



Advance Product Data

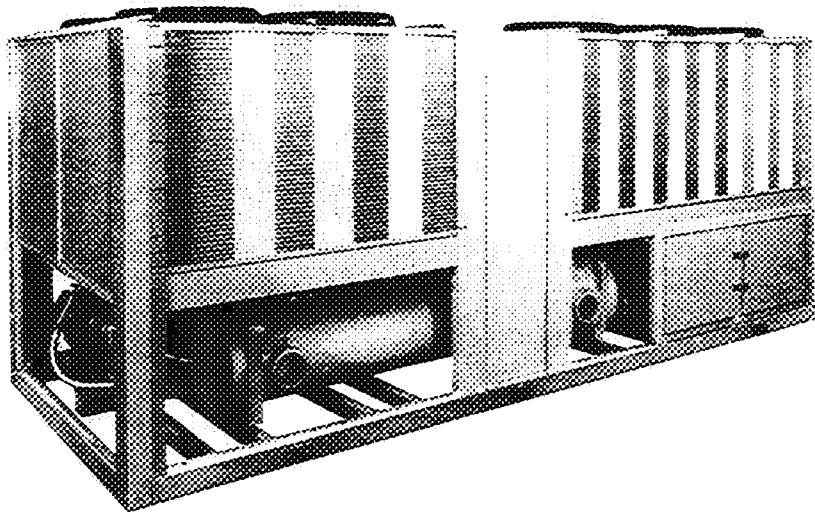
30GN,GT Packaged Hermetic Reciprocating Liquid Chillers 50/60 Hz

Nominal Capacities
120 to 400 Tons (420-1400 kW)

Quality Assurance



Approvals:
ISO 9002
EN 29002
BS5750 PART 2
ANSI/ASQC Q92



The New Model 30GN,GT130-420 Chillers Are Designed to Meet Your Toughest Design Requirements — Around the World

- smaller footprint
- higher efficiency
- expanded application envelope
- easier installation

Features/Benefits

Improved performance and efficiency at lower cost

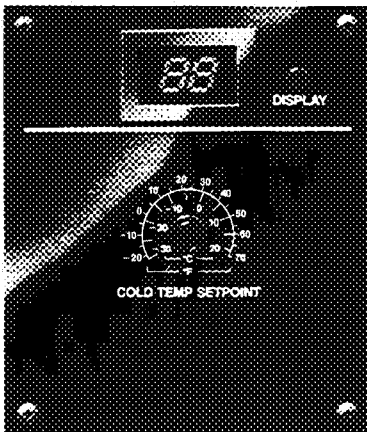
Unit length is reduced up to 25%, lowering installation costs of pads, fencing, and real estate space.

Efficiency is improved with IPLV (Integrated Part Load Value) in accordance with ARI (Air Conditioning and Refrigeration Institute) Standard 590-92 as high as 13, and full-load energy efficiency ratio (EER) to 9.6 — to assure you of lowest annual electrical operating costs.

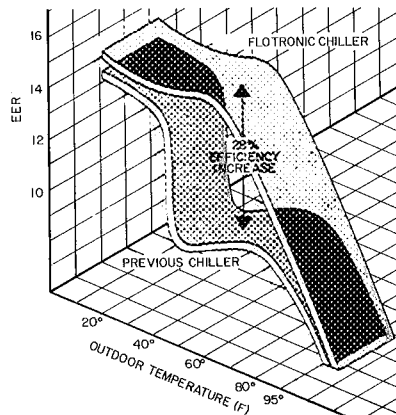
Models 30GN,GT can operate fully loaded in ambient temperatures up to 125 F (52 C). This provides full capacity when most needed, under extreme heat conditions. This capability also enables 30GN,GT to continue its high level of performance even in dirtier environments.

The exclusive Carrier low-ambient capability to -20 F (-29 C) is now available as a factory-installed option. Where the field-installed accessory is used, it fits neatly into the control panel with minimal installation labor and cost.

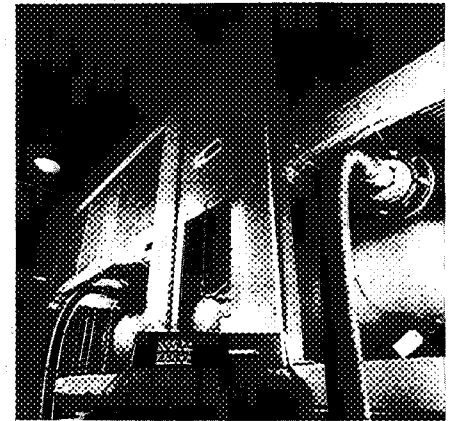
Models 30GN,GT have victaulic-type cooler connections for fast, easy field piping. The new 300 psig (2068 kPa) water-side rated cooler is "U" stamped, enabling the units to be used in higher-rise applications.



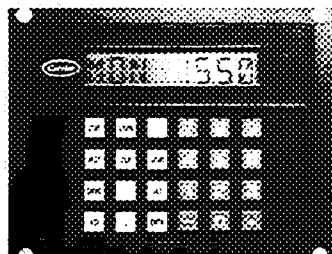
30GT 2-DIGIT DISPLAY



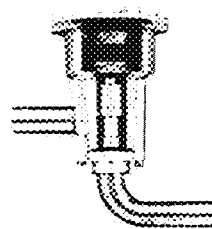
**PART-LOAD EFFICIENCY
28% GAIN**



100% FACTORY RUN TEST



**30GN 8-CHARACTER
DISPLAY**



**ELECTRONIC
EXPANSION VALVE
(EXV)**



06E COMPRESSOR

Model number nomenclature

30GN — Air-Cooled Flotronic™ II Outdoor Liquid Chiller 30GT — Air-Cooled Flotronic™ Outdoor Liquid Chiller	30GN - 130 - C 6 - KA	Options KA — Standard EXV Unit GA — Motormaster® III Control SD — Brine Unit* Other Options: Contact Carrier Representative												
P — Part Wind - — Across the Line		Packaging -- — Domestic Packaging -3 — International Packaging												
Unit Sizes <table border="1"> <tr><td>130</td><td>210</td><td>330</td></tr> <tr><td>150</td><td>240</td><td>360</td></tr> <tr><td>170</td><td>270</td><td>390</td></tr> <tr><td>190</td><td>300</td><td>420</td></tr> </table>	130	210	330	150	240	360	170	270	390	190	300	420		V-Ph-Hz 5 — 208/230-3-60 6 — 460-3-60 1 — 575-3-60 2 — 380-3-60 3 — 346-3-50 9 — 380/415-3-50 -- — Copper-Aluminum Condenser C — Copper-Copper Condenser
130	210	330												
150	240	360												
170	270	390												
190	300	420												

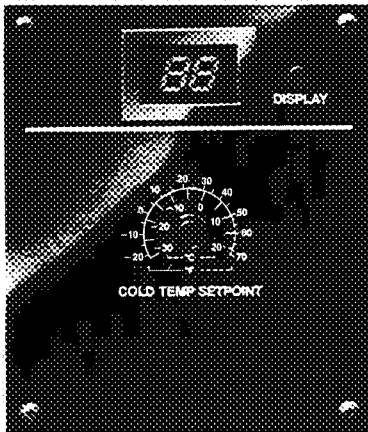
LEGEND

CCN — Carrier Comfort Network

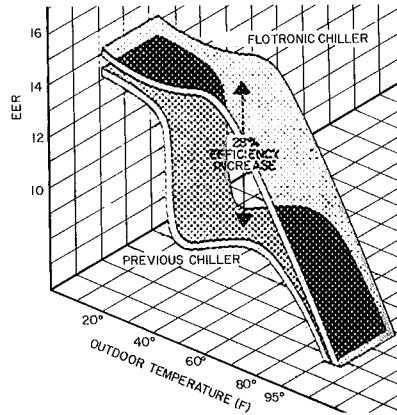
EXV — Electronic Expansion Valve

PW — Part Winding

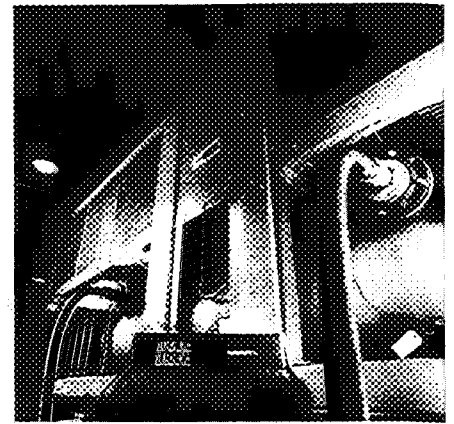
*For brine options, contact your Carrier representative.



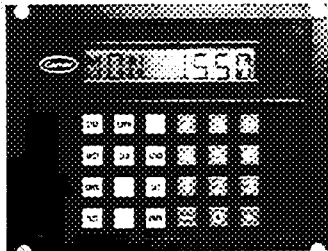
30GT 2-DIGIT DISPLAY



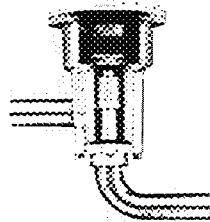
**PART-LOAD EFFICIENCY
28% GAIN**



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**30GN 8-CHARACTER
DISPLAY**



**ELECTRONIC
EXPANSION VALVE
(EXV)**



06E COMPRESSOR

Model number nomenclature

30GN - 130 - C 6 - - KA

30GN — Air-Cooled Flotronic™ II
Outdoor Liquid Chiller

30GT — Air-Cooled Flotronic™
Outdoor Liquid Chiller

P — Part Wind
- — Across the Line

Unit Sizes

130	210	330
150	240	360
170	270	390
190	300	420

Options

KA — Standard EXV Unit
GA — Motormaster® III Control
SD — Brine Unit*
Other Options: Contact Carrier Representative

Packaging

-- — Domestic Packaging
-3 — International Packaging

V-Ph-Hz

5 — 208/230-3-60
6 — 460-3-60
1 — 575-3-60
2 — 380-3-60
3 — 346-3-50
9 — 380/415-3-50

-- — Copper-Aluminum Condenser
C — Copper-Copper Condenser

LEGEND

CCN — Carrier Comfort Network
EXV — Electronic Expansion Valve
PW — Part Winding

*For brine options, contact your Carrier representative.

