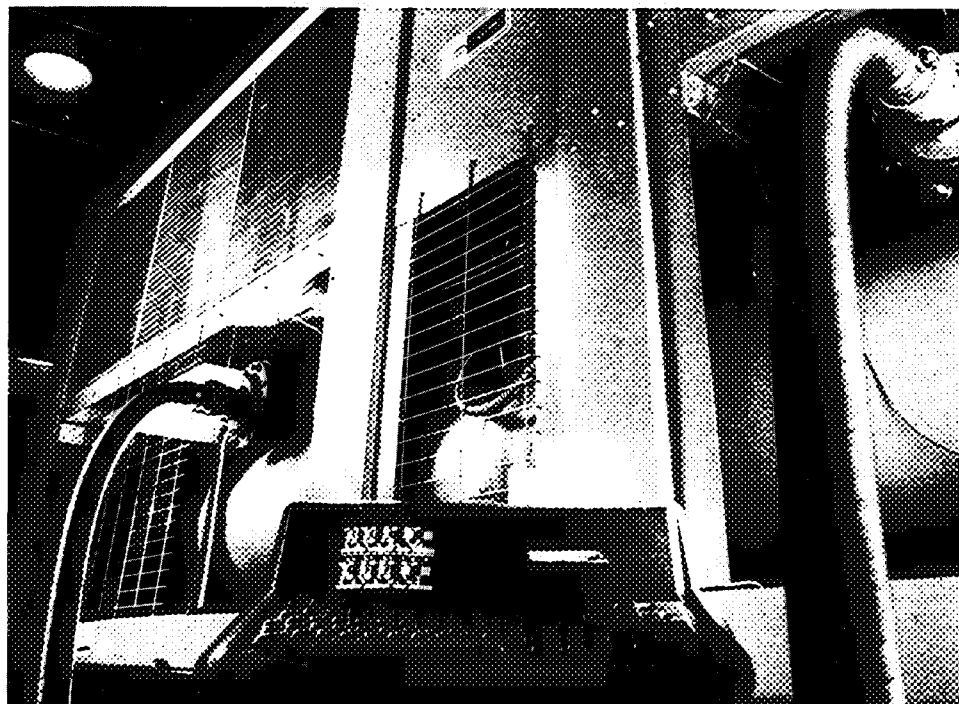
06E COMPRESSOR



ELECTRONIC EXPANSION VALVE (EXV)



PART-LOAD EFFICIENCY
28% GAIN



FACTORY RUN TEST

Table of contents

	Page		Page
Features/Benefits	1,2	Performance Data ..	16-31
Model Number Nomenclature ..	3	Electrical Data	32,33
Physical Data ..	4,5	Controls	34-36
Options and Accessories	6	Typical Piping and Wiring ..	37
Base Unit Dimensions	7-14	Application Data	38-41
Selection Procedure	15	Guide Specifications	42-51

Model number nomenclature

30GB - 040 - C 6 - -AA			
30GB — Air-Cooled Outdoor Liquid Chiller (040-200) 30GT — Air-Cooled Outdoor Liquid Chiller (225-280)	040 070 110 200 045 075 125 225 055 090 150 250 060 100 175 280	C - Copper - Copper Condenser	Options - -* — EXV with Flotronic Control (040 to 200) AA — TXV (040 to 200) AF* — Flotronic II Control (225-280) AJ* — Flotronic Control (225 to 280) DA* — Flotronic II Control (040 to 200)
			1 — 575-3-60 † 2 — 380-3-60 ‡ 5 — 208/230-3-60 6 — 460-3-60

* For brine options on 040 to 200 size units, contact your Carrier representative

† Export only — not for U S domestic sale.

‡ Three-phase, 3-wire or 4-wire (with neutral), depending on model

Physical data — 30GB

MODEL 30GB	040	045	055	060	070	075	090
APPROX OPER WT — lb (kg)	3780 (1715)	4250 (1928)	4800 (2178)	4900 (2223)	6200 (2813)	6900 (3130)	7522 (3412)
REFRIG CHG — lb (kg)							
R-22 Ckt 1	40 (18.1)	38 (17.2)	65 (29.5)	65 (29.5)	106 (48.1)	122 (54.9)	110 (49.9)
Ckt 2	40 (18.1)	60 (27.2)	71 (32.2)	85 (38.5)	71 (32.2)	70 (31.3)	110 (49.9)
COMPRESSORS, Type...Rpm (r/s)							
06E* (No.) Ckt 1	(1) 2250	(1) 2250	(1) 6275	(1) 6275	(2) 6275, A250	(2) F275, 6275	(2) F265
(No.) Ckt 2	(1) A250	(1) F275	(1) F275	(1) A299	(1) F275	(1) F275	(2) F265
Capacity Control Steps	4	4	4	4	6	6	4
Ckt 1	50	40	50	43	62.5	67	50
% Cap. Ckt 2	50	60	50	57	37.5	33	50
Minimum Step Capacity (%)	25	20	33.3	29	25	22.2	25
CONDENSER FANS — Type							
Fan Speed — Rpm (r/s)	1080 (18)	1080 (18)	1080 (18)	1080 (18)	1140 (19)	1140 (19)	1140 (19)
No. Blades...Diameter — in. (mm)	4.26 (660)	4.26 (660)	4.26 (660)	Ckt 1 - 3 26 (660), Ckt 2 - 3.30 (762)	3 30 (762)	4.30 (762)	4 30 (762)
No. Fans...Total kW	4.268	6.402	6.402	6.61	6.93	6.93	8...12.4
Total Airflow — Cfm (L/s)	26,000 (12,269)	39,000 (18,404)	39,000 (18,404)	46,500 (21,943)	58,800 (27,748)	58,800 (27,748)	78,400 (36,997)
CONDENSER COILS — Type							
Tubes (Copper), OD — in. (mm)	¾ (9.5)	½ (12.7)	½ (12.7)	Plate Fins (Aluminum) ½ (12.7)	½ (12.7)	½ (12.7)	½ (12.7)
Fins/in. (Fin pitch, mm)	17.0 (1.49)	17.5 (1.45)	14.2 (1.79)	Ckt 1 - 14.2 (1.79), Ckt 2 - 15.0 (1.69)	15.5 (1.64)	13.5 (1.88)	13.5 (1.88)
No. Rows	3	2	3	Ckt 1 - 3, Ckt 2 - 4	3	4/3	3
Face Area Ckt 1	38.33 (3.56)	43.125 (4.0)	57.5 (5.34)	57.5 (5.34)	95.83 (8.9)	80.6 (7.48)	80.6 (7.48)
ft² (m²) Ckt 2	38.33 (3.56)	71.875 (6.68)	57.5 (5.34)	57.5 (5.34)	57.5 (5.34)	40.4 (3.71)	80.6 (7.48)
Max. Working Pressure, Refrigerant psig (kPa)				450 (3103)			
COOLER — No. ...Type							
Model 10HA400---	794	824	824	824	854	364	364
No. Refrigerant Circuits	2	2	2	2	2	2	2
Net Water Volume — Gal. (L)	15.4 (58.3)	17.7 (67.0)	17.7 (67.0)	17.7 (67.0)	23.6 (89.3)	21.7 (82.1)	21.7 (82.1)
(Includes nozzle)							
Max. Working Press. — psig (kPa)							
WATER CONNECTIONS							
Inlet and Outlet — in.	¾	¾	¾	¾	¾	¾	¾
Drain — in. FPT							

MODEL 30GB	100	110	125	150	175	200
APPROX OPER WT — lb (kg)	8500 (3865)	10,445 (4738)	11,050 (5013)	14,100 (6396)	14,600 (6625)	15,100 (6850)
REFRIG CHG — lb (kg)						
R-22 Ckt 1	130 (59.0)	155 (70.3)	170 (77.1)	230 (104.3)	230 (104.3)	230 (104.3)
Ckt 2	130 (59.0)	105 (47.6)	120 (54.4)	230 (104.3)	230 (104.3)	230 (104.3)
COMPRESSORS, Type...Rpm (r/s)						
06E* (No.) Ckt 1	(2) F275	(3) F265	(3) F275	(3) F275	(4) F275	(4) F275
(No.) Ckt 2	(2) F275	(2) F275	(2) F275	(3) F275	(3) F275	(4) F275
Capacity Control Steps	4	5	5	6	7	8
Ckt 1	50	56	60	50	57	50
% Cap. Ckt 2	50	44	40	50	43	50
Minimum Step Capacity (%)	25	20	20	16.7	14.3	12.5
CONDENSER FANS — Type						
Fan Speed — Rpm (r/s)	1140 (19)	1140 (19)	1140 (19)	1140 (19)	1140 (19)	1140 (19)
No. Blades...Diameter — in. (mm)	4.30 (762)	4.30 (762)	4.30 (762)	4.30 (762)	4.30 (762)	4.30 (762)
No. Fans...Total kW	8.12.4	10.15.5	10.15.5	12.18.6	12.18.6	12.18.6
Total Airflow — Cfm (L/s)	78,400 (36,997)	98,000 (46,246)	98,000 (46,246)	117,600 (55,495)	117,600 (55,495)	117,600 (55,495)
CONDENSER COILS — Type						
Tubes (Copper), OD — in. (mm)	½ (12.7)	½ (12.7)	½ (12.7)	½ (12.7)	½ (12.7)	½ (12.7)
Fins/in. (Fin pitch, mm)	13.5 (1.88)	13.5 (1.88)	13.5 (1.88)	13.5 (1.88)	13.5 (1.88)	13.5 (1.88)
No. Rows	4	3	4/3	4	4	4
Face Area Ckt 1	80.6 (7.48)	121.0 (11.24)	121.0 (11.24)	121.0 (11.24)	121.0 (11.24)	121.0 (11.24)
ft² (m²) Ckt 2	80.6 (7.48)	81.0 (7.52)	81.0 (7.52)	121.0 (11.24)	121.0 (11.24)	121.0 (11.24)
Max. Working Pressure, Refrigerant psig (kPa)				450 (3103)		
COOLER — No. ...Type						
Model 10HA400---	194	194	454	504	504	504
No. Refrigerant Circuits	2	2	2	2	2	2
Net Water Volume — Gal. (L)	40.4 (152.9)	40.4 (152.9)	52.4 (198.3)	60.2 (227.9)	60.2 (227.9)	60.2 (227.9)
(Includes nozzles)						
Max. Working Press. — psig (kPa)						
WATER CONNECTIONS						
Inlet and Outlet — in.	5	5	6	6	6	6
Drain — in. FPT	¾	¾	¾	¾	¾	¾

*A or F prefix designates no unloader
2 or 6 prefix designates one electric unloader
6E-250 compressors have 4 cylinders, all others have 6

†Copper fins also available

Physical data — 30GT

UNIT 30GT		225	250	280
APPROX OPERATING WT (lb)				
Aluminum Coils		15,340	19,290	19,590
Copper Coils		17,240	21,730	22,270
REFRIGERANT CHARGE, R-22 (lb)				
Total — Over Clear Glass	Ckt A	190-41	280-41	305-45
(see Note 1)	Ckt B	190-41	335-65	371-72
COMPRESSORS, TYPE		Reciprocating, Semi Hermetic		
Rpm		1750		
Oil Charge, pt		19		
Capacity Control Steps		8		
Percent Capacity				
	Ckt A	50	50	50
	Ckt B	50	50	50
Compressor Model Numbers According to Compressor Locations in A-B Circuits	Ckt Location	Compressor Model Numbers — 06E		
	A1	275	275	299
	A2	275	275	299
	A3	275	299	299
	A4	299	299	299
	B1	275	275	299
	B2	275	275	299
	B3	275	299	299
	B4	299	299	299
CONDENSER FANS, TYPE		Propeller, Direct Drive		
Qty — Diameter, in.		16-30	20-30	22-30
Rpm		1140		
Total kW		24.8	31.0	34.1
Blades Per Fan		4		
Total Airflow, cfm		136,000	170,000	187,000
CONDENSER COILS; TYPE, DIAM-SPACING, in.		Copper Tubes, 3/8-17 FPI		
Rows (Qty)		3,3		
Total Face Area, sq ft				
	Ckt A	168	212	232
	Ckt B	168	218.7	242.4
COOLER, QTY — TYPE		One — Direct Expansion, Shell and Tube		
Model No. 10HB400- - -		026-01	023-01	
Weight (less water), lb		1865	2800	
Refrigerant Ckts (Qty)		2		
Net Water Volume (incl. nozzles), gal		70.4	100.7	
Max. Working Pressure, psig		235 Refrigerant Side — 300 Water Side		
Relief Valve Setting, psig		235		
WATER CONNECTIONS, WORKING PRESSURE, psig		Nozzles Grooved for Victaulic Fitting, 300		
Inlet and Outlet Nominal Diameter, in.		6	8	
Drain, in.		3/4 FPT		

NOTES

- 1 Over clear glass — the amount of refrigerant added after sight glass shows clear liquid (charging while unit running)
- 2 Facing the compressor, Circuit A is right and Circuit B is left

Factory-installed options

Thermostatic expansion valves (30GB040-200) —

For those situations where energy savings of the EXV are secondary and equipment first costs are most important. With this option, the electronic expansion valve and controls and part-load energy savings related to the EXV function, are replaced by thermal expansion valves and liquid line solenoid valves. Minimum operating ambient temperature for FIOP TXV-equipped units with standard head pressure control is 32 F (0° C). Contact your Carrier representative for details on operation at temperatures below 32 F. This FIOP model has full microprocessor temperature control features and diagnostic capability.

Copper tube/copper fin condensers (040-280)

Medium temperature brine operation for 15 to 34 F leaving water temperature applications

Flotronic II control option includes standard features plus 7-day time schedule and 8-character alphanumeric diagnostic display/set point panel that displays evaporator and condensing pressures and actual temperatures. Panel has remote mounting capability. Control option also includes standard return reset and Carrier Comfort Network (CCN) compatibility.

Field-installed accessories

Demand limit control module provides 2 demand limit steps. One, between 50% and 100% of maximum compressor displacement. Two, between 0% and 49% displacement. An external switching device determines when to limit unit capacity.

Leaving chilled water temperature reset permits adjustment of LCWT based on return water, space or outdoor temperature.

Sensor kit assembly for outdoor or space temperature reset of chilled water temperature.

Ground current protection — An electronic sensor that monitors all phases of the 3-phase power supply to the compressor. At the first sign of a short to the ground, the sensor shuts down the compressor, preventing contamination of the refrigerant system. Accessory with 040-060 sizes only (standard on 070-280 sizes).

Discharge and suction pressure gage panel — For routine maintenance requiring reading of system pressures, both pressure gages are mounted on a common panel. Each gage is equipped with a shutoff valve. Each lead compressor requires a separate gage panel. Panels mount on top of the chiller control panel. Accessory with 040-070 and 225-280 sizes (standard on 075-200 sizes).

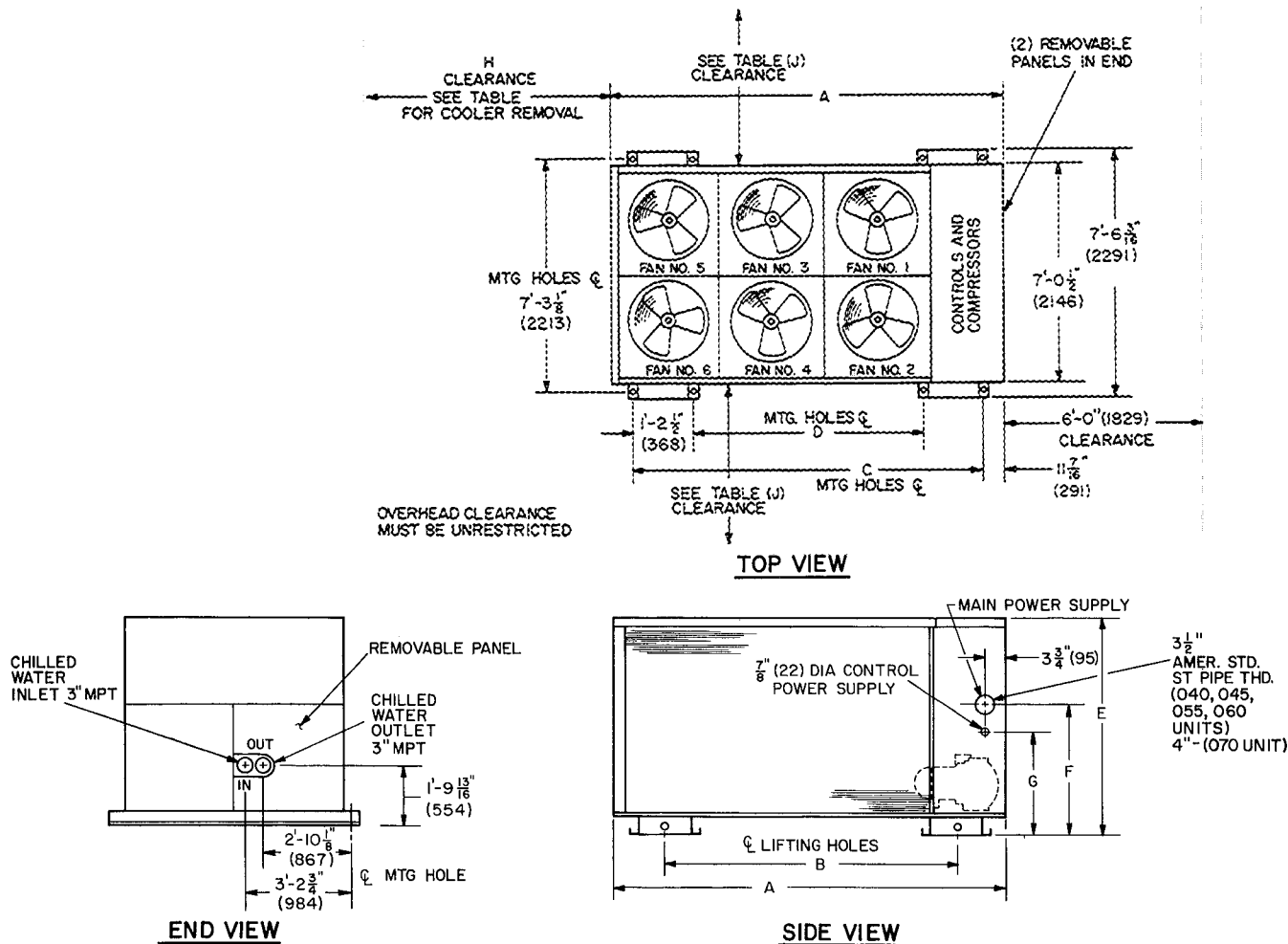
Oil pressure switch package includes 2 oil pressure switches for unit. Mounts on lead compressor in each refrigerant circuit to protect compressor from damage due to lack of proper lubrication. Accessory with 040-060 sizes (standard on 70-280 sizes).

Capacity control — Electric suction cutoff unloaders add to the central microprocessor control's capacity stages, for savings on operating costs. Applicable on all sizes up to 150.

Motormaster® head-pressure control — Motormaster accessory allows unit to operate down to -20 F (-28.8 C).

Chilled water flow switch prevents unit operation if chilled water flow is interrupted. The 040-280 sizes have flow sensing capability (standard) that shuts down operating compressors that experience loss of flow.

Base unit dimensions (30GB040-070)



Space for service and airflow

NOTE: Dimensions in () are in millimeters

DIMENSIONS $\frac{\text{ft-in.}}{(\text{mm})}$

DIM.	UNIT 30GB		
	040	045,055,060	070
A	11-10 3/8 (3616)	13-7 1/8 (4162)	
B	9-4 7/8 (2867)	11-3 (3429)	
C	10-7 3/8 (3235)	12-5 1/2 (3797)	
D	8-2 1/8 (2499)	10-0 1/2 (3061)	
E	4-8 3/8 (1427)	5-8 1/2 (1730)	7-4 1/8 (2238)
F	4-3 1/8 (1316)	5-3 1/4 (1619)	6-0 1/8 (1853)
G	3-6 1/4 (1086)	4-6 3/8 (1387)	4-11 1/4 (1505)
H	7-5 (2261)	7-6 (2286)	10-4 (3150)
J		5-0 (1524)	7-0 (2134)

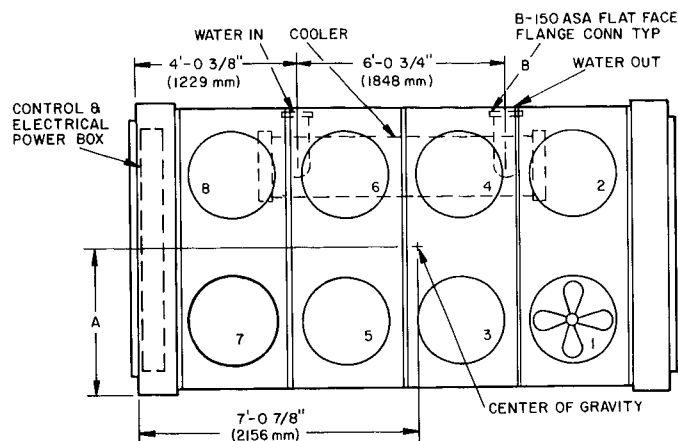
Base unit dimensions (30GB075-100)

NOTE: Unit must have clearances as follows:

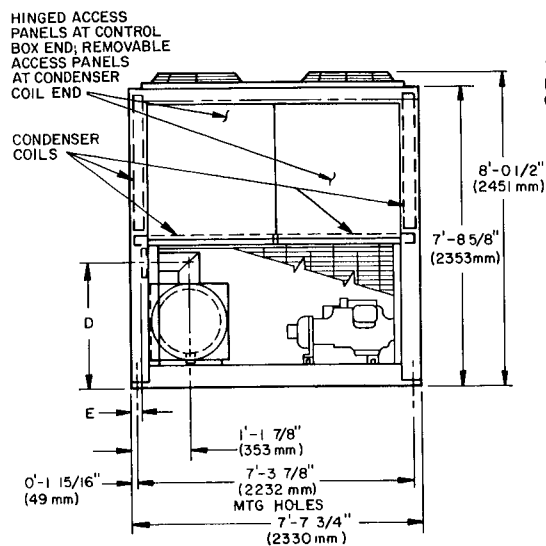
Top — Do not restrict in any way
Ends — 5'0" (1524 mm)
Sides — 6'0" (1829 mm)

DIM.	DIMENSIONS ft-in. (mm)	
	UNIT 30GB	
	075,090	100
A	3-5 ¹ / ₁₆ " (1065)	3-8 ¹ / ₁₆ " (1125)
B	0-4 (102)	0-5 (127)
C	0-6 ¹ / ₁₆ " (164)	0-6 ¹ / ₁₆ " (162)
D	2-23 ¹ / ₁₆ " (665)	2-4 ¹ / ₁₆ " (735)
E	0-1 ¹ / ₁₆ " (28)	0-1 ¹ / ₁₆ " (46)

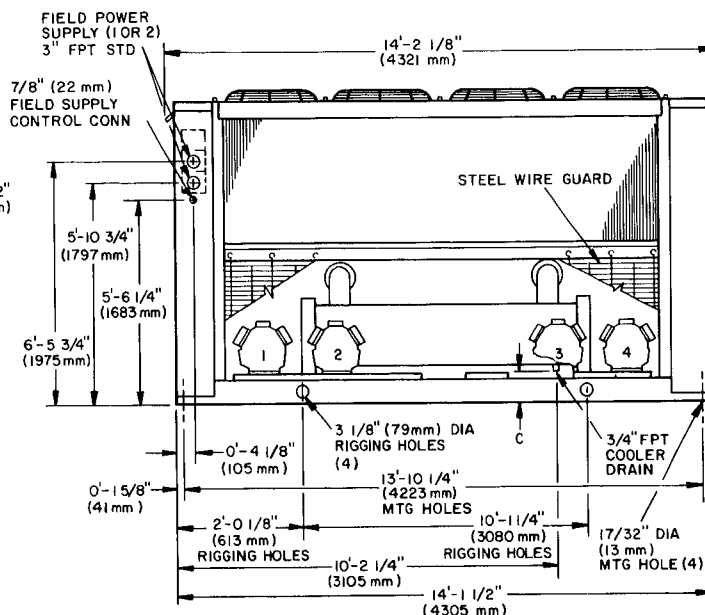
*090 only (see 075 below)



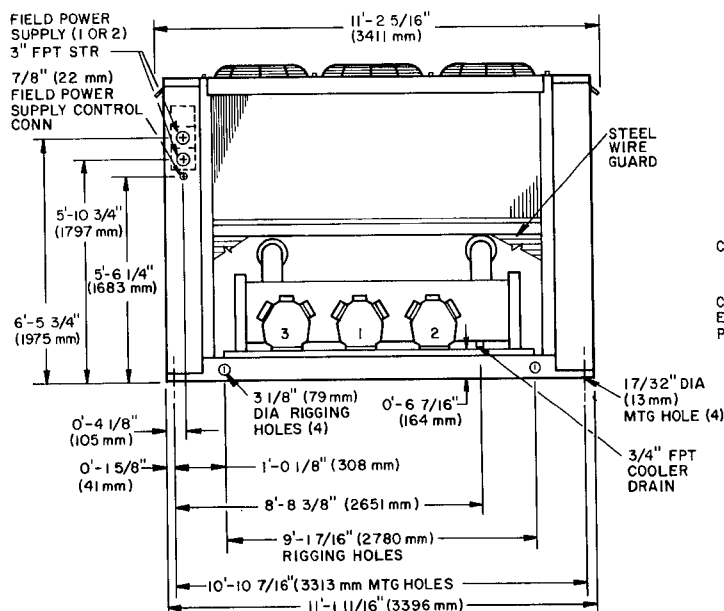
TOP VIEW (30GB090,100)



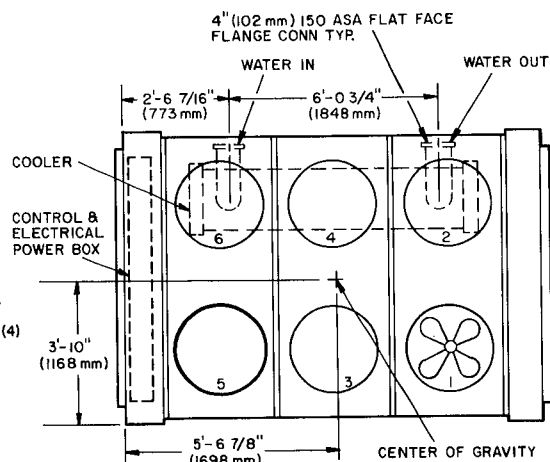
END VIEW (075,090,100)



SIDE VIEW (30GB090,100)

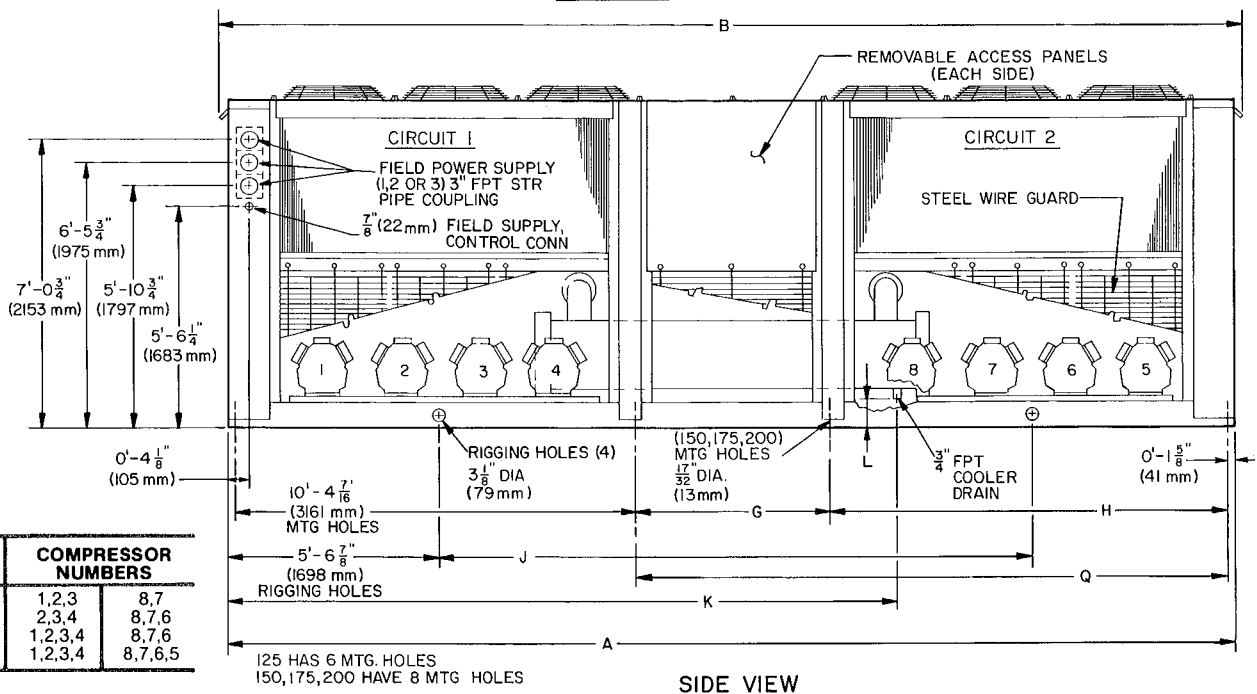
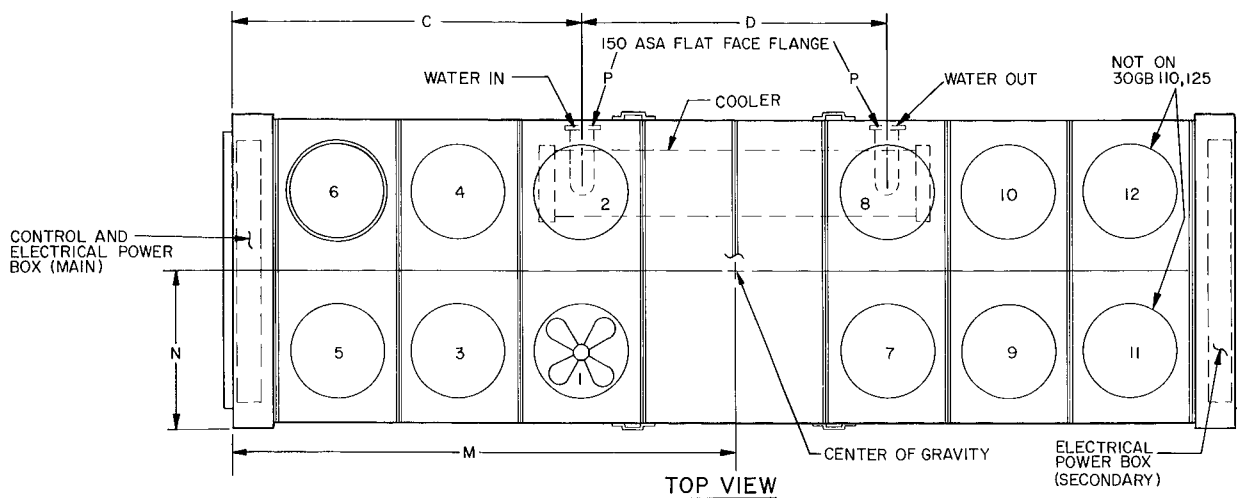


SIDE VIEW (30GB075)