Physical data — 60 Hz

ENGLISH AND SI

UNIT SIZE 30GN,GT		130	150	170	190	210
APPROX OPER WT- CU-AL Lb		10046	10481	11293	12676	13380
Kg		4566	4764	5133	5762	6082
CU-CU Lb		11318	11753	12565	14195	14899
Kg		5145	5342	5711	6452	6772
COMPRESSORS		Semihermetic, Reciprocating..1725 RPM, 29.2 R/S				
Qty Clr A		2	3	3	3	4
Qty Clr B		2	2	3	3	3
Capacity Steps (Std/Opt)		11/8				
Min Step % (Std/Opt)		14/7	11/6	11/6	9/5	12/9
COOLER QTY, TYPE		(1) Shell & Tube, Max Refr Press-278 psig, 1916 kPa				
Net Water Volume-Gal/L		50.5 /191		59.8 /226		70.4/ 266.5
Max Waterside Pressure		300 psig /2068 kPa				
No Refr Circ		2				
REFRIGERANT TYPE		HCFC-22				
Ckt A-Lb/Kg		155/71	161/73	167/76	203/92	209/95
Ckt B-Lb/Kg		155/71	161/73	167/76	203/92	209/95
CONDENSER FANS		Propeller Type, 26"/762 mm Dia; 1140 RPM/19 R/S				
Qty..Kw		10..15.5			12..18.6	
Airflow-		98000			117600	
CFM		46246			55495	
L/S						
CONDENSER COILS		3/8" Dia Copper Tube; Std Alum Fin (Opt Copper),17 FPI/669 FPM				
# Rows		3				
Face Area- Sq Ft/Sq M		225/20.9			269/25	
Max Refr Press		450 psig/3103 kPa				

UNIT SIZE 30GN,GT		240	270	300	330	360	390	420
APPROX OPER WT- CU-AL Lb		18656	19903	21339	22586	25352	26056	26760
Kg		8480	9047	9700	10266	11524	11844	12164
CU-CU Lb		20878	22125	23883	25130	26760	29094	29798
Kg		9490	10057	10856	11423	12164	13225	13545
COMPRESSORS		Semihermetic, Reciprocating..1725 RPM, 29.2 R/S						
Qty: Module A, Clr A		2	3	2	3	3	4	4
Module A, Clr B		2	2	2	3	3	3	3
Module B, Clr A		2	2	3	3	3	3	4
Module B, Clr B		2	2	3	3	3	3	3
Capacity Steps (Std/Opt)		22/16						
Min Step % (Std/Opt)		7/3	5/3	6/3	6/3	6/3	5/3	6/5
COOLER QTY, TYPE		(1) Shell & Tube, Max Refr Press-278 psig, 1916 kPa						
Net Water Volume-Gal/L		80.8/305.6	90.1/340.6	110.3/417	119.6/452	119.6/452	130.2/492	140.8/533
Max Waterside Pressure		300 psig /2068 kPa						
No Refr Circ		4						
REFRIGERANT TYPE		HCFC-22						
Module A Ckt A- Lb/kg		155/71	167/76	155/71	167/76	203/92	203/92	209/95
Ckt B-Lb/Kg		155/71	167/76	155/71	167/76	203/92	203/92	209/95
Module B Ckt A- Lb/kg		98/45	98/45	167/76	167/76	203/92	209/95	209/95
Ckt B-Lb/Kg		105/48	105/48	167/76	167/76	203/92	209/95	209/95
CONDENSER FANS		Propeller Type, 26"/762 mm Dia; 1140 RPM/19 R/S						
Qty..Kw		18..28.2		20..31		24..37.2		
Airflow-		174000		196000		215600		235200
CFM		81780		92120		101332		110544
L/S								
CONDENSER COILS		3/8" Dia Copper Tube; Std Alum Fin (Opt Copper),17 FPI/669 FPM						
# Rows		3						
Face Area- Sq Ft/Sq M		393/36.5		450/41.8		538/50		
Max Refr Press		450PSIG/3103kPa						

LEGEND

CU-AL — Copper Tubing - Aluminum Fins Condenser Coil
 CU-CU — Copper Tubing - Copper Fins Condenser Coil
 — Fins Per Inch
 FPM — Fins Per Meter

NOTE: Facing the compressors, Circuit A is on the right and Circuit B is on the left

Physical data — 50 Hz

ENGLISH AND SI

UNIT SIZE 30GN,GT	130	150	170	190	210
APPROX OPER WT- CU-AL lb	10511	10481	11443	12906	13545
Kg	4778	4764	5201	5866	6157
CU-CU lb	11783	11753	12715	14425	15046
Kg	5356	5342	5780	6557	6839
COMPRESSORS	Semihermetic, Reciprocating..1450 RPM, 24 R/S				
Qty Cir A	2	3	3	3	4
Qty Cir B	2	2	3	3	3
Capacity Steps (Std/Opt)	11/8				
Min Step % (Std/Opt)	14/7	11/6	11/6	9/5	12/9
COOLER QTY, TYPE	(1) Shell & Tube, Max Refr Press-278 psig, 1916 kPa				
Net Water Volume-Gal/L	50.5 /191		59.8 /226		70.4/ 266.5
Max Waterside Pressure	300 psig /2068 kPa				
No Refr Circ	2				
REFRIGERANT TYPE	HCFC-22				
Ckt A-Lb/Kg	155/71	161/73	167/76	203/92	209/95
Ckt B-Lb/Kg	155/71	161/73	167/76	203/92	209/95
CONDENSER FANS	Propeller Type, 930 RPM/15.5 R/S				
Qty..Kw	10..15.5			12..18.6	
Airflow- CFM	98000			117600	
L/S	46246			55495	
CONDENSER COILS	3/8" Dia Copper Tube; Std Alum Fin (Opt Copper),17 FPI/669 FPM				
# Rows	3				
Face Area- Sq Ft/Sq M	225/20.9			269/25	
Max Refr Press	450 psig/3103 kPa				

UNIT SIZE 30GN,GT	240	270	300	330	360	390	420
APPROX OPER WT- CU-AL Lb	19221	20153	21954	22886	24349	26451	27090
Kg	8737	9160	9979	10403	11068	12023	12314
CU-CU Lb	21443	22375	24498	25430	27140	29471	30092
Kg	9747	10170	11135	11559	12336	13396	13678
COMPRESSORS	Semihermetic, Reciprocating..1450 RPM, 24 R/S						
Qty: Module A, Cir A	2	3	2	3	3	4	4
Module A, Cir B	2	2	2	3	3	3	3
Module B, Cir A	2	2	3	3	3	3	4
Module B, Cir B	2	2	3	3	3	3	3
Capacity Steps (Std/Opt)	22/16						
Min Step % (Std/Opt)	7/3	5/3	6/3	6/3	6/3	5/3	6/5
COOLER QTY, TYPE	(1) Shell & Tube, Max Refr Press-278 psig, 1916 kPa						
Net Water Volume-Gal/L	80.8/305.6	90.1/340.6	110.3/417	119.6/452	119.6/452	130.2/492.5	140.8/533
Max Waterside Pressure	300 psig /2068 kPa						
No Refr Circ	4						
REFRIGERANT TYPE	HCFC-22						
Module A Ckt A- Lb/kg	155/71	167/76	155/71	167/76	203/92	209/95	209/95
Ckt B-Lb/Kg	155/71	167/76	155/71	167/76	203/92	209/95	209/95
Module B Ckt A- Lb/kg	98/45	98/45	167/76	167/76	167/76	203/92	209/95
Ckt B-Lb/Kg	105/48	105/48	167/76	167/76	167/76	203/92	209/95
CONDENSER FANS	Propeller Type, 930 RPM/15.5 R/S						
Qty..Kw	18..28.2		20..31		22..34.1	24..37.2	
Airflow-	174000		196000		215600	235200	
CFM	81780		92120		101332	110544	
L/S							
CONDENSER COILS	3/8" Dia Copper Tube; Std Alum Fin (Opt Copper),17 FPI/669 FPM						
# Rows	3						
Face Area- Sq Ft/Sq M	393/36.5		450/41.8		494/46	538/50	
Max Refr Press	450 psig/3103 kPa						

LEGEND

CU-AL — Copper Tubing - Aluminum Fins Condenser Coil
 CU-CU — Copper Tubing - Copper Fins Condenser Coil
 FPI — Fins Per Inch
 FPM — Fins Per Meter

NOTE: Facing the compressors, Circuit A is on the right and Circuit B is on the left.

Factory-installed options

Part-wind (PW) start — Generally, PW start is not required where multiple 06E compressors are installed. The starting current is generally lower than a larger compressor using PW start. However, a part-wind start option is available (denoted by a **P** in the fifth position of the unit model number).

Copper/copper condenser coils — A **C** in the eleventh position of the unit model number indicates copper tubing and copper fins. The standard copper tube/aluminum fin condenser coil is replaced by internally enhanced copper tubing mechanically bonded to sine wave copper fin stock.

Motormaster® III low ambient control — The Motormaster III head pressure control device is available from the factory. This control permits operation of 30GN,GT units to -20 F (-29 C) ambient temperature. The control is prewired at the factory.

Brine — The Brine option permits supply liquid temperatures to be set to a minimum of 15 F (-9.4 C). Refrigeration

circuit components, such as the expansion device, are modified to correct for the lower refrigeration flow rates.

Cooler heater — A cooler heater may be factory installed. The package includes controls to energize the heater at 35 F (2 C) and below, and eight cooler tape heaters, 210 watts each.

High-static fans — The high-static fans allow the 30GN,GT to be used in applications with an external static pressure of up to 1 in. wg (external to the chiller) at nominal condenser airflow. Two options are available: 0.4 in. wg (100 kPa) and 1 in. wg (250 kPa).

Non-fused disconnect — A non-fused electrical disconnect is available factory installed.

Sound reduction package kit — This kit consists of a specially designed system of condenser fans and orifices to reduce system sound levels without compromising unit performance.

Field-installed accessories

Hot-gas bypass — The package includes control solenoid valves and the hot gas bypass valve along with installation instructions. Piping and electrical connections are made easy by factory-provided piping stubs and electrical terminal blocks. The accessory requires use of the accessory Control Option Board.

Gage panel — (for 30GT only) Accessory package includes one suction gage and one discharge gage mounted on the same panel, with a shutoff valve for each gage. Two gage panels are required for **each** circuit. For 30GN, all system pressures are monitored through the 8-character display.

Motormaster III control — This device permits unit operation down to -20 F (-29 C). The package includes sensor, control, and installation hardware. Factory-installed fan motors compatible with the Motormaster III require no field motor changes. A Motormaster III control is required for **each** circuit. In 575-v applications, 4 transformers must be field supplied.

Chilled water flow switch — Although low water flow detection is provided by the unit internal control devices, this accessory is available for field installation.

Temperature reset — For Flotronic™ (30GT) units only, for leaving-water temperature reset. The accessory lets the unit reset the leaving-water temperature to a higher value

during low load conditions. Temperature reset can be initiated from return water temperature, space temperature, or outdoor temperature. The accessory requires use of the accessory Control Option Board.

Demand limit control module — The accessory has a 2-point adjustment (0-49% and 50-100%), activated by a remote signal, either 115 v or 230 v. This module is a prewired board for 30GT units. Model 30GN uses the Options Board Module for 2-step demand limit.

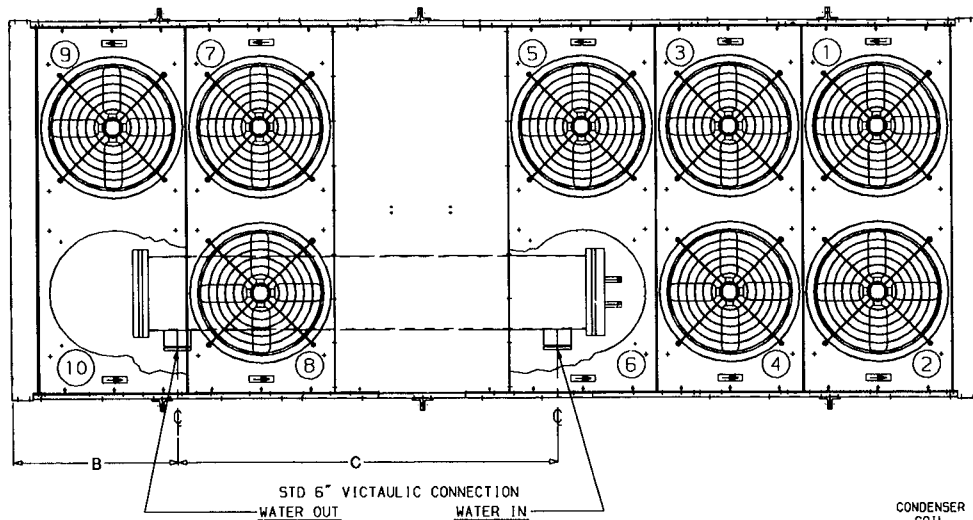
Control transformer — The transformer is sized to supply the needs of the control circuit, sourcing power from the main unit power connection.

Sound reduction kit — Kit consists of a specially designed fan system of fans and orifices for reducing system noise without compromising unit performance. No fan motor change is required, and the fan system is compatible with Motormaster III control. Accessory is packaged in sets of 2 per package.

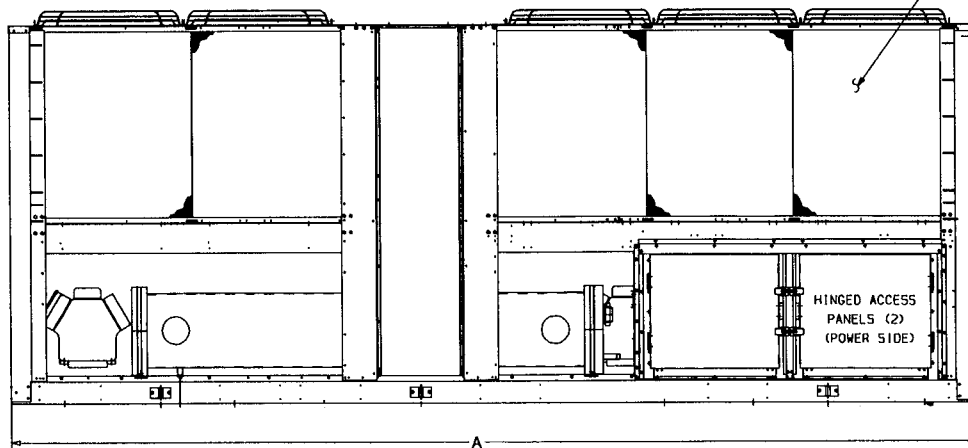
Security grilles for condenser coils and/or compressor section — These accessory grilles mount to the condenser coil shelf and to the base rail.

Condenser coil hail guard package — The package includes louvered condenser coil hail guards, and installation hardware.

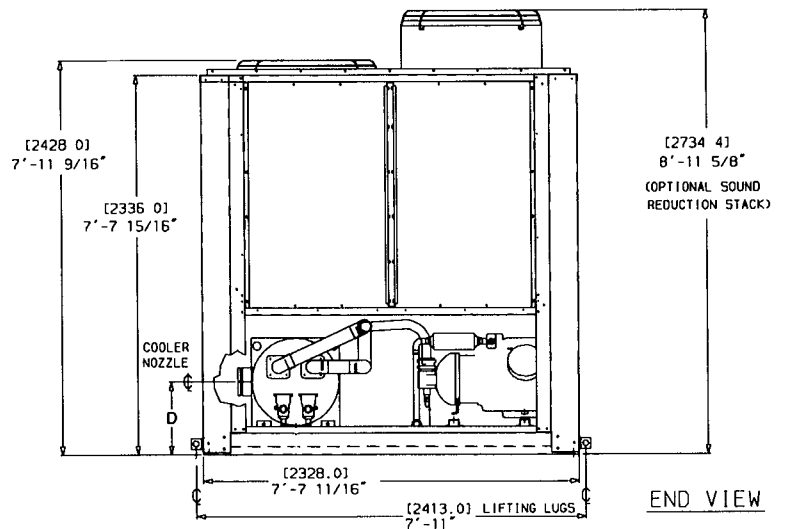
Base unit dimensions — 30GN,GT130-210



TOP VIEW



FRONT VIEW



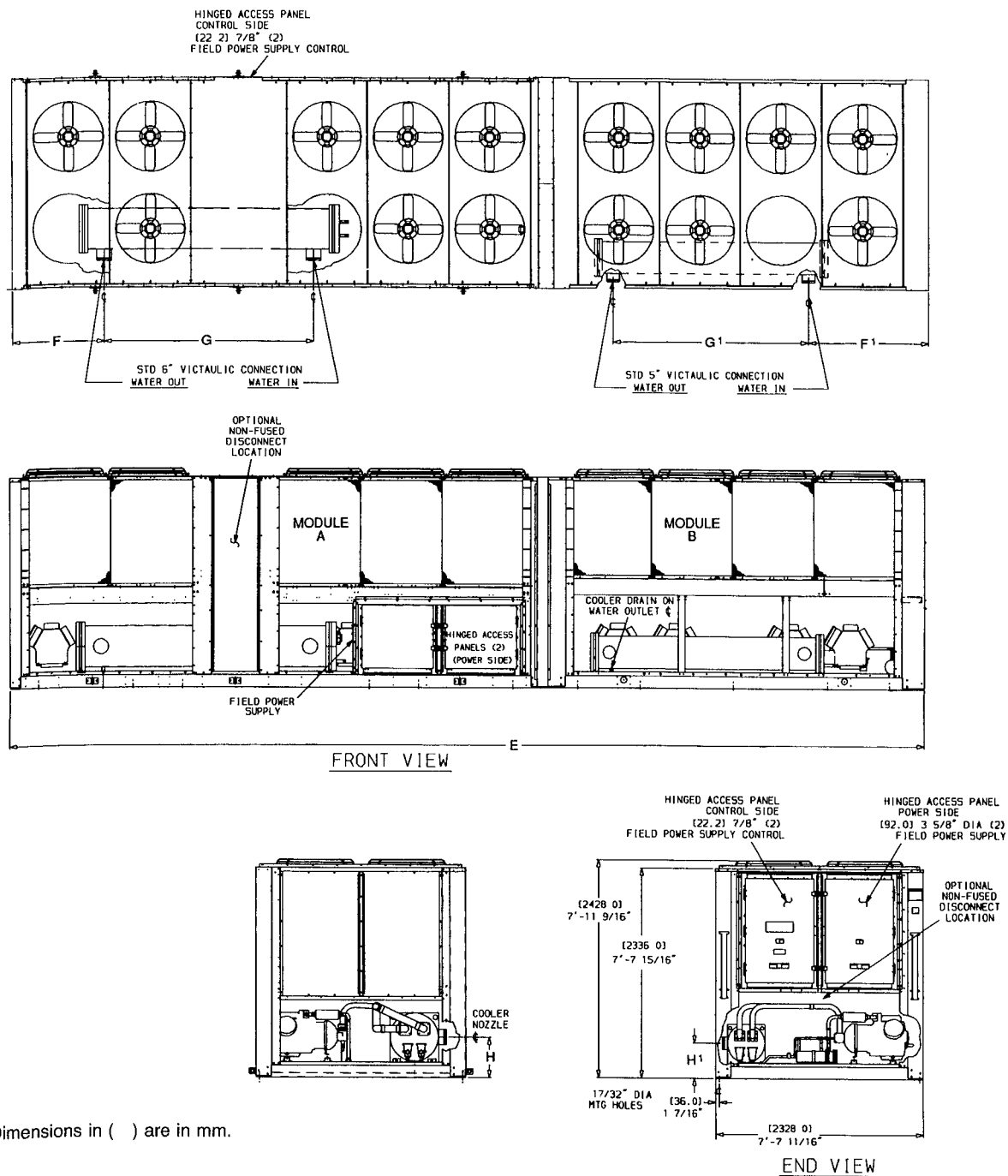
END VIEW

NOTE: Dimensions in () are in mm

DIMENSIONS — ft-in. (mm)

30GN,GT	130	150	170	190	210
A — OVERALL LENGTH	19-5 ⁵ / ₁₆ (5944)			22-5 ¹ / ₂ (6852)	
B — END TO COOLER OUTLET	3-3 ³ / ₈ (1006)			6-3 ⁷ / ₁₆ (1916)	5-11 ¹ / ₂ (1816)
C — COOLER INLET TO OUTLET	7-8 ¹ / ₄ (2343)			8- 2 ⁵ / ₈ (2504)	
D — COOLER NOZZLE HEIGHT	1-4 ³ / ₄ (425)		1-5 ⁵ / ₈ (448)		1- 6 ⁷ / ₁₆ (468)