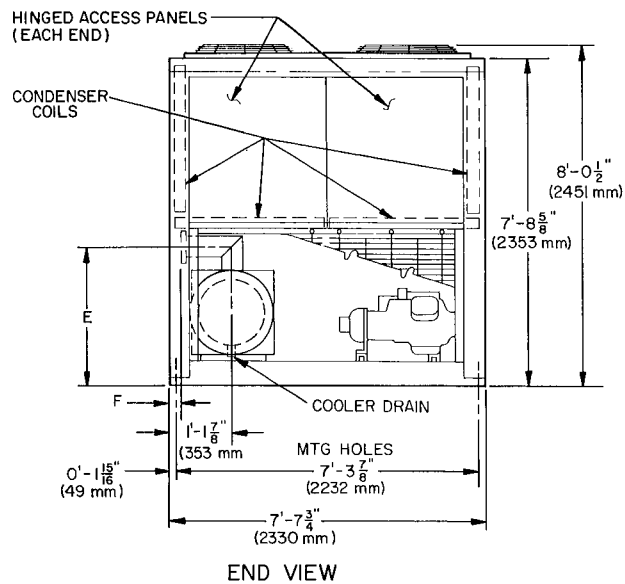


TOP VIEW (30GB075)

Base unit dimensions (30GB110-200)



30GB SIZES	COMPRESSOR NUMBERS	
110, 125	1, 2, 3	8, 7
150	2, 3, 4	8, 7, 6
175	1, 2, 3, 4	8, 7, 6
200	1, 2, 3, 4	8, 7, 6, 5



DIMENSIONS $\frac{\text{ft-in.}}{(\text{mm})}$

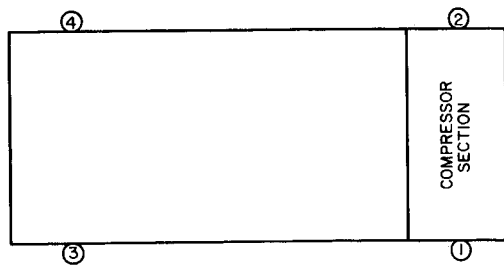
DIM.	UNIT 30GB					DIM	UNIT 30GB				
	110	125	150	175	200		110	125	150	175	200
A	21-7 $\frac{1}{16}$ (6586)		24-7 $\frac{1}{16}$ (7496)			J	12-6 (3810)		13-5 $\frac{1}{16}$ (4100)		
B	21-7 $\frac{1}{16}$ (6602)		24-7 $\frac{1}{16}$ (7512)			K	15-2 $\frac{1}{16}$ (4625)	16-5 $\frac{1}{16}$ (5005)	16-5 (5004)		
C	9-0 $\frac{1}{16}$ (2748)	8-3 $\frac{1}{16}$ (2525)	8-5 $\frac{1}{16}$ (2572)			L	0-6 $\frac{1}{16}$ (162)		0-6 $\frac{1}{16}$ (165)		
D	6-0 $\frac{1}{16}$ (1848)	8-0 $\frac{1}{16}$ (2446)	7-8 $\frac{1}{16}$ (2350)			M	10-10 $\frac{1}{16}$ (3315)	10-6 $\frac{1}{16}$ (3207)	12-3 $\frac{1}{16}$ (3748)		
E	2-4 $\frac{1}{16}$ (735)	2-4 $\frac{1}{16}$ (716)	2-8 $\frac{1}{16}$ (819)			N	3-8 $\frac{1}{16}$ (1137)	3-6 $\frac{1}{16}$ (1086)	3-9 $\frac{1}{16}$ (1165)		
F	0-1 $\frac{1}{16}$ (46)	0-2 $\frac{1}{16}$ (65)	0-2 $\frac{1}{16}$ (64)			P	0-5 (127)	0-6 (152)	0-6 (152)		
G	—		3-7 (1092)			Q	10-11 $\frac{1}{16}$ (3343)		—		
H	—		10-4 $\frac{1}{16}$ (3161)								

NOTE: Unit must have clearances as follows:
 Top — Do not restrict in any way.
 Ends — 5'0" (1524 mm)
 Sides — 6'0" (1829 mm)

Base unit dimensions (cont)

30GB Mounting Weights (Approximate)

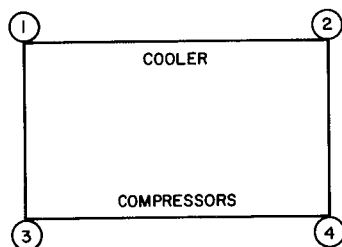
30GB040-070 WEIGHT DISTRIBUTION



WEIGHTS — lb (kg)

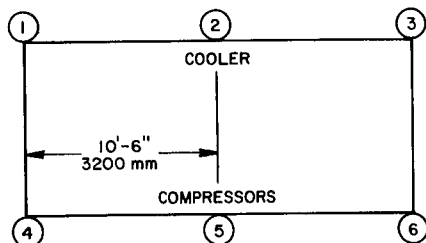
SUPPORT POINTS	UNIT 30GB				
	040	045	055	060	070
1	1255 (569)	1385 (628)	1528 (693)	1578 (716)	1974 (895)
2	1255 (569)	1385 (628)	1528 (693)	1528 (693)	1974 (895)
3	635 (288)	740 (336)	872 (396)	922 (418)	1126 (511)
4	635 (288)	740 (336)	872 (396)	872 (396)	1126 (511)

30GB075-100 WEIGHT DISTRIBUTION



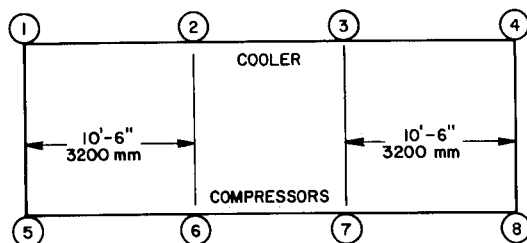
SUPPORT POINTS	UNIT 30GB		
	075	090	100
1	1840 (835)	1790 (814)	2088 (949)
2	1750 (794)	1790 (814)	2088 (949)
3	1700 (771)	1970 (895)	2172 (987)
4	1610 (730)	1970 (895)	2172 (987)

30GB110,125 WEIGHT DISTRIBUTION



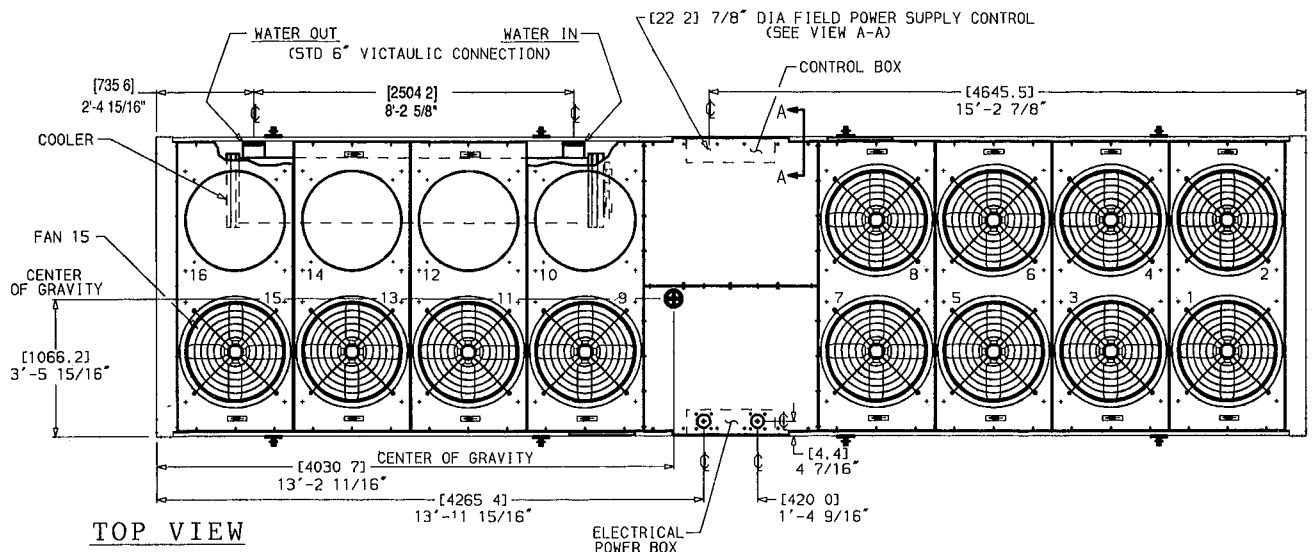
SUPPORT POINTS	UNIT 30GB	
	110	125
1	1172 (533)	1430 (650)
2	2450 (1114)	2713 (1233)
3	1297 (590)	1394 (634)
4	1658 (754)	1697 (771)
5	2236 (1016)	2404 (1093)
6	1532 (696)	1412 (642)

30GB150-200 WEIGHT DISTRIBUTION



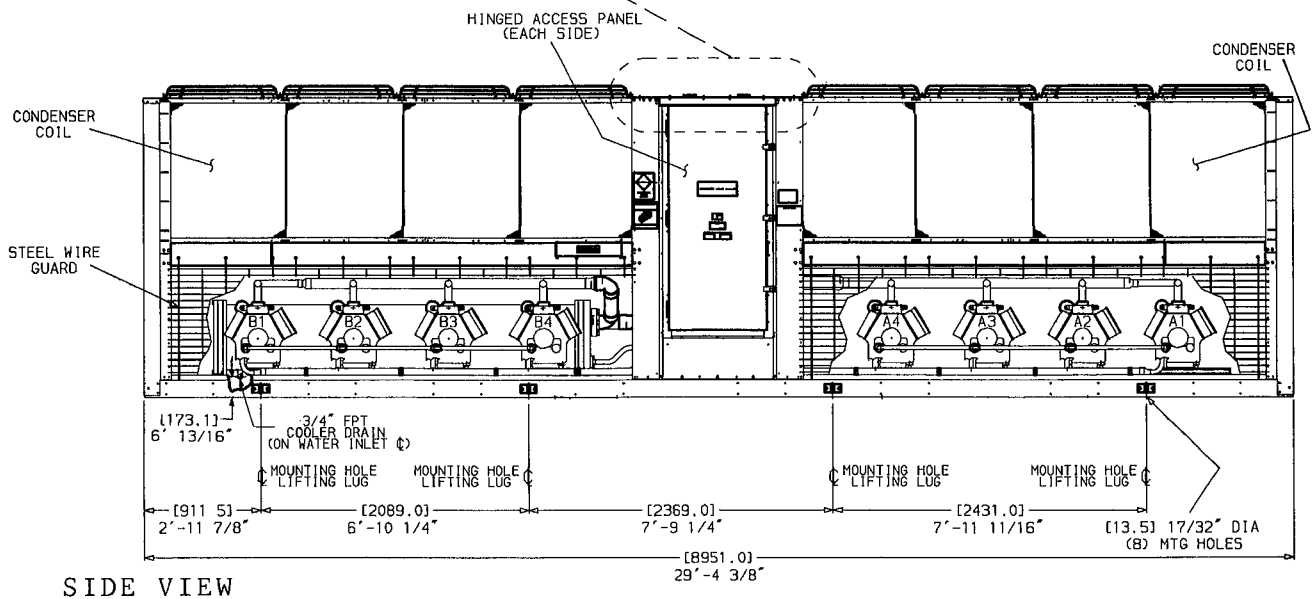
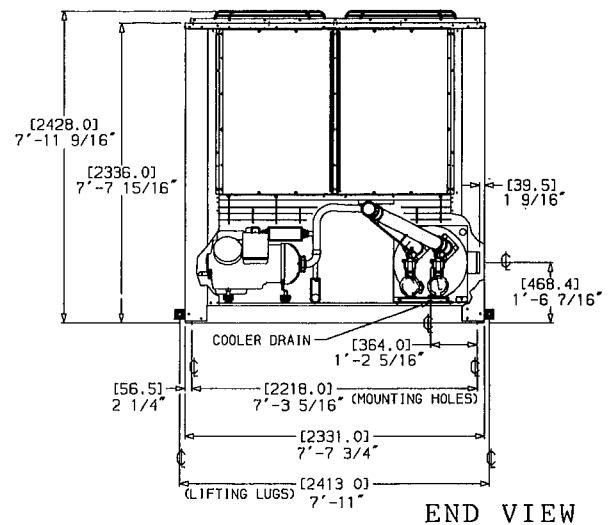
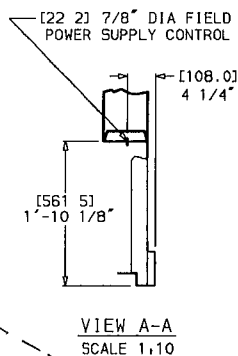
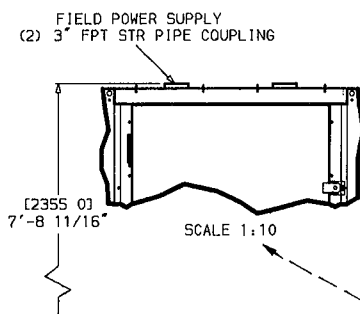
SUPPORT POINTS	UNIT 30GB		
	150	175	200
1	1261 (573)	1350 (614)	1350 (614)
2	2230 (1014)	2250 (1023)	2250 (1023)
3	2230 (1014)	2230 (1014)	2250 (1023)
4	1261 (573)	1261 (573)	1350 (614)
5	1353 (615)	1675 (761)	1675 (761)
6	2200 (1000)	2275 (1034)	2275 (1034)
7	2200 (1000)	2200 (1000)	2275 (1034)
8	1353 (615)	1353 (615)	1675 (761)

→ Base unit dimensions (30GT225)

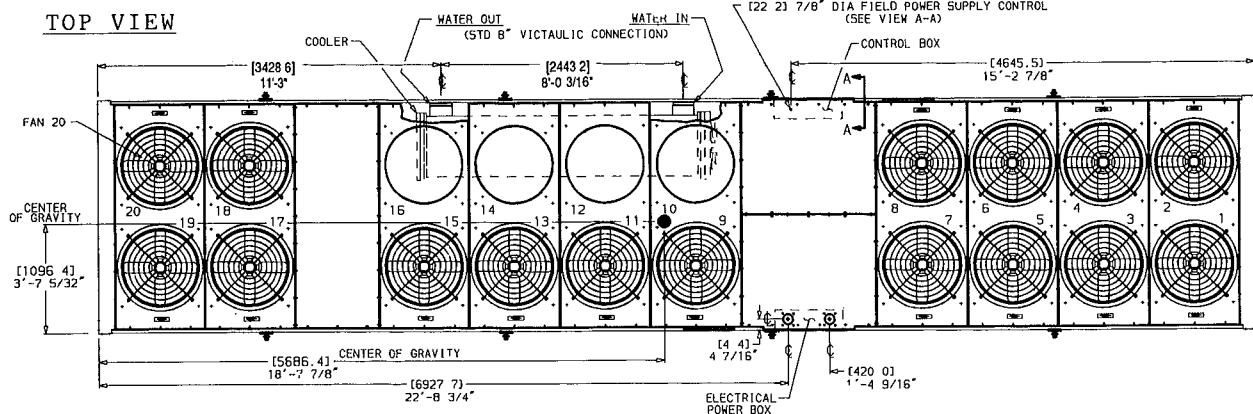


NOTES:

- 1 Dimensions in [] are in millimeters
- 2 Approximate operating weight of the unit is:
 30GT225 — 15,340 lbs [6958 kg]
 30GT225C — 17,240 lbs [7820 kg]
- 3 Units must have clearances for airflow as follows:
 Top — Do not restrict in any way
 Ends — [1524 mm] 5 feet
 Sides — [1829 mm] 6 feet

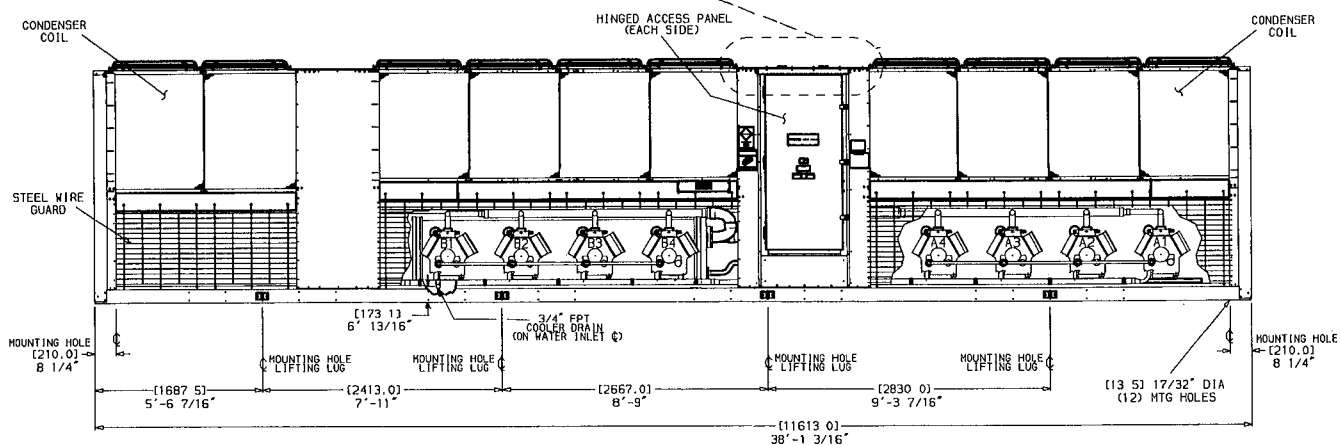
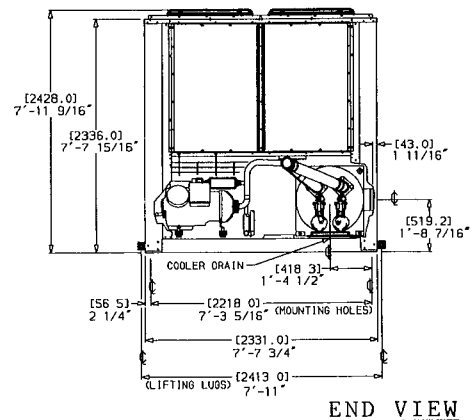
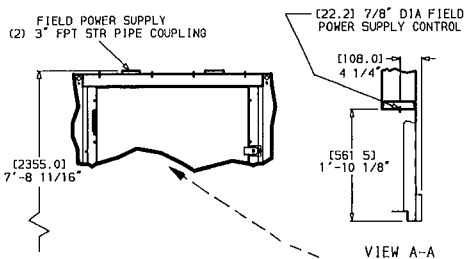


→ Base unit dimensions (30GT250)

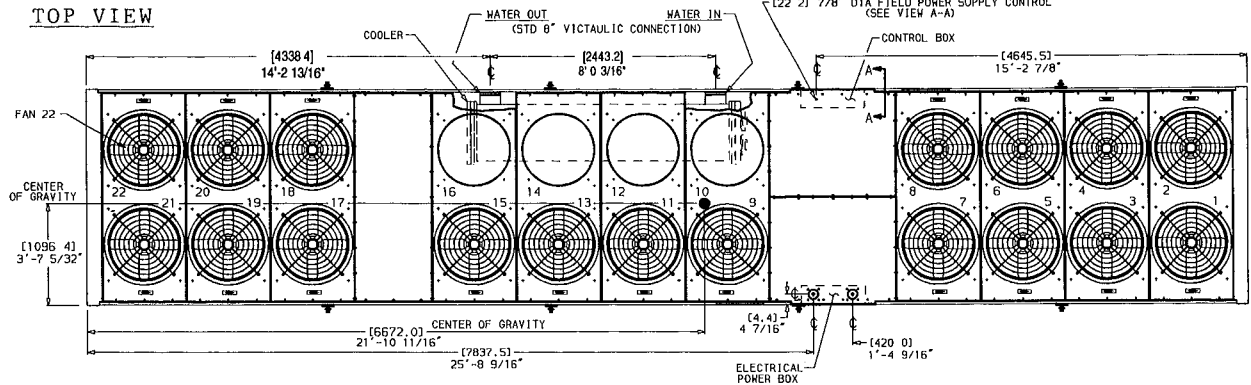


NOTES:

- 1 Dimensions in [] are in millimeters
- 2 Approximate operating weight of the unit is:
30GT250 — 19,290 lbs [8750 kg]
30GT250C — 21,730 lbs [9857 kg]
- 3 Units must have clearances for airflow as follows:
Top — Do not restrict in any way
Ends — [1524 mm] 5 feet
Sides — [1829 mm] 6 feet

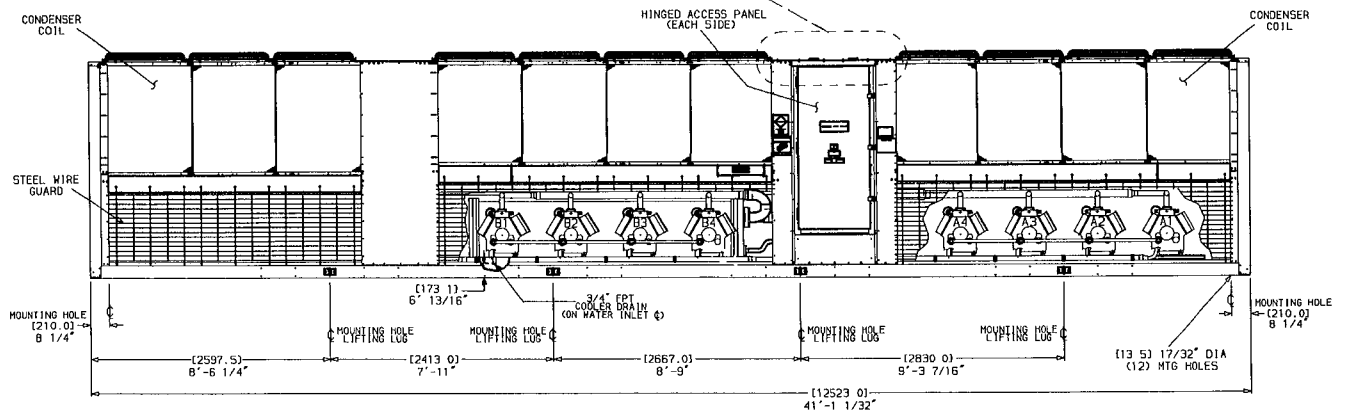
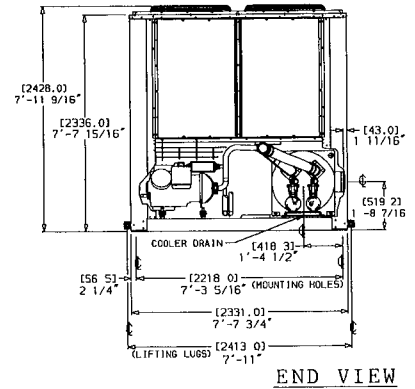
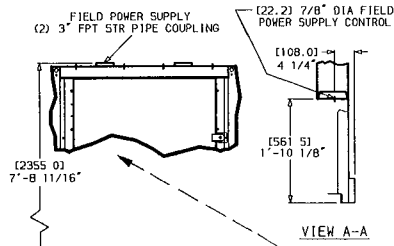


→ Base unit dimensions (30GT280)



NOTES:

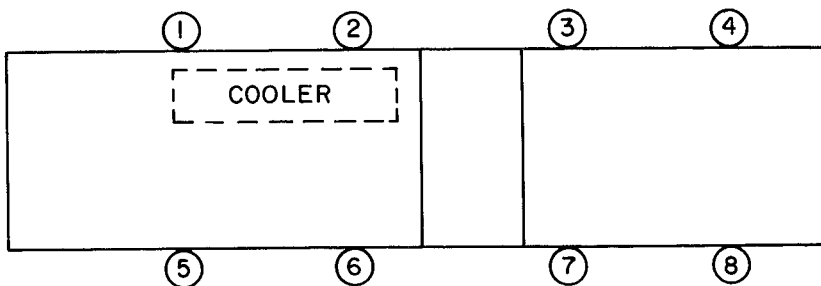
- Dimensions in [] are in millimeters
- Approximate operating weight of the unit is:
 30GT280 — 19,590 lbs [8886 kg]
 30GT280C — 22,270 lbs [10,102 kg]
- Units must have clearances for airflow as follows:
 Top — Do not restrict in any way
 Ends — [1524 mm] 5 feet
 Sides — [1829 mm] 6 feet



Base unit dimensions (cont)

30GT Mounting Weights (Approximate)

30GT225 WEIGHT DISTRIBUTION

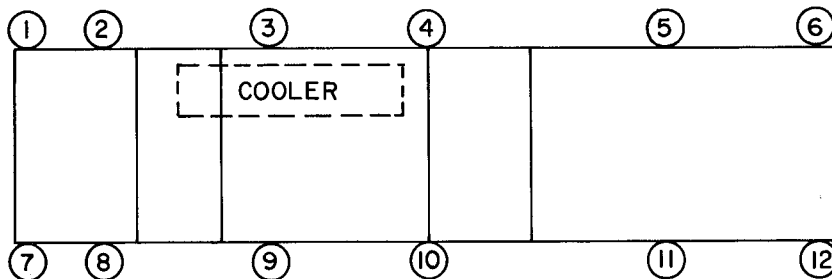


WEIGHTS—lb (kg)

SUPPORT POINTS	UNIT 30GT	
	225	225C
1	2400 (1089)	2650 (1202)
2	2400 (1089)	2650 (1202)
3	1400 (635)	1570 (712)
4	1400 (635)	1570 (712)
5	2350 (1066)	2650 (1200)
6	2350 (1066)	2650 (1200)
7	1520 (689)	1750 (793)
8	1520 (689)	1750 (793)

C - Copper

30GT250, 280 WEIGHT DISTRIBUTION



SUPPORT POINTS	UNIT 30GT	
	250	250C
1	500 (227)	560 (254)
2	1250 (565)	1400 (635)
3	3450 (1565)	3900 (1769)
4	2500 (1134)	2800 (1270)
5	1200 (545)	1350 (612)
6	600 (272)	680 (308)
7	500 (225)	560 (254)
8	750 (340)	850 (386)
9	3040 (1378)	3450 (1565)
10	2050 (930)	2300 (1043)
11	2600 (1179)	2930 (1329)
12	850 (386)	950 (431)

C - Copper

SUPPORT POINTS	UNIT 30GT	
	280	280C
1	550 (249)	625 (284)
2	1400 (635)	1600 (727)
3	3550 (1610)	4050 (1837)
4	2450 (1111)	2800 (1270)
5	1150 (522)	1300 (590)
6	550 (249)	625 (284)
7	590 (268)	675 (306)
8	900 (408)	1020 (463)
9	3100 (1406)	3500 (1588)
10	2000 (907)	2275 (1032)
11	2500 (1134)	2850 (1293)
12	850 (386)	950 (431)

C - Copper

Selection procedure — English (with 30GB example)

I Determine unit size and operating conditions required to provide specified capacity at given conditions:

Capacity required 175 tons
Leaving chilled water temperature (LCWT) 45 F
Cooler water temperature rise 14 F
Condenser entering air temperature (CEAT) 95 F
Loop volume 595 gallons

Ratings are based on 10 F rise and are suitable for rise from 5 F to 15 F without adjustment. In this case, however, greater accuracy is desired.

II Correct LCWT for 14 F cooler water temperature rise.

Enter correction curve at 14 F and read a correction of 0.3 F. Corrected LCWT is, therefore, 45 + 0.3 = 45.3 F.

III Determine capacity, unit size and power input.

Enter rating table at given CEAT and LCWT — respectively 95 F and 45 F.

Read down capacity column until the capacity nearest to but higher than specified required capacity is reached. In this case, 183.1 tons is delivered by a

30GB175. Interpolate between 45 F and 46 F to find determined capacity and power input at corrected LCWT (45.3 F). Values are:

Capacity 184.1 tons
Power input 213.2 kW

IV Calculate corrected cooler water flow.

$$\text{Water flow} = \frac{24 \times \text{corr cap. in tons}}{\text{temperature rise F}} = \text{U.S. gpm}$$
$$= \frac{24 \times 184.1}{14} = 315.6 \text{ U.S. gpm}$$

V Calculate the cooler pressure drop.

Enter cooler pressure drop curve at the corrected flow rate (315.6 U.S. gpm) and read, for the 30GB175, a pressure drop of 5.9 ft of water.

VI Check loop volume and cooler water flow rate.

Minimum loop volume, from applicable data, is 532 gallons for 30GB175. Therefore, given volume of 595 gallons is satisfactory. Minimum water flow rate, from application data, is 192 gpm for 30GB175. Flow rate of 315.6 gpm is well above minimum required.

Selection procedure — SI (with 30GB example)

I Determine unit size and operating conditions required to provide specified capacity at given conditions:

Capacity required 600 kW
Leaving chilled water temperature (LCWT) 6 C
Cooler water temperature rise 7.8 C
Condenser entering air temperature (CEAT) 35 C
Loop volume 2250 L

Ratings are based on 6 C rise and are suitable for rise from 2.8 C to 8.3 C without adjustment. In this case, however, greater accuracy is desired.

II Correct LCWT for 7.8 C cooler water temperature rise.

Enter correction curve at 7.8 C and read a correction of 0.17 C. Corrected LCWT is, therefore, 6 + 0.17 = 6.2 C.

III Determine capacity, unit size and power input.

Enter rating table at given CEAT and LCWT — respectively 35 C and 6 C. Read down the capacity column until the capacity nearest to but higher than the specified required capacity is reached. In this case, 618.1 kW is delivered by a 30GB175. Interpolate

between 6 C and 7 C to find the determined capacity and power input at corrected LCWT (6.2 C). Values are:

Capacity 622.5 kW
Power input 208.3 kW

IV Calculate corrected cooler water flow.

$$\text{Water flow} = \frac{0.239 \times \text{corr cap. in kW}}{\text{temperature rise C}} = \text{L/s}$$
$$= \frac{0.239 \times 622.5}{7.8} = 19.1 \text{ L/s}$$

V Calculate cooler pressure drop.

Enter cooler pressure drop curve at corrected flow rate (19.1 L/s) and read, for 30GB175, a pressure drop of 16.8 kPa.

VI Check loop volume and cooler water flow rate.

Minimum loop volume, from application data, is 2013 L for 30GB175. Therefore, given volume of 2250 L is satisfactory. Minimum water flow rate, from application data, is 12.1 L/s for 30GB175. Flow rate of 19.1 L/s is well above minimum required.