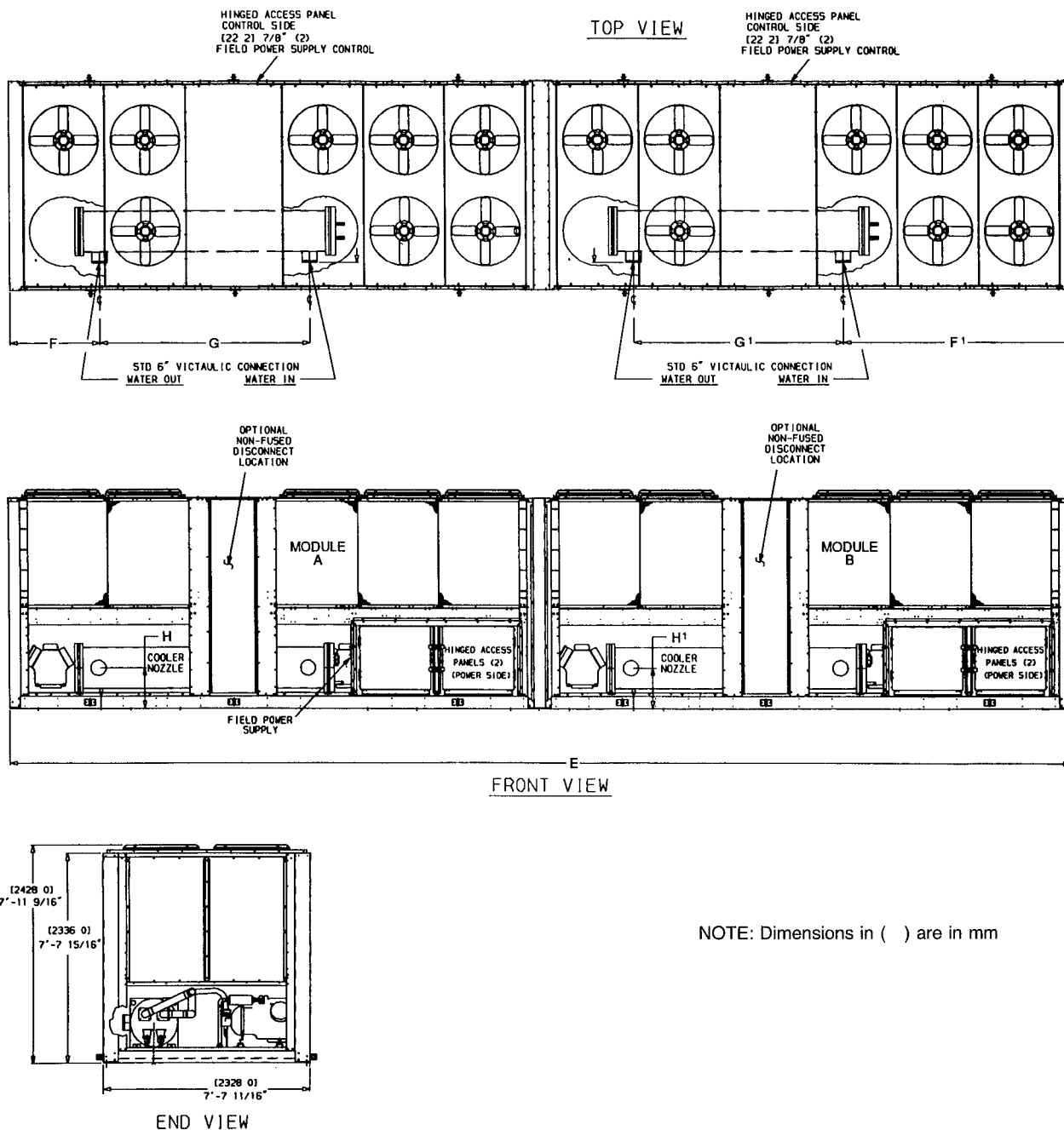
Base unit dimensions — 30GN,GT240,270



DIMENSIONS — ft-in. (mm)

30GN,GT	240	270
E — OVERALL LENGTH	33-7 ¹ / ₈ (10221)	
F — LEFT END TO COOLER OUTLET — 'A'	3-6 ⁵ / ₈ (1032)	
F' — RIGHT END TO COOLER INLET — 'B'	4-5 ¹ / ₈ (1350)	
G — COOLER INLET TO OUTLET — 'A'	7-8 ¹ / ₄ (2343)	
G' — COOLER INLET TO OUTLET — 'B'	7-2 ³ / ₁₆ (2189)	
H — COOLER NOZZLE HEIGHT — 'A'	1-4 ⁵ / ₈ (423)	1-5 ⁵ / ₈ (448)
H' — COOLER NOZZLE HEIGHT — 'B'	1-3 ³ / ₈ (390)	

Base unit dimensions — 30GN,GT300-420



DIMENSIONS — ft-in. (mm)

30GN,GT	300	330	360 (50 HZ)	360 (60 HZ)	390	420
E — OVERALL LENGTH	39¾ (11906)	42½ (12815)	45¼ (13722)			
F — LEFT END TO COOLER OUTLET — 'A'	3-3⅝ (1032)	1-5⅝ (448)	6-37/16 (1916)	5-11½ (1816)		
F' — RIGHT END TO COOLER INLET — 'B'	8-61/16 (2593)					8-31/16 (2332)
G — COOLER INLET TO OUTLET — 'A'	7-8¼ (2343)				8-2⅝ (2504)	
G' — COOLER INLET TO OUTLET — 'B'	7-8¼ (2343)					8-2⅝ (2504)
H — COOLER NOZZLE HEIGHT — 'A'	1-4¾ (425)	1-5⅝ (448)			1-67/16 (468)	
H' — COOLER NOZZLE HEIGHT — 'B'	1-5⅝ (448)					1-67/16 (468)

Selection procedure – English

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

Capacity required (60 Hz) 170 tons
 Leaving chilled water temperature (LCWT) 44 F
 Cooler water temperature rise 14° F
 Condenser entering-air temperature (CEAT) . . 95 F
 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 LCWT Correction curve (at right) at 14 F and read a correction of 0.3 F. Corrected LCWT is, therefore, 44 + 0.3 = 44.3 F.

III Determine capacity, unit size, and power input.

Enter Cooling Capacities table at given CEAT and LCWT — respectively, 95 F and 44 F.

Read down capacity column until the capacity nearest to, but higher than, specified required capacity is reached. In this case, 172 tons is delivered by a size 190.

Interpolate between 44 F and 45 F to find determined capacity and power input at corrected LCWT (44.3 F).

Values are:

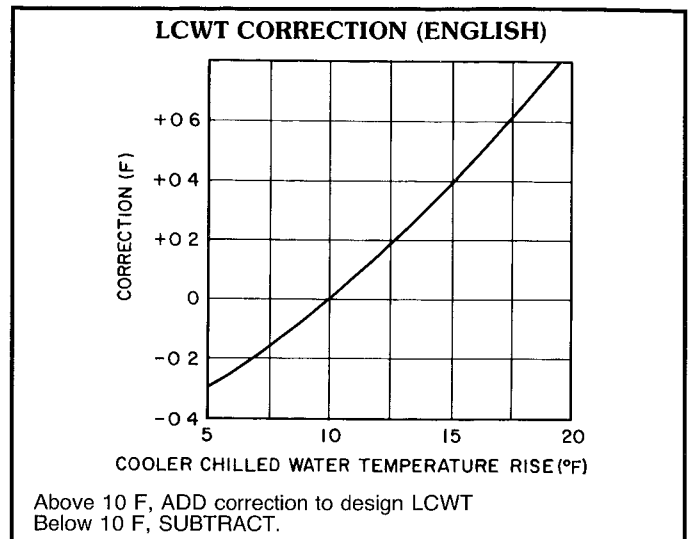
Capacity 173 tons
 Power input 202.6 kW

IV Calculate corrected cooler water flow.

$$\begin{aligned} \text{Water flow} &= \frac{24 \times \text{corrected cap. in tons}}{\text{temperature rise } ^\circ\text{F}} \\ &= \text{U.S. gpm} \\ &= \frac{24 \times 173}{14} = 296.6 \text{ U.S. gpm} \end{aligned}$$

V Calculate cooler pressure drop.

Enter Cooler Pressure Drop curve at the corrected flow rate (296.6 U.S. gpm) and read for size 190 a pressure drop of 7.5 ft of water.



Selection procedure – SI

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

Capacity required (50 Hz) 600 kW
 Leaving chilled water temperature (LCWT) 6 C
 Cooler water temperature rise 7.8° C
 Condenser entering-air temperature (CEAT) . . 35 C

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 LCWT Correction curve (at right) at 7.8 C and read a correction of 0.14 C. Corrected LCWT is, therefore, 6 + 0.14 = 6.1 C.

III Determine capacity, unit size, and power input.

Enter Cooling Capacities 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, 611 kW is delivered by a size 190.

Interpolate between 6 C and 7 C to find determined capacity and power input at corrected LCWT (6.1 C).

Values are:

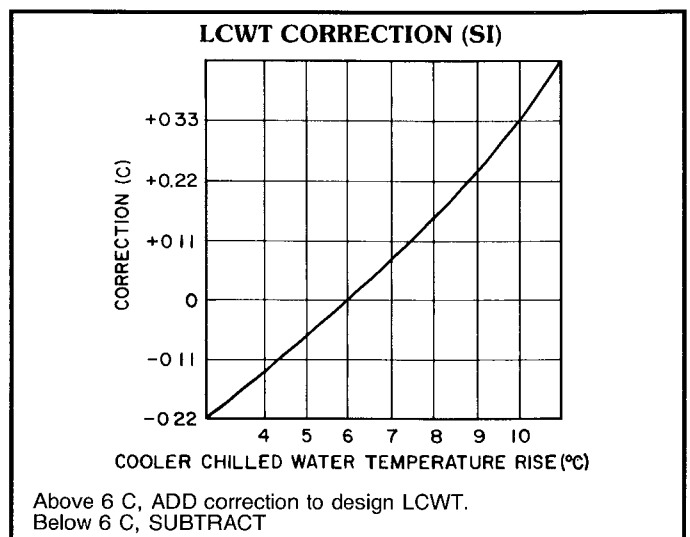
Capacity 613 kW
 Power input 213 kW

IV Calculate corrected cooler water flow.

$$\begin{aligned} \text{Water flow} &= \frac{0.239 \times \text{corrected cap. in kW}}{\text{temperature rise } ^\circ\text{C}} \\ &= \text{L/s} \\ &= \frac{0.239 \times 613}{7.8} = 18.8 \text{ L/s} \end{aligned}$$

V Calculate cooler pressure drop.

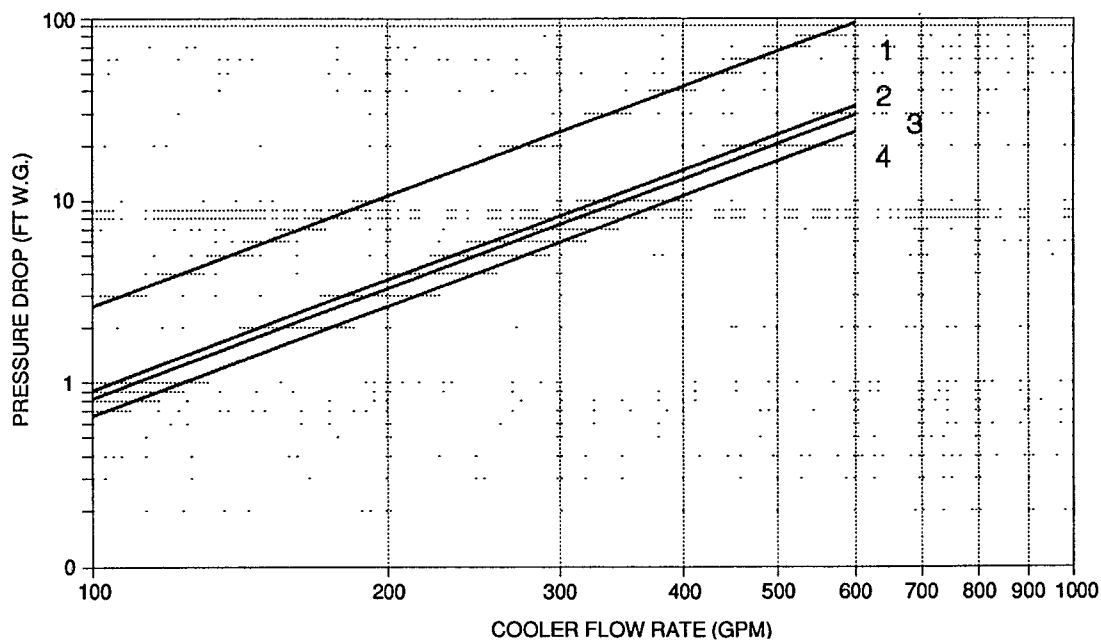
Enter Cooler Pressure Drop curve at corrected flow rate (18.8 L/s) and read, for size 190 a pressure drop of 23 kPa.



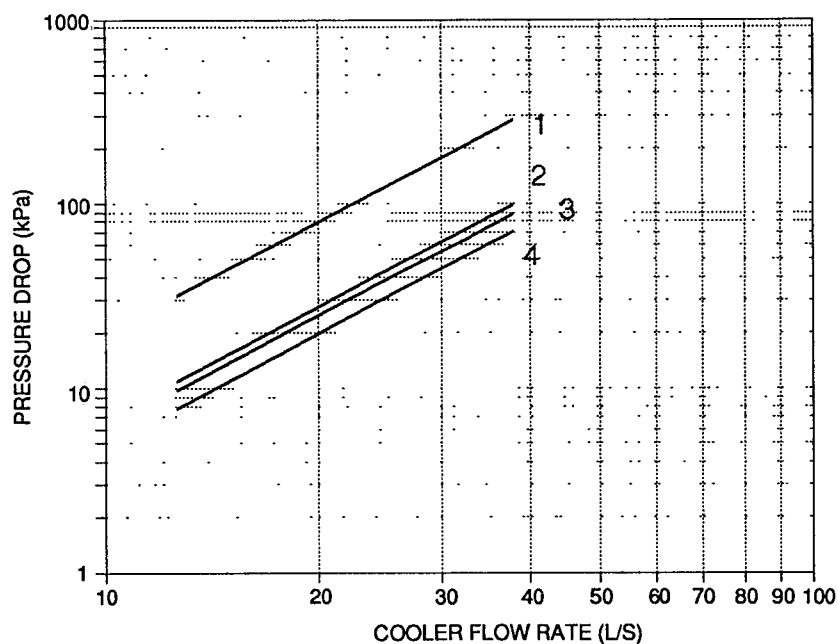
Performance data — English and SI

PRESSURE DROP CURVES

ENGLISH



SI METRIC



COOLER PRESSURE DROP KEY

- 1 Module B — 30GN,GT240,270
- 2 30GN,GT130,150
Module A — 30GN,GT240,300
- 3 30GN,GT170
Module A — 30GN,GT270,330
Module B — 30GN,GT300,330,360 (50 Hz)
- 4 30GN,GT190,210
Module A — 30GN,GT360 (50 or 60 Hz), 390 & 420
Module B — 30GN,GT360 (60 Hz), 390 & 420

Performance data — English

COOLING CAPACITIES — 60 HZ

LCWT (F)	UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (F)														
		85			95			105			115			125		
		CAP (TONS)	INPUT (KW)	FLOW RATE (GPM) COOLER	CAP (TONS)	INPUT (KW)	FLOW RATE (GPM) COOLER	CAP (TONS)	INPUT (KW)	FLOW RATE (GPM) COOLER	CAP (TONS)	INPUT (KW)	FLOW RATE (GPM) COOLER	CAP (TONS)	INPUT (KW)	FLOW RATE (GPM) COOLER
40	130	119	127	286	112	134	269	105	140	251	97	145	233	90	149	215
	150	138	149	331	129	157	311	121	164	290	112	170	270	104	174	249
	170	154	167	371	145	175	348	136	183	326	126	190	303	117	195	280
	190	169	183	406	159	193	382	149	201	357	138	209	332	128	215	306
	210	198	217	475	186	228	446	174	238	417	161	247	387	149	254	358
	240	214	222	514	201	233	483	188	243	451	175	252	420	162	260	388
	270	249	261	598	234	275	562	219	287	526	204	297	488	188	306	451
	300	273	294	656	257	309	617	240	323	577	223	335	536	206	344	495
	330	309	333	741	290	351	697	271	366	651	252	379	605	233	390	559
	360	338	367	812	318	386	763	297	403	713	276	418	663	255	429	613
	390	367	400	881	345	421	828	322	439	774	300	456	719	277	468	664
42	420	395	433	949	372	456	892	347	476	834	323	493	775	298	507	716
	130	124	130	297	116	137	279	109	143	261	101	148	243	94	153	225
	150	143	152	343	135	160	323	126	168	303	117	174	281	108	179	260
	170	160	170	385	151	179	362	141	187	339	131	194	316	122	200	292
	190	176	187	422	165	197	397	155	206	372	144	214	346	133	220	320
	210	205	221	493	193	233	464	181	244	434	168	253	404	156	260	374
	240	222	226	534	209	238	502	196	249	470	182	259	437	169	266	405
	270	259	267	621	244	281	585	228	294	548	212	305	509	196	314	471
	300	284	300	682	267	316	641	250	330	601	233	343	559	215	353	517
	330	321	340	770	302	359	724	283	375	678	263	389	631	243	401	584
	360	352	374	844	331	395	794	310	412	743	288	428	691	266	441	639
44	390	381	408	915	359	430	861	336	450	806	312	467	750	289	481	693
	420	411	442	986	386	466	928	362	487	869	337	506	808	311	521	747
	130	128	132	308	121	140	290	113	146	272	106	152	253	98	157	235
	150	149	155	357	140	164	336	131	171	315	122	178	293	113	184	272
	170	167	174	400	157	183	377	147	192	353	137	199	329	127	206	304
	190	183	191	438	172	202	413	161	211	387	150	219	360	139	226	334
	210	213	226	512	201	238	482	188	249	452	175	259	421	162	267	390
	240	231	231	555	218	244	522	204	255	490	190	265	456	176	273	422
	270	269	272	646	253	287	608	237	300	570	221	312	531	205	322	491
	300	295	306	708	278	323	667	261	338	625	243	351	582	225	362	539
	330	333	347	800	314	367	754	294	384	706	274	399	658	254	411	609
45	360	365	382	877	344	403	826	322	422	774	300	439	721	278	452	667
	390	396	417	950	373	440	895	350	460	839	326	478	781	301	493	723
	420	427	452	1024	402	477	965	377	499	904	351	518	842	325	535	780
	130	131	134	314	123	141	296	116	171	277	108	154	259	109	161	261
	150	151	157	363	143	166	342	134	201	321	125	180	299	126	188	302
	170	170	175	408	160	185	384	150	225	360	140	202	336	141	211	339
	190	186	193	446	175	204	421	164	247	394	153	222	368	155	232	372
	210	217	228	522	205	241	491	192	292	461	179	262	430	181	274	434
	240	235	233	565	222	246	532	208	299	499	194	268	465	196	280	470
	270	274	275	658	258	290	620	242	352	581	226	316	542	228	330	547
	300	301	309	722	283	326	680	266	396	637	248	356	594	250	372	600
50	330	340	351	815	320	370	768	300	449	720	280	403	671	283	421	678
	360	372	386	893	350	408	841	329	495	789	306	444	736	310	464	743
	390	403	421	968	380	445	912	356	539	855	332	484	798	336	506	806
	420	435	456	1044	410	482	983	384	584	922	358	525	860	362	548	868
	130	143	141	344	135	149	325	127	157	305	119	163	286	0	0	0
	150	166	165	398	157	175	376	147	183	353	138	191	330	0	0	0
	170	186	184	446	176	195	421	165	205	396	154	214	370	0	0	0
	190	204	203	489	192	215	462	181	226	434	169	235	406	0	0	0
	210	238	240	571	225	254	540	211	267	507	198	278	474	0	0	0
	240	258	245	619	243	260	584	229	273	549	214	285	514	0	0	0
	270	300	289	720	283	306	680	267	321	640	249	335	598	0	0	0
	300	329	325	790	311	344	746	292	362	702	273	377	656	0	0	0
50	330	372	369	893	351	391	843	330	410	793	309	428	741	0	0	0
	360	407	406	978	385	430	923	362	452	868	338	471	812	0	0	0
	390	442	443	1060	417	469	1001	392	493	941	367	514	880	0	0	0
	420	476	480	1143	450	508	1079	423	534	1015	395	556	949	0	0	0