Performance data — English

30GB,GT

STANDARD RATINGS*—REFRIGERANT 22

UNIT 30GB	CAPACITY		COMPRESSOR POWER INPUT (kW)	FAN POWER (kW)	COOLER WATER PRESSURE DROP (ft water)	ENERGY EFFICIENCY RATIO (EER)
	(tons)	(Btuh)				
040	36.8	441,600	39.4	2.68	10.8	10.5
045	45.8	549,600	49.7	4.02	9.5	10.2
055	53.2	637,200	60.0	4.02	12.6	10.0
060	59.7	716,400	70.1	6.10	13.7	9.4
070	69.6	835,200	78.1	9.30	14.0	9.6
075	77.7	932,400	89.2	9.30	10.7	9.5
090	92.5	1,110,000	105.5	12.4	15.0	9.4
100	102.3	1,227,600	117.1	12.4	9.8	9.5
110	114.7	1,376,400	135.8	15.5	12.2	9.1
125	131.2	1,574,400	150.3	15.5	8.8	9.5
150	160.5	1,927,200	180.7	18.6	8.4	9.7
175	179.6	2,155,200	210.1	18.6	10.4	9.4
200	199.6	2,395,200	239.2	18.6	12.8	9.3
30GT						
225	226.5	2,718,000	266.4	24.8	18.3	9.3
250	247.3	2,967,600	284.8	31.0	13.7	9.4
280	277.7	3,332,400	324.6	34.0	17.3	9.3

* Per ARI Standard 590

NOTE: 95F condenser entering air temperature; 54 F entering/44 F leaving cooler water; 0.00025 ft² • hr • °F/Btu cooler fouling allowance

EER = $\frac{\text{Capacity (Btuh)}}{\text{Input Power (W)}}$



040-070
225-280

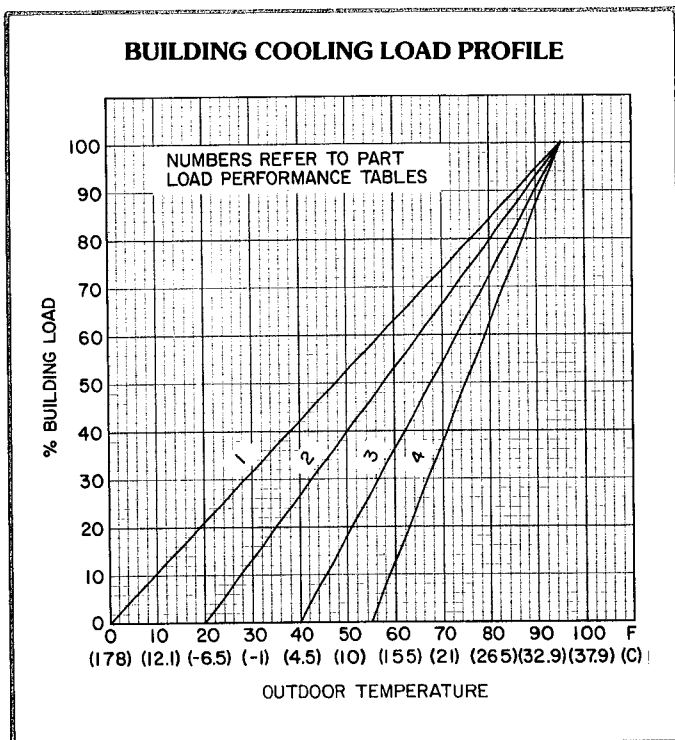


075-200



040-280

PART-LOAD EFFICIENCY (EXV UNITS ONLY)



MINIMUM CAPACITY STEP (%)

MODEL 30GB	STANDARD UNIT*	STANDARD UNIT WITH ACCESSORY UNLOADER†
040	25	25
045	20	20
055	33	33
060	29	29
070	25	25
075	22	22
090	25	17
100	25	17
110	20	13
125	20	13
150	17	11
175	14	†
200	13	†
30GT		
225	12	†
250	11	†
280	13	†

* Includes factory-furnished unloader where applicable

† With field-installed accessory unloader (*italics*: step value unchanged)

‡ Unloaders not available for 30GB175 and 200 units, or for 30GT225-280 without Flotronic II controls

NOTE: See Table of Capacity Control Steps For capacity control steps for 30GT225-280 Flotronic II with accessory unloaders, see Controls and Troubleshooting book for Flotronic II

PART LOAD RATINGS

1 ZERO LOAD AT 0° F (-17.8 C) OUTDOOR TEMPERATURE

% SYSTEM FULL LOAD	OUTSIDE AMBIENT TEMP		UNIT EER															
			UNIT 30GB													UNIT 30GT		
	F	(C)	040	045	055	060	070	075	090	100	110	125	150	175	200	225	250	280
100	95.0	35.0	10.5	10.2	10.0	9.4	9.6	9.5	9.4	9.5	9.1	9.5	9.7	9.4	9.3	9.3	9.4	9.3
90	85.5	29.8	11.2	11.3	11.4	10.8	11.1	12.1	12.0	12.1	11.6	12.1	12.3	12.0	11.8	11.8	11.9	11.8
80	76.0	24.3	12.8	12.3	12.4	12.0	12.5	14.6	14.5	14.6	14.0	14.6	14.9	14.5	14.3	14.3	14.5	14.3
70	66.5	19.0	13.6	13.3	13.4	13.3	13.9	17.1	17.1	17.2	16.5	17.2	17.5	17.0	16.7	16.7	16.9	16.7
60	57.0	13.9	15.6	14.4	14.6	14.5	15.7	19.7	19.6	19.7	18.9	19.7	20.1	19.5	19.2	19.2	19.4	19.2
50	47.5	8.5	20.4	17.0	17.2	17.3	18.0	22.2	22.1	22.2	21.3	22.3	22.6	22.1	21.7	21.7	21.9	21.7
40	38.0	3.1	22.7	20.5	20.8	22.1	19.6	24.7	24.6	24.8	23.8	24.8	25.2	24.6	24.2	24.2	24.5	24.2
30	28.5	-2.0	25.6	22.8	23.0	26.8	21.3	26.9	26.8	27.0	25.9	27.0	27.5	26.8	26.3	26.3	26.6	26.3

2 ZERO LOAD AT 20 F (-6.5 C) OUTDOOR TEMPERATURE

% SYSTEM FULL LOAD	OUTSIDE AMBIENT TEMP		UNIT EER															
			UNIT 30GB													UNIT 30GT		
	F	(C)	040	045	055	060	070	075	090	100	110	125	150	175	200	225	250	280
100	95.0	35.0	10.5	10.2	10.0	9.4	9.6	9.5	9.4	9.5	9.1	9.5	9.7	9.4	9.3	9.3	9.4	9.3
90	87.5	30.9	10.9	10.9	11.1	10.2	10.8	11.5	11.5	11.5	11.1	11.6	11.8	11.5	11.3	11.3	11.4	11.3
80	80.0	26.5	12.1	11.6	11.8	10.7	11.9	13.5	13.5	13.6	13.0	13.6	13.8	13.0	13.2	13.2	13.3	13.2
70	72.5	22.3	12.7	12.3	12.6	11.3	12.9	15.5	15.5	15.6	14.9	15.6	15.8	15.4	15.2	15.2	15.4	15.2
60	65.0	18.2	13.9	13.3	13.3	11.8	14.2	17.5	17.5	17.6	16.8	17.6	17.9	17.4	17.1	17.1	17.3	17.1
50	57.5	14.0	16.4	14.9	15.6	12.9	15.8	19.5	19.4	19.6	18.8	19.6	19.9	19.4	19.1	19.1	19.3	19.1
40	50.0	10.0	20.0	16.6	18.0	15.0	17.2	21.5	21.4	21.6	20.7	21.6	22.0	21.4	21.0	21.0	21.2	21.0
30	42.5	5.9	21.9	18.2	19.7	17.3	18.6	23.5	23.4	23.6	22.6	23.6	24.0	23.4	23.0	23.0	23.2	23.0

3 ZERO LOAD AT 40 F (4.4 C) OUTDOOR TEMPERATURE

% SYSTEM FULL LOAD	OUTSIDE AMBIENT TEMP		UNIT EER															
			UNIT 30GB													UNIT 30GT		
	F	(C)	040	045	055	060	070	075	090	100	110	125	150	175	200	225	250	280
100	95.0	35.0	10.5	10.2	10.0	9.4	9.6	9.5	9.4	9.5	9.1	9.5	9.7	9.4	9.3	9.3	9.4	9.3
90	89.5	31.9	10.6	10.6	10.9	10.5	10.5	11.0	11.0	11.0	10.6	11.0	11.2	10.9	10.8	10.8	10.9	10.8
80	84.0	28.9	11.2	11.2	11.3	11.3	11.3	12.5	12.4	12.5	12.0	12.5	12.7	12.4	12.2	12.2	12.3	12.2
70	78.5	25.8	12.0	11.5	11.7	12.3	12.1	14.0	13.9	14.0	13.4	14.0	14.2	13.9	13.6	13.6	13.7	13.6
60	73.0	22.8	12.6	12.2	12.1	13.1	12.8	15.4	15.9	15.5	14.8	15.5	15.8	15.4	15.1	15.1	15.3	15.1
50	67.5	19.7	14.3	13.0	13.4	14.5	13.7	16.9	16.9	17.0	16.3	17.0	17.3	16.8	16.5	16.5	16.7	16.5
40	62.0	16.7	16.4	14.1	15.3	17.7	14.9	18.4	18.3	18.4	17.7	18.5	18.8	18.3	18.0	18.0	18.2	18.0
30	56.5	13.6	18.1	15.3	16.6	20.8	16.0	19.9	19.8	19.9	19.1	20.0	20.3	19.8	19.4	19.4	19.6	19.4

4 ZERO LOAD AT 55 F (12.5 C) OUTDOOR TEMPERATURE

% SYSTEM FULL LOAD	OUTSIDE AMBIENT TEMP		UNIT EER															
			UNIT 30GB													UNIT 30GT		
	F	(C)	040	045	055	060	070	075	090	100	110	125	150	175	200	225	250	280
100	95.0	35.0	10.5	10.2	10.0	9.4	9.6	9.5	9.4	9.5	9.1	9.5	9.7	9.4	9.3	9.3	9.4	9.3
90	91.0	32.8	10.6	10.4	10.5	10.0	10.3	10.6	10.5	10.6	10.2	10.6	10.8	10.5	10.3	10.3	10.4	10.3
80	87.0	30.6	11.0	10.7	10.9	10.4	10.9	11.7	11.6	11.7	11.2	11.7	11.9	11.6	11.4	11.4	11.5	11.4
70	83.0	28.3	11.4	10.8	11.1	10.8	11.4	12.7	12.7	12.8	12.2	12.8	13.0	12.6	12.4	12.4	12.5	12.4
60	79.0	26.1	11.8	11.1	11.3	11.1	11.8	13.8	13.7	13.8	13.3	13.8	14.1	13.7	13.5	13.5	13.6	13.5
50	75.0	23.9	13.1	11.5	11.8	11.4	12.4	14.9	14.8	14.9	14.3	14.9	15.2	14.8	14.5	14.5	14.7	14.5
40	71.0	21.7	13.9	12.1	13.0	13.0	13.1	15.9	15.9	15.0	15.3	16.0	16.2	15.8	15.6	15.6	15.8	15.6
30	67.0	19.3	15.1	13.0	14.5	14.7	13.9	17.0	16.9	17.0	16.3	17.0	17.3	16.9	16.6	16.6	16.8	16.6

NOTES:

- Above efficiency ratings obtained at 54/44 F (12.2/6.7 C) cooler water; full load at 95 F (35 C)
- The longer the time operating at low temperatures, the greater the difference in operating costs favoring a Flotronic chiller over a standard TXV unit
- Contact your local Carrier representative for a computer analysis of operating costs

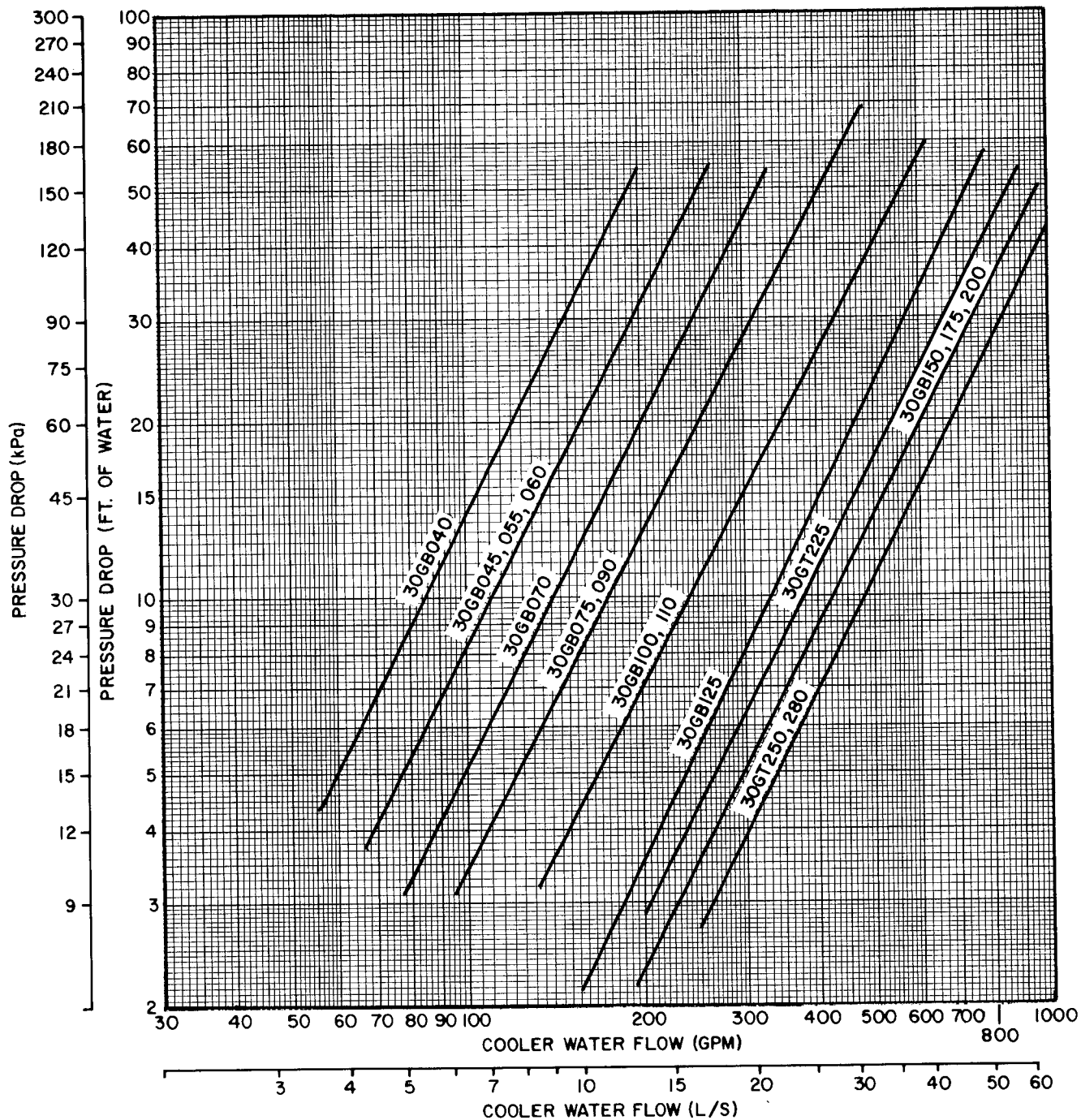
$$\text{EER} = \text{Energy Efficiency Ratio} = \frac{\text{Capacity (Btuh)}}{\text{Input Power (W)}}$$

- Chart no. 4 above indicates the ARI Standard 590 part-load profile

Performance data — English and SI

30GB,GT

TOTAL COOLER PRESSURE DROP (Water Side)



Performance data — English

30GB040-090

COOLING CAPACITIES — ENGLISH

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (F)											
		85				90				95			
		Cap.	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
40	040	36.3	35.6	86.7	10.5	35.1	36.7	83.8	9.8	33.8	37.7	80.8	9.2
	045	45.1	44.9	107.8	9.2	43.6	46.3	104.3	8.6	42.2	47.5	100.8	8.1
	055	52.2	54.5	124.8	12.2	50.7	56.0	121.1	11.5	49.0	57.4	117.3	10.8
	060	58.5	63.7	139.9	12.4	56.7	65.4	135.6	11.7	55.0	67.0	131.5	11.0
	070	68.4	70.8	163.5	13.5	66.2	72.8	158.4	12.7	64.1	74.6	153.2	11.9
	075	76.2	81.0	182.2	10.3	74.0	83.2	176.8	9.7	71.7	85.2	171.3	9.1
	090	90.9	95.3	217.3	14.4	88.2	98.1	210.8	13.6	85.4	100.7	204.1	12.8
42	040	37.8	36.4	90.5	11.4	36.6	37.5	87.5	10.7	35.3	38.6	84.4	10.0
	045	47.0	45.9	112.4	10.0	45.5	47.3	108.8	9.4	44.0	48.6	105.2	8.8
	055	54.4	55.7	130.0	13.2	52.8	57.3	126.2	12.4	51.1	58.7	122.2	11.7
	060	60.9	65.1	145.7	13.4	59.1	66.9	141.4	12.6	57.3	68.6	137.1	11.9
	070	71.2	72.3	170.4	14.6	69.0	74.4	165.1	13.8	66.8	76.4	159.8	12.9
	075	79.3	82.8	189.8	11.1	77.0	85.1	184.2	10.5	74.7	87.2	178.6	9.9
	090	94.6	97.5	226.3	15.6	91.7	100.3	219.5	14.7	88.9	103.1	212.8	13.9
44	040	39.4	37.1	94.2	12.3	38.1	38.3	91.2	11.6	36.8	39.5	88.1	10.8
	045	48.9	46.9	117.1	10.8	47.4	48.3	113.4	10.1	45.8	49.7	109.7	9.5
	055	56.5	56.9	135.3	14.2	54.9	58.5	131.4	13.4	53.2	60.1	127.3	12.7
	060	63.4	66.5	151.7	14.5	61.5	68.4	147.2	13.7	59.7	70.1	142.9	12.9
	070	74.1	73.9	177.5	15.8	71.9	76.0	172.0	14.9	69.6	78.1	166.6	14.0
	075	82.5	84.6	197.4	12.0	80.1	87.0	191.7	11.3	77.7	89.2	186.0	10.7
	090	98.3	99.6	235.4	16.8	95.4	102.6	228.4	15.9	92.5	105.5	221.5	15.0
45	040	40.2	37.5	96.2	12.8	38.9	38.8	93.1	12.0	37.6	39.9	89.9	11.2
	045	49.9	47.4	119.5	11.2	48.3	48.8	115.8	10.5	46.8	50.2	112.0	9.9
	055	57.7	57.6	138.2	14.8	56.0	59.2	134.0	14.0	54.3	60.8	129.9	13.2
	060	64.6	67.2	154.7	15.0	62.7	69.1	150.2	14.2	60.9	70.9	145.8	13.4
	070	75.6	74.6	181.1	16.4	73.3	76.8	175.6	15.5	71.0	78.9	170.1	14.6
	075	84.1	85.5	201.3	12.5	81.7	87.9	195.6	11.8	79.2	90.2	189.7	11.1
	090	100.2	100.7	240.0	17.5	97.3	103.8	233.0	16.5	94.4	106.7	225.9	15.5
46	040	41.0	37.9	98.2	13.3	39.7	39.2	95.0	12.5	38.3	40.3	91.8	11.7
	045	50.9	47.9	121.9	11.6	49.3	49.4	118.1	11.0	47.7	50.8	114.4	10.3
	055	58.7	58.1	140.7	15.3	57.1	59.9	136.7	14.5	55.3	61.4	132.5	13.7
	060	65.9	67.9	157.8	15.6	64.0	69.9	153.2	14.7	62.1	71.7	148.7	13.9
	070	77.1	75.4	184.7	17.1	74.8	77.7	179.1	16.1	72.5	79.8	173.6	15.2
	075	85.7	86.4	205.2	12.9	83.3	88.9	199.4	12.2	80.8	91.2	193.5	11.5
	090	102.1	101.8	244.7	18.1	99.2	104.9	237.6	17.1	96.2	107.9	230.4	16.1
48	040	42.6	38.7	102.1	14.3	41.3	40.0	98.9	13.5	39.9	41.2	95.6	12.6
	045	52.9	48.9	126.8	12.6	51.3	50.4	123.0	11.8	49.7	51.9	119.1	11.1
	055	61.0	59.4	146.3	16.5	59.3	61.1	142.1	15.6	57.5	62.8	137.9	14.7
	060	68.4	69.4	164.0	16.8	66.5	71.4	159.4	15.9	64.6	73.3	154.8	15.0
	070	80.0	77.0	191.8	18.4	77.7	79.3	186.3	17.4	75.4	81.6	180.7	16.4
	075	89.0	88.2	213.3	13.9	86.5	90.8	207.3	13.2	84.0	93.3	201.3	12.4
	090	106.0	104.0	254.1	19.5	103.0	107.3	246.9	18.4	100.0	110.4	239.6	17.4
50	040	44.3	39.5	106.1	15.4	42.9	40.8	102.9	14.5	41.5	42.1	99.5	13.7
	045	55.0	49.9	131.8	13.5	53.3	51.5	127.9	12.8	51.7	53.0	123.9	12.0
	055	63.3	60.6	151.8	17.7	61.6	62.5	147.6	16.8	59.7	64.2	143.2	15.9
	060	71.1	70.8	170.4	18.1	69.1	72.9	165.7	17.1	67.1	74.9	161.0	16.2
	070	83.1	78.5	199.3	19.8	80.8	81.0	193.6	18.7	78.4	83.3	187.9	17.6
	075	92.3	90.1	221.4	15.0	89.8	92.8	215.3	14.2	87.2	95.4	209.1	13.4
	090	110.0	106.3	263.8	20.9	106.9	109.6	256.4	19.8	103.8	112.8	248.9	18.7
55	040	48.5	41.5	116.5	18.4	47.1	43.0	113.1	17.4	45.7	44.4	109.6	16.4
	045	60.3	52.4	144.8	16.2	58.6	54.2	140.7	15.3	56.9	55.9	136.5	14.5
	055	69.4	63.8	166.5	21.2	67.5	65.8	161.9	20.1	65.5	67.7	157.3	19.0
	060	77.9	74.6	187.0	21.6	75.8	76.9	182.0	20.5	73.8	79.1	177.0	19.4
	070	91.1	82.6	218.6	23.6	88.6	85.3	212.6	22.4	86.1	87.9	206.5	21.2
	075	101.0	94.9	242.4	17.8	98.3	97.9	236.0	16.9	95.6	100.7	229.5	16.0
	090	120.2	112.0	288.6	24.9	117.0	115.7	280.9	23.6	113.7	119.2	272.8	22.3
60	040	51.8	43.1	124.4	20.9	50.1	44.5	120.3	19.6	48.3	45.8	116.1	18.3
	045	64.3	54.3	154.4	18.3	62.2	56.0	149.4	17.2	60.2	57.7	144.5	16.1
	055	74.7	66.6	179.3	24.4	72.5	68.7	174.2	23.1	70.4	70.7	169.0	21.8
	060	85.2	78.5	204.6	25.6	82.9	81.0	199.3	24.3	80.7	83.4	193.9	23.1
	070	98.8	86.5	237.4	27.7	96.1	89.3	230.8	26.2	93.3	92.0	224.1	24.8
	075	106.9	98.3	256.8	19.9	104.0	101.3	249.8	18.9	101.1	104.2	242.9	17.9
	090	131.0	118.1	314.6	29.4	127.5	122.0	306.4	27.9	124.0	125.7	297.9	26.4

LEGEND

Cap. — Cooling Capacity Tons of Refrigeration
 kW — Compressor Power Input
 LCWT — Leaving Chilled Water Temperature (F)
 PD — Pressure Drop (Ft of Water)
 Flow Rate — U S Gpm

NOTES:

- Ratings apply to units with electronic or thermal expansion valves
- All ratings are based on:
 - A cooler water temperature rise of 10 F. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve
 - A fouling factor of 0.00025 in the cooler
 - Refrigerant 22

- When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT:

- Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (tons) and power input (kW) to compressor at its rated voltage
- Calculate corrected flow rate through the cooler:

$$= \frac{24 \times \text{capacity in tons}}{\text{temperature rise F}} = \text{U S gpm}$$

- Enter cooler pressure drop curve at corrected flow rate and read pressure drop

- When cooler water temperature rise is less than 5 F, high flow rate will normally be accompanied by an excessive pressure drop. In such cases, contact your Carrier representative for special selection of a cooler with wider baffle spacing

- Ratings are in accordance with ARI Standard 590-86

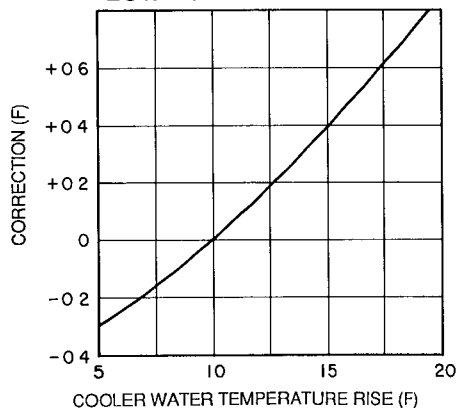
Performance data — English (cont)

30GB040-090 (cont)

COOLING CAPACITIES — ENGLISH (cont)

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (F)											
		105				115				125 (Export Only)			
		Cap.	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
40	040	31.2	39.5	74.7	7.9	28.7	41.1	68.6	6.7	26.1	42.2	62.3	5.6
	045	39.2	49.7	93.6	7.0	36.1	51.6	86.4	6.0	33.1	53.1	79.0	5.1
	055	45.8	59.9	109.4	9.5	42.4	62.1	101.5	8.2	39.1	63.8	93.5	7.0
	060	51.6	70.0	123.3	9.7	48.1	72.6	114.9	8.5	—	—	—	—
	070	59.7	78.0	142.8	10.4	55.3	80.9	132.1	9.0	50.8	83.1	121.4	7.6
	075	67.0	88.9	160.1	8.0	62.2	92.0	148.8	7.0	57.5	94.5	137.4	6.0
	090	79.8	105.6	190.8	11.2	74.3	110.1	177.7	9.8	68.9	114.3	164.7	8.5
42	040	32.6	40.5	78.1	8.6	30.0	42.1	71.9	7.3	27.4	43.4	65.5	6.1
	045	40.9	50.9	97.9	7.6	37.8	52.9	90.4	6.6	34.7	54.5	82.9	5.6
	055	47.7	61.4	114.1	10.3	44.3	63.7	106.0	8.9	40.9	65.6	97.8	7.6
	060	53.8	71.7	128.7	10.6	50.2	74.4	120.1	9.3	—	—	—	—
	070	62.4	79.9	149.2	11.3	57.8	83.0	138.3	9.8	53.2	85.4	127.3	8.4
	075	69.9	91.1	167.2	8.7	65.0	94.4	155.6	7.6	60.1	97.2	143.8	6.5
	090	83.2	108.2	199.1	12.2	77.6	113.0	185.5	10.6	72.0	117.3	172.3	9.2
44	040	34.1	41.4	81.7	9.4	31.4	43.2	75.3	8.0	28.7	44.6	68.7	6.7
	045	42.7	52.1	102.2	8.3	39.5	54.3	94.6	7.2	36.3	56.0	86.9	6.1
	055	49.7	62.8	119.0	11.1	46.3	65.3	110.7	9.7	42.7	67.3	102.3	8.3
	060	56.1	73.4	134.2	11.4	52.4	76.3	125.4	10.1	—	—	—	—
	070	65.1	81.8	155.7	12.3	60.4	85.1	144.6	10.7	55.7	87.8	133.3	9.1
	075	72.8	93.3	174.3	9.4	67.9	96.8	162.4	8.2	62.8	99.8	150.4	7.1
	090	86.7	110.9	207.5	13.2	80.9	115.8	193.6	11.6	75.2	120.4	179.9	10.0
45	040	34.8	41.9	83.4	9.7	32.2	43.8	77.0	8.4	29.4	45.2	70.4	7.0
	045	43.6	52.8	104.4	8.6	40.4	55.0	96.7	7.5	37.1	56.8	89.0	6.4
	055	50.7	63.6	121.5	11.6	47.2	66.1	113.1	10.1	43.7	68.2	104.6	8.7
	060	57.2	74.3	137.0	11.9	53.5	77.3	128.1	10.5	—	—	—	—
	070	66.4	82.8	159.0	12.8	61.7	86.2	147.8	11.1	56.9	89.0	136.4	9.5
	075	74.3	94.4	178.0	9.8	69.3	98.1	165.9	8.6	64.2	101.2	153.8	7.4
	090	88.5	112.2	211.8	13.7	82.6	117.2	197.7	12.0	76.8	122.0	183.8	10.5
46	040	35.6	42.4	85.2	10.2	32.9	44.3	78.7	8.7	30.1	45.8	72.0	7.4
	045	44.5	53.4	106.7	9.0	41.3	55.6	98.9	7.8	38.0	57.5	91.0	6.6
	055	51.8	64.3	124.0	12.0	48.2	67.0	115.5	10.5	44.6	69.1	106.9	9.0
	060	58.4	75.1	139.9	12.4	54.6	78.2	130.8	10.9	—	—	—	—
	070	67.8	83.8	162.4	13.3	63.0	87.2	151.0	11.6	58.2	90.1	139.5	10.0
	075	75.8	95.5	181.6	10.2	70.8	99.3	169.5	8.9	65.6	102.5	157.2	7.7
	090	90.2	113.5	216.1	14.3	84.3	118.7	201.9	12.5	78.4	123.5	187.7	10.9
48	040	37.1	43.4	88.9	11.0	34.3	45.4	82.3	9.5	31.5	47.0	75.4	8.0
	045	46.4	54.6	111.2	9.8	43.1	57.0	103.3	8.5	39.7	59.0	95.2	7.2
	055	53.9	65.8	129.1	13.0	50.3	68.8	120.4	11.4	46.6	71.0	111.6	9.8
	060	60.8	76.9	145.7	13.4	56.9	80.1	136.3	11.8	—	—	—	—
	070	70.6	85.7	169.2	14.4	65.7	89.4	157.6	12.6	60.8	92.5	145.7	10.8
	075	78.9	97.8	189.0	11.0	73.7	101.8	176.7	9.7	68.5	105.2	164.0	8.4
	090	93.8	116.2	224.9	15.4	87.7	121.6	210.2	13.5	81.7	126.6	195.7	11.8
50	040	38.7	44.4	92.7	11.9	35.8	46.5	85.9	10.3	32.9	48.3	78.9	8.8
	045	48.3	55.9	115.9	10.6	44.9	58.4	107.7	9.2	41.5	60.6	99.4	7.9
	055	56.0	67.4	134.4	14.0	52.3	70.3	125.5	12.3	48.5	72.8	116.4	10.6
	060	63.2	78.7	151.6	14.4	59.2	82.1	142.0	12.7	—	—	—	—
	070	73.4	87.7	176.1	15.6	68.5	91.5	164.3	13.6	63.5	94.9	152.2	11.8
	075	82.0	100.0	196.6	11.9	76.7	104.3	184.0	10.5	71.3	107.9	171.1	9.1
	090	97.5	118.9	233.8	16.6	91.2	124.5	218.8	14.6	85.0	129.8	203.8	12.8
55	040	42.7	46.9	102.4	14.4	37.9	49.3	95.2	12.5	36.6	51.3	87.8	10.7
	045	53.3	59.0	128.0	12.8	49.7	61.9	119.3	11.2	46.0	64.4	110.5	9.6
	055	61.6	71.3	147.8	16.8	57.7	74.6	138.5	14.9	53.7	77.4	128.8	12.9
	060	69.5	83.2	166.8	17.3	—	—	—	—	—	—	—	—
	070	80.9	92.7	194.1	18.8	75.6	97.0	181.5	16.5	70.3	100.9	168.7	14.3
	075	89.7	105.6	215.2	14.2	83.9	110.2	201.3	12.5	—	—	—	—
	090	107.0	125.7	256.7	19.9	100.4	132.0	241.0	17.6	—	—	—	—
60	040	44.8	48.3	107.7	15.9	41.3	50.4	99.2	13.6	37.7	52.3	90.7	11.4
	045	56.1	60.8	134.7	14.1	51.9	63.5	124.7	12.2	47.8	65.8	114.8	10.4
	055	66.1	74.4	158.8	19.3	61.5	77.5	147.7	16.8	—	—	—	—
	060	76.2	87.8	183.1	20.7	—	—	—	—	—	—	—	—
	070	87.7	97.1	210.6	22.0	81.9	101.7	196.8	19.3	—	—	—	—
	075	95.2	109.5	228.6	15.9	89.2	114.4	214.2	14.0	—	—	—	—
	090	116.9	132.8	280.8	23.6	—	—	—	—	—	—	—	—