LEGEND

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

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 HCFC-22

- 2 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

COOLING CAPACITIES – 50 HZ

		CONDENSER ENTERING AIR TEMPERATURE (F)														
		85			95			105			115			125		
LCWT	UNIT	CAP	INPUT	FLOW RATE	CAP	INPUT	FLOW RATE	CAP	INPUT	FLOW RATE	CAP	INPUT	FLOW RATE	CAP	INPUT	FLOW RATE
(F)	SIZE	(TONS)	(KW)	(GPM) COOLER	(TONS)	(KW)	(GPM) COOLER	TONS	(KW)	(GPM) COOLER	TONS	(KW)	(GPM) COOLER	TONS	(KW)	(GPM) COOLER
40	130	121	130	292	114	137	274	107	143	256	99	148	238	92	152	220
	150	143	162	342	134	171	322	125	178	301	116	185	279	108	190	258
	170	155	171	373	146	181	351	137	188	328	127	195	305	117	201	281
	190	177	197	425	166	207	399	156	216	373	145	224	347	134	231	321
	210	197	218	472	185	229	444	173	239	415	161	248	385	148	255	356
	240	217	223	521	204	235	490	191	245	458	177	254	425	164	261	393
	270	251	266	602	236	280	566	220	292	529	205	303	492	189	311	454
	300	277	301	665	260	317	625	243	331	584	226	343	543	209	353	501
	330	311	343	746	292	361	701	273	377	655	254	391	609	234	402	563
	360	333	368	798	313	388	750	292	405	701	271	420	651	251	432	602
	390	374	415	897	351	437	843	328	456	788	305	473	732	282	486	677
	420	394	436	944	370	459	888	346	479	830	321	496	771	297	510	712
42	130	126	133	303	119	140	285	111	146	267	103	152	248	96	156	230
	150	148	165	356	139	174	335	131	182	313	121	189	291	112	195	270
	170	161	175	387	152	185	365	142	193	341	132	200	318	122	206	294
	190	184	201	441	173	212	415	162	222	389	151	230	362	139	237	335
	210	204	222	490	192	235	461	180	245	432	167	254	402	155	262	372
	240	225	228	541	212	240	509	199	251	477	185	260	443	171	268	410
	270	261	271	625	245	286	588	230	299	551	214	310	513	198	319	474
	300	288	308	690	271	325	650	253	339	608	236	352	566	218	363	523
	330	323	350	775	304	369	729	284	386	683	265	400	635	245	412	587
	360	345	376	829	325	397	780	304	415	730	283	430	679	262	443	628
	390	388	424	932	365	447	877	342	467	821	318	484	764	294	499	706
	420	409	445	981	385	469	923	360	490	864	335	509	804	310	524	743
44	130	131	135	315	124	143	296	116	150	278	108	155	259	100	160	240
	150	154	169	369	145	178	348	136	186	326	127	194	304	117	200	281
	170	168	179	403	158	189	379	148	197	355	138	205	331	128	212	306
	190	191	205	459	180	217	432	169	227	405	157	236	377	145	243	349
	210	212	227	510	200	240	480	187	251	450	175	261	419	162	269	388
	240	234	233	562	221	245	529	207	257	496	193	267	462	178	275	428
	270	271	277	650	255	292	612	239	306	574	223	318	534	206	328	495
	300	299	314	717	282	332	676	264	347	633	246	361	590	227	372	546
	330	335	358	805	316	377	758	296	395	711	276	410	662	255	423	613
	360	359	384	861	338	405	811	317	424	760	295	441	708	273	455	656
	390	403	432	968	380	456	912	356	478	855	332	496	796	307	512	737
	420	425	454	1019	400	479	960	375	502	900	349	521	838	323	538	776
45	130	134	137	321	126	145	302	118	175	283	110	157	264	104	163	249
	150	157	171	376	148	180	355	138	219	332	129	196	310	122	203	292
	170	171	181	410	161	191	386	151	231	362	141	208	338	133	215	319
	190	195	207	467	183	219	440	172	266	413	160	238	385	151	247	363
	210	216	230	519	204	242	489	191	294	458	178	264	428	168	273	403
	240	239	235	573	225	248	539	211	301	506	197	270	472	185	280	445
	270	276	280	662	260	295	624	244	358	585	227	322	545	214	333	514
	300	304	318	731	287	335	688	269	407	645	251	365	602	236	378	568
	330	342	361	820	322	381	773	302	463	724	282	415	676	265	430	637
	360	366	388	877	344	410	826	323	497	775	301	446	723	284	462	681
	390	411	437	986	387	461	929	363	560	871	339	502	813	319	520	766
	420	433	459	1038	407	484	978	382	588	917	356	528	855	336	547	806
50	130	146	144	351	138	152	331	130	160	312	121	167	291	0	0	0
	150	172	179	412	162	190	389	152	199	366	143	208	342	0	0	0
	170	187	190	449	177	201	424	166	211	399	155	220	373	0	0	0
	190	213	218	512	201	231	483	189	243	454	177	253	425	0	0	0
	210	237	241	569	224	255	537	210	268	505	197	280	472	0	0	0
	240	261	247	627	247	262	592	232	275	557	217	287	521	0	0	0
	270	302	294	725	285	312	685	268	327	644	251	341	602	0	0	0
	300	333	334	800	315	354	756	296	371	711	277	387	664	0	0	0
	330	374	380	898	353	402	848	332	422	798	311	441	746	0	0	0
	360	400	408	961	378	432	907	355	454	853	332	473	798	0	0	0
	390	450	459	1080	425	486	1020	400	511	959	374	533	897	0	0	0
	420	474	483	1137	447	511	1074	421	537	1010	393	560	944	0	0	0

LEGEND

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

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 HCFC-22

2 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

Performance data — SI

COOLING CAPACITIES — 60 HZ

LCWT (C)	UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (C)														
		30			35			40			45			50		
		CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER
4	130	405	126	17.4	383	131	16.5	360	137	15.5	338	141	14.5	314	145	13.5
	150	469	148	20.2	443	154	19.1	416	160	17.9	391	166	16.8	363	170	15.6
	170	525	165	22.6	497	172	21.4	467	179	20.1	438	185	18.9	407	190	17.5
	190	576	182	24.8	545	189	23.4	512	197	22.0	480	204	20.7	446	209	19.2
	210	673	215	29.0	636	224	27.4	598	233	25.7	561	241	24.1	521	247	22.4
	240	732	220	31.5	693	230	29.8	651	239	28.0	611	247	26.3	567	254	24.4
	270	852	259	36.7	806	270	34.7	757	281	32.6	710	291	30.6	660	299	28.4
	300	930	291	40.1	880	304	37.9	827	316	35.6	776	327	33.4	721	336	31.0
	330	1051	330	45.2	994	344	42.8	934	358	40.2	876	371	37.7	814	381	35.1
	360	1151	363	49.6	1089	379	46.9	1023	394	44.1	960	408	41.3	892	419	38.4
	390	1248	396	53.7	1181	413	50.8	1110	430	47.8	1041	445	44.8	967	457	41.6
	420	1345	429	57.9	1273	448	54.8	1196	466	51.5	1122	482	48.3	1042	495	44.9
5	130	419	131	18.0	396	137	17.1	373	143	16.1	350	148	15.1	326	152	14.1
	150	485	154	20.9	459	161	19.8	432	167	18.6	405	173	17.4	378	178	16.3
	170	543	172	23.4	514	180	22.1	484	187	20.9	454	193	19.6	424	200	18.2
	190	595	189	25.6	564	198	24.3	531	206	22.9	498	213	21.4	464	220	20.0
	210	696	223	30.0	659	234	28.4	620	244	26.7	582	252	25.1	542	260	23.3
	240	757	229	32.6	717	240	30.9	675	250	29.1	633	258	27.3	590	266	25.4
	270	881	270	37.9	834	283	35.9	785	294	33.8	737	304	31.7	687	313	29.6
	300	962	303	41.4	911	317	39.2	858	330	36.9	805	341	34.6	750	352	32.3
	330	1087	344	46.8	1029	360	44.3	969	375	41.7	909	387	39.1	847	399	36.5
	360	1191	378	51.3	1127	396	48.5	1062	412	45.7	996	426	42.9	928	439	40.0
	390	1291	413	55.6	1222	432	52.6	1151	450	49.6	1080	464	46.5	1006	479	43.3
	420	1392	447	59.9	1317	468	56.7	1241	487	53.4	1164	503	50.1	1085	519	46.7
6	130	435	131	18.7	411	137	17.7	388	143	16.7	364	148	15.7	336	152	14.5
	150	503	153	21.6	475	160	20.5	448	167	19.3	421	173	18.1	385	178	16.5
	170	564	171	24.3	533	179	22.9	503	187	21.6	472	193	20.3	435	199	18.5
	190	618	188	26.6	584	197	25.1	551	206	23.7	517	213	22.3	475	219	20.5
	210	722	223	31.1	682	233	29.4	644	244	27.7	604	251	26.0	555	259	24.5
	240	786	228	33.8	743	239	32.0	701	250	30.2	658	258	28.3	605	266	26.5
	270	914	269	39.4	864	281	37.2	815	294	35.1	765	304	32.9	705	313	30.5
	300	998	302	43.0	943	316	40.6	890	330	38.3	836	341	36.0	767	351	32.5
	330	1128	342	48.5	1066	358	45.9	1006	375	43.3	944	387	40.6	867	399	36.5
	360	1235	377	53.2	1167	394	50.3	1102	412	47.4	1034	425	44.5	955	439	40.5
	390	1339	411	57.7	1266	430	54.5	1195	450	51.4	1121	464	48.3	1045	479	44.5
	420	1444	445	62.1	1364	466	58.7	1288	487	55.4	1208	503	52.0	1125	518	48.5
7	130	449	133	19.3	426	140	18.3	402	146	17.3	377	151	16.2	343	156	15.2
	150	520	156	22.4	492	164	21.2	465	171	20.0	436	177	18.8	400	183	17.6
	170	583	174	25.1	552	183	23.8	521	191	22.4	489	198	21.1	457	204	19.7
	190	639	192	27.5	605	202	26.0	571	211	24.6	536	218	23.1	501	225	21.6
	210	747	227	32.1	707	238	30.4	667	249	28.7	626	258	27.0	586	266	25.2
	240	813	232	35.0	770	245	33.1	726	255	31.3	682	265	29.4	637	273	27.4
	270	945	273	40.7	895	288	38.5	845	300	36.4	793	311	34.2	742	321	31.9
	300	1033	307	44.5	978	323	42.1	923	337	39.7	866	350	37.3	810	360	34.9
	330	1166	348	50.2	1104	367	47.5	1042	383	44.9	979	397	42.1	915	409	39.4
	360	1278	383	55.0	1210	403	52.1	1142	421	49.2	1072	437	46.2	1002	450	43.1
	390	1385	418	59.6	1312	440	56.5	1238	459	53.3	1163	476	50.1	1087	491	46.8
	420	1493	453	64.3	1414	477	60.9	1335	498	57.5	1253	516	53.9	1171	532	50.4
10	130	496	141	21.3	470	148	20.2	445	155	19.2	420	161	18.1	0	0	0
	150	573	165	24.7	544	174	23.4	515	182	22.2	485	188	20.9	0	0	0
	170	643	184	27.7	610	194	26.3	577	203	24.9	544	210	23.4	0	0	0
	190	705	203	30.3	668	214	28.8	632	224	27.2	596	232	25.7	0	0	0
	210	823	240	35.4	781	253	33.6	739	264	31.8	697	274	30.0	0	0	0
	240	896	246	38.6	850	259	36.6	805	271	34.6	759	281	32.7	0	0	0
	270	1043	289	44.9	989	305	42.6	936	319	40.3	883	330	38.0	0	0	0
	300	1139	325	49.0	1080	343	46.5	1022	359	44.0	964	371	41.5	0	0	0
	330	1286	369	55.4	1220	389	52.5	1155	407	49.7	1089	421	46.9	0	0	0
	360	1409	406	60.7	1337	428	57.6	1265	448	54.5	1193	463	51.4	0	0	0
	390	1528	442	65.8	1450	467	62.4	1372	488	59.1	1293	505	55.7	0	0	0
	420	1647	479	70.9	1562	505	67.3	1478	529	63.6	1394	547	60.0	0	0	0

LEGEND

Cap. — Cooling Capacity kW of Refrigeration
kW — Compressor Power Input
LCWT — Leaving Chilled Water Temperature (C)

NOTES:

1 All ratings are based on:

a A cooler water temperature rise of 6.6° 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 HCFC-22