LCWT CORRECTION



Above 10 F, ADD correction to design LCWT
Below 10 F, SUBTRACT

COOLING CAPACITIES — ENGLISH

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (F)											
		85				90				95			
		Cap.	kW	Cooler		Cap	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
40	100	100.6	106.5	240.5	9.5	97.8	109.5	233.8	9.0	95.0	112.3	227.0	8.5
	110	113.1	123.3	270.3	11.9	109.8	126.8	262.6	11.2	106.6	130.2	254.8	10.6
	125	129.1	136.7	308.7	8.5	125.3	140.3	299.5	8.0	121.4	143.8	290.3	7.5
	150	158.0	164.2	377.7	8.1	153.2	168.7	366.2	7.6	148.4	173.0	354.7	7.2
	175	176.7	191.3	422.3	10.1	171.5	196.2	410.0	9.5	166.3	200.9	397.6	9.0
	200	196.4	218.5	469.6	12.4	190.6	223.6	455.6	11.7	184.8	228.4	441.7	11.0
42	100	104.4	108.6	249.7	10.2	101.5	111.7	242.8	9.7	98.6	114.7	235.9	9.1
	110	117.2	125.8	280.4	12.7	113.9	129.5	272.6	12.1	110.6	133.0	264.6	11.4
	125	134.1	139.5	320.8	9.2	130.2	143.4	311.4	8.7	126.3	147.0	302.1	8.2
	150	164.2	167.6	392.9	8.8	159.3	172.4	381.1	8.3	154.4	176.9	369.4	7.8
	175	183.6	195.6	439.3	10.9	178.3	200.7	426.7	10.3	173.0	205.5	413.8	9.7
	200	204.0	223.4	488.0	13.3	198.0	228.8	473.7	12.6	192.1	233.8	459.5	11.9
44	100	108.2	110.7	258.9	10.9	105.3	114.0	252.0	10.4	102.3	117.1	244.9	9.8
	110	121.5	128.4	290.8	13.7	118.1	132.2	282.8	12.9	114.7	135.8	274.6	12.2
	125	139.3	142.5	333.4	10.0	135.3	146.5	323.8	9.4	131.2	150.3	314.1	8.8
	150	170.6	171.1	408.4	9.4	165.6	176.1	396.4	8.9	160.5	180.8	384.3	8.4
	175	190.6	199.8	456.3	11.7	185.2	205.2	443.3	11.1	179.7	210.1	430.2	10.4
	200	211.5	228.3	506.4	14.3	205.5	233.9	491.8	13.5	199.4	239.2	477.3	12.8
45	100	110.1	111.8	263.6	11.3	107.2	115.1	256.6	10.7	104.2	118.3	249.5	10.2
	110	123.6	129.7	296.0	14.1	120.2	133.5	287.9	13.4	116.8	137.2	279.7	12.7
	125	141.8	144.0	339.7	10.4	137.8	148.1	330.0	9.8	133.7	152.0	320.3	9.2
	150	174.0	172.9	416.6	9.8	168.8	178.0	404.2	9.3	163.7	182.8	392.0	8.7
	175	194.2	202.0	465.0	12.1	188.8	207.5	452.1	11.5	183.1	212.5	438.5	10.8
	200	215.5	230.8	515.9	14.9	209.3	236.5	501.2	14.0	203.2	241.9	486.6	13.3
46	100	112.0	112.9	268.3	11.7	109.1	116.3	261.3	11.1	106.1	119.5	254.1	10.5
	110	125.8	131.0	301.3	14.6	122.4	134.9	293.1	13.9	118.9	138.7	284.8	13.1
	125	144.5	145.5	346.0	10.8	140.4	149.6	336.2	10.1	136.3	153.6	326.4	9.5
	150	177.2	174.7	424.5	10.2	172.0	179.8	412.0	9.6	166.9	184.7	399.7	9.1
	175	197.7	204.1	473.6	12.6	192.2	209.6	460.3	11.9	186.5	214.9	446.8	11.2
	200	219.4	233.3	525.5	15.4	213.2	239.2	510.6	14.6	207.0	244.7	495.9	13.8
48	100	116.0	115.1	278.0	12.5	113.0	118.6	270.7	11.9	109.9	121.9	263.4	11.3
	110	130.2	133.6	311.9	15.6	126.7	137.6	303.6	14.8	123.2	141.6	295.2	14.1
	125	149.7	148.5	358.9	11.6	145.6	152.8	348.9	10.9	141.4	156.9	338.8	10.3
	150	183.8	178.2	440.4	10.9	178.6	183.6	427.9	10.3	173.3	188.7	415.3	9.8
	175	205.1	208.5	491.5	13.5	199.3	214.2	477.7	12.8	193.6	219.6	463.9	12.1
	200	227.4	238.4	545.0	16.5	221.1	244.5	529.8	15.6	214.8	250.3	514.7	14.8
50	100	120.0	117.3	287.7	13.4	116.9	120.9	280.3	12.7	113.8	124.4	272.9	12.1
	110	134.6	136.2	322.8	16.7	131.1	140.4	314.2	15.9	127.5	144.5	305.6	15.0
	125	155.0	151.5	371.8	12.4	150.9	156.0	361.7	11.8	146.6	160.3	351.5	11.1
	150	190.6	181.8	456.9	11.7	185.3	187.4	444.2	11.1	179.8	192.7	431.0	10.5
	175	212.5	212.9	509.6	14.5	206.7	218.8	495.5	13.7	200.8	224.5	481.4	13.0
	200	235.5	243.6	564.7	17.7	229.1	249.9	549.3	16.8	222.7	255.9	533.9	15.9
55	100	130.3	122.8	312.7	15.7	127.0	126.7	304.8	15.0	123.8	130.5	297.0	14.2
	110	146.1	142.9	350.6	19.6	142.3	147.4	341.6	18.6	138.6	151.9	332.6	17.7
	125	168.9	159.2	405.5	14.9	164.5	164.1	394.9	14.1	160.0	168.9	384.1	13.3
	150	208.1	191.0	499.6	14.0	202.6	197.1	486.2	13.2	196.9	202.9	472.6	12.5
	175	231.7	224.2	556.2	17.2	225.6	230.7	541.4	16.3	219.3	236.8	526.4	15.4
	200	256.6	257.0	615.8	20.9	250.0	263.9	600.0	19.9	243.1	270.3	583.5	18.8
60	100	140.9	128.4	338.4	18.3	137.6	132.7	330.5	17.5	134.2	136.8	322.3	16.7
	110	158.0	149.8	379.5	22.8	154.1	154.7	370.1	21.7	150.1	159.5	360.6	20.7
	125	183.4	167.2	440.6	17.6	178.8	172.6	429.5	16.7	174.1	177.7	418.1	15.8
	150	226.6	200.6	544.3	16.5	220.7	207.2	530.2	15.7	214.8	213.5	515.9	14.9
	175	251.7	236.0	604.6	20.2	245.4	243.0	589.6	19.2	238.8	249.7	573.6	18.2
	200	278.4	270.8	668.7	24.5	271.5	278.3	652.2	23.4	264.6	285.4	635.6	22.2

LEGEND

Cap. — Cooling Capacity Tons of Refrigeration
kW — Compressor Power Input
LCWT — Leaving Chilled Water Temperature (F)
PD — Pressure Drop (Ft of Water)
Flow Rate — U.S. Gpm

NOTES:

- Ratings apply to units with electronic or thermal expansion valves
- All ratings are based on:
 - A cooler water temperature rise of 10 F. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve
 - A fouling factor of 0.00025 in the cooler
 - Refrigerant 22
- When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT:
 - Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (tons) and power input (kW) to compressor at its rated voltage
 - Calculate corrected flow rate through the cooler:

$$= \frac{24 \times \text{capacity in tons}}{\text{temperature rise F}} = \text{U.S. gpm}$$
 - Enter cooler pressure drop curve at corrected flow rate and read pressure drop
- When cooler water temperature rise is less than 5 F, high flow rate will normally be accompanied by an excessive pressure drop. In such cases, contact your Carrier representative for special selection of a cooler with wider baffle spacing
- Ratings are in accordance with ARI Standard 590-86

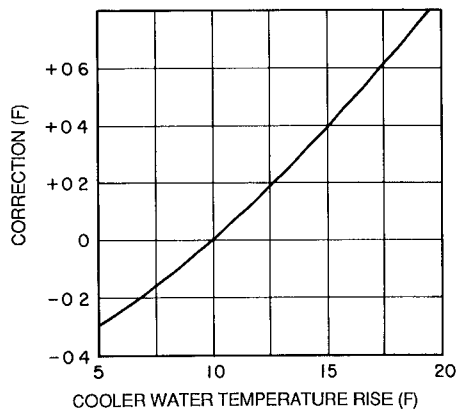
Performance data — English (cont)

30GB100-200 (cont)

COOLING CAPACITIES — ENGLISH (cont)

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (F)											
		105				115				125 (Export Only)			
		Cap.	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
40	100	89.2	117.5	213.2	7.5	83.3	122.2	199.1	6.6	77.3	126.0	184.7	5.7
	110	100.1	136.5	239.2	9.4	93.5	142.2	223.5	8.2	86.9	147.3	207.6	7.1
	125	113.7	150.2	271.7	6.6	105.8	155.6	252.9	5.7	97.8	160.1	233.7	4.8
	150	138.7	180.6	331.4	6.3	128.8	187.3	307.9	5.5	118.8	192.7	284.1	4.7
	175	155.4	209.0	371.5	7.9	144.7	216.1	345.8	6.8	133.6	221.8	319.4	5.9
	200	173.0	237.0	413.5	9.7	161.0	244.4	385.0	8.4	149.0	250.4	356.2	7.2
42	100	92.7	120.2	221.7	8.1	86.7	125.0	207.3	7.1	80.5	129.2	192.7	6.2
	110	104.0	139.6	248.7	10.1	97.2	145.6	232.5	8.9	90.5	151.0	216.4	7.7
	125	118.3	153.7	283.1	7.1	110.3	159.6	263.8	6.2	102.1	164.4	244.2	5.3
	150	144.4	184.9	345.5	6.8	134.3	192.0	321.4	5.9	124.2	197.9	297.1	5.1
	175	161.9	214.1	387.2	8.5	150.8	221.6	360.8	7.4	139.5	227.7	333.6	6.4
	200	180.0	242.8	430.7	10.5	167.8	250.7	401.5	9.1	155.5	257.1	371.9	7.9
44	100	96.3	122.9	230.5	8.7	90.1	128.0	215.8	7.7	83.9	132.4	200.8	6.7
	110	107.9	142.7	258.3	10.9	101.1	149.0	241.9	9.6	94.1	154.7	225.4	8.4
	125	123.1	157.3	294.6	7.7	114.8	163.5	274.8	6.7	106.4	168.7	254.8	5.8
	150	150.4	189.3	360.0	7.4	140.1	196.8	335.3	6.4	129.7	203.1	310.4	5.6
	175	168.3	219.1	402.9	9.2	157.0	227.1	375.9	8.0	145.6	233.8	348.5	6.9
	200	187.3	248.8	448.3	11.3	174.8	257.1	418.5	9.9	162.2	264.0	388.2	8.6
45	100	98.1	124.2	235.0	9.1	91.9	129.4	220.0	8.0	85.6	134.0	204.9	7.0
	110	109.9	144.3	263.2	11.3	103.0	150.7	246.6	9.9	96.0	156.6	229.9	8.7
	125	125.5	159.1	300.5	8.1	117.1	165.4	280.4	7.0	108.7	170.9	260.2	6.0
	150	153.4	191.4	367.4	7.7	143.0	199.1	342.3	6.7	132.4	205.6	316.9	5.8
	175	171.6	221.7	411.0	9.6	160.2	229.9	383.6	8.4	148.6	236.9	355.9	7.2
	200	190.9	251.7	457.2	11.8	178.3	260.4	427.0	10.3	165.6	267.5	396.5	8.9
46	100	100.0	125.5	239.4	9.4	93.7	130.9	224.3	8.3	87.3	135.6	209.1	7.2
	110	111.9	145.9	268.1	11.7	104.9	152.5	251.4	10.3	97.9	158.5	234.4	9.0
	125	127.9	160.9	306.4	8.4	119.5	167.4	286.1	7.3	110.9	173.1	265.7	6.3
	150	156.5	193.6	374.8	8.0	145.9	201.6	349.4	7.0	135.2	208.3	323.8	6.0
	175	175.0	224.3	419.1	9.9	163.4	232.7	391.3	8.7	151.8	240.0	363.5	7.5
	200	194.7	254.8	466.4	12.2	181.9	263.6	435.7	10.7	169.0	271.0	404.8	9.3
48	100	103.6	128.2	248.4	10.1	97.2	133.9	233.1	8.9	90.7	138.9	217.5	7.8
	110	116.1	149.0	278.1	12.5	108.9	155.9	261.0	11.1	101.7	162.2	243.7	9.7
	125	132.9	164.6	318.4	9.1	124.2	171.5	297.7	7.9	115.4	177.3	276.6	6.8
	150	162.7	198.1	390.0	8.6	151.9	206.4	363.9	7.6	140.9	213.6	337.6	6.5
	175	181.9	229.6	435.9	10.7	169.9	238.4	407.2	9.4	—	—	—	—
	200	202.1	260.8	484.4	13.1	189.2	270.2	453.4	11.6	—	—	—	—
50	100	107.4	130.9	257.5	10.8	100.9	136.8	241.9	9.6	94.3	142.1	226.0	8.4
	110	120.2	152.2	288.3	13.4	112.9	159.4	270.8	11.9	105.5	166.0	252.9	10.4
	125	138.0	168.3	330.8	9.8	129.1	175.5	309.5	8.6	120.1	181.8	288.0	7.4
	150	169.0	202.5	405.2	9.3	157.9	211.3	378.6	8.2	146.7	218.9	351.7	7.1
	175	188.8	234.9	452.7	11.5	176.7	244.2	423.6	10.1	—	—	—	—
	200	209.8	266.9	502.9	14.1	196.5	276.7	471.1	12.5	—	—	—	—
55	100	117.1	137.7	281.1	12.8	110.3	144.3	264.8	11.4	103.4	150.3	248.1	10.1
	110	131.0	160.4	314.4	15.9	123.3	168.2	295.9	14.1	115.5	175.7	277.2	12.5
	125	150.9	177.7	362.3	11.8	141.6	185.7	339.8	10.4	—	—	—	—
	150	185.4	213.8	444.9	11.1	173.7	223.7	416.9	9.8	—	—	—	—
	175	206.8	248.4	496.5	13.8	194.1	258.8	465.8	12.2	—	—	—	—
	200	229.5	282.5	550.9	16.9	215.7	293.6	517.7	15.0	—	—	—	—
60	100	127.2	144.6	305.5	15.0	120.1	152.0	288.6	13.5	—	—	—	—
	110	142.2	168.6	341.5	18.6	134.1	177.3	322.1	16.6	—	—	—	—
	125	163.7	186.8	393.1	13.9	153.4	195.3	368.5	12.2	—	—	—	—
	150	202.6	225.4	486.6	13.3	189.6	235.8	455.4	11.7	—	—	—	—
	175	225.7	262.4	542.2	16.3	—	—	—	—	—	—	—	—
	200	250.2	298.7	601.1	20.0	—	—	—	—	—	—	—	—

LCWT CORRECTION



Above 10 F, ADD correction to design LCWT
Below 10 F, SUBTRACT

COOLING CAPACITIES — ENGLISH

LCWT	UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (F)														
		85.0			95.0			105.0			115.0			125.0		
		Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate
40.0	225	223.1	242.5	534.0	210.4	254.9	503.6	197.5	266.0	472.7	184.4	275.7	441.3	171.1	284.2	409.7
	250	243.2	258.9	582.2	229.6	273.3	549.6	215.8	286.4	516.5	202.0	298.3	483.5	188.0	308.8	450.1
	280	273.1	296.0	653.7	258.4	311.2	618.7	243.9	325.4	583.7	229.1	338.5	548.5	214.5	350.6	513.5
42.0	225	231.3	247.7	554.0	218.3	260.6	522.9	205.1	272.2	491.4	191.8	282.6	459.4	178.2	291.5	427.0
	250	252.3	264.0	604.5	238.3	279.0	571.0	224.3	292.8	537.2	210.0	305.1	503.0	195.7	316.2	468.8
	280	283.0	302.1	678.0	267.9	317.9	641.8	253.0	332.7	606.1	238.0	346.3	570.1	222.8	358.9	533.7
44.0	225	239.8	253.0	574.8	226.5	266.4	542.9	212.9	278.5	510.4	199.3	289.4	477.8	185.4	298.9	444.3
	250	261.5	269.2	626.9	247.3	284.8	592.9	232.8	299.1	558.2	218.3	312.1	523.3	203.5	323.8	487.9
	280	293.0	308.1	702.3	277.7	324.6	665.8	262.4	340.0	629.0	246.9	354.2	591.9	231.4	367.4	554.8
46.0	225	248.4	258.3	595.8	234.8	272.3	563.2	220.9	284.9	529.8	206.9	296.4	496.4	192.8	306.5	462.5
	250	271.1	274.4	650.3	256.3	290.6	614.9	241.7	305.6	579.6	226.7	319.1	543.8	211.5	331.3	507.3
	280	303.2	314.3	727.2	287.6	331.4	689.8	272.0	347.4	652.3	256.1	362.2	614.3	240.1	375.9	576.0
48.0	225	257.1	263.7	617.1	243.2	278.2	583.8	229.0	291.4	549.7	214.7	303.4	515.4	200.3	314.0	480.6
	250	280.8	279.7	673.8	265.8	296.5	637.9	250.5	312.0	601.2	235.3	326.2	564.8	219.8	339.1	527.6
	280	313.6	320.6	752.7	297.6	338.3	714.2	281.5	354.8	675.7	265.5	370.3	637.1	249.1	384.6	597.7
50.0	225	266.0	269.2	638.7	251.8	284.2	604.7	237.4	298.0	570.1	222.7	310.4	534.8	207.9	321.1	499.2
	250	290.5	285.0	697.5	275.3	302.4	661.0	259.8	318.6	623.8	244.0	333.3	585.9	228.3	346.8	548.1
	280	324.5	325.0	779.1	307.9	345.2	739.2	291.4	362.3	699.6	274.7	378.3	659.7	258.2	393.3	620.0
55.0	225	288.8	283.3	694.2	273.9	299.6	658.4	258.8	314.7	622.0	243.5	328.6	585.1	—	—	—
	250	315.9	298.6	759.3	299.9	317.5	720.7	282.4	334.5	678.9	264.7	349.8	636.2	246.9	363.8	593.5
	280	352.0	343.2	846.1	334.6	362.9	804.2	317.1	381.5	762.1	299.3	398.9	719.3	280.4	414.3	673.9
60.0	225	307.8	294.4	740.4	289.1	309.5	695.4	270.3	323.1	650.2	251.5	335.1	605.0	—	—	—
	250	327.4	304.1	787.6	308.1	321.9	741.1	288.7	338.2	694.5	269.4	352.9	648.0	250.0	365.9	601.5
	280	371.6	353.8	893.9	350.2	372.4	842.4	328.9	389.5	791.2	307.8	405.1	740.4	286.6	419.4	689.5

LEGEND

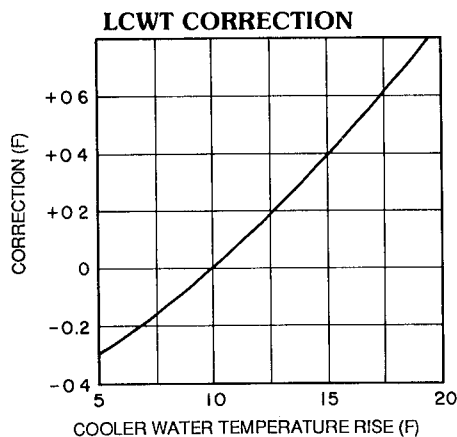
Cap. — Cooling Capacity Tons of Refrigeration
 kW — Compressor Power Input
 LCWT — Leaving Chilled Water Temperature (F)
 Flow Rate — U.S. Gpm

NOTES:

1. All ratings are based on
 - a. A cooler water temperature rise of 10 F. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve
 - b. A fouling factor of 0.00025 in the cooler
 - c. Refrigerant 22.

2. When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT
 - a. Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (tons) and power input (kW) to compressor at its rated voltage
 - b. Calculate corrected flow rate through the cooler

$$= \frac{24 \times \text{capacity in tons}}{\text{temperature rise F}} = \text{U.S. gpm}$$
 - c. Enter cooler pressure drop curve at corrected flow rate and read pressure drop
3. When cooler water temperature rise is less than 5 F, high flow rate will normally be accompanied by an excessive pressure drop. In such cases contact your Carrier representative for special selection of a cooler with wider baffle spacing
4. Ratings are in accordance with ARI Standard 590-86.



Above 10 F, ADD correction to design LCWT
 Below 10 F, SUBTRACT

Performance data — SI

30GB040-090

COOLING CAPACITIES — SI

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (C)											
		25				30				35			
		Cap.	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
4.0	040	132.7	33.5	5.27	29.1	124.9	35.6	4.96	26.0	117.1	37.4	4.65	22.9
	045	164.4	42.4	6.53	25.4	155.2	44.9	6.16	22.7	146.1	47.1	5.80	20.2
	055	190.1	51.6	7.55	33.5	180.1	54.4	7.15	30.2	170.0	56.9	6.75	27.0
	060	216.4	61.0	5.16	29.8	205.1	64.2	4.89	29.8	194.1	67.1	4.63	29.8
	070	248.7	66.9	9.87	37.1	235.4	70.6	9.34	33.4	221.8	74.0	8.81	29.8
	075	276.8	76.7	10.99	28.2	262.7	80.8	10.43	25.5	248.3	84.5	9.86	22.9
	090	330.7	90.0	13.13	39.6	313.2	95.1	12.43	35.7	295.9	99.8	11.75	32.0
5.0	040	137.6	34.2	5.46	31.3	129.8	36.3	5.16	28.0	121.8	38.2	4.84	24.8
	045	170.5	43.2	6.77	27.2	161.1	45.8	6.40	24.4	151.8	48.1	6.03	21.8
	055	197.0	52.6	7.83	35.9	186.7	55.5	7.42	32.4	176.4	58.1	7.01	29.1
	060	224.1	62.1	5.35	29.8	212.6	65.4	5.07	29.8	201.4	68.5	4.81	29.8
	070	257.8	68.1	10.24	39.8	244.2	72.0	9.70	35.9	230.4	75.5	9.15	32.1
	075	286.6	78.2	11.39	30.2	272.4	82.4	10.82	27.3	257.7	86.3	10.24	24.6
	090	342.4	91.7	13.60	42.4	324.7	97.0	12.90	38.3	306.8	102.0	12.19	34.4
6.0	040	142.6	34.8	5.67	33.5	134.7	37.0	5.35	30.0	126.5	39.0	5.03	26.7
	045	176.7	44.0	7.02	29.2	167.2	46.6	6.65	26.3	157.6	49.1	6.26	23.4
	055	204.1	53.6	8.11	38.5	193.6	56.6	7.69	34.8	182.9	59.3	7.27	31.2
	060	232.1	63.2	5.54	29.8	220.4	66.7	5.26	29.8	208.8	69.9	4.99	29.8
	070	267.1	69.4	10.62	42.7	253.1	73.4	10.06	38.5	239.1	77.1	9.50	34.5
	075	296.8	79.6	11.80	32.3	282.1	84.1	11.22	29.3	267.2	88.1	10.62	26.4
	090	354.5	93.5	14.09	45.4	336.4	99.0	13.37	41.1	318.1	104.1	12.65	36.9
7.0	040	147.7	35.4	5.88	35.9	139.6	37.7	5.55	32.2	131.3	39.8	5.22	28.7
	045	183.0	44.8	7.28	31.3	173.3	47.5	6.89	28.2	163.5	50.1	6.50	25.2
	055	211.1	54.6	8.40	41.1	200.5	57.7	7.97	37.2	189.6	60.5	7.54	33.5
	060	240.3	64.4	5.74	29.8	228.3	68.0	5.45	29.8	216.5	71.4	5.17	29.8
	070	276.6	70.6	11.00	45.7	262.5	74.8	10.44	41.3	248.0	78.6	9.87	37.0
	075	307.1	81.1	12.22	34.5	292.2	85.7	11.62	31.4	277.0	89.9	11.02	28.3
	090	366.8	95.3	14.59	48.5	348.3	101.0	13.86	44.0	329.7	106.3	13.11	39.5
8.0	040	153.0	36.0	6.09	38.4	144.7	38.4	5.76	34.5	136.2	40.6	5.42	30.8
	045	189.5	45.6	7.54	33.5	179.6	48.4	7.15	30.2	169.6	51.1	6.75	27.1
	055	218.3	55.6	8.69	43.9	207.5	58.8	8.26	39.8	196.5	61.8	7.82	35.9
	060	248.6	65.6	5.94	29.8	236.4	69.3	5.65	29.8	224.3	72.8	5.36	29.8
	070	286.2	71.9	11.39	48.8	271.8	76.2	10.82	44.2	257.2	80.2	10.23	39.7
	075	317.7	82.6	12.64	36.9	302.4	87.4	12.03	33.5	286.8	91.7	11.41	30.3
	090	379.5	97.1	15.10	51.9	360.5	103.0	14.35	47.0	341.5	108.5	13.59	42.4
9.0	040	158.2	36.7	6.30	41.0	149.9	39.1	5.97	37.0	141.2	41.4	5.62	33.0
	045	196.1	46.4	7.81	35.8	186.0	49.3	7.41	32.3	175.8	52.1	7.00	29.0
	055	225.7	56.6	8.99	46.9	214.7	59.9	8.55	42.6	203.4	63.0	8.10	38.4
	060	257.1	66.8	6.15	29.8	244.6	70.6	5.85	29.8	232.2	74.2	5.55	29.8
	070	295.8	73.2	11.78	52.0	281.3	77.6	11.20	47.3	266.4	81.8	10.61	42.6
	075	328.4	84.1	13.08	39.3	312.8	89.1	12.45	35.8	296.9	93.6	11.82	32.4
	090	392.2	99.0	15.61	55.3	372.8	105.1	14.84	50.2	353.5	110.7	14.07	45.3
10.0	040	163.6	37.3	6.52	43.8	155.1	39.8	6.18	39.5	146.3	42.2	5.83	35.3
	045	202.9	47.2	8.08	38.2	192.6	50.2	7.67	34.6	182.1	53.1	7.25	31.1
	055	233.3	57.6	9.29	49.9	222.0	61.1	8.84	45.4	210.5	64.3	8.39	41.0
	060	265.8	68.0	6.36	29.8	253.0	72.0	6.05	29.8	240.4	75.7	5.75	29.8
	070	305.8	74.4	12.18	55.5	291.0	79.1	11.59	50.5	275.8	83.4	10.99	45.5
	075	339.3	85.7	13.51	41.9	323.4	90.8	12.88	38.2	307.2	95.4	12.24	34.6
	090	405.2	100.9	16.14	58.9	385.4	107.1	15.35	53.5	365.6	112.9	14.56	48.4
13.0	040	180.5	39.3	7.20	52.9	171.5	42.1	6.84	48.0	162.2	44.6	6.47	43.1
	045	223.9	49.8	8.93	46.2	213.0	53.1	8.49	42.0	201.9	56.2	8.05	37.9
	055	256.7	60.8	10.24	60.1	244.8	64.6	9.76	54.9	232.6	68.1	9.27	49.8
	060	292.9	71.7	7.01	29.8	279.3	76.1	6.69	29.8	265.8	80.2	6.36	29.8
	070	336.9	78.4	13.43	67.0	321.2	83.5	12.81	61.2	305.2	88.3	12.17	55.4
	075	373.1	90.4	14.88	50.4	355.4	95.9	14.17	45.9	337.5	100.9	13.46	41.6
	090	445.2	106.7	17.75	70.8	424.3	113.4	16.92	64.5	403.2	119.7	16.08	58.5
16.0	040	192.1	40.8	7.67	59.7	181.2	43.4	7.23	53.4	170.0	45.8	6.79	47.3
	045	237.6	51.4	9.48	51.9	224.8	54.7	8.97	46.7	211.9	57.7	8.46	41.7
	055	276.5	63.5	11.04	69.5	263.3	67.4	10.51	63.3	249.2	70.9	9.94	56.9
	060	321.5	75.7	7.70	29.8	307.1	80.4	7.36	29.8	292.7	84.9	7.01	29.8
	070	366.5	82.2	14.63	78.9	349.0	87.5	13.93	71.8	331.2	92.5	13.22	65.0
	075	396.2	93.8	15.81	56.7	377.7	99.5	15.07	51.7	359.4	104.9	14.34	47.0
	090	487.3	112.8	19.45	84.3	465.3	120.1	18.57	77.2	442.5	126.9	17.66	70.1

LEGEND

Cap. — Cooling Capacity kW of Refrigeration
 kW — Compressor Power Input
 LCWT — Leaving Chilled Water Temperature (C)
 PD — Pressure Drop (kPa of Water)
 Flow Rate — L/s

NOTES:

- Ratings apply to units with electronic or thermal expansion valves
- All ratings are based on:
 - A cooler water temperature rise of 6 F. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve.
 - A fouling factor of 0.000044 in the cooler
 - Refrigerant 22

- When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT:

- Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (kW) and power input (kW) to compressor at its rated voltage.

- Calculate corrected flow rate through the cooler:

$$= \frac{0.239 \times \text{capacity in kW}}{\text{temperature rise } ^\circ\text{C}} = \text{L/s}$$

- Enter cooler pressure drop curve at corrected flow rate and read pressure drop

- When cooler water temperature rise is less than 3 C, high flow rate will normally be accompanied by an excessive pressure drop. In such cases, contact your Carrier representative for special selection of a cooler with wider baffle spacing

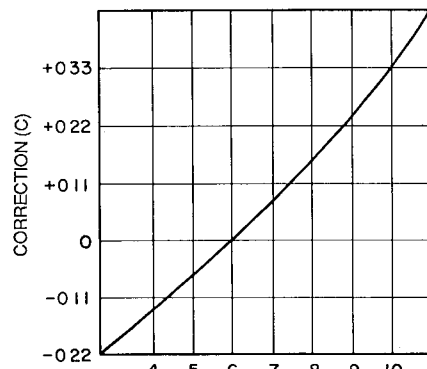
- Ratings are in accordance with ARI Standard 590-86

30GB040-090 (cont)

COOLING CAPACITIES — SI (cont)

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (C)											
		40				45				50 (Export Only)			
		Cap.	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
4.0	040	109.1	39.0	4.33	20.0	101.0	40.4	4.01	17.3	92.8	41.5	3.68	14.7
	045	136.6	49.1	5.42	17.8	127.1	50.8	5.05	15.5	117.5	52.1	4.67	13.3
	055	159.7	59.2	6.34	24.0	149.3	61.1	5.93	21.1	138.9	62.7	5.51	18.4
	060	183.3	69.9	4.37	29.8	172.3	72.3	4.11	29.8	—	—	—	—
	070	208.1	77.0	8.26	26.3	194.2	79.5	7.71	23.1	180.1	81.6	7.15	20.0
	075	233.6	87.7	9.27	20.3	218.7	90.5	8.68	17.9	203.7	92.9	8.09	15.6
	090	278.4	104.2	11.05	28.5	261.1	108.3	10.37	25.2	244.0	112.0	9.69	22.1
5.0	040	113.5	39.9	4.51	21.6	105.4	41.4	4.19	18.8	97.0	42.5	3.85	16.0
	045	142.1	50.2	5.65	19.2	132.4	51.9	5.26	16.8	122.6	53.4	4.87	14.5
	055	165.9	60.5	6.59	25.8	155.3	62.5	6.17	22.8	144.6	64.3	5.74	19.8
	060	190.3	71.4	4.54	29.8	178.9	73.9	4.27	29.8	—	—	—	—
	070	216.4	78.7	8.60	28.4	202.2	81.4	8.03	24.9	187.8	83.7	7.46	21.7
	075	242.7	89.7	9.64	21.9	227.5	92.7	9.04	19.3	212.2	95.2	8.43	16.9
	090	289.0	106.5	11.48	30.6	271.3	110.7	10.78	27.1	253.8	114.7	10.08	23.9
6.0	040	118.0	40.7	4.69	23.4	109.8	42.3	4.36	20.3	101.3	43.6	4.03	17.4
	045	147.8	51.2	5.87	20.7	137.9	53.1	5.48	18.2	127.9	54.7	5.08	15.7
	055	172.1	61.8	6.84	27.8	161.4	64.0	6.41	24.5	150.4	65.8	5.98	21.4
	060	197.5	72.9	4.72	29.8	185.8	75.6	4.44	29.8	—	—	—	—
	070	224.9	80.4	8.94	30.6	210.4	83.3	8.36	27.0	195.7	85.7	7.78	23.5
	075	251.9	91.7	10.01	23.6	236.4	94.8	9.40	20.9	220.8	97.5	8.78	18.3
	090	299.9	108.8	11.92	32.9	281.7	113.2	11.20	29.2	263.9	117.4	10.49	25.8
7.0	040	122.7	41.6	4.88	25.2	114.3	43.3	4.55	22.0	105.6	44.7	4.20	18.9
	045	153.5	52.3	6.11	22.3	143.4	54.3	5.70	19.6	133.2	56.1	5.30	17.0
	055	178.5	63.1	7.10	29.8	167.6	65.4	6.67	26.4	156.4	67.4	6.22	23.1
	060	204.9	74.4	4.89	29.8	192.9	77.2	4.61	29.8	—	—	—	—
	070	233.5	82.1	9.29	33.0	218.6	85.2	8.70	29.1	203.7	87.8	8.10	25.4
	075	261.4	93.6	10.40	25.3	245.5	97.0	9.77	22.4	229.6	99.8	9.13	19.7
	090	311.1	111.2	12.37	35.4	292.3	115.8	11.63	31.4	274.1	120.1	10.90	27.7
8.0	040	127.5	42.5	5.07	27.1	118.8	44.2	4.73	23.7	110.0	45.7	4.38	20.4
	045	159.4	53.4	6.34	24.0	149.1	55.5	5.93	21.1	138.6	57.4	5.52	18.4
	055	185.2	64.4	7.37	32.0	173.9	66.9	6.92	28.4	162.5	69.0	6.47	24.9
	060	212.4	76.0	5.08	29.8	200.1	78.9	4.78	29.8	—	—	—	—
	070	242.3	83.8	9.64	35.4	227.1	87.0	9.04	31.3	211.8	89.8	8.43	27.4
	075	271.0	95.6	10.78	27.2	254.8	99.1	10.14	24.1	238.5	102.2	9.49	21.3
	090	322.4	113.6	12.83	37.9	303.2	118.3	12.06	33.7	284.5	122.8	11.32	29.8
9.0	040	132.3	43.3	5.27	29.1	123.5	45.2	4.92	25.5	114.5	46.8	4.56	22.1
	045	165.4	54.5	6.58	25.8	154.8	56.8	6.17	22.7	144.2	58.7	5.74	19.8
	055	191.8	65.8	7.64	34.3	180.4	68.3	7.18	30.5	168.7	70.6	6.72	26.8
	060	220.1	77.6	5.26	29.8	207.5	80.6	4.96	29.8	—	—	—	—
	070	251.2	85.6	10.00	38.0	235.8	88.9	9.39	33.7	220.2	91.9	8.77	29.5
	075	280.6	97.6	11.17	29.1	264.3	101.3	10.52	25.9	247.7	104.6	9.86	22.9
	090	333.9	116.0	13.29	40.6	314.4	120.9	12.52	36.2	295.1	125.6	11.75	32.0
10.0	040	137.2	44.2	5.47	31.3	128.2	46.2	5.11	27.5	119.1	47.8	4.74	23.8
	045	171.5	55.7	6.83	27.7	160.7	58.0	6.40	24.4	149.8	60.0	5.97	21.4
	055	198.8	67.1	7.92	36.7	187.0	69.8	7.45	32.7	175.1	72.2	6.97	28.8
	060	227.9	79.2	5.45	29.8	215.0	82.3	5.14	29.8	—	—	—	—
	070	260.2	87.3	10.37	40.7	244.6	90.9	9.74	36.2	228.7	94.0	9.11	31.8
	075	290.6	99.7	11.57	31.1	273.8	103.5	10.91	27.8	257.0	106.9	10.24	24.6
	090	345.6	118.4	13.76	43.4	325.6	123.5	12.97	38.7	305.9	128.3	12.18	34.3
13.0	040	152.5	46.9	6.08	38.4	143.1	49.1	5.71	33.9	133.3	51.1	5.32	29.7
	045	190.6	59.1	7.60	34.0	179.1	61.7	7.14	30.2	167.5	64.1	6.68	26.5
	055	220.0	71.3	8.77	44.7	207.7	74.4	8.28	40.0	195.0	77.1	7.77	35.5
	060	252.4	84.1	6.04	29.8	—	—	—	—	—	—	—	—
	070	288.7	92.6	11.51	49.8	272.2	96.7	10.85	44.5	255.2	100.3	10.18	39.3
	075	319.4	105.5	12.74	37.4	300.9	109.7	12.00	33.3	282.4	113.5	11.26	29.5
	090	381.7	125.7	15.22	52.6	360.8	131.5	14.39	47.2	—	—	—	—
16.0	040	159.0	48.0	6.34	41.6	147.8	50.0	5.90	36.2	136.7	51.8	5.45	31.1
	045	198.9	60.5	7.94	36.9	185.6	63.0	7.41	32.3	172.5	65.1	6.89	28.1
	055	234.5	74.1	9.36	50.6	219.5	76.9	8.76	44.6	204.6	79.4	8.17	39.0
	060	278.4	89.1	6.67	29.8	—	—	—	—	—	—	—	—
	070	313.1	97.1	12.50	58.3	294.9	101.3	11.77	52.0	275.8	105.0	11.01	45.7
	075	340.6	109.8	13.59	42.4	321.5	114.3	12.83	37.9	—	—	—	—
	090	418.5	133.2	16.70	62.9	—	—	—	—	—	—	—	—

LCWT CORRECTION



COOLER WATER TEMPERATURE RISE (C)

Above 6 C, ADD correction to design LCWT
Below 6 C, SUBTRACT

Performance data — SI (cont)

30GB100-200

COOLING CAPACITIES — SI

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (C)											
		25				30				35			
		Cap	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
4.0	100	364.4	100.7	14.47	25.8	347.1	106.4	13.78	23.5	329.3	111.5	13.07	21.2
	110	410.2	116.6	16.28	32.4	390.0	123.1	15.48	29.4	369.6	129.1	14.67	26.5
	125	469.0	129.4	18.62	23.2	445.2	136.4	17.68	20.9	421.1	142.7	16.72	18.6
	150	574.3	155.3	22.80	22.3	544.4	163.9	21.61	20.1	514.2	171.6	20.42	18.0
	175	641.8	181.7	25.48	27.6	609.4	190.9	24.19	25.0	576.7	199.2	22.89	22.4
	200	713.3	208.0	28.32	33.9	677.2	217.8	26.88	30.6	640.7	226.6	25.44	27.5
5.0	100	376.5	102.4	14.96	27.5	358.8	108.3	14.25	25.1	340.7	113.6	13.53	22.7
	110	423.6	118.6	16.83	34.5	403.1	125.4	16.01	31.4	382.5	131.7	15.20	28.4
	125	485.2	131.8	19.28	24.9	460.9	139.0	18.31	22.4	436.3	145.6	17.33	20.1
	150	594.3	158.1	23.61	23.8	563.9	167.1	22.40	21.5	533.2	175.1	21.18	19.3
	175	664.2	185.1	26.39	29.5	630.6	194.6	25.05	26.7	596.8	203.3	23.71	24.0
	200	737.6	212.1	29.30	36.2	700.8	222.2	27.84	32.8	663.6	231.4	26.36	29.5
6.0	100	388.7	104.2	15.45	29.3	370.7	110.2	14.74	26.7	352.3	115.8	14.00	24.2
	110	437.2	120.7	17.38	36.7	416.4	127.7	16.55	33.4	395.4	134.3	15.72	30.3
	125	501.6	134.2	19.94	26.7	477.0	141.7	18.96	24.1	451.8	148.5	17.96	21.6
	150	615.2	161.0	24.45	25.5	583.9	170.2	23.21	23.0	552.5	178.6	21.96	20.7
	175	686.8	188.6	27.30	31.5	652.8	198.5	25.95	28.6	618.1	207.4	24.57	25.7
	200	761.8	216.1	30.29	38.6	724.4	226.7	28.80	35.0	687.1	236.2	27.31	31.6
7.0	100	401.0	105.9	15.95	31.1	382.8	112.2	15.23	28.5	364.1	117.9	14.48	25.8
	110	451.0	122.8	17.94	39.1	429.8	130.0	17.10	35.6	408.5	136.8	16.25	32.3
	125	518.3	136.6	20.61	28.6	493.1	144.4	19.61	25.8	467.6	151.5	18.60	23.2
	150	636.1	163.8	25.30	27.2	604.2	173.4	24.03	24.6	572.2	182.1	22.76	22.2
	175	709.5	192.1	28.22	33.6	674.9	202.3	26.84	30.5	639.9	211.7	25.45	27.5
	200	786.9	220.3	31.30	41.1	748.8	231.2	29.79	37.3	710.4	241.1	28.26	33.7
8.0	100	413.5	107.7	16.46	33.1	395.1	114.1	15.72	30.3	376.0	120.1	14.96	27.5
	110	465.1	125.0	18.51	41.5	443.5	132.4	17.65	37.8	421.8	139.4	16.78	34.4
	125	535.3	139.0	21.30	30.5	509.6	147.1	20.28	27.6	483.6	154.4	19.25	24.8
	150	657.1	166.7	26.15	29.0	625.3	176.7	24.88	26.4	592.3	185.7	23.57	23.7
	175	733.1	195.8	29.18	35.9	697.8	206.3	27.77	32.6	661.8	215.9	26.34	29.4
	200	812.5	224.5	32.33	43.8	774.2	235.9	30.81	39.9	734.6	246.0	29.24	36.0
9.0	100	426.5	109.5	16.98	35.1	407.6	116.1	16.23	32.2	388.2	122.3	15.46	29.3
	110	479.3	127.1	19.08	44.0	457.4	134.7	18.21	40.2	435.1	141.9	17.32	36.5
	125	552.5	141.5	22.00	32.6	526.3	149.8	20.96	29.5	499.9	157.4	19.90	26.6
	150	678.8	169.6	27.03	30.9	646.0	179.9	25.72	28.1	613.1	189.3	24.41	25.4
	175	756.9	199.4	30.14	38.2	720.8	210.3	28.70	34.7	684.4	220.3	27.25	31.4
	200	838.4	228.8	33.38	46.6	799.5	240.5	31.83	42.5	759.3	251.1	30.23	38.4
10.0	100	439.5	111.2	17.50	37.2	420.0	118.1	16.73	34.1	400.4	124.4	15.95	31.1
	110	493.8	129.3	19.67	46.6	471.5	137.1	18.78	42.7	448.9	144.6	17.88	38.8
	125	569.6	144.0	22.69	34.7	543.4	152.5	21.65	31.6	516.4	160.4	20.57	28.4
	150	700.9	172.6	27.92	32.9	667.5	183.2	26.59	30.0	633.6	192.9	25.23	27.1
	175	781.1	203.1	31.11	40.6	744.3	214.3	29.65	37.0	707.2	224.7	28.17	33.5
	200	864.8	233.2	34.45	49.5	825.2	245.3	32.87	45.2	784.8	256.3	31.26	41.0
13.0	100	479.4	116.7	19.11	44.1	458.9	124.1	18.30	40.6	438.3	131.1	17.48	37.1
	110	538.4	135.9	21.47	55.2	514.9	144.5	20.53	50.7	491.1	152.6	19.58	46.2
	125	623.8	151.7	24.87	41.9	595.7	161.0	23.75	38.1	567.3	169.7	22.62	34.5
	150	769.6	181.6	30.69	39.6	734.3	193.3	29.28	36.1	698.3	204.0	27.84	32.8
	175	856.1	214.4	34.14	48.6	817.1	226.6	32.58	44.4	777.9	238.1	31.02	40.4
	200	946.7	246.7	37.75	59.1	905.2	259.9	36.09	54.2	862.6	272.0	34.39	49.3
16.0	100	521.0	122.4	20.79	51.9	499.7	130.4	19.94	47.9	478.0	137.9	19.08	44.0
	110	584.8	142.8	23.34	64.8	559.9	152.0	22.34	59.6	534.9	160.8	21.35	54.6
	125	679.6	159.6	27.12	50.0	648.5	169.4	25.88	45.4	616.7	178.5	24.61	41.0
	150	842.2	191.2	33.61	47.2	803.7	203.6	32.07	43.1	763.3	214.9	30.46	39.0
	175	934.0	226.2	37.28	57.7	893.4	239.5	35.65	52.9	852.2	252.0	34.01	48.3
	200	—	260.9	41.18	69.9	988.3	275.1	39.44	64.3	943.6	288.2	37.66	58.8

LEGEND

Cap. — Cooling Capacity kW of Refrigeration
 kW — Compressor Power Input
 LCWT — Leaving Chilled Water Temperature (C)
 PD — Pressure Drop (kPa of Water)
 Flow Rate — L/s

NOTES:

- Ratings apply to units with electronic or thermal expansion valves
- All ratings are based on:
 - A cooler water temperature rise of 6 F. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve.
 - A fouling factor of 0.000044 in the cooler
 - Refrigerant 22
- When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT:
 - Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (kW) and power input (kW) to compressor at its rated voltage
 - Calculate corrected flow rate through the cooler:

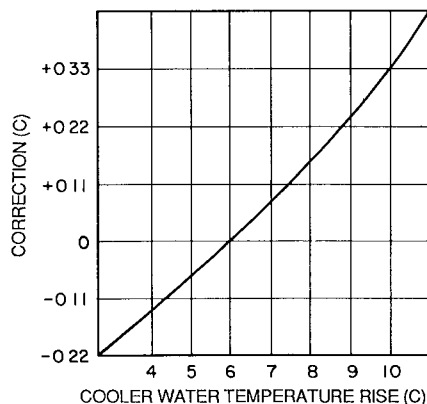
$$= \frac{0.239 \times \text{capacity in kW}}{\text{temperature rise C}} = \text{L/s}$$
 - Enter cooler pressure drop curve at corrected flow rate and read pressure drop
- When cooler water temperature rise is less than 3 C, high flow rate will normally be accompanied by an excessive pressure drop. In such cases, contact your Carrier representative for special selection of a cooler with wider baffle spacing
- Ratings are in accordance with ARI Standard 590-86

30GB100-200 (cont)

COOLING CAPACITIES — SI (cont)

LCWT	UNIT 30GB	CONDENSER ENTERING AIR TEMPERATURE (C)											
		40				45				50 (Export Only)			
		Cap	kW	Cooler		Cap.	kW	Cooler		Cap.	kW	Cooler	
				Flow Rate	PD			Flow Rate	PD			Flow Rate	PD
4.0	100	311.1	116.1	12.35	19.0	292.7	120.2	11.62	16.9	273.9	123.7	10.87	14.9
	110	349.2	134.8	13.86	23.8	328.5	139.8	13.04	21.1	307.9	144.5	12.22	18.6
	125	396.7	148.3	15.75	16.5	372.0	153.3	14.77	14.5	346.9	157.4	13.77	12.6
	150	484.0	178.4	19.22	16.0	453.1	184.4	17.99	14.1	421.8	189.4	16.75	12.2
	175	542.3	206.4	21.53	19.9	508.7	212.8	20.20	17.6	474.2	218.1	18.83	15.4
	200	603.6	234.1	23.96	24.5	566.2	240.8	22.48	21.7	528.3	246.3	20.97	18.9
5.0	100	322.2	118.4	12.80	20.4	303.5	122.8	12.06	18.2	284.2	126.5	11.29	16.0
	110	361.5	137.5	14.36	25.4	340.4	142.9	13.52	22.7	319.2	147.7	12.68	20.0
	125	411.4	151.5	16.34	17.8	386.2	156.7	15.34	15.7	360.6	161.1	14.33	13.6
	150	502.0	182.2	19.94	17.2	470.4	188.5	18.69	15.1	438.7	193.9	17.43	13.2
	175	562.5	210.9	22.35	21.4	528.3	217.7	20.99	19.0	492.8	223.3	19.58	16.6
	200	625.9	239.3	24.86	26.3	587.7	246.4	23.35	23.3	549.1	252.3	21.82	20.4
6.0	100	333.6	120.8	13.26	21.8	314.3	125.4	12.49	19.4	294.8	129.3	11.72	17.2
	110	373.9	140.3	14.87	27.2	352.4	145.9	14.01	24.3	330.8	151.0	13.15	21.5
	125	426.4	154.7	16.95	19.2	400.5	160.1	15.92	16.9	374.5	164.9	14.89	14.7
	150	520.9	186.1	20.71	18.5	488.4	192.7	19.42	16.3	456.1	198.5	18.13	14.3
	175	582.9	215.4	23.17	23.0	548.1	222.7	21.79	20.4	512.0	228.6	20.35	17.9
	200	648.6	244.6	25.78	28.2	609.7	252.1	24.24	25.0	570.3	258.3	22.67	22.0
7.0	100	345.0	123.2	13.72	23.3	325.4	127.9	12.94	20.8	305.5	132.2	12.15	18.4
	110	386.6	143.1	15.38	29.0	364.7	148.9	14.51	25.9	342.6	154.2	13.63	23.0
	125	441.6	157.9	17.56	20.6	415.2	163.6	16.51	18.2	388.7	168.7	15.46	15.9
	150	539.9	189.9	21.48	19.8	506.8	197.0	20.16	17.5	473.5	203.0	18.83	15.4
	175	603.8	220.0	24.02	24.6	568.2	227.6	22.60	21.9	531.9	234.1	21.16	19.2
	200	671.7	249.9	26.72	30.3	632.0	257.8	25.14	26.9	592.0	264.4	23.55	23.7
8.0	100	356.6	125.5	14.19	24.9	336.7	130.5	13.40	22.3	316.5	135.0	12.59	19.8
	110	399.5	145.9	15.90	30.9	377.2	152.0	15.01	27.7	354.6	157.5	14.11	24.6
	125	457.1	161.1	18.19	22.1	430.2	167.2	17.12	19.6	402.9	172.5	16.04	17.1
	150	559.2	193.8	22.25	21.2	525.6	201.2	20.92	18.8	491.5	207.6	19.56	16.5
	175	625.1	224.7	24.88	26.3	588.5	232.5	23.42	23.4	551.3	239.4	21.94	20.7
	200	695.6	255.3	27.68	32.4	654.9	263.6	26.06	28.8	614.0	270.6	24.43	25.4
9.0	100	368.4	127.9	14.67	26.5	348.1	133.1	13.86	23.8	327.6	137.8	13.04	21.1
	110	412.5	148.7	16.42	33.0	389.9	155.0	15.52	29.5	366.9	160.9	14.61	26.3
	125	473.0	164.4	18.83	23.8	445.5	170.7	17.74	21.0	417.6	176.3	16.63	18.4
	150	579.0	197.8	23.05	22.7	544.6	205.5	21.68	20.2	509.9	212.3	20.30	17.8
	175	647.1	229.4	25.76	28.2	609.5	237.6	24.27	25.1	571.7	244.8	22.76	22.2
	200	719.1	260.6	28.63	34.6	677.8	269.3	26.98	30.8	636.3	276.8	25.33	27.3
10.0	100	380.4	130.3	15.15	28.2	359.8	135.8	14.33	25.3	338.9	140.7	13.50	22.6
	110	425.8	151.6	16.96	35.1	402.9	158.2	16.05	31.5	379.4	164.2	15.11	28.1
	125	489.0	167.7	19.48	25.4	461.0	174.3	18.36	22.6	432.6	180.2	17.23	19.8
	150	599.4	201.8	23.87	24.3	564.1	209.9	22.47	21.6	528.6	216.9	21.05	19.1
	175	669.1	234.1	26.65	30.1	630.6	242.6	25.12	26.8	591.9	250.2	23.58	23.7
	200	743.4	266.1	29.61	36.9	701.4	275.1	27.94	33.0	659.2	283.1	26.26	29.3
13.0	100	417.4	137.6	16.64	33.8	395.9	143.7	15.79	30.5	373.9	149.3	14.91	27.3
	110	466.9	160.3	18.62	41.9	442.4	167.5	17.64	37.8	418.0	174.4	16.67	33.9
	125	538.3	177.7	21.47	31.0	509.1	185.2	20.30	27.7	479.0	191.9	19.10	24.5
	150	661.8	213.8	26.39	29.5	624.7	223.0	24.91	26.4	587.0	231.2	23.41	23.4
	175	738.2	248.6	29.43	36.5	697.6	258.3	27.82	32.7	—	—	—	—
	200	818.9	282.9	32.65	44.6	774.7	293.1	30.89	40.1	—	—	—	—
16.0	100	456.0	145.1	18.20	40.2	433.3	151.8	17.29	36.4	410.4	158.1	16.38	32.8
	110	509.7	169.2	20.34	49.8	483.9	177.1	19.31	45.0	—	—	—	—
	125	584.5	187.0	23.33	36.7	551.7	194.7	22.02	32.7	—	—	—	—
	150	722.8	225.4	28.85	35.1	681.1	234.9	27.18	31.3	—	—	—	—
	175	810.5	263.7	32.34	43.8	767.4	274.3	30.63	39.4	—	—	—	—
	200	898.3	300.3	35.85	53.5	852.3	311.8	34.01	48.3	—	—	—	—

LCWT CORRECTION



Above 6 C, ADD correction to design LCWT
Below 6 C, SUBTRACT

Performance data — SI (cont)

30GT225-280

COOLING CAPACITIES — SI

LCWT	UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (C)														
		30.0			35.0			40.0			45.0			50.0		
		Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate	Cap.	Input kW	Cooler Flow Rate
4.0	225	799.5	243.7	33.8	738.5	254.6	32.0	696.7	264.4	30.2	655.1	273.2	28.4	612.9	280.9	26.6
	250	846.6	259.7	36.7	802.6	272.5	34.8	759.0	284.2	32.9	715.0	294.8	31.0	670.7	304.4	29.1
	280	952.3	297.0	41.3	905.5	310.6	39.3	858.8	323.2	37.2	811.8	334.9	35.2	765.2	345.8	33.2
5.0	225	805.7	248.5	35.0	764.1	259.8	33.2	721.9	270.2	31.3	678.8	279.3	29.5	635.8	287.5	27.6
	250	875.5	264.5	38.0	831.0	277.7	36.1	785.7	289.8	34.1	740.8	300.9	32.1	695.5	311.0	30.2
	280	983.5	302.6	42.7	936.1	316.7	40.6	888.2	329.7	38.5	840.3	341.9	36.5	792.0	353.2	34.4
6.0	225	832.5	253.3	36.1	789.9	265.1	34.3	747.1	275.9	32.4	703.5	285.6	30.5	659.0	294.1	28.6
	250	905.1	269.2	39.3	859.4	282.9	37.3	813.6	295.6	35.3	767.0	307.1	33.3	720.7	317.6	31.3
	280	1016.2	308.3	44.1	966.8	322.7	42.0	918.2	336.3	39.9	869.1	349.0	37.7	819.9	360.8	35.6
7.0	225	860.4	258.3	37.4	816.4	270.5	35.5	772.5	281.6	33.6	728.2	291.8	31.6	683.2	300.8	29.7
	250	934.8	274.0	40.6	888.6	288.2	38.6	841.6	301.4	36.6	794.4	313.4	34.5	746.4	324.3	32.4
	280	1049.0	314.0	45.6	999.0	329.0	43.4	948.4	343.0	41.2	898.5	356.1	39.0	848.0	368.3	36.8
8.0	225	887.8	263.2	38.6	843.9	275.9	36.7	798.5	287.5	34.7	753.2	298.0	32.7	707.4	307.6	30.8
	250	965.9	278.9	42.0	918.3	293.6	39.9	870.2	307.2	37.8	821.8	319.7	35.7	773.2	331.2	33.6
	280	1081.4	319.7	47.0	1031.2	335.2	44.8	980.0	349.7	42.6	928.1	363.3	40.3	876.7	376.0	38.1
9.0	225	916.6	268.3	39.9	871.4	281.4	37.9	825.2	293.4	35.9	778.8	304.4	33.9	731.9	314.3	31.8
	250	997.0	283.8	43.4	948.4	299.0	41.2	899.5	313.1	39.1	850.0	326.1	37.0	800.1	338.0	34.8
	280	1115.2	325.5	48.5	1063.4	341.4	46.2	1011.6	356.5	44.0	959.0	370.6	41.7	905.7	383.7	39.4
10.0	225	945.5	273.4	41.1	899.3	286.9	39.1	852.6	299.4	37.1	804.9	310.8	35.0	757.0	321.2	32.9
	250	1028.4	288.7	44.7	979.1	304.4	42.6	929.1	319.0	40.4	878.6	332.5	38.2	827.6	344.9	36.0
	280	1150.2	331.4	50.0	1096.4	347.8	47.7	1042.9	363.3	45.4	990.0	377.9	43.1	935.9	391.6	40.7
13.0	225	1034.4	289.2	45.1	985.7	303.9	42.9	936.2	317.7	40.8	886.3	330.5	38.6	—	—	—
	250	1121.5	302.9	48.8	1065.3	319.4	46.4	1009.2	334.7	44.0	952.0	348.7	41.5	895.0	361.6	39.0
	280	1257.1	349.4	54.8	1199.6	367.3	52.2	1138.4	383.3	49.6	1077.7	398.4	46.9	1016.4	412.4	44.3
16.0	225	1076.5	296.1	46.9	1017.2	309.6	44.3	957.7	321.8	41.8	898.1	332.8	39.2	—	—	—
	250	1145.5	306.0	49.9	1084.2	322.0	47.3	1022.9	336.7	44.6	961.6	350.2	41.9	900.4	362.3	39.3
	280	1300.3	355.8	56.7	1232.5	372.5	53.7	1165.1	387.9	50.8	1098.0	402.2	47.9	1031.1	415.3	45.0

LEGEND

Cap. — Cooling Capacity kW of Refrigeration
 kW — Compressor Power Input
 LCWT — Leaving Chilled Water Temperature (C)
 Flow Rate — L/s

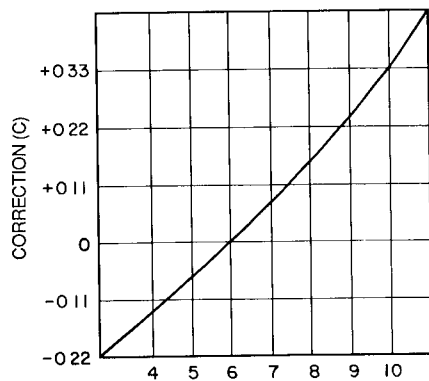
NOTES

- 1 All ratings are based on.
 - a A cooler water temperature rise of 6 C. When greater accuracy is desired, correct design LCWT, before entering rating tables, by reference to the LCWT correction curve
 - b A fouling factor of 0.00044 in the cooler
 - c Refrigerant 22

- 2 When a corrected LCWT is used, cooler pressure drop must also be corrected for new LCWT
 - a Enter rating table for corrected LCWT. By interpolation, determine corrected capacity (kW) and power input (kW) to compressor at its rated voltage
 - b Calculate corrected flow rate through the cooler

$$= \frac{0.239 \times \text{capacity in kW}}{\text{temperature rise C}} = \text{L/s}$$
 - c Enter cooler pressure drop curve at corrected flow rate and read pressure drop
- 3 When cooler water temperature rise is less than 3 C, high flow rate will normally be accompanied by an excessive pressure drop. In such cases, contact your Carrier representative for special selection of a cooler with wider baffle spacing
- 4 Ratings are in accordance with ARI Standard 590-86.