2 When cooler water temperature rise is less than 2.5° 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

COOLING CAPACITIES – 50 HZ

LCWT (C)	UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (C)											
		30			35			40			45		
		CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER	CAP (KW)	INPUT (KW)	FLOW RATE (L/S) COOLER
4	130	405	123	17.4	391	134	16.8	367	140	15.8	345	145	14.8
	150	469	144	20.2	459	167	19.8	431	174	18.6	405	180	17.4
	170	525	161	22.6	500	177	21.5	470	185	20.2	441	191	19.0
	190	576	182	24.8	570	204	24.5	535	212	23.1	502	219	21.6
	210	673	215	29.0	633	225	27.3	595	234	25.6	558	242	24.0
	240	734	222	31.6	708	242	30.5	666	252	28.7	624	261	26.9
	270	853	260	36.7	812	286	35.0	763	297	32.9	716	307	30.8
	300	930	285	40.1	891	312	38.4	837	324	36.1	785	335	33.8
	330	1051	323	45.2	1000	355	43.1	940	369	40.5	882	382	38.0
	360	1101	343	47.4	1070	381	46.1	1006	396	43.3	943	410	40.6
	390	1248	396	53.7	1203	429	51.8	1130	446	48.7	1060	461	45.6
5	420	1345	429	57.9	1266	450	54.5	1190	469	51.2	1116	485	48.1
	130	404	125	17.4	405	138	17.4	381	143	16.4	358	148	15.4
	150	468	147	20.1	475	171	20.5	447	178	19.3	420	184	18.1
	170	524	164	22.6	518	181	22.3	488	189	21.0	457	195	19.7
	190	575	181	24.7	590	208	25.4	555	217	23.9	521	224	22.4
	210	671	214	28.9	655	230	28.2	617	240	26.6	579	248	24.9
	240	732	226	31.5	733	248	31.6	690	258	29.7	648	266	27.9
	270	852	265	36.7	841	292	36.2	792	304	34.1	743	314	32.0
	300	929	290	40.0	922	319	39.7	869	332	37.4	815	343	35.1
	330	1049	329	45.2	1035	363	44.6	975	377	42.0	915	390	39.4
	360	1099	345	47.3	1108	390	47.7	1043	405	44.9	978	419	42.1
6	390	1246	395	53.6	1245	439	53.6	1173	456	50.5	1100	471	47.4
	420	1343	428	57.8	1311	461	56.4	1234	479	53.1	1158	495	49.9
	130	419	128	18.1	419	140	18.0	434	143	18.7	371	151	16.0
	150	485	150	20.9	492	174	21.2	510	178	22.0	436	188	18.8
	170	544	167	23.4	536	185	23.1	556	189	23.9	475	199	20.4
	190	596	184	25.7	611	212	26.3	633	217	27.3	541	229	23.3
	210	696	218	30.0	679	234	29.2	703	240	30.3	601	253	25.9
	240	760	230	32.7	759	252	32.7	787	258	33.9	672	272	29.0
	270	883	270	38.0	871	297	37.5	902	304	38.8	771	321	33.2
	300	963	295	41.5	955	324	41.1	990	332	42.6	846	350	36.4
	330	1088	335	46.8	1072	369	46.2	1111	377	47.8	950	398	40.9
7	360	1140	352	49.1	1147	396	49.4	1189	405	51.2	1016	428	43.7
	390	1292	402	55.6	1290	446	55.5	1336	456	57.5	1142	481	49.2
	420	1393	435	60.0	1358	469	58.4	1407	479	60.6	1202	506	51.8
	130	459	136	19.7	434	143	18.7	410	149	17.7	385	155	16.6
	150	539	169	23.2	510	178	22.0	481	186	20.7	452	193	19.5
	170	587	179	25.3	556	189	23.9	525	197	22.6	492	204	21.2
	190	669	206	28.8	633	217	27.3	598	226	25.7	561	235	24.2
	210	743	228	32.0	703	240	30.3	664	250	28.6	623	259	26.8
	240	831	245	35.8	787	258	33.9	743	269	32.0	697	279	30.0
	270	953	289	41.0	902	304	38.8	852	317	36.7	800	329	34.4
	300	1046	315	45.0	990	332	42.6	935	346	40.2	877	359	37.8
10	330	1174	359	50.5	1111	377	47.8	1049	394	45.2	985	409	42.4
	360	1255	385	54.0	1189	405	51.2	1122	423	48.3	1053	439	45.4
	390	1411	434	60.8	1336	456	57.5	1262	476	54.3	1184	494	51.0
	420	1486	456	64.0	1407	479	60.6	1328	501	57.2	1247	519	53.7
	130	506	144	21.8	480	152	20.7	454	159	19.6	428	164	18.4
	150	594	179	25.6	564	189	24.3	533	198	23.0	503	205	21.6
	170	647	190	27.9	614	200	26.4	581	209	25.0	548	217	23.6
	190	737	218	31.7	700	230	30.1	662	240	28.5	624	249	26.9
	210	819	241	35.3	777	254	33.5	735	266	31.7	694	275	29.9
	240	916	259	39.5	869	273	37.4	823	286	35.4	776	296	33.4
	270	1051	306	45.2	997	322	42.9	943	337	40.6	890	349	38.3
10	300	1153	334	49.6	1094	352	47.1	1035	368	44.6	976	381	42.0
	330	1294	379	55.7	1228	400	52.9	1162	419	50.0	1096	433	47.2
	360	1384	408	59.6	1314	430	56.6	1243	450	53.5	1172	465	50.5
	390	1556	459	67.0	1477	484	63.6	1397	507	60.2	1318	524	56.7
	420	1638	482	70.5	1555	508	66.9	1471	532	63.3	1387	551	59.7

LEGEND

Cap. — Cooling Capacity kW of Refrigeration
kW — Compressor Power Input
LCWT — Leaving Chilled Water Temperature (C)

NOTES:

- All ratings are based on:
a A cooler water temperature rise of 6.6° 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 HCFC-22

- When cooler water temperature rise is less than 2.5° 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

Electrical data

UNIT 30GN,GT	Nameplate	VOLTAGE		POWER CIRCUIT			CONTROL CIRCUIT	
		Min	Max	MCA	MOCP	ICF	VOLTAGE	MCA
130	208/230-3-60	187	253	610	700	1111	115-1-60	30
	380-3-60	342	418	331	400	613	230-1-60	15
	480-3-60	414	506	306	350	556	115-1-60	30
	575-3-60	518	633	256	300	356	115-1-60	30
	380/415-3-50	342	440	353	400	603	230-1-60	15
	346-3-50	325	380	363	450	523	230-1-60	15
150	208/230-3-60	187	253	253	684	800	115-1-60	30
	380-3-60	342	418	380	400	642	230-1-60	15
	480-3-60	414	506	332	400	583	115-1-60	30
	575-3-60	518	633	284	300	446	115-1-60	30
	380/415-3-50	342	440	428	500	678	230-1-60	15
	346-3-50	325	380	465	500	605	230-1-60	15
170	208/230-3-60	187	253	728	800	1099	115-1-60	30
	380-3-60	342	418	388	400	598	230-1-60	15
	480-3-60	414	506	365	400	550	115-1-60	30
	575-3-60	518	633	295	300	419	115-1-60	30
	380/415-3-50	342	440	438	500	688	230-1-60	15
	346-3-50	325	380	472	500	612	230-1-60	15
190	208/230-3-60	187	253	800	1301	911	115-1-60	30
	380-3-60	342	418	433	500	714	230-1-60	15
	480-3-60	414	506	401	800	1302	115-1-60	30
	575-3-60	518	633	338	350	500	115-1-60	30
	380/415-3-50	342	440	509	600	760	230-1-60	15
	346-3-50	325	380	555	600	694	230-1-60	15
210	208/230-3-60	187	253	891	1000	1391	115-1-60	30
	380-3-60	342	418	480	500	761	230-1-60	15
	480-3-60	414	506	446	500	696	115-1-60	30
	575-3-60	518	633	374	400	537	115-1-60	30
	380/415-3-50	342	440	524	600	774	230-1-60	15
	346-3-50	325	380	568	600	708	230-1-60	15

LEGEND AND NOTES FOR ELECTRICAL DATA

ICF — Maximum Instantaneous Current Flow
MCA — Minimum Circuit Ampacity (for wire sizing)
MOCP — Maximum Overcurrent Protection device (amps)

NOTES:

1. All units have single point power connection
2. Main power must be supplied from a field-supplied fused electrical service with field-supplied or factory-supplied disconnect
3. Cooler heater, crankcase heater, and control circuit power must be supplied from a separate source through a field-supplied disconnect. The control circuit accessory transformer may be applied to power from the main unit power supply.
4. Maximum incoming wire size for each terminal block is 500 kcmil.
5. Maximum phase imbalance is 2%
6. Units have the following power terminal blocks and parallel conductors:

UNIT SIZE	VOLTS-PH-HZ	MAIN POWER BLOCK	PARALLEL CONDUCTOR
30GN,GT130 to 210 30GN,GT240-420 MODULE 'A' 30GN,GT300-420 MODULE 'B'	208/230-3-60	3	9
	380-3-60	2	6
	460-3-60	2	6
	575-3-60	2	6
	380/415-3-50	2	6
	346-3-50	2	6
30GN,GT240,270 MODULE 'B'	208/230-3-60	1	6
	380-3-60	1	3
	460-3-60	1	3
	575-3-60	1	3
	380/415-3-50	1	3
	346-3-50	1	3