LCWT CORRECTION



Above 6 C, ADD correction to design LCWT
 Below 6 C, SUBTRACT

Performance data (cont)

CAPACITY CONTROL STEPS

UNIT 30GB	CONTROL STEPS	% DISPLACEMENT (Approximate)	LOADING SEQUENCE A (Note 1)				LOADING SEQUENCE B (Note 1)			
			No of Compr	No. of Cyl	Operating		No of Compr	No of Cyl	Operating	
					Compressor No.				Compressor No.	
					Circuit 1	Circuit 2			Circuit 1	Circuit 2
040 Standard (One Unloader)	1	25 0	1	2	1*	—	—	—	—	—
	2	50 0	1	4	1*	—	—	—	—	—
	3	75 0	2	6	1*	2	—	—	—	—
	4	100.0	2	8	1*	2	—	—	—	—
040 Accessory Unloader Added to Compressor No. 2	1	25 0	1	2	1*	—	1	2	—	2*
	2	50 0	2	4	1*	2*	2	4	1*	2*
	3	75 0	2	6	1*	2	2	6	1	2*
	4	100.0	2	8	1	2	2	8	1	2
045 Standard (One Unloader)	1	20 0	1	2	1*	—	—	—	—	—
	2	40 0	1	4	1*	—	—	—	—	—
	3	80 0	2	8	1*	2	—	—	—	—
	4	100.0	2	10	1	2	—	—	—	—
045 Accessory Unloader Added to Compressor No. 2	1	A 20 0 B 40 0	1	2	1*	—	1	4	—	2*
	2	60 0	2	6	1*	2*	2	6	1*	2*
	3	80 0	2	8	1*	2	2	8	1	2*
	4	100.0	2	10	1	2	2	10	1	2
055 Standard (One Unloader)	1	33 3	1	4	1*	—	—	—	—	—
	2	50 0	1	6	1*	—	—	—	—	—
	3	83 3	2	10	1*	2	—	—	—	—
	4	100.0	2	12	1	2	—	—	—	—
055 Accessory Unloader Added to Compressor No. 2	1	33 3	1	4	1*	—	1	4	—	2*
	2	66 7	2	8	1*	2*	2	8	1*	2*
	3	83 3	2	10	1*	2	2	10	1	2*
	4	100.0	2	12	1	2	2	12	1	2
060 Standard (One Unloader)	1	28 7	1	4	1*	—	—	—	—	—
	2	43 1	1	6	1*	—	—	—	—	—
	3	85 6	2	10	1*	2	—	—	—	—
	4	100.0	2	12	1	2	—	—	—	—
060 Accessory Unloader Added to Compressor No. 2	1	A 28 7 B 37 9	1	4	1*	—	1	4	—	2*
	2	66 7	2	8	1*	2*	2	8	1*	2*
	3	85 6	2	10	1*	2	2	10	1	2*
	4	100.0	2	12	1	2	2	12	1	2
070 Standard (One Unloader)	1	25 0	1	4	1*	—	—	—	—	—
	2	37 5	1	6	1	—	—	—	—	—
	3	62 5	2	10	1*	3	—	—	—	—
	4	75 0	2	12	1	3	—	—	—	—
	5	87 5	3	14	1*,2	3	—	—	—	—
	6	100.0	3	16	1,2	3	—	—	—	—
070 Accessory Unloader Added to Compressor No. 3	1	25 0	1	4	1*	—	1	4	—	3*
	2	50 0	2	8	1*	3*	2	8	1*	3*
	3	62 5	2	10	1*	3	2	10	1	3*
	4	75 0	2	12	1	3	2	12	1	3
	5	87 5	3	14	1*,2	3	3	14	1*,2	3
	6	100.0	3	16	1,2	3	3	16	1,2	3
075 Standard	1	22	1	4	1*	—	—	—	—	—
	2	33	1	6	1	—	—	—	—	—
	3	56	2	10	1*	3	—	—	—	—
	4	67	2	12	1	3	—	—	—	—
	5	89	3	16	1*,2	3	—	—	—	—
	6	100	3	18	1,2	3	—	—	—	—
075 Accessory Unloader Added to Compressor No. 3	1	22	1	4	1*	—	1	4	—	3*
	2	44	2	8	1*	3*	2	8	1*	3*
	3	56	2	10	1*	3	2	10	1	3*
	4	67	2	12	1	3	2	12	1	3
	5	89	3	16	1*,2	3	3	16	1*,2	3
	6	100	3	18	1,2	3	3	18	1,2	3
090,100 Standard	1	25	1	6	1	—	1	6	—	3
	2	50	2	12	1	3	2	12	1	3
	3	75	3	18	1,2	3	3	18	1	3,4
	4	100	4	24	1,2	3,4	4	24	1,2	3,4
090,100 Accessory Unloader Added to Compressor No. 1	1	17	1	4	1*	—	—	—	—	—
	2	25	1	6	1	—	—	—	—	—
	3	42	2	10	1*	3	—	—	—	—
	4	50	2	12	1	3	—	—	—	—
	5	67	3	16	1*,2	3	—	—	—	—
	6	75	3	18	1,2	3	—	—	—	—
	7	92	4	22	1*,2	3,4	—	—	—	—
	8	100	4	24	1,2	3,4	—	—	—	—
090,100 Accessory Unloaders Added to Compr No. 1 & 3	1	17	1	4	1*	—	1	4	—	3*
	2	33	2	8	1*	3*	2	8	1*	3*
	3	42	2	10	1*	3	2	10	1	3*
	4	50	2	12	1	3	2	12	1	3
	5	67	3	16	1*,2	3	3	16	1	3*,4
	6	75	3	18	1,2	3	3	18	1	3*,4
	7	92	4	22	1*,2	3,4	4	22	1,2	3*,4
	8	100	4	24	1,2	3,4	4	24	1,2	3,4
110, 125 Standard	1	20	1	6	1	—	1	6	—	4
	2	40	2	12	1	4	2	12	1	4
	3	60	3	18	1,2	4	3	18	1	4,5
	4	80	4	24	1,2	4,5	4	24	1,2	4,5
	5	100	5	30	1,2,3	4,5	5	30	1,2,3	4,5

Performance data (cont)

CAPACITY CONTROL STEPS (cont)

UNIT 30GB	CONTROL STEPS	% DISPLACEMENT (Approximate)	LOADING SEQUENCE A (Note 1)				LOADING SEQUENCE B (Note 1)			
			Operating				Operating			
			No. of Compr	No. of Cyl	Compressor No.		No. of Compr	No. of Cyl	Compressor No.	
					Circuit 1	Circuit 2			Circuit 1	Circuit 2
110, 125 Accessory Unloader Added to Compr No. 1	1	13	1	4	1*	—	—	—	—	—
	2	20	1	6	1*	—	—	—	—	—
	3	33	2	10	1*	—	—	—	—	—
	4	40	2	12	1*	—	—	—	—	—
	5	53	3	16	1*,2	4	—	—	—	—
	6	60	3	18	1,2	4	—	—	—	—
	7	73	4	22	1*,2	4,5	—	—	—	—
	8	80	4	24	1,2	4,5	—	—	—	—
	9	93	5	28	1*,2,3	4,5	—	—	—	—
	10	100	5	30	1,2,3	4,5	—	—	—	—
110, 125 Accessory Unloaders Added to Compr No. 1 & 4	1	13	1	4	1*	—	1	4	—	4*
	2	27	2	8	1*	4*	2	8	1*	4*
	3	33	2	10	1*	4	2	10	1	4*
	4	40	2	12	1	4	2	12	1	4
	5	53	3	16	1,2	4	3	16	1	4*,5
	6	60	3	18	1,2	4	3	18	1	4,5
	7	73	4	22	1*,2	4,5	4	22	1,2	4*,5
	8	80	4	24	1,2	4,5	4	24	1,2	4,5
	9	93	5	28	1*,2,3	4,5	5	28	1,2,3	4*,5
	10	100	5	30	1,2,3	4,5	5	30	1,2,3	4,5
150 Standard	1	17	1	6	1	—	1	6	—	4
	2	33	2	12	1	4	2	12	1	4
	3	50	3	18	1,2	4	3	18	1	4,5
	4	67	4	24	1,2	4,5	4	24	1,2	4,5
	5	83	5	30	1,2,3	4,5	5	30	1,2	4,5,6
	6	100	6	36	1,2,3	4,5,6	6	36	1,2,3	4,5,6
150 Accessory Unloader Added to Compr No. 1	1	11	1	4	1*	—	—	—	—	—
	2	17	1	6	1*	—	—	—	—	—
	3	28	2	10	1*	4	—	—	—	—
	4	33	2	12	1	4	—	—	—	—
	5	44	3	16	1*,2	4	—	—	—	—
	6	50	3	18	1,2	4	—	—	—	—
	7	61	4	22	1*,2	4,5	—	—	—	—
	8	67	4	24	1,2	4,5	—	—	—	—
	9	78	5	28	1*,2,3	4,5	—	—	—	—
	10	83	5	30	1,2,3	4,5	—	—	—	—
	11	94	6	34	1*,2,3	4,5,6	—	—	—	—
	12	100	6	36	1,2,3	4,5,6	—	—	—	—
150 Accessory Unloaders Added to Compr No. 1 & 4	1	11	1	4	1*	—	1	4	—	4*
	2	22	2	8	1*	4*	2	8	1*	4*
	3	28	2	10	1*	4	2	10	1	4*
	4	33	2	12	1	4	2	12	1	4
	5	44	3	16	1*,2	4	3	16	1	4*,5
	6	50	3	18	1,2	4	3	18	1	4,5
	7	61	4	22	1*,2	4,5	4	22	1,2	4*,5
	8	67	4	24	1,2	4,5	4	24	1,2	4,5
	9	78	5	28	1*,2,3	4,5	5	28	1,2	4*,5,6
	10	83	5	30	1,2,3	4,5	5	30	1,2	4,5,6
	11	94	6	34	1*,2,3	4,5,6	6	34	1,2,3	4*,5,6
	12	100	6	36	1,2,3	4,5,6	6	36	1,2,3	4,5,6
175 Standard (Note 3)	1	14	1	6	1	—	1	6	—	5
	2	29	2	12	1	5	2	12	1	5
	3	43	3	18	1,2	5	3	18	1	5,6
	4	57	4	24	1,2	5,6	4	24	1,2	5,6
	5	71	5	30	1,2,3	5,6	5	30	1,2	5,6,7
	6	86	6	36	1,2,3	5,6,7	6	36	1,2,3	5,6,7
	7	100	7	42	1,2,3,4	5,6,7	7	42	1,2,3,4	5,6,7
200 Standard (Note 3)	1	13	1	6	1	—	1	6	—	5
	2	25	2	12	1	5	2	12	1	5
	3	38	3	18	1,2	5	3	18	1	5,6
	4	50	4	24	1,2	5,6	4	24	1,2	5,6
	5	63	5	30	1,2,3	5,6	5	30	1,2	5,6,7
	6	75	6	36	1,2,3	5,6,7	6	36	1,2,3	5,6,7
	7	88	7	42	1,2,3,4	5,6,7	7	42	1,2,3	5,6,7,8
	8	100	8	48	1,2,3,4	5,6,7,8	8	48	1,2,3,4	5,6,7,8

*Compressor unloaded

NOTES:

- The microprocessor has a random number generator that selects loading sequence A or B, which in turn determines the compressor circuit that is energized first. This evens out operating hours on each circuit over an extended period of time.
- If unit operation is anticipated with system load below minimum unloaded capacity of chiller:
 - Consider using 2 smaller units in place of larger unit
 - Increase *water loop volume* to ensure adequate run time (see Application Data)
- Accessory unloaders cannot be added to 30GB175 and 200 units, or 30GT225-280 units

CAPACITY CONTROL STEPS

UNIT 30GT*	CONTROL STEPS	% DISPLACE- MENT	LOADING SEQUENCE A (NOTE 1)				LOADING SEQUENCE B (NOTE 1)			
			Operating				Operating			
			No. of Comp	No. of Cyl	Compressor No.		No. of Comp	No. of Cyl	Compressor No.	
					Circuit A	Circuit B			Circuit A	Circuit B
225	1	12	1	6	A1	—	1	6	—	B1
	2	23	2	12	A1	B1	2	12	A1	B1
	3	35	3	18	A1,A2	B1	3	18	A1	B1,B2
	4	46	4	24	A1,A2	B1,B2	4	24	A1,A2	B1,B2
	5	58	5	30	A1,A2,A3	B1,B2	5	30	A1,A2	B1,B2,B3
	6	69	6	36	A1,A2,A3	B1,B2,B3	6	36	A1,A2,A3	B1,B2,B3
	7	85	7	42	A1,A2,A3,A4	B1,B2,B3	7	42	A1,A2,A3	B1,B2,B3,B4
	8	100	8	48	A1,A2,A3,A4	B1,B2,B3,B4	8	48	A1,A2,A3,A4	B1,B2,B3,B4
250	1	11	1	6	A1	—	1	6	—	B1
	2	22	2	12	A1	B1	2	12	A1	B1
	3	32	3	18	A1,A2	B1	3	18	A1	B1,B2
	4	43	4	24	A1,A2	B1,B2	4	24	A1,A2	B1,B2
	5	57	5	30	A1,A2,A3	B1,B2	5	30	A1,A2	B1,B2,B3
	6	72	6	36	A1,A2,A3	B1,B2,B3	6	36	A1,A2,A3	B1,B2,B3
	7	86	7	42	A1,A2,A3,A4	B1,B2,B3	7	42	A1,A2,A3	B1,B2,B3,B4
	8	100	8	48	A1,A2,A3,A4	B1,B2,B3,B4	8	48	A1,A2,A3,A4	B1,B2,B3,B4
280	1	13	1	6	A1	—	1	6	—	B1
	2	25	2	12	A1	B1	2	12	A1	B1
	3	38	3	18	A1,A2	B1	3	18	A1	B1,B2
	4	50	4	24	A1,A2	B1,B2	4	24	A1,A2	B1,B2
	5	63	5	30	A1,A2,A3	B1,B2	5	30	A1,A2	B1,B2,B3
	6	75	6	36	A1,A2,A3	B1,B2,B3	6	36	A1,A2,A3	B1,B2,B3
	7	88	7	42	A1,A2,A3,A4	B1,B2,B3	7	42	A1,A2,A3	B1,B2,B3,B4
	8	100	8	48	A1,A2,A3,A4	B1,B2,B3,B4	8	48	A1,A2,A3,A4	B1,B2,B3,B4

NOTES:

- The microprocessor has a random number generator that selects loading sequence A or B which in turn determines the compressor circuit that is energized first. This evens out operating hours on each circuit over an extended period of time.
- If unit operation is anticipated with system load below minimum unloaded capacity of chiller:
 - Consider using 2 smaller units in place of larger unit.
 - Increase *water loop volume* to ensure adequate run time (see Application Data).
- Accessory unloaders cannot be added to 30GB175 and 200 or 30GT225-280 units.

* For capacity control steps data for 30GT225-280 Flotronic II with accessory unloaders, see Controls and Troubleshooting book for Flotronic II.

Electrical data — 30GB

30GB	UNIT						COMPRESSORS†						FAN MOTORS‡				
	Volts (3Ph, 60Hz)			MCA	MOCP (Fuse)	ICF	RLA (ea)		LRA (ea)		Total MTA		Total kW (no.)	FLA (ea)		MTA (FCB)	
	Nameplate	Supplied*					Compressor No.				CB No.			Fan No.**			
		Min	Max				1	2	1	2	1	2		1,3,5	2,4,6		
040	208	187	229	182	250	499	72 8	72 8	345	345	106	106	2 7 (4)	4 6		21	
	230	207	253	172	225	499	68 4	68 4	345	345	106	106		4 6		21	
	380	342	418	104	125	287	39 0	39 0	191	191	54	54		4 6		21	
	460	414	506	82	110	246	32 4	32 4	173	173	50	50		2 3		14	
	575	518	633	62	90	181	26 9	26 9	120	120	42	42		1 8		14	
045	208	187	229	234	300	547	72 8	106 4	345	506	106	166	4 0 (6)	4 6		21	
	230	207	253	229	300	547	68 4	106 4	345	506	106	166		4 6		21	
	380	342	418	143	200	322	39 0	64 0	191	280	54	89		4 6		21	
	460	414	506	105	150	166	32 4	46 8	173	253	50	73		2 3		14	
	575	518	633	88	125	198	26 9	40 4	120	176	42	63		1 8		14	
055	208	187	229	267	350	746	106 4	106 4	506	506	166	166	4 0 (6)	4 6		21	
	230	207	253	267	350	746	106 4	106 4	506	506	166	166		4 6		21	
	380	342	418	168	250	436	64 0	64 0	280	280	89	89		4 6		21	
	460	414	506	119	150	360	46 8	46 8	253	253	73	73		2 3		14	
	575	518	633	102	125	268	40 4	40 4	176	176	63	63		1 8		14	
060	208	187	229	327	450	792	106 4	147 3	506	690	166	222	6 1 (6)	4 6	7 7	35	
	230	207	253	327	450	792	106 4	147 3	506	690	166	222		4 6	7 7	35	
	380	342	418	200	250	473	64 0	89 0	280	382	89	125		4 6	7 7	21	
	460	414	506	145	200	374	46 8	65 6	253	345	73	90		2 3	3 3	18	
	575	518	633	119	150	282	40 4	52 6	176	276	63	82		1 8	2 6	14	
070	208	187	229	360	450	720	1,3	2	1,3	2	1,3	2	9 3 (6)	6 6		35	
	230	207	253	347	450	720	110 0	72 8	506	345	166	106		6 6		35	
	380	342	418	226	250	405	64 0	39 0	280	191	89	54		3 6		14	
	460	414	506	160	200	350	48 5	32 4	253	173	73	50		3 0		35	
	575	508	633	132	150	258	40 4	26 9	176	120	63	42		2 4		18	
075	208	187	229	373	450	766	102 5	102 5	506	506	154	154	9 3 (6)	6 6		74	
	230	207	253	360	450	766	98 7	98 7	506	506	154	154		6 6		74	
	380	342	418	226	250	428	63 0	63 0	280	280	89	89		3 6		37	
	460	414	506	175	200	376	48 4	48 4	253	253	73	73		3 0		28	
	575	518	633	146	175	281	40 4	40 4	176	176	63	63		2 4		22	
090	208	187	229	445	500	808	1,2	3,4	1,2	3,4	1,2	3,4	12 4 (8)	6 6		74	
	230	207	253	445	500	808	92 3	92 3	446	446	144	144		6 6		74	
	380	342	418	266	300	443	55 7	55 7	247	247	78	78		3 6		37	
	460	414	506	196	225	382	40 5	40 5	223	223	63	63		3 0		28	
	575	518	633	185	200	314	39 1	39 1	164	164	61	61		2 4		22	
100	208	187	229	472	500	889	1,2	3,4	1,2	3,4	1,2	3,4	12 4 (8)	6 6		74	
	230	207	253	472	500	889	98 7	98 7	506	506	154	154		6 6		74	
	380	342	418	297	350	498	63 0	63 0	280	280	88	88		3 6		37	
	460	414	506	223	250	434	46 8	46 8	253	253	73	73		3 0		28	
	575	518	633	191	225	330	40 4	40 4	176	176	63	63		2 4		22	
110	208	187	229	574	600	938	1,2,3	4,5	1,2,3	4,5	1,2,3	4,5	15 5 (10)	6 6		74	
	230	207	253	565	600	938	92 3	102 5	446	506	144	154		6 6		74	
	380	342	418	345	400	521	55 7	98 7	446	506	144	154		3 6		37	
	460	414	506	266	300	447	40 5	51 0	223	253	63	73		3 0		28	
	575	518	633	233	250	376	39 1	40 8	164	176	61	63		2 4		22	
125	208	187	229	604	700	1012	1,2,3	4,5	1,2,3	4,5	1,2,3	4,5	15 5 (10)	6 6		74	
	230	207	253	584	600	1012	102 5	102 5	506	506	154	154		6 6		74	
	380	342	418	367	400	568	98 7	98 7	506	506	154	154		3 6		37	
	460	414	506	298	300	492	63 0	63 0	280	280	88	88		3 0		28	
	575	518	633	238	250	380	51 0	51 0	253	253	73	73		2 4		22	
150	208	187	229	720	800	1136	1,2,3	4,5,6	1,2,3	4,5,6	1,2,3	4,5,6	18 6 (12)	6 6		74	
	230	207	253	696	700	1136	102 5	102 5	506	506	154	154		6 6		74	
	380	342	418	437	500	638	98 7	98 7	506	506	154	154		3 6		37	
	460	414	506	355	400	550	63 0	63 0	280	280	88	88		3 0		28	
	575	518	633	284	300	430	51 0	40 8	176	176	63	63		2 4		22	
175	208	187	229	822	1000	1246	1,2,3,4	5,6,7	1,2,3,4	5,6,7	1,2,3,4	5,6,7	18 6 (12)	6 6		74	
	230	207	253	795	800	1246	102 5	102 5	506	506	154	154		6 6		74	
	380	342	418	500	500	701	98 7	98 7	506	506	154	154		6 6		74	
	460	414	506	406	450	602	117 1	110 0	506	506	164	154		3 6		37	
	575	518	633	325	350	475	63 0	63 0	280	280	88	88		3 0		28	
200	208	187	229	925	1000	1356	1,2,3,4	5,6,7,8	1,2,3,4	5,6,7,8	1,2,3,4	5,6,7,8	18 6 (12)	6 6		74	
	230	207	253	894	1000	1356	102 5	102 5	506	506	154	154		6 6		74	
	380	342	418	563	600	764	98 7	98 7	506	506	154	154		6 6		74	
	460	414	506	457	500	654	117 1	117 1	506	506	164	164		3 6		37	
	575	518	633	365	400	520	63 0	63 0	280	280	88	88		3 0		28	

Italics denote export units (not for sale in U S A)

NOTE: As shipped, all units are XL (across the line) start

FCB — Fan Circuit Breaker

CB — Circuit Breaker

FLA — Full Load Amps (Fan Motors)

ICF — Maximum Instantaneous Current Flow during starting (the point in starting sequence where the sum of the LRA for the starting compressor, plus the total RLA for all running compressors, plus the total FLA for all running fan motors is maximum)

kW — Total condenser fan motor power input

LRA — Locked Rotor Amps

MCA — Minimum Circuit Amps (for wire sizing) Complies with NEC

MOCP — Maximum Overcurrent Protective Device Amps

MTA — Must Trip Amps (Circuit Breaker)

NEC — National Electrical Code

RLA — Rated Load Amps (Compressors)

*Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits
 †30GB040,045,055,060 have 2 compressors; 30GB070 and 075 have 3 compressors; 30GB090 and 100 have 4 compressors; 30GB110 and 125 have 5 compressors; 30GB150 has 6 compressors; 30GB175 has 7 compressors; 30GB200 has 8 compressors
 ‡30GB040-060 fan motors single-phase; all others 3-phase
 30GB040 through 100; one FCB for all fans
 30GB110 through 200: one FCB for each circuit
 **No. 5 and 6 do not apply on 30GB040
 380-v export units (040-070 FLA shows fan nos 1,2/3,4,5,6

GENERAL ELECTRICAL NOTES:

- Unit listings are:
 UL — Underwriters Laboratories: 30GB040 through 30GB070
 ETL — ETL Testing Laboratories: 30GB075 through 30GB200
- Electrical data based on unit conforming to ARI Standard 590, Section 8.1 *Maximum Loading Conditions* (115 F ambient at -10% voltage)
- All units have single-location power connection to simplify field-power wiring. Main power must be supplied from a field-supplied disconnect. Unit must be properly grounded.
- Control circuit power must be supplied from a separate source through a field-supplied disconnect (See Note 12)
- Crankcase and cooler heaters are wired into the control circuit so they are always operable as long as the control circuit power supply disconnect is on, even if any safety device is open or the unit ON-OFF circuit breaker is off
- On 208/230-3-60 units:
 30GB040,045, 055, 060 have one terminal block, with 3 conductors from the disconnect.
 30GB070-100 have 2 terminal blocks and require 6 parallel conductors from the disconnect.
 30GB110-200 have 3 terminal blocks and require 9 parallel conductors from the disconnect

- On 380-3-60 units (export only):
 30GB040,045,055,060 have one terminal block, with 4 conductors from disconnect
 30GB070-100 have one terminal block, with 3 conductors from disconnect
 30GB110-200 have 2 terminal blocks and require 6 parallel conductors from disconnect
- On 460, 575-3-60 units:
 30GB040-125 have one terminal block, with 3 conductors from disconnect
 30GB150-200 have 2 terminal blocks and require 6 parallel conductors from disconnect
- Maximum incoming wire size for each terminal block is 500 kcmil
- The 208-230 volt 30GB060 and 200 units must have copper main power conductors to meet NEC requirements
- Amperage required for control circuit is as follows:

UNIT 30GB	POWER SUPPLY	CONTROL CIRCUIT	
		Power	Amps
040-200	380-3-60	230-1-60	15
040-070	208/230-3-60, 460-3-60, 575-3-60	115-1-60	15
075,090,100			20
110,125			25
150,175,200			30

Italics denote export unit (not for sale in U S A)

- Power draw of control circuits includes both crankcase heaters and cooler heaters. Each compressor has a crankcase heater which draws 200 watts of power

Cooler heaters:

040-070 — 2 cable heaters (210 watts each)
 075-110 — 2 cable heaters (210 watts each)
 125-280 — 4 cable heaters (210 watts each)

Electrical data—30GT

Unit							Compressors						Fan Motors		
30GT	Volts (3 Ph., 60 Hz)			MCA	MOCP (Fuse)	ICF	RLA (ea)		LRA (ea)		Total MTA		Total kW (no.)	FLA (ea)	MTA (FCB)
	Nameplate	Supplied*					Compressor No.				CB No.				
		Min	Max				A4,B4	A1-A3 B1-B3	A4,B4	A1-A3 B1-B3	A4,B4	A1-A3 B1-B3			
225	380	342	418	592	600	874	80 1	58 2	382	280	62	42	24.8 (16)	3 9	50
	460	414	506	487	500	749	66 0	48 1	345	253	102	73		3 2	37
	575	518	633	416	450	626	53 0	40 4	276	176	82	63		3 4	37
250	380	342	418	651	700	933	A3,A4, B3,B4	A1,A2, B1,B2	A3,A4, B3,B4	A1,A2, B1,B2	A3,A4, B3,B4	A1,A2, B1,B2	31.0 (20)	3 9	71
	460	414	506	535	600	798	80 1	58 2	382	280	62	40		3 2	50
	575	518	633	455	500	665	66 2	48 1	345	253	102	73		3 4	50
280	380	342	418	742	800	1024	A1-A4, B1-B4	0	A1-A4, B1-B4	0	A1-A4, B1-B4	0	34.1 (22)	3 9	71
	460	414	506	610	700	873	79 5	-	382	-	62	-		3 2	50
	575	518	633	509	600	719	65 7	-	345	-	102	-		3 4	50
							52 6	-	276	-	82	-			

CB — Circuit Breaker

FCB — Fan Circuit Breaker

FLA — Full Load Amps (Fan Motors)

ICF — Maximum Instantaneous Current Flow during starting (the point in starting sequence where the sum of the LRA for the starting compressor, plus the total RLA for all running compressors, plus the total FLA for all running fan motors is maximum)

kW — Total condenser fan motor power input

LRA — Locked Rotor Amps

MCA — Minimum Circuit Amps (for wire sizing) Complies with NEC Section 430-24

MOCP — Maximum Overcurrent Protective Device Amps

MTA — Must Trip Amps (Circuit Breaker)

NEC — National Electrical Code

RLA — Rated Load Amps (Compressors)

* Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits

NOTES:

- All motors are 3-phase, nominal unit voltage
- All units constructed in accordance with NEC (National Electrical Code)
- 460-3-60 units are UL listed
- 575-3-60 units are CSA listed
- Amperage required for control circuit is as follows:

UNIT 30GT	POWER SUPPLY	CONTROL CIRCUIT	
		POWER	AMPS
225,250,280	380-3-60	230-1-60	15
	460-3-60	115-1-60	30
	575-3-60	115-1-60	30

- 380-v units are export models (not for sale in U S A)

Controls — 30GB, 30GT

Microprocessor — Microprocessor controls overall unit operation. Its central executive routine controls a number of processes simultaneously. These include internal timers, reading inputs, A to D conversions, fan control, display control, diagnostic control, output relay control, demand limit, capacity control, head pressure control and temperature reset. Some processes are updated almost continuously, others every 2 to 3 seconds, and some every 30 seconds.

The microprocessor routine is started by switching control circuit ON-OFF circuit breaker switch to ON. (This switch is also used to reset microprocessor should any safety trip and also functions as circuit breaker for electronic processor and relay boards.) On Flotronic II, ON-OFF switch is replaced by the LOCAL/STOP/CCN switch.

When the switch is closed, a 2-minute initialization routine is begun. During this time, inputs are checked, EXV and internal constants are initialized and a **20** appears on display. If display button is pushed during this period, control goes into a 42-step Quick Test routine (not on Flotronic II), normally used for a readiness check during start-up or for service.

Microprocessor controls capacity of chiller by cycling compressors on and off at a rate to satisfy actual dynamic load conditions. Control will maintain leaving water temperature set with dial on display board through intelligent cycling of compressors. Accuracy will depend on loop volume, loop flow rate, load, outside air temperature, number of stages, and particular stage being cycled off. No adjustment for cooling range or cooler flow rate is required, because the control automatically compensates for cooling range by measuring both return water temperature and leaving water temperature. This is referred to as *leaving water temperature control with return water temperature compensation*.

The basic logic for determining when to add or remove a stage is a time band integration of deviation from set point plus rate of change of leaving water temperature. When leaving water temperature is close to set point and slowly moving closer, logic prevents addition of another stage. If leaving water temperature is less than 35 F (1.7 C) for water, or 6 F (3.3 C) below the set point for

brine units, the unit is shut off until the water temperature goes to 6 F (3.3 C) above the set point, to protect against freezing.

If 1°F/minute (0.6°C/minute) pulldown control has been selected (factory setting), no additional steps of capacity will be added as long as difference between leaving water temperature and set point is greater than 4°F (2.2°C) and rate of change in leaving water temperature is less than 1°F/minute (0.6°C/minute).

If it has been less than 90 seconds since the last capacity change, compressors will continue to run unless a safety trips. This prevents rapid cycling and also helps return oil during short on periods.

Where available, two sequences are used to obtain circuit lead/lag operation and even out compressor operating hours. This requires accessory unloaders on some units. First, as unit turns on, microprocessor functioning as a random number generator determines which circuit will start first. Also, when decreasing from maximum stage, control will again randomly select which circuit is to run the longest.

The control also performs other special functions when turning on or off. When a circuit is to be turned off, EXV is closed first and compressor is run for an additional 10 seconds to pump out refrigerant that was in the cooler. Again, at start-up, if compressor hasn't run in the last 15 minutes, EXV is held closed for 10 seconds while compressor runs to pump out any refrigerant that has migrated to the cooler. The oil pressure switch is bypassed for one minute during start-up and for 45 seconds during normal operation.

Thermistors — Eight thermistors are used for temperature sensing inputs to microprocessor. (A ninth [T10] may be used as a remote temperature sensor for optional LCWT reset.)

- T1 Cooler leaving chilled water temperature
- T2 Cooler entering water (return temperature)
- T3 Saturated condensing temperature — Circuit A or 1
- T4 Saturated condensing temperature — Circuit B or 2
- T5 Cooler saturation temperature — Circuit A or 1
- T6 Cooler saturation temperature — Circuit B or 2

- T7 Return gas temperature entering compressor cylinder — Circuit A or 1
- T8 Return gas temperature entering compressor cylinder — Circuit B or 2
- T10 Remote temperature sensor (accessory)

The microprocessor uses these temperatures to control capacity, fan cycling and electronic expansion valve (EXV) operation.

Electronic expansion valve (EXV)

— To control flow of refrigerant for different operating conditions, EXV piston moves up and down over slot orifices through which refrigerant flows to modulate size of opening. Piston is moved by a stepper motor through 760 discrete steps. The piston is repositioned by microprocessor every 3 seconds.

The EXV is used to control superheat in compressor. Two thermistors in each circuit (T5 and T7/T6 and T8) are used to determine superheat. One thermistor (T5/T6) is located in cooler and other (T7/T8) in compressor after motor in the gas passage entering the cylinders. The EXV is controlled to maintain superheat entering pistons at approximately 15 F (8.3 C) to 20 F (11.1 C), which results in slightly superheated refrigerant leaving cooler.

The electronic control provides for a prepurge and pumpout cycle each time the lead compressor in a circuit is started or stopped. The compressor is allowed to run for approximately 10 seconds before and after the liquid line solenoid valve and/or electronic expansion valve opens or closes. Prepurge cycle is eliminated if compressor has operated in last 15 minutes. These pumpout cycles minimize amount of excess refrigerant that can go to compressor on start-up and cause oil dilution which would result in eventual bearing wear.

The microprocessor software is programmed so that EXV functions as a MOP (maximum operating pressure) valve, limiting the suction temperatures to 55 F (12.8 C). This makes it possible to start unit at high water temperatures, up to 95 F (35 C), without overloading compressor. Another feature that is factory set (which may be eliminated in the field by repositioning a dip switch on the microprocessor) limits rate of pulldown to 1°F (0.6°C) per minute thereby reducing the kW demand on start-up.

Accessory controls — Demand can be further limited by keeping a selected number of compressors from turning on by utilizing demand limit control accessory. This interfaces with microprocessor to control unit so that chiller's kW demand does not exceed its setting. It is activated from an external switch.

Microprocessor is programmed to accept various accessory temperature reset options, based on return water temperature, outdoor temperature, or space temperature, that reset the LCWT. An accessory thermistor (T10, above) is required if outdoor temperature or space temperature reset is elected

Compressor protection and control system (CPCS) — The board provides compressor ground current protection, shutting off compressor(s) if a 2 to 3 ampere ground current is sensed by a toroid around the compressor power leads

The CPCS control system is standard on 070-280 sizes, and offered as accessory on 040-060 sizes

Complete electronic control system contains several additional components

Relay board — Relay board, connected to microprocessor by a ribbon cable, drives all of 24-v, 115-v, or 230-v loads. Relays control compressors, fans, and unloaders, if used

Display/set point board (standard) — Display board, also connected to microprocessor by a ribbon cable, is used to communicate with operator. In addition to leaving water set point potentiometer, board contains 2-digit LED display (optional 8-character display on Flotronic II). The LED display is normally off after initialization period, to extend its life. Pressing display button will result in LED displaying the appropriate overload or status code.

If this is done, display will show from one to 3 codes alternating every 2 seconds, as follows:

CODE	STATUS
1 0-12	Capacity stage Number of stages in operation
2 20-26	Operating Mode
20	Initialization
21	Temperature Reset
22	Demand Limit
24	Pulldown Control
26	Remote ON-OFF
3 51-87	Overload Codes
	Alarm light/circuit energized
	NOTE: These codes take priority
51-58	Compressor fault
59-60	Loss of charge (circuit 1 or A, circuit 2 or B)
61	Low water flow
63-64	Low oil pressure (circuit 1 or A, circuit 2 or B)
65	Low water temperature
70	Illegal configuration
71-80	Thermistor failure
81-87	Reset/Set Point Limit Failure

These codes are summarized on a chart in each unit's control box, and are described in detail in the Controls and Troubleshooting book

Display/set point board with Flotronic II controls (optional) — Eight-digit LCD alphanumeric panel displays all of the above (with explanation of codes), plus set points, time of day, and actual temperatures, pressures and superheat.

Control Sequence

Off cycle — During unit off cycle, crankcase is energized. If ambient temperature is below 36 F (2 C), cooler and control box heaters are also energized. Electronic expansion valves are closed.

Start-up — After control circuit ON-OFF circuit breaker switched ON, prestart process takes place for 2 minutes, when microprocessor checks itself and waits for temperature to stabilize. First circuit to start may be A or B or 1 or 2, (automatic lead/lag feature). The controlled pull down feature limits compressor loading on start-up to reduce demand on start-up and unnec-

essary compressor usage. The microprocessor limits supply water temperature decrease (start-up only) to 1° F (0.6 C) per minute.

Capacity control — On first call for cooling, microprocessor starts initial compressor and fan stage on lead circuit. The electronic expansion valve remains closed for 10 seconds, permitting a pumpout on start-up. After pumpout, the valves open and, if necessary, additional outdoor fans are energized. Crankcase heaters are de-energized when a compressor is started. As additional cooling is required, lag circuit starts. If further cooling is needed, compressors are added, alternating between lead and lag circuits. Speed at which capacity is added or decreased is controlled by temperature deviation from set point and rate of temperature change of chilled water.

As less cooling is required, circuits shut down (or unload) in an order that evens out each circuit's compressor run time. When no further cooling is called for (in each compressor circuit), expansion valve closes and compressor and fans continue to run while pumping down cooler.

Low-temperature override feature prevents LCWT from overshooting the set point and possibly causing a nuisance trip-out by the freeze protection.

High-temperature override feature allows chiller to add capacity quickly during rapid load variations.

Demand limit — If applied, unit step controls limit total power draw of unit to selected point by controlling number of operational compressors during periods of peak electrical demand. Consult Accessory Demand Limit Control Module Installation Instructions for further details.

Reset accessory — If applied, microprocessor compares either return water, space or outdoor temperature with the accessory board settings, and adjusts leaving chilled water temperature appropriately.

Controls — 30GB, 30GT (cont)

Electronic expansion valve and outdoor fan control — Expansion valve opens and closes on signal from microprocessor to maintain an approximate 20 F (11 C) refrigerant superheat entering the compressor cylinders. (The compressor motor increases the refrigerant superheat from the approximate 5 F [3 C] leaving the cooler to that entering the cylinders.) Outdoor fans (operated by microprocessor) run to as low an ambient as possible to maintain a minimum expansion valve pressure differential

Abnormal conditions (alarm light) — All control safeties in chiller operate through compressor protection board or control relay and microprocessor. High-pressure switch and discharge gas thermostat directly shuts down compressor(s) through compressor protection board or control relay. For other safeties, microprocessor (1)

makes appropriate decision to shut down a compressor due to a safety trip or bad sensor reading (2) energizes *alarm light* and (3) displays appropriate failure code on the display. Chiller holds in safety mode until reset. It then reverts to normal control when unit is reset.

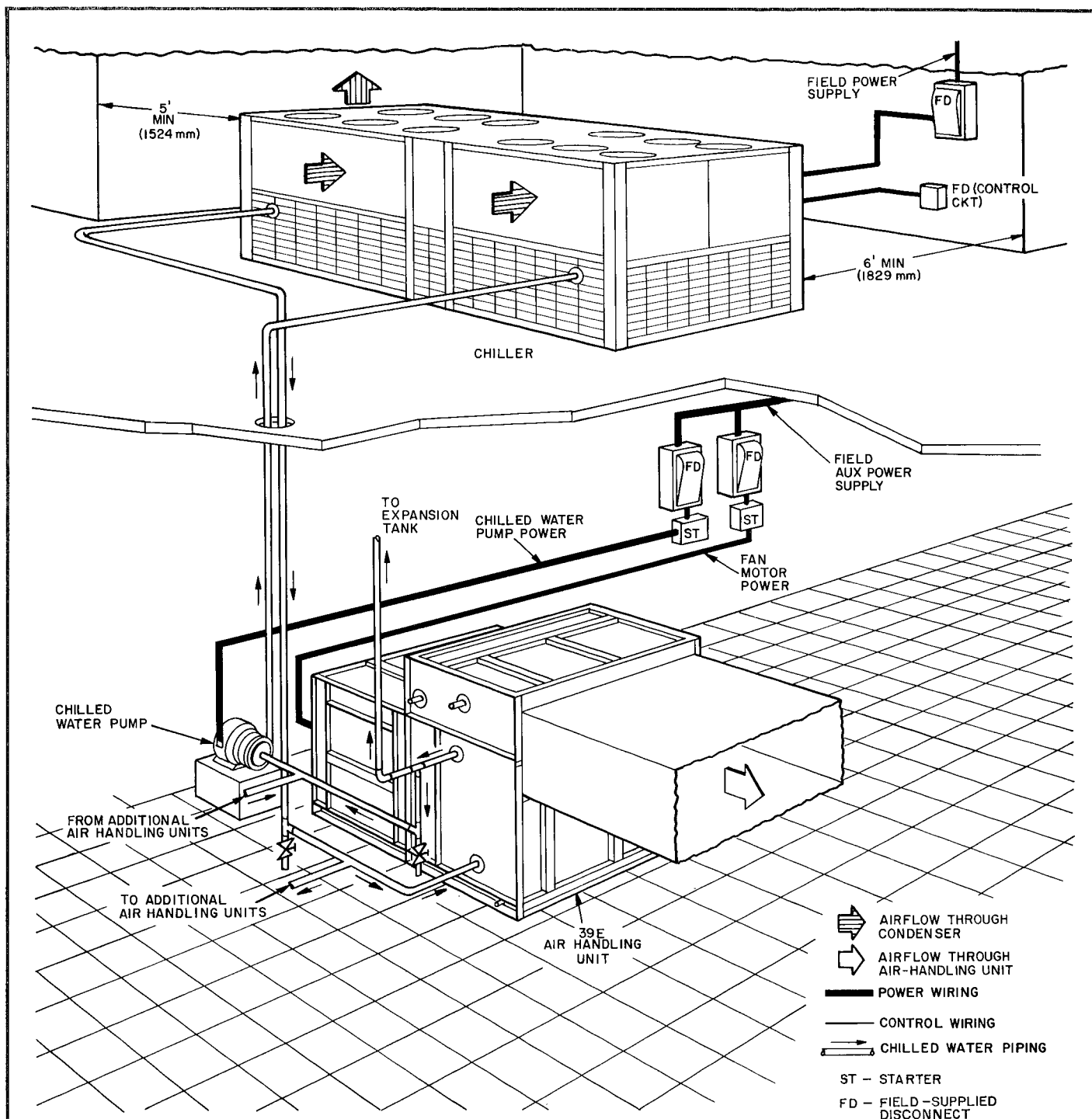
Safeties include: — *Oil pressure safety* cuts out if pressure differential is below minimum. Safety is bypassed on start-up for 45 seconds. *Loss-of-charge safety* cuts out if system pressure drops below minimum.

High-pressure cut-out shuts down compressors if compressor discharge pressure increases to 426 psig (2937 kPa) on 30GT domestic and export 60 Hz models, and 395 psig (2724 kPa) on 30GB models. *Discharge gas thermostat opens* when discharge gas temperature exceeds maximum 295 F (146 C). *Ground current safety* opens

on sensing a current-to-ground in compressor windings in excess of 2.5 amps. *Compressor anti-recycling* feature limits compressor cycling. *Loss of flow protection* provided by temperature differences between entering and leaving water temperature sensors if cooler temperature drops to 35 F (1.8 C). *Sensor failures* are detected by the microprocessor.

Diagnostics — Microprocessor may be put through Quick Test (see Controls and Troubleshooting book) without additional equipment or tools. Quick Test (not on Flotronic II) confirms microprocessor is functional, informs observer through LED display the condition of each sensor and switch in chiller, and allows observer to check for proper operation of fans and compressor(s).

Typical piping and wiring — 30GB,30GT



NOTES:

- 1 Chiller must be installed *level* to maintain proper compressor oil return
- 2 Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and not in accordance with recognized standards.
- 3 All wiring must comply with applicable local and national codes
- 4 All piping must follow standard piping techniques. Refer to Carrier System Design Manual or appropriate ASHRAE handbook for details
- 5 See *Application* data for minimum system water volume. This may require the addition of a holding tank to ensure adequate volume

Application data — 30GB, 30GT

Leveling unit

Unit must be level when installed to ensure proper oil return to the compressors.

While most outdoor locations are suitable for 30GB,GT units, the roof is a common site that presents a problem if roof has been pitched to aid in water removal. To assure proper oil return, be sure that unit is level, particularly in its major lengthwise dimension, as compressor oil return piping runs in that direction.

It should be determined prior to installation if any special treatment is required to assure a level installation.

Cooler water temperature

1. **Maximum** leaving chilled water temperature (LCWT) for unit is 70 F (21 C). Unit can start and pull down with up to 95 F (35 C) entering water temperature due to MOP (maximum operating pressure) feature of the expansion valve. For sustained operation, it is recommended that entering water temperature not exceed 85 F (29.4 C).
2. **Minimum** LCWT for standard unit is 40 F (4.5 C). It is permissible to use a standard microprocessor-controlled Flotronic chiller with leaving water temperatures in the range of 34 F to 39.9 F (1° C to 4.4 C) only if a protective brine solution (20% antifreeze solution, or greater) is used and microprocessor dip switch is properly set. (See Controls and Troubleshooting book for further information.)

Medium temperature brine application

Application of chiller for brine duty within the 39.9 F to 34 F (4.4 C to 1° C) range is possible with proper field change of control configuration. Application in the range 34 F to 15 F (1° C to 9.4 C) requires unit with factory modification. For ratings below 40 F (4.5 C) LCWT, contact your local Carrier representative.

Leaving water temperature reset

Accessory board* may be installed in chiller to provide reset of LCWT in constant water flow systems. Reset reduces compressor power usage at part load when design LCWT is not necessary. Humidity control should be considered since higher coil temperatures resulting from reset will reduce latent heat capacity. Three reset options are offered.

From return water temperature* — Increase LCWT temperature set point as return (or entering) water temperature decreases (indicating load decrease). Option may be used in any application where return water provides accurate load indication. Limitation of return water reset is: LCWT may only be reset to value of design return water temperature. Return reset is standard, and resets at the display panel.

From outdoor temperature* — Increases LCWT as outdoor ambient temperature decreases (indicating load decrease). This reset should be applied only where outdoor ambient is an accurate indication of load. An accessory thermistor is required.

From space temperature* — Increases LCWT as space temperature decreases (indicating load decrease). This reset should be applied only where space temperature is an accurate indication of load.

For details on applying a reset option, refer to unit Controls and Troubleshooting Instructions.

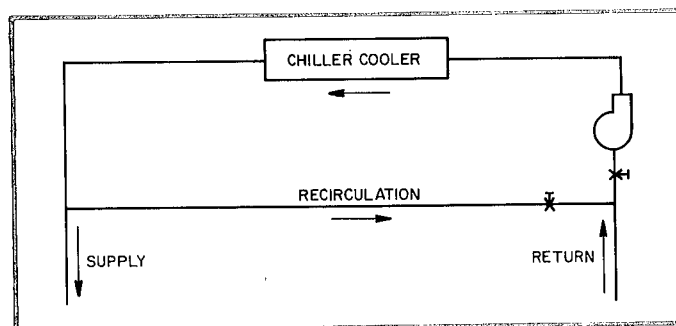
*Obtain ordering part numbers from current price pages

Cooler temperature rise

Ratings and performance data in this publication are for a cooling rise of 10° F or 5.6° C. Flotronic chillers with microprocessor control may be operated at a different temperature rise provided flow limits are not exceeded. For minimum flow rates, see Minimum Cooler Water Flow Rates table. High flow rate is limited by pressure drop that can be tolerated. If another rise is used, apply LCWT correction as given in selection example.

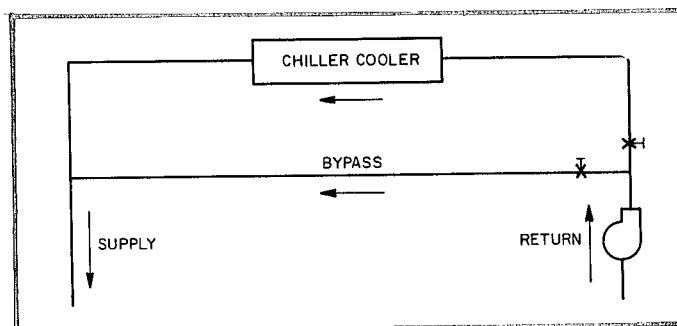
Minimum cooler flow (maximum cooler temperature rise) for standard units is shown in table. When gpm (L/s) required is lower (or rise higher), follow recommendations below:

- a. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature rise.
- b. Chilled water may be recirculated to raise flow rate. However, mixed temperature entering cooler must be maintained a minimum of at least 5° F (2.8° C) above the leaving chilled water temperature.
- c. Special cooler baffling is required to allow minimum flow rate to be reduced 12%.



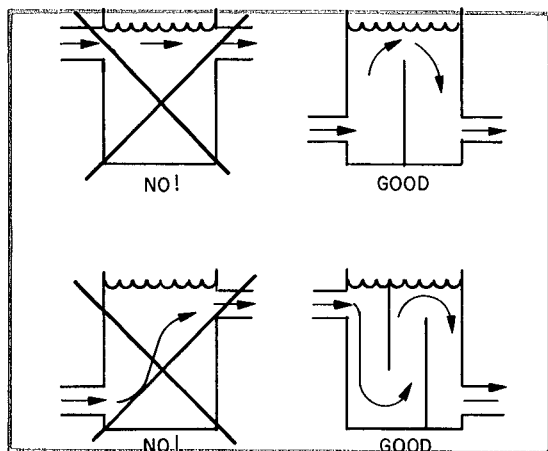
Maximum cooler flow (>5 gpm/ton or <5° F rise [$>0.09 \text{ L/s} \cdot \text{kW}$ or $<2.7^\circ \text{C}$ range]) results in practical maximum pressure drop through cooler.

- a. Return water may bypass the cooler to keep pressure drop through cooler within acceptable limits. This permits a higher ΔT with lower water flow through cooler and mixing after the cooler.
- b. Special cooler baffling is available by special order, to permit a cooler flow rate increase of 10%.



Variable cooler flow rates may be applied to standard chiller. Unit will, however, attempt to maintain a constant leaving chilled water temperature. In such cases, minimum flow must be in excess of minimum flow given in Table and flow rate must change in steps of less than 10% per minute. Apply 6 gallons per ton (6.5 liters per kW) water loop volume minimum if flow rate changes more rapidly.

Water loop volume — In circulation must equal or exceed 3 gallons per ton of cooling (3.25 liters per kW) for temperature stability and accuracy in normal air conditioning applications. (For example, a 30GB200 would require 593 gallons [2243 liters]). In jobs where accuracy is vital or for operation at ambient below 32 F (0 C) with low unit loading conditions, there should be from 6 to 10 gallons per ton (6.5 to 10.8 liters per kW). To achieve this volume, it is often necessary to install a tank in the loop. Tank should be baffled to ensure there is no stratification and that water (or brine) entering tank is adequately mixed with liquid in the tank.



**MINIMUM COOLER WATER FLOW RATES
AND MINIMUM LOOP VOLUME**

UNIT 30GB	MINIMUM FLOW (1)		PRESSURE DROP		MINIMUM VOLUME (2)	
	Gpm	L/s	Ft of water	kPa	Gallons	Liters
040	56	3.5	4.4	13.2	110	414
045	67	4.2	3.8	11.4	136	513
055	67	4.2	3.8	11.4	157	594
060	67	4.2	3.8	11.4	180	681
070	76	4.8	3.1	9.3	206	780
075	95	6.0	3.1	9.3	230	871
090	95	6.0	3.1	9.3	272	1029
100	134	8.5	3.2	9.6	303	1147
110	134	8.5	3.2	9.6	338	1281
125	156	9.8	2.2	6.6	388	1469
150	192	12.1	2.3	6.9	475	1796
175	192	12.1	2.3	6.9	532	2013
200	192	12.1	2.3	6.9	593	2243
30GT	Gpm	L/s	Ft of water	kPa	Gallons	Liters
	225	9.2	3.2	10.0	678	2565
	250	12.0	3.4	10.3	741	2803
	280	12.0	3.4	10.3	833	3101

ARI — Air Conditioning & Refrigeration Institute

- NOTES 1. Minimum flow based on 1.5 fps (0.46 m/s) velocity in cooler without special cooler baffling
2. Minimum Loop Volumes Gallons = V x ARI Cap (tons)
Liters = N x ARI Cap (kW)

APPLICATION	V	N
Normal Air Conditioning	3	3.25
Process Type Cooling	6	6.5
Low Ambient Unit Operation	6	6.5

Cooler fouling factor used to calculate tabulated ratings was .00025 ft² • hr • °F/Btu (.000044 m² • K/W). As fouling factor is increased, both unit capacity and compressor power decrease. Standard ratings should be corrected using following multipliers:

FOULING FACTOR		CAPACITY MULTIPLIER	COMPRESSOR POWER MULTIPLIER
English (ft ² • hr • °F/Btu)	SI (m ² • K/W)		
00025	000044	1.00	1.00
00075	000132	0.97	0.98
00175	000308	0.91	0.91

Cooler protection — When operating in areas that experience temperatures below 32 F (0° C), cooler protection in form of ethylene glycol (or other suitable brine) is required to protect cooler from low ambient freeze-up. Even though unit cooler is equipped with insulation and an electric heater that helps prevent freeze-up, it does not protect water piping external to unit. Use only antifreeze solutions approved for heat exchanger duty. Use of automotive type antifreezes is not recommended because of the fouling that can occur once their relatively short-lived inhibitor breaks down.

Draining cooler and outdoor piping is recommended if system is not to be used during freezing weather conditions. See section below for low ambient temperature operation.

Condenser

Altitude correction factors must be applied to standard ratings at altitudes above 2000 ft (610 m) using following multipliers:

ALTITUDE		CAPACITY MULTIPLIER	COMPRESSOR POWER MULTIPLIER
English (ft)	SI (m)		
0	0	1.00	1.00
2000	610	0.99	1.01
4000	1220	0.98	1.02
6000	1830	0.97	1.03
8000	2440	0.96	1.04
10000	3050	0.95	1.05

Condenser airflow restrictions will affect the unit capacity, condenser head pressure and compressor power input. Correction factors to be applied for external static restrictions up to 0.2 in. wg (50 Pa) are shown below.

EXTERNAL STATIC		CAPACITY MULTIPLIER	COMPRESSOR POWER MULTIPLIER
English (in. wg)	SI (Pa)		
0.0	0.0	1.00	1.00
0.1	25	0.986	1.01
0.2	50	0.968	1.03

High ambient temperature — Standard 30GB chillers can operate to 115 F (46 C) ambient temperature. Standard export chillers can operate to 125 F (52 C) ambient temperature. Standard 30GT chillers can start and operate to 125 F (52 C) ambient temperature at nominal voltage.

Application data — 30GB, 30GT (cont)

Low ambient temperature operation

30GB chillers with electronic expansion valves (EXV) will start and operate at ambient temperatures down to 0° F (-18 C) (35 F [1.7 C] for 30GT) with following field provisions.

Wind baffles must be added for operation below 32 F (0° C)

⚠ WARNING

Operation at low ambient temperature is not recommended if minimum load on chiller is below minimum step of unloading.

Antifreeze solution must be added to water loop to protect loop down to 15° F (8° C) below minimum operating ambient temperature

For operation of 30GT chillers below 35 F (18 C), 30GB EXV-equipped chillers below 0° F (-18 C), or 30GB TXV-equipped (factory-installed option) chillers below 32 F (0° C), the Carrier Motormaster® condenser head pressure control and its associated components must be added. Motormaster control allows operation down to -20 F (-29 C). Consult your local Carrier representative for details.

Provide sufficient volume in the chilled water loop — At least 6 gallons per ton of refrigeration (6.5 liters per kilowatt) is recommended minimum, provided there is a moderate system load.

Capacity Correction (Antifreeze)

Ethylene glycol (or other suitable brine) should be used in installations where subfreezing temperatures are expected. Unit performance data must be corrected for the addition of ethylene glycol as shown in following example. Correction factors may be derived from following curves.

Example: English — Where a 5 F outdoor temperature is anticipated, determine concentration of ethylene glycol to protect system to -10 F ambient temperature at zero flow.

Enter the solution crystallization point curve at -10 F, read 40% concentration of ethylene glycol is required to prevent crystals from forming in solution

Consider the 30GB175 unit from the Selection Procedure (Water) example (refer to correction curves at 40% solution)

Correct unit capacity — On glycol performance capacity correction curve, read 0.95.

$$\begin{aligned}\text{Corrected capacity} &= 0.95 \times \text{determined capacity} \\ &= 0.95 \times 184.1 \\ &= 174.9 \text{ tons}\end{aligned}$$

Correct cooler water flow — On the gpm correction factor curve, read 1.15

Cooler water flow (at corrected capacity)

$$= \frac{24 \times \text{corrected capacity}}{\text{temperature rise}} = \text{U.S. gpm}$$

$$= \frac{24 \times 174.9 \text{ tons}}{14 \text{ F}} = 299.8 \text{ U.S. gpm}$$

$$\begin{aligned}\text{Cooler water flow (40\% solution)} &= 1.15 \times 299.8 \\ &= 344.8 \text{ U.S. gpm}\end{aligned}$$

Correct cooler pressure drop — On cooler pressure drop correction curve, read 1.33.

On cooler pressure drop curve, for 344.8 gpm, read PD = 7.0 ft water gage. The pressure drop for 40% solution = $1.33 \times 7.0 = 9.3$ ft water

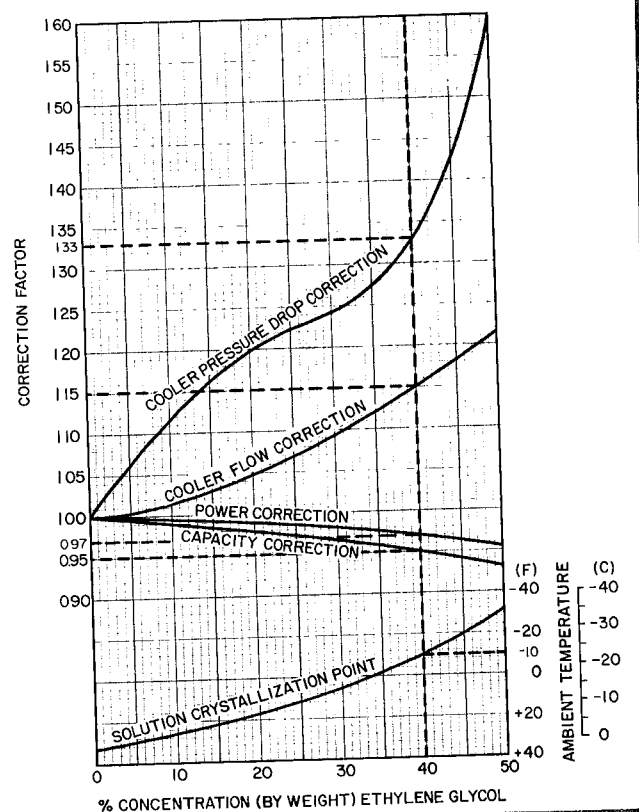
Correct compressor power input (kW) — On the power correction curve, read 0.97 correction factor at 40% ethylene glycol concentration.

Power input from Selection Procedure example = 213.2 kW.

$$\text{Corrected power input} = 0.97 \times 213.2 = 206.8 \text{ kW}$$

ETHYLENE GLYCOL PERFORMANCE CORRECTION FACTORS AND SOLUTION CRYSTALLIZATION POINTS

Correction factors apply to published chilled water performance ratings from 40 to 60 F (4.4 to 15.6 C) LWT



Example: SI — Determine concentration of ethylene glycol to protect the system to -23 C ambient temperature at zero flow

Enter correction curves and on the solution crystallization point curve, at -23 C, read 40% concentration ethylene glycol is required to prevent crystals from forming in solution.

Consider 30GB175 unit selected in the preceding example (refer to correction curves at 40% solution).

Correct unit capacity — On capacity correction curve read 0.95.

$$\begin{aligned}\text{Corrected capacity} &= 0.95 \times \text{determined capacity} \\ &= 0.95 \times 622.5 \\ &= 591.4 \text{ kW}\end{aligned}$$

Correct cooler water flow — On cooler flow correction curve, read 1.15.

Cooler water flow (at corrected capacity)

$$\begin{aligned}&= \frac{0.239 \times \text{corr cap. in kW}}{\text{temperature rise } ^\circ\text{C}} = \text{L/s} \\ &= \frac{0.239 \times 591.4}{7.8} = 18.1 \text{ L/s}\end{aligned}$$

$$\begin{aligned}\text{Cooler water flow (40\% solution)} &= 1.15 \times 18.1 \\ &= 20.8 \text{ L/s}\end{aligned}$$

Correct cooler pressure drop — On cooler pressure drop correction curve, read 1.33.

On cooler pressure drop curve, for 20.8 L/s, read PD = 19.4 kPa. The pressure drop for 40% solution = $1.33 \times 19.4 = 25.8$ kPa.

Correct compressor power input (kW) — On the power correction curve, read 0.97 correction factor at 40% ethylene glycol concentration.

Power input from Selection Procedure example = 208.3 kW.

$$\text{Corrected power input} = 0.97 \times 208.3 = 202.1 \text{ kW.}$$

Oversizing chillers

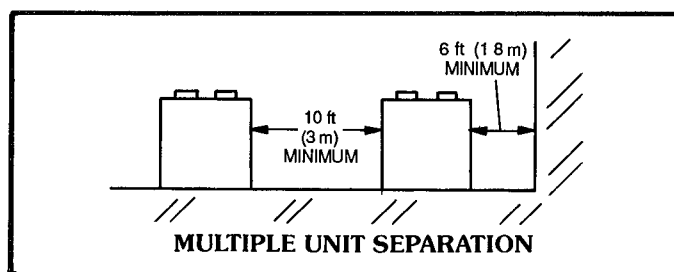
Oversizing chillers by more than 15% at design conditions must be avoided as the system operating efficiency would be affected adversely (resulting in greater/excessive electrical demand). When future expansion of equipment is anticipated, it is strongly recommended that a single chiller be installed to meet present load requirements and a second chiller added to meet the additional load demand.

It is also recommended that the installation of 2 smaller chillers be considered where operation at minimum load is critical. The operation of a smaller chiller loaded to a greater percent of minimum is preferred to operating a single chiller at or near its minimum recommended value.

Hot gas bypass should not be used as a means to allow oversizing chillers. Hot gas bypass should be given consideration where substantial operating time is anticipated below the minimum unloading step

Multiple chillers

Where chiller capacities greater than 280 ton (985 kW) are required, or where stand-by capability is desired, chillers may be installed in *parallel*. Units should be of equal size to ensure balanced water flows. Where a large temperature drop ($> 25^\circ\text{F}$ [13.9°C]) is desired, chillers may be installed in *series*. Water temperature sensors need not be moved for multiple chiller operation. A 10-ft (3-m) separation is required between units for airflow, and a 6-ft (1.8-m) distance is required from units to obstructions. See figure. See Dimensions for service clearances.



Electrical/utility interests

Energy management — See Controls and Troubleshooting manual and accessory installation instructions for details.

Demand limiting (also called load shedding) — When utilities demand for electricity exceeds a certain level, loads are shed to keep electricity demand below a prescribed maximum level. Typically, this happens on hot days when air conditioning is most needed.

Demand may be limited on unit by resetting water temperature, or by using a demand limit accessory that unloads the chiller to a given predetermined percent of the load. Both features require signal from an intelligent central control. Do not cycle demand limiter for less than 10 minutes on and 5 minutes off.

Duty cycling cycles electrical loads at regular intervals regardless of need. This reduces electrical operating costs of building by "fooling" demand indicating devices. Duty cycling of compressors or fans is *not* recommended since motor winding and bearing life suffer from constant cycling.

Remote ON-OFF control

If remote ON-OFF unit control is required, an ON-OFF relay must be installed in unit control box and wired in accordance with unit installation instructions.

Part-wind start

Not generally required on 30GB, GT chillers due to use of multiple compressors allowing smaller electrical load increments, but is available if required. Maximum instantaneous current flow (see ICF in Electrical Data) should be used in determining need.

Guide Specifications — 30GB040 to 070

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications — Section 15703

Size Range: **40 to 70 Tons, Nominal**

Carrier Model Number: **30GB**

Note: Items throughout the specification which apply to "Thermostatic Expansion Valves" are indicated by single brackets [i.e.]

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Microprocessor controlled air-cooled liquid chiller utilizing reciprocating compressors and [thermostatic expansion valve] electronic expansion valves.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 590, latest edition.
- B. Unit construction shall be designed to conform to ANSI B9.1 Safety Code, NEC (National Electric Code) and ASME applicable codes.
- C. Unit shall have National Electrical Inspection Agency (UL or ETL) and CSA approvals

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled per unit manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

- A. General:
Factory assembled, single piece, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-22) and special features required prior to field start-up

B. Unit Cabinet

- 1. Frame shall be of heavy gage galvanized steel members
- 2. Galvanized steel casing, zinc phosphatized, with an electrostatically applied baked enamel finish with hinged access panels for compressor section
- 3. Unit shall be capable of withstanding Federal Test Method Standard No. 141 (method 6061) 500 hour salt spray test.

C. Fans:

Condenser fans shall be direct-driven propeller type discharging air vertically upward and shall be equipped with the following features:

- 1. Permanently lubricated bearings.
- 2. PVC coated steel wire safety guards
- 3. Inherent corrosion resistance shafts
- 4. Statically and dynamically balanced fan wheels

D. Compressors:

- 1. Reciprocating semi-hermetic type only
- 2. Each equipped with an automatically reversible oil pump, operating oil charge, suction and discharge shutoff valves, and an insert-type factory sized crankcase heater to control oil dilution.