7. Contact your Carrier field representative for electrical data with high-static condenser fans

UNIT 30GN,QT	Nameplate	MODULE A							MODULE B				
		VOLTAGE		POWER CIRCUIT-MODULE A			CONTROL CIRCUIT		POWER CIRCUIT-MODULE B			CONTROL CIRCUIT	
		Min	Max	MCA	MOCP	ICF	VOLTAGE	MCA	MCA	MOCP	ICF	VOLTAGE	MCA
240	208/230-3-Ø	187	253	810	700	1111	115-1-Ø	30	462	500	838	115-1-Ø	30
	380-3-Ø	342	418	331	400	813	230-1-Ø	15	241	250	455	230-1-Ø	15
	480-3-Ø	414	508	308	350	558	115-1-Ø	30	214	250	408	115-1-Ø	30
	575-3-Ø	518	633	258	300	358	115-1-Ø	30	191	225	290	115-1-Ø	30
	380/415-3-50	342	440	353	400	603	230-1-Ø	15	267	300	389	230-1-Ø	15
	348-3-50	325	380	383	450	523	230-1-Ø	15	304	350	434	230-1-Ø	15
270	208/230-3-Ø	187	253	728	800	1099	115-1-Ø	30	482	500	838	115-1-Ø	30
	380-3-Ø	342	418	388	400	598	230-1-Ø	15	241	250	455	230-1-Ø	15
	480-3-Ø	414	508	385	400	550	115-1-Ø	30	214	250	408	115-1-Ø	30
	575-3-Ø	518	633	295	300	419	115-1-Ø	30	191	225	290	115-1-Ø	30
	380/415-3-50	342	440	438	500	688	230-1-Ø	15	267	300	389	230-1-Ø	15
	348-3-50	325	380	472	500	612	230-1-Ø	15	304	350	434	230-1-Ø	15
300	208/230-3-Ø	187	253	810	700	1111	115-1-Ø	30	728	800	1099	115-1-Ø	30
	380-3-Ø	342	418	331	400	813	230-1-Ø	15	388	400	598	230-1-Ø	15
	480-3-Ø	414	508	308	350	558	115-1-Ø	30	365	400	550	115-1-Ø	30
	575-3-Ø	518	633	258	300	358	115-1-Ø	30	295	300	419	115-1-Ø	30
	380/415-3-50	342	440	353	400	603	230-1-Ø	15	438	500	688	230-1-Ø	15
	348-3-50	325	380	383	450	523	230-1-Ø	15	472	500	612	230-1-Ø	15
330	208/230-3-Ø	187	253	728	800	1099	115-1-Ø	30	728	800	1099	115-1-Ø	30
	380-3-Ø	342	418	388	400	598	230-1-Ø	15	388	400	598	230-1-Ø	15
	480-3-Ø	414	508	385	400	550	115-1-Ø	30	365	400	550	115-1-Ø	30
	575-3-Ø	518	633	295	300	419	115-1-Ø	30	295	300	419	115-1-Ø	30
	380/415-3-50	342	440	438	500	688	230-1-Ø	15	438	500	688	230-1-Ø	15
	348-3-50	325	380	472	500	612	230-1-Ø	15	472	500	612	230-1-Ø	15
360	208/230-3-Ø	187	253	800	1301	911	115-1-Ø	30	800	1301	911	115-1-Ø	30
	380-3-Ø	342	418	433	500	714	230-1-Ø	15	433	500	714	230-1-Ø	15
	480-3-Ø	414	508	401	800	1302	115-1-Ø	30	401	800	1302	115-1-Ø	30
	575-3-Ø	518	633	338	350	500	115-1-Ø	30	338	350	500	115-1-Ø	30
	380/415-3-50	342	440	438	500	688	230-1-Ø	15	438	500	688	230-1-Ø	15
	348-3-50	325	380	472	500	612	230-1-Ø	15	472	500	612	230-1-Ø	15
390	208/230-3-Ø	187	253	891	1000	1391	115-1-Ø	30	800	1301	911	115-1-Ø	30
	380-3-Ø	342	418	480	500	781	230-1-Ø	15	433	500	714	230-1-Ø	15
	480-3-Ø	414	508	448	500	696	115-1-Ø	30	401	800	1302	115-1-Ø	30
	575-3-Ø	518	633	374	400	537	115-1-Ø	30	338	350	500	115-1-Ø	30
	380/415-3-50	342	440	524	600	774	230-1-Ø	15	509	600	780	230-1-Ø	15
	348-3-50	325	380	568	600	708	230-1-Ø	15	555	600	694	230-1-Ø	15
420	208/230-3-Ø	187	253	891	1000	1391	115-1-Ø	30	891	1000	1391	115-1-Ø	30
	380-3-Ø	342	418	480	500	781	230-1-Ø	15	480	500	781	230-1-Ø	15
	480-3-Ø	414	508	448	500	696	115-1-Ø	30	448	500	696	115-1-Ø	30
	575-3-Ø	518	633	374	400	537	115-1-Ø	30	374	400	537	115-1-Ø	30
	380/415-3-50	342	440	524	600	774	230-1-Ø	15	524	600	774	230-1-Ø	15
	348-3-50	325	380	568	600	708	230-1-Ø	15	568	600	708	230-1-Ø	15

Controls

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 switch to ON position. (This switch is also used to reset microprocessor should any safety trip, and also functions as ON-OFF switch for electronic processor and relay boards.) On Flotron™ 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 Quick Test routine, 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, 2 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 has not 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
- T4 Saturated condensing temperature — Circuit B
- T5 Evaporator refrigerant temperature — Circuit A
- T6 Evaporator refrigerant temperature — Circuit B
- T7 Return gas temperature entering compressor cylinder — Circuit A
- T8 Return gas temperature entering compressor cylinder — Circuit B
- T10 Remote temperature sensor (accessory)

The microprocessor uses these temperatures to control capacity, fan cycling, and 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 to 20° F (8.3° C to 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 EXV 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 an 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 all sizes.

Complete electronic control system contains several additional components.

Flotronic™ controls with 2-digit 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 (light-emitting diode) display. The LED display is normally off after initialization period. 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 A, Circuit B)
61	Low Water Flow
63,64	Low Oil Pressure (Circuit A, Circuit 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 Instructions.

Flotronic II (CCN) controls — Controls are factory-shipped in 30GN units, and include microprocessor controls and compatibility with Carrier Comfort Network (CCN) building comfort system. Control has a diagnostic display or Local Interface Device (LID) with 8-character display with capability to expand the output into full phrases. Also includes monitoring of system operational status, fault/overload conditions, key refrigeration temperatures, system pressures, and inputs to the processor at the unit or remote.

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 switch (LOCAL/STOP/CCN) switches 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, (automatic lead/lag feature). The controlled pulldown feature limits compressor loading on start-up to reduce demand on start-up and unnecessary 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 EXV 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 deenergized 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), EXV 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 (30GT only) 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.

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 shut 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.

Controls (cont)

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 cutout* shuts down compressors if compressor discharge pressure increases to 426 psig (2937 kPa). *Ground current* safety opens on sensing a current-to-ground in compressor windings in excess of 2.5 amps. *Loss of flow protection* is 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 Instructions) without additional equipment or tools. Quick Test confirms microprocessor is functional, informs observer through the display the condition of each sensor and switch in chiller, and allows observer to check for proper operation of fans, compressor(s), and expansion valves.

Guide specifications

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications

Size Range **120 to 400 Tons (420 to 1400 kW)**
Nominal

Carrier Model Number. **30GN,GT**

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 590-92.
- B. Unit construction shall be designed to conform to ASHRAE 15 latest revision safety standard, NEC (U.S.A) and ASME applicable codes.
- C. Unit shall be manufactured according to ISO 9002 (International Standards Organization) manufacturing quality standard
- D. Unit operation shall be fully tested at the factory.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Unit shall be stored and handled per unit manufacturer's recommendations.
- B. Unit controls shall be capable of withstanding 185 F (85 C) storage temperature in the control compartment for an indefinite period of time.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (HCFC-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.
3. Cabinet 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%
4. Speed shall not exceed 1750 rpm (29.2 r/s) at 60 Hz or 1500 rpm (25 r/s) at 50 Hz.
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 3/4-in. (19-mm) PVC foam (closed-cell) of maximum K factor 0.28
5. Each cooler shall incorporate 2 independent direct expansion refrigerant circuits.
6. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 278 psig (1916 kPa) and a minimum water-side pressure of 300 psig (2068 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 (EXV), and complete operating charge of refrigerant HCFC-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) Eight-character diagnostic display/set point panel on 30GN unit. Two-digit panel on 30GT unit.
 - 6) Thermistors, and/or pressure transducers (30GN only), and potentiometers.
- b. Capable of performing the following functions:
 - 1) Automatic circuit 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

- b. Unit shall be capable of operating down to $-20\text{ F } (-29\text{ C})$ with the addition of the field or factory-installed solid-state Motormaster® III control with condenser coil temperature sensor. In addition, adequate field-supplied anti-freeze protection shall be field-installed in the evaporator circuit — and where wind velocity greater than 5 mph (8 km/h) is anticipated, field-fabricated and installed wind baffles shall be required.
- * 2. Cooler Heater:
Optional factory-installed heater shall protect cooler to $-20\text{ F } (-29\text{ C})$.
- * 3. Optional Condenser Coil Material:
Unit shall be factory equipped with a condenser coil made from copper tubes and copper fins
- * 4. Hot Gas Bypass:
Shall be field-installed to allow the unit to operate at lower capacity levels than standard
- 5. Security Condenser Grilles.
A set of metal grilles complete with support retainers and fasteners shall be provided for the protection of the condensing coils, compressors, and cooler.
- 6. Hail Guard:
Unit shall be field-equipped with louvered condenser coil hail guards and installation hardware.
- * 7 Part-Wind Start:
Shall be factory installed to reduce compressor inrush current.
- * 8. Brine Units
Unit shall be factory-equipped to operate down to $15\text{ F } (-9.4\text{ C})$ leaving chilled water temperature.
- 9. Flow Switch:
A chilled water flow switch shall be field-installed for low water flow detection.
- * 10. Control Transformer.
A transformer shall be field-installed to permit single-point power connection combining unit primary electrical power supply with control power supply.
- * 11 High-Static Fan:
Special condenser fans, motors, and mounts shall be factory installed allowing fans to generate 0.4 in. wg (0.10 kPa) and 1 in wg (0.25 kPa) static pressure external to the chiller at nominal condenser airflow (cfm).
- 12. Non-Fused Disconnect:
A non-fused electrical disconnect for main unit power shall be factory installed.
- 13. Demand Limit Control (30GT unit).
Unit shall be field-equipped with a 2-point demand limit control (0 to 49% and 50 to 100%) activated remotely by an electric signal.
- 14. Pressure Gage Panel (30GT unit).
Unit shall be field-equipped with suction and discharge pressure gages with manual shutoff valves.
- 15 Temperature Reset Board (30GT unit):
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
- * 16. Sound Reduction Kits.
Unit shall be equipped with kits to reduce system noise without compromising performance.

Guide specifications (cont)

- 4) Limiting of the chilled water temperature pull-down rate at start-up to 1° F (0.6° C) per minute to prevent excessive demand spikes (charges) at start-up.
- 5) Seven-day time schedule (30GN only).
- 6) Leaving chilled water temperature reset from return water (30GN only).
- 7) Demand limit control with 2-point control (0 to 100% each) (30GN only).

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 detection.
 - 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) High-pressure switch.
 - 8) Low oil protection for each compressor circuit
 - 9) Ground current compressor protection
- b. Compressors shall be equipped with the following manual-reset type protections:
 - 1) Pressure overload.
 - 2) Electrical overload through the use of definite-purpose contactors and calibrated, ambient compensated, magnetic trip circuit breakers. Circuit breakers shall open all 3 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. On 30GN units, 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. On 30GT units, display module shall be capable of indicating the tripping of protections through display of a 2-digit code, for which a legend shall be provided in control panel. Information 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, transducer (30GN only), or potentiometer malfunction.

- 8) Entering and leaving water temperature.
- 9) Evaporator and condenser pressure (30GN only)
- 10) Electronic expansion valve positions (30GN only).
- 11) All set points (30GN only).
- 12) Time of day (30GN only).

- 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.

- c. Provide serial output port.

I. Operating Characteristics.

1. Unit shall be capable of starting and running fully loaded at outdoor ambient temperatures from 0° F to 125 F (-18 to 52 C), without special controls.
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 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 3-phase type with permanently lubricated bearings and Class B insulation

K. Electrical Requirements:

1. Unit (or module) primary electrical power supply (3 phase) shall be connected to a single location.
2. Unit control power (1 phase) shall be connected to a separate entry point
3. 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 (-18 C) with the addition of antifreeze in the evaporator circuit, and with the addition of field-fabricated and field-installed wind baffles. The wind baffles shall be installed when wind velocity greater than 5 mph (8 km/h) is anticipated, and ambient temperature is below 32 F (0° C).