- 3. Each mounted on spring vibration isolators with an isolation efficiency of no less than 95 percent.
- 4. Speed shall not exceed 1750 rpm (29.2 rps).
- 5. Cycles per hour per compressor shall not exceed 6.

E. Cooler.

- 1. Shell-and-tube type with removable heads
- 2. Tubes shall be internally enhanced seamless copper type rolled into tube sheets.
- 3. Equipped with MPT type water connections
- 4. Shell shall be insulated with 3/4-in. (19mm) polyvinyl chloride foam (closed-cell) of maximum K factor 0.28 with a protective steel jacket.
- 5. Equipped with electric heaters along the shell under the insulation to protect against cooler freeze-up.
- 6. Design shall incorporate 2 independent direct expansion refrigerant circuits.
- 7. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 235 psig (1620 kPa) and a minimum water side pressure of 150 psig (1034 kPa).

F. Condenser.

- 1. Coil shall be air-cooled with integral subcooler, constructed of aluminum fins mechanically bonded to seamless copper tubes which are then cleaned, dehydrated and sealed.
- 2. Air-cooled condenser coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa)

G. Refrigeration Components.

Refrigerant circuit components shall include hot gas muffler, high side pressure relief device, liquid line shutoff valves, suction and discharge shutoff valves, replaceable core filter-drier, moisture indicating sight glass, stepper motor actuated electronic expansion valve [thermostatic expansion valve], and complete operating charge of refrigerant R-22 and compressor oil.

H. Controls, Safeties and Diagnostics

- 1. Controls:
 - a. Unit controls shall include the following minimum components:
 - 1) Microprocessor.
 - 2) Power and control circuit terminal blocks.
 - 3) On/off control switch
 - 4) Replaceable solid-state relay panel.
 - 5) 2-digit diagnostic display/set point panel
 - 6) Thermistors and/or potentiometers
 - b. Capable of performing the following functions:
 - 1) Pumpout at beginning and end of every circuit cycle.
 - 2) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature

- 3) Limiting of the chilled water temperature pull-down rate at start-up to 1° F per minute to prevent excessive demand spikes (charges) at start-up.
 - c. Control compartment shall be equipped with a 115-v convenience outlet.
 - d. Unit controls shall be capable of withstanding 185 F storage temperature in the control compartment for an indefinite period of time
2. Safeties
- a. Unit shall be equipped with thermistors and/or potentiometers and all necessary components in conjunction with the control system to provide the unit with the following protections.
 - 1) Loss of refrigerant charge protection
 - 2) Low water flow protection.
 - 3) Low chilled water temperature protection.
 - 4) Low and high superheat protection.
 - 5) Low control voltage (to unit) protection
 - 6) Visual alarm signal (alarm light)
 - 7) Oil pressure high pressure switch.
 - b. Compressors shall be equipped with the following manual reset type protections.
 - 1) Thermal overload.
 - 2) Pressure overload
 - 3) Electrical overload through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit breakers. Circuit breakers shall open all three phases in the event of an overload in any one phase, (single-phasing condition)
 - c. Fan motors shall have inherent overcurrent protection.
3. Diagnostics
- a. Diagnostic display module shall be capable of indicating the tripping of protections through display of a 2 number code for which a legend shall be provided in control panel. Protections included for display shall be:
 - 1) Compressor lockout
 - 2) Loss of charge
 - 3) Low water flow
 - 4) Cooler freeze protection.
 - 5) High or low suction superheat
 - 6) Thermistor or potentiometer malfunction.
 - b. Module must also be capable of performing a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.
 - c. Provide serial output port
- I. Operating Characteristics
1. Unit shall be capable of starting and running at outdoor ambient temperatures up to 115 F (46.1 C) per maximum load criteria of ARI Standard 590.
 2. Unit shall be capable of starting up with 95 F (35 C) entering water temperature to the cooler
 3. Multi-step cooling capacity control shall be accomplished through the use of unloaders and compressor staging.
 4. Two refrigerant circuits shall be provided to protect against loss of total capacity.
 5. Unit shall operate without special controls down to an ambient temperature of 32 F (0° C).
 6. Unit shall have automatic lead/lag feature to automatically alternate the lead circuit to ensure even compressor wear
- J Motors
1. Compressor motors shall be cooled by suction gas passing around motor windings.
 2. Condenser fan motors shall be single-phase type (040-060) and 3-phase type (070) with permanently lubricated bearings and class B insulation
- K Electrical Requirements:
1. Unit primary electrical power supply shall be connected at a single location.
 2. Unit shall operate on 3-phase, 60 cycle power at the voltage shown in the equipment schedule.
 3. Control voltage shall be 115-v single-phase separate power supply.
 4. Unit shall be shipped with factory control and power wiring installed.
- L Special Features:
- Certain standard features are not applicable when the features designated by * are specified. For assistance in amending the specifications, your local Carrier Sales Office should be contacted
- * 1. Low Ambient Temperature Operation:
- a. Unit shall be capable of operating down to 0° F (-17.8 C) with the addition of antifreeze in the evaporator circuit and with the addition of field fabricated and installed wind baffles. [In addition the unit shall be field furnished with a solid state control with condenser coil temperature sensor and shall require a change to an approved condenser fan motor and capacitor for the application.]
 - b. Unit shall be capable of operating down to -20 F (-28.8 C) with the addition of antifreeze in the evaporator circuit and with the addition of field fabricated and installed wind baffles. In addition the unit shall be field furnished with a solid-state control with condenser coil temperature sensor and shall require a change to an approved condenser fan motor and capacitor for the application.
- * 2 Demand Limit Control:
- Unit shall be equipped with a 2-point demand limit control (0-49% and 50-100%) activated remotely by an electric signal.
- * 3. Pressure Gages:
- Unit shall be field equipped with suction and discharge pressure gages with manual shutoff valves.
- * 4. Ground Current Compressor Protection:
- Each compressor shall be equipped with ground

Guide Specifications — 30GB040 to 070 (cont)

current protection which shall shut down compressor when no more than 2.5 supply amps are measured to prevent the formation of acids (standard in the 70 nominal ton unit).

* 5 Low Oil Pressure Protection.

Unit shall be equipped with switches and wiring to include low oil pressure as a diagnostically displayed feature (standard on the 70 nominal ton unit).

* 6. Compressor Protection Module (standard on 70-nominal ton unit). Includes the following for each compressor:

- a) Compressor contactor control.
- b) Crankcase heater control
- c) Ground current protection.
- d) High pressure protection
- e) Discharge gas temperature protection
- f) 20-30 second recycle time delay.
- g) Status communication switch input to processor

* 7. Optional Condenser Coil Material.

Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.

8. Temperature Reset Board

Allows microprocessor control to compare either return or outdoor temperature with the accessory board settings and adjust leaving water temperature accordingly. Shall include necessary sensor.

9. Hot Gas Bypass

Shall be field installed to allow the unit to operate at lower capacity levels than standard.

10. Condenser Coil Protective Grille Package

A set of metal grilles complete with support retainers and fasteners shall be provided for the protection of the condensing coils

* Optional Controls and Diagnostics:

1. Controls.

- a. Unit controls shall include the following minimum components:

- 1) Microprocessor
- 2) Power and control circuit terminal blocks
- 3) On/off control switch.
- 4) Replaceable solid-state relay panel.

- 5) 8 digit alphanumeric diagnostic display/set point panel
- 6) Thermistors and/or pressure transducers.

b. Capable of performing the following functions.

- 1) Automatic compressor lead/lag.
- 2) Pumpout at beginning and end of every circuit cycle
- 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.
- 4) Limit the chilled water temperature pulldown rate at start-up to 1 degree F per minute to prevent excessive demand spikes (charges) at start-up.
- 5) Seven-day time schedule
- 6) Leaving chilled water temperature reset from return.
- 7) Demand limit control with 2-point control (0-100% each)

2. Diagnostics:

- a Diagnostic display module shall be capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display. Protections included for display shall be.

- 1) Compressor lockout
- 2) Loss of charge.
- 3) Low water flow.
- 4) Low oil pressure
- 5) Cooler freeze protection
- 6) High or low suction superheat.
- 7) Thermistor or potentiometer malfunction.
- 8) Entering and leaving water temperature.
- 9) Evaporator and condenser saturation temperatures.
- 10) EXV positions.
- 11) All set points.
- 12) Time of day.

- b Module in conjunction with the microprocessor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started

Guide Specifications — 30GB075

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications — Section 15703

Size Range: **75 Tons, Nominal**

Carrier Model Number: **30GB**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Microprocessor controlled air-cooled liquid chiller utilizing reciprocating compressors and electronic expansion valves.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 590, latest edition
- B Unit construction shall comply with ANSI B9.1 Safety Code, NEC (National Electric Code) and ASME applicable codes
- C Unit shall have National Electrical Inspection Agency (UL or ETL), and CSA approvals.
- D. Unit cabinet shall be capable of withstanding Federal Test Method Standard No 141 (method 6061) 500 hour salt spray test

- E Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 235 psig (1620 kPa) and a minimum water side pressure of 250 psig (1034 kPa).
- F Air-cooled condenser coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa).

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit controls shall be capable of withstanding 185 F storage temperatures in the control compartment for an indefinite period of time
- B. Unit shall be stored and handled per unit manufacturer's recommendations

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, single piece, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-22) and special features required prior to field start-up

B. Unit Cabinet:

Galvanized steel casing, zinc phosphatized, with an electrostatically applied baked enamel finish

C Fans:

Condenser fans shall be direct-driven propeller type, discharging air vertically upward

- 1. Equipped with permanently lubricated bearings.
- 2. Equipped with PVC coated steel wire safety guards
- 3. Shafts shall have inherent corrosion resistance
- 4. Statically and dynamically balanced.

D Compressors.

- 1. Reciprocating semi-hermetic type only
- 2. Each equipped with an automatically reversible oil pump, operating oil charge, suction and discharge shutoff valves, and an insert type factory sized crankcase heater to control oil dilution.
- 3. Each mounted on spring vibration isolators with an isolation efficiency of no less than 95 percent.
- 4. Speed shall not exceed 1750 rpm (29.2 rps).
- 5. Cycles per hour per compressor shall not exceed 6.

E. Cooler:

- 1. Shell-and-tube type with removable heads.
- 2. Tubes shall be internally enhanced seamless copper type rolled into tube sheets
- 3. Equipped with flanged type water connections.
- 4. Shell shall be insulated with 3/4-in. (19mm) closed cell PVC foam of maximum K factor 0.28.
- 5. Equipped with electric heaters along the shell under the insulation to protect against cooler freeze-up.
- 6. Design shall incorporate 2 independent direct expansion refrigerant circuits

F. Condenser:

Coil shall be air-cooled with integral subcooler, constructed of aluminum fins mechanically bonded to

seamless copper tubes which are then cleaned, dehydrated and sealed.

G. Refrigeration Components.

Refrigerant circuit components shall include hot gas muffler, high side pressure relief device, liquid line shutoff valve, suction and discharge pressure gages with manual shutoff valves, replaceable core filter drier, moisture indicating sight glass, stepper motor actuated electronic expansion valve, and complete operating charge of refrigerant R-22 and compressor oil.

H. Controls, Safeties and Diagnostics:

1. Controls:

- a. Unit controls shall include the following minimum components:

- 1) Microprocessor
- 2) Power and control circuit terminal blocks.
- 3) On/off control switch.
- 4) Replaceable solid-state relay panel.
- 5) 2-digit diagnostic display/set point panel.
- 6) Thermistors and/or potentiometers.

- b. Capable of performing the following functions.

- 1) Pumpout at beginning and end of every circuit cycle.
- 2) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.
- 3) Limit the chilled water temperature pull-down rate at start-up to 1° F per minute to prevent excessive demand spikes (charges) at start-up.

- c. Control compartment shall be equipped with a 115-v convenience outlet.

2 Safeties:

- a. Unit shall be equipped with thermistors and/or potentiometers and all necessary components in conjunction with the control system to provide the unit with the following protections:

- 1) Loss of refrigerant charge protection.
- 2) Low water flow protection.
- 3) Low chilled water temperature protection
- 4) Low and high superheat protection.
- 5) Low oil protection for each compressor circuit.
- 6) Low control voltage (to unit) protection.
- 7) Ground current protection for each compressor which shuts down compressor when no more than 2.5 supply amps are measured to prevent formation of acids.

- b. Compressors shall be equipped with the following manual reset type protections.

- 1) Thermal overload.
- 2) Pressure overload.
- 3) Electrical overload through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit

Guide Specifications —30GB075 (cont)

circuit breakers. Circuit breakers shall open all three phases in the event of an overload in any one phase, or single-phasing condition.

- c. Fan motors shall have inherent overcurrent protection.

3. Diagnostics:

- a. Diagnostic display module shall be capable of indicating the safety lockout condition through displaying a 2 number code for which a legend shall be provided in control panel. Protections included for display shall be:

- 1) Compressor lockout.
- 2) Loss of charge.
- 3) Low water flow.
- 4) Low oil pressure
- 5) Cooler freeze protection.
- 6) High or low suction superheat.
- 7) Thermistor or potentiometer malfunction.

- b. Module must also be capable of performing a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.

I. Operating Characteristics:

1. Unit shall be capable of starting and running at outdoor ambient temperatures up to 115 F (46.1 C) per maximum load criteria of ARI Standard 590.
2. Unit shall be capable of starting up with 95 F (35 C) entering water temperature to the cooler.

J. Motors:

1. Compressor motors shall be cooled by suction gas passing around motor windings.
2. Condenser fan motors shall be 3-phase type with permanently lubricated bearings and class B insulation.

K. Electrical Requirements:

1. Unit primary electrical power supply shall be connected at a single location.
2. Unit shall operate on 3-phase, 60 cycle power at the voltage shown in the equipment schedule.
3. Control voltage shall be 115-v single-phase separate power supply.
4. Unit shall be shipped with factory control and power wiring installed.

L. Special Features:

Certain standard features are not applicable when features designated by * are specified.

* Low Ambient Operation:

Unit shall be capable of starting and running at outdoor ambient temperatures down to 0° F (-17.8 C) with the addition of brine in the cooler circuit and wind baffles.

* Unloaders:

Unit shall be equipped with electrically actuated suction cutoff type cylinder unloaders on both lead compressors and automatic lead/lag.

Demand Limit Control:

Unit shall be equipped with a 2-point demand limit control (0-49% and 50-100%) activated remotely by an electric signal.

* Optional Controls and Diagnostics.

1 Controls:

- a. Unit controls shall include the following minimum components.

- 1) Microprocessor
- 2) Power and control circuit terminal blocks.
- 3) On/off control switch.
- 4) Replaceable solid-state relay panel.
- 5) 8 digit alphanumeric diagnostic display/set point panel.
- 6) Thermistors and/or pressure transducers.

- b. Capable of performing the following functions:

- 1) Automatic compressor lead/lag.
- 2) Pumpout at beginning and end of every circuit cycle.
- 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.
- 4) Limit the chilled water temperature pulldown rate at start-up to 1 degree F per minute to prevent excessive demand spikes (charges) at start-up
- 5) Seven-day time schedule
- 6) Leaving chilled water temperature reset from return.
- 7) Demand limit control with 2-point control (0-100% each).

2. Diagnostics:

- a. Diagnostic display module shall be capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display. Protections included for display shall be.

- 1) Compressor lockout.
- 2) Loss of charge
- 3) Low water flow
- 4) Low oil pressure.
- 5) Cooler freeze protection
- 6) High or low suction superheat.
- 7) Thermistor or potentiometer malfunction.
- 8) Entering and leaving water temperature.
- 9) Evaporator and condenser saturation temperatures.
- 10) EXV positions.
- 11) All set points.
- 12) Time of day.

- b. Module in conjunction with the microprocessor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.

* Optional Condenser Coil Material:

Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.

Guide Specifications — 30GB090 to 200

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications — Section 15703

Size Range: **90 to 200 Tons, Nominal**

Carrier Model Number: **30GB**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Microprocessor controlled air-cooled liquid chiller utilizing reciprocating compressors and electronic expansion valves.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 590, latest edition.
- B. Unit construction shall comply with ANSI B9.1 Safety Code, NEC (National Electric Code) and ASME applicable codes.
- C. Unit shall have National Electrical Inspection Agency (UL or ETL), and CSA approvals.
- D. Unit cabinet shall be capable of withstanding Federal Test Method Standard No. 141 (method 6061) 500 hour salt spray test.
- E. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 235 psig (1620 kPa) and a minimum water side pressure of 150 psig (1034 kPa).
- F. Air-cooled condenser coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa).
- G. Unit shall be test run at the factory.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit controls shall be capable of withstanding 185 F storage temperatures in the control compartment for an indefinite period of time.
- B. Unit shall be stored and handled per unit manufacturer's recommendations

Part 2 — Products

2.01 EQUIPMENT

- A. General:
Factory assembled, single piece, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-22) and special features required prior to field start-up
- B. Unit Cabinet:
Galvanized steel casing, zinc phosphatized, with an electrostatically applied baked enamel finish.
- C. Fans:
Condenser fans shall be direct-driven propeller type, discharging air vertically upward:
 - 1. Equipped with permanently lubricated bearings.
 - 2. Equipped with PVC coated steel wire safety guards.
 - 3. Shafts shall have inherent corrosion resistance.
 - 4. Statically and dynamically balanced.

D. Compressors:

- 1. Reciprocating semi-hermetic type only.
- 2. Each equipped with an automatically reversible oil pump, operating oil charge, suction and discharge shutoff valves, and an insert type factory sized crankcase heater to control oil dilution.
- 3. Each mounted on spring vibration isolators with an isolation efficiency of no less than 95 percent.
- 4. Speed shall not exceed 1750 rpm (29.2 rps).
- 5. Cycles per hour per compressor shall not exceed 6.

E. Cooler:

- 1. Shell-and-tube type with removable heads.
- 2. Tubes shall be internally enhanced seamless copper type rolled into tube sheets.
- 3. Equipped with flanged type water connections.
- 4. Shell shall be insulated with 3/4-in. (19mm) closed cell PVC foam of maximum K factor 0.28.
- 5. Equipped with electric heaters along the shell under the insulation to protect against cooler freeze-up.
- 6. Design shall incorporate 2 independent direct expansion refrigerant circuits.

F. Condenser:

Coil shall be air-cooled with integral subcooler, constructed of aluminum fins mechanically bonded to seamless copper tubes which are then cleaned, dehydrated and sealed.

G. Refrigeration Components:

Refrigerant circuit components shall include hot gas muffler, high side pressure relief device, liquid line shutoff valve, replaceable core filter drier, moisture indicating sight glass, stepper motor actuated electronic expansion valve, and complete operating charge of refrigerant R-22 and compressor oil.

H. Controls, Safeties and Diagnostics:

1 Controls:

- a. Unit controls shall include the following minimum components:
 - 1) Microprocessor.
 - 2) Power and control circuit terminal blocks.
 - 3) On/off control switch.
 - 4) Replaceable solid-state relay panel.
 - 5) 2-digit diagnostic display/set point panel.
 - 6) Thermistors and/or potentiometers.
- b. Capable of performing the following functions:
 - 1) Automatic compressor lead/lag.
 - 2) Pumpout at beginning and end of every circuit cycle.
 - 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.

Guide specifications — 30GB090 to 200 (cont)

- 4) Limit the chilled water temperature pull-down rate at start-up to 1° F per minute to prevent excessive demand spikes (charges) at start-up
 - c. Control compartment shall be equipped with a 115-v convenience outlet.
2. Safeties
- a. Unit shall be equipped with thermistors and/or potentiometers and all necessary components in conjunction with the control system to provide the unit with the following protections:
 - 1) Loss of refrigerant charge protection.
 - 2) Low water flow protection.
 - 3) Low chilled water temperature protection
 - 4) Low and high superheat protection.
 - 5) Low oil protection for each compressor circuit.
 - 6) Low control voltage (to unit) protection
 - 7) Ground current protection for each compressor which shuts down compressor when no more than 2.5 supply amps are measured to prevent formation of acids.
 - b. Compressors shall be equipped with the following manual reset type protections:
 - 1) Thermal overload.
 - 2) Pressure overload.
 - 3) Electrical overload through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit breakers. Circuit breakers shall open all three phases in the event of an overload in any one phase, or single-phasing condition.
 - c. Fan motors shall have inherent overcurrent protection.
3. Diagnostics:
- a. Diagnostic display module shall be capable of indicating the tripping of protections through display of a 2 number code for which a legend shall be provided in control panel. Protections included for display shall be:
 - 1) Compressor lockout.
 - 2) Loss of charge.
 - 3) Low water flow
 - 4) Low oil pressure
 - 5) Cooler freeze protection.
 - 6) High or low suction superheat.
 - 7) Thermistor or potentiometer malfunction
 - 8) Evaporator and condenser saturation temperatures.
 - 9) EXV position.
 - 10) All set points.
 - 11) Time of day.
 - b. Module in conjunction with the micro-processor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started
- I. Operating Characteristics:
1. Unit shall be capable of starting and running at outdoor ambient temperatures up to 115 F (46.1 C) per maximum load criteria of ARI Standard 590
 2. Unit shall be capable of starting up with 95 F (35 C) entering water temperature to the cooler.
- J. Motors
1. Compressor motors shall be cooled by suction gas passing around motor windings
 2. Condenser fan motors shall be 3-phase type with permanently lubricated bearings and class B insulation.
- K. Electrical Requirements:
1. Unit primary electrical power supply shall be connected at a single location.
 2. Unit shall operate on 3-phase, 60 cycle power at the voltage shown in the equipment schedule.
 3. Control voltage shall be 115-v single-phase separate power supply
 4. Unit shall be shipped with factory control and power wiring installed
- L. Special Features:
- Certain standard features are not applicable when features designated by * are specified.
- * Low Ambient Operation.
- Unit shall be capable of starting and running at outdoor ambient temperatures down to 0° F (-17.8 C) with the addition of brine in the cooler circuit and wind baffles
- * Unloaders
- Unit shall be equipped with electrically actuated suction cutoff type cylinder unloaders.
- Demand Limit Control
- Unit shall be equipped with a 2-point demand limit control (0-49% and 50-100%) activated remotely by an electric signal.
- * Optional Controls and Diagnostics:
1. Controls:
 - a. Unit controls shall include the following minimum components:
 - 1) Microprocessor.
 - 2) Power and control circuit terminal blocks
 - 3) On/off control switch
 - 4) Replaceable solid-state relay panel.
 - 5) 8 digit alphanumeric diagnostic display/set point panel
 - 6) Thermistors and/or pressure transducers.
 - b. Capable of performing the following functions.

- 1) Automatic compressor lead/lag.
 - 2) Pumpout at beginning and end of every circuit cycle.
 - 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.
 - 4) Limit the chilled water temperature pulldown rate at start-up to 1 degree F per minute to prevent excessive demand spikes (charges) at start-up.
 - 5) Seven-day time schedule.
 - 6) Leaving chilled water temperature reset from return.
 - 7) Demand limit control with 2-point control (0-100% each)
2. Diagnostics:
- a Diagnostic display module shall be capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display. Protections included for display shall be.
 - 1) Compressor lockout.
 - 2) Loss of charge.
 - 3) Low water flow
 - 4) Low oil pressure.
 - 5) Cooler freeze protection.
 - 6) High or low suction superheat.
 - 7) Thermistor or potentiometer malfunction.
 - 8) Entering and leaving water temperature.
 - 9) Evaporator and condenser pressure.
 - 10) EXV positions.
 - 11) All set points
 - 12) Time of day.
 - b. Module in conjunction with the microprocessor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.
- * Optional Condenser Coil Material:
Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.

Guide specifications — 30GT225 to 280

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications — Section 15703

Size Range: **225 to 280 Tons, Nominal**

Carrier Model Number: **30GT**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Microprocessor controlled air-cooled liquid chiller utilizing reciprocating compressors and electronic expansion valves.

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 590, latest edition.
- B Unit construction shall comply with ANSI B9 1 Safety Code, NEC (National Electric Code) and ASME applicable codes.
- C. Unit shall have National Electrical Inspection Agency (UL or ETL) and CSA approvals
- D. Unit cabinet shall be capable of withstanding Federal Test Method Standard No. 141 (method 6061) 500 hour salt spray test.
- E. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 235 psig (1620 kPa) and a minimum water side pressure of 150 psig (1034 kPa).
- F. Air-cooled condenser coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 450 psig (3103 kPa).
- G. Unit shall be fully tested at the factory.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit controls shall be capable of withstanding 185 F storage temperatures in the control compartment for an indefinite period of time.
- B. Unit shall be stored and handled per unit manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, single-piece, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

Galvanized steel casing, zinc phosphatized, with an electrostatically applied baked enamel finish.

C. Fans:

Condenser fans shall be direct driven propeller type discharging air vertically upward:

1. Equipped with permanently lubricated bearings.
2. Equipped with PVC coated steel wire safety guards.
3. Shafts shall have inherent corrosion resistance.
4. Statically and dynamically balanced.

D. Compressors:

1. Reciprocating semi-hermetic type built by equipment manufacturer only.
2. Each equipped with automatically reversible oil pump, operating oil charge, discharge shutoff valves, and an insert type factory sized crankcase heater to control oil dilution.
3. Each mounted on spring vibration isolators with an isolation efficiency of no less than 95%.
4. Speed shall not exceed 1750 rpm (29.2 rps).
5. Cycles per hour per compressor shall not exceed 6

E. Cooler:

1. Shell and tube type with removable heads.
2. Tubes shall be internally enhanced seamless copper type rolled into tube sheets.
3. Equipped with victaulic-type water connections
4. Shell shall be insulated with ¾-in. (19mm) closed cell polyvinyl chloride foam of maximum K factor 0.28.

5. Equipped with electric heaters along the shell under the insulation to protect against cooler freeze-up.
 6. Design shall incorporate 2 independent direct expansion refrigerant circuits.
- F. Condenser:
Coil shall be air-cooled with integral subcooler, constructed of aluminum fins mechanically bonded to seamless copper tubes which are then cleaned, dehydrated and sealed.
- G. Refrigeration Components:
Refrigerant circuit components shall include hot gas muffler, high side pressure relief device, liquid line shutoff valve, replaceable core filter drier, moisture indicating sight glass, stepper motor actuated electronic expansion valve, and complete operating charge of refrigerant R-22 and compressor oil.
- H. Controls, Safeties and Diagnostics:
1. Controls:
 - a. Unit controls shall include the following minimum components:
 - 1) Microprocessor.
 - 2) Power and control circuit terminal blocks.
 - 3) On/off control switch.
 - 4) Replaceable solid-state relay panel.
 - 5) Leaving chilled water set point panel.
 - 6) 2-digit diagnostic display.
 - 7) Thermistors and/or potentiometer.
 - b. Capable of performing the following functions:
 - 1) Automatic compressor lead/lag.
 - 2) Pumpout at beginning and end of every circuit cycle.
 - 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.
 - 4) Limit the chilled water temperature pull-down rate at start-up to 1 degree F per minute to prevent excessive demand spikes (charges) at start-up.
 - c. Control compartment shall be equipped with a 115-volt convenience outlet (except 380-v).
 2. Safeties:
 - a. Unit shall be equipped with thermistors and/or potentiometers and all necessary components in conjunction with the control system to provide the unit with the following protections:
 - 1) Loss of refrigerant charge protection.
 - 2) Low water flow protection.
 - 3) Low chilled water temperature protection.
 - 4) Low and high superheat protection.
 - 5) Low oil protection for each compressor circuit.
 - 6) Low control voltage (to unit) protection.
 - 7) Ground current protection for each circuit which shuts down compressor when no more than 2.5 supply amps are measured to prevent formation of acids.
 - b. Compressors shall be equipped with the following manual reset type protections:
 - 1) Thermal overload.
 - 2) Pressure overload.
 - 3) Electrical overload through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit breakers. Circuit breakers shall open all three phases in the event of an overload in any one phase, or single-phasing condition.
- c. Fan motors shall have inherent overcurrent protection.
3. Diagnostics:
 - a. Diagnostic display module shall be capable of indicating the safety lockout condition through displaying a 2 number code for which a legend shall be provided in the control panel. The protections included for display shall be:
 - 1) Compressor lockout.
 - 2) Loss of charge.
 - 3) Low water flow.
 - 4) Low oil pressure.
 - 5) Cooler freeze protection.
 - 6) High or low suction superheat.
 - 7) Thermistor or potentiometer malfunction.
 - b. Module in conjunction with the microprocessor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.
- I. Operating Characteristics:
 1. Unit shall be capable of starting and running at outdoor ambient temperatures from 35 to 115 F (46.1 C) per criteria of ARI Standard 590.
 2. Unit shall be capable of starting up with 95 F (35 C) entering water temperature to the cooler.
- J. Motors:
 1. Compressor motors shall be cooled by suction gas passing around motor windings.
 2. Condenser fan motors shall be 3-phase type with permanently lubricated bearings and class B insulation.
- K. Electrical Requirements:
 1. Unit primary electrical power supply shall be connected at a single location.
 2. Unit shall operate on 3-phase, 60 cycle power at the voltage shown in the equipment schedule.
 3. Control voltage shall be 115-v single-phase separate power supply.
 4. Unit shall be shipped with factory control and power wiring installed
- L. Special Features:
Certain standard features are not applicable when the features designated by * are specified.
- * Low Ambient Operation:
Unit shall be capable of starting and running at outdoor ambient temperatures down to -20 F (-29 C) with the addition of brine in the cooler circuit, wind baffles, and Motormaster® head pressure control.

Guide specifications — 30GT225 to 280 (cont)

* Unloaders:

Unit shall be equipped with electrically actuated suction cutoff type cylinder unloaders. (Flotronic II units).

Demand Limit Control:

Unit shall be equipped with a 2-point demand limit control (0-49% and 50-100%) activated remotely by an electric signal.

* Optional Condenser Coil Material:

Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins.

* Optional Controls and Diagnostics:

1. Controls:

a. Unit controls shall include the following minimum components:

- 1) Microprocessor.
- 2) Power and control circuit terminal blocks.
- 3) On/off control switch.
- 4) Replaceable solid-state relay panel.
- 5) 8 digit alphanumeric diagnostic display/set point panel.
- 6) Thermistors and/or pressure transducers.

b. Capable of performing the following functions:

- 1) Automatic compressor lead/lag.
- 2) Pumpout at beginning and end of every circuit cycle.
- 3) Capacity control based on leaving chilled water temperature and compensated by rate of change of return water temperature.

4) Limit the chilled water temperature pulldown rate at start-up to 1 degree F per minute to prevent excessive demand spikes (charges) at start-up.

5) Seven-day time schedule.

6) Leaving chilled water temperature reset from return.

7) Demand limit control with 2-point control (0-100% each).

2. Diagnostics:

a. Diagnostic display module shall be capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display. Protections included for display shall be:

- 1) Compressor lockout.
- 2) Loss of charge.
- 3) Low water flow.
- 4) Low oil pressure.
- 5) Cooler freeze protection.
- 6) High or low suction superheat.
- 7) Thermistor or potentiometer malfunction.
- 8) Entering and leaving water temperature.
- 9) Evaporator and condenser pressure.
- 10) EXV positions.
- 11) All set points.
- 12) Time of day.

b. Module in conjunction with the microprocessor must also be capable of displaying the output (results) of a run test to verify operation of every switch, thermistor, potentiometer, fan, and compressor before chiller is started.

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Tab | 5c

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