



Advance Product Data

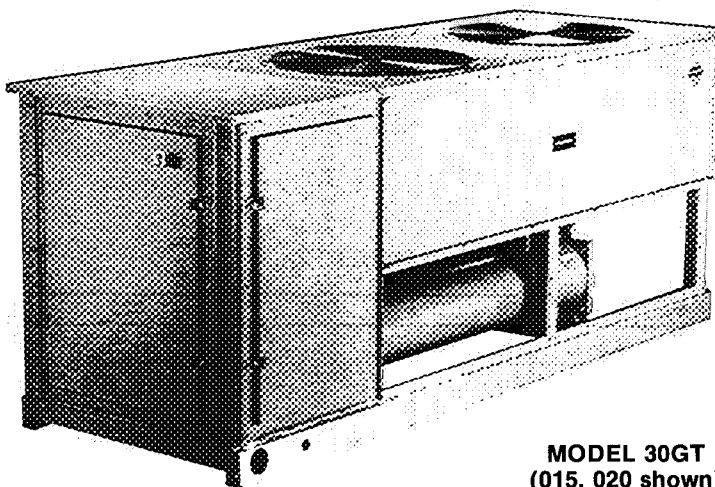
Nominal Capacity: 15 to 35 tons

Packaged Air-Cooled Reciprocating Chillers

**30GT015
through 035**

Superseded by 30GT-11D

*no art numbers -
job superseded before
no's were recorded*



MODEL 30GT
(015, 020 shown)

Peak Operating Performance in Five Convenient Sizes

- Ideal cooling system for many commercial and industrial applications.
- More cost-saving advantages than ever before.
- Smaller, lighter, easier-to-install packages.
- Outstanding EER's for full and part load operation.

Features

Five convenient sizes to meet exacting commercial building cooling requirements.

Many cost-saving features combined with practical smaller and lighter packaging.

EER's (Energy Efficiency Ratios) up to 10.4 for full and 13.5 for part load which reduce operating expenses and save energy.

Special heat exchanger tube design increases internal surface area for improved heat transfer, and improves the refrigerant's wetting action on the tube's inner surface.

Suction cutoff unloading provides high part load efficiency from three-stage operation allowing rapid loading and unloading of compressor cylinders.

Reduced noise and vibration due to dual-flared fan orifices, lower condenser airflow, vibration isolators and mufflers.

Proven semi-hermetic compressor for operational reliability. Plus direct drive fan motors are totally enclosed for protection against harsh weather.

Condenser coil has horizontal design which helps prevent fin damage during shipment and handling. Condenser is constructed of aluminum or copper fins mechanically bonded to seamless copper tubes.

Year-round dependability is also assured by the Time Guard® device which prevents compressor rapid cycling, high and low pressure switches, thermostatically controlled cooler heating cable, control relays, calibrated magnetic trip circuit breakers and crankcase heater. Reliability is enhanced by the reduced refrigerant charge.

Easier installation and rigging adds even more dollar savings for the owner: units are shipped job-ready, factory assembled and tested with a full R-22 operating charge, a lower, streamlined 23 - 32% lower profile than previous models helps eliminate many architectural problems, the horizontally positioned condenser eliminates the need for low ambient wind baffles or hail guards, vibration isolation is factory installed, and hookup to power and water lines is done in minimal time.

Convenient serviceability saves maintenance dollars. There are hinged interior access panels, and a serviceable, semi-hermetic compressor for periodic maintenance.

Wide application flexibility with sizes ranging from 15 to 35 tons for virtually every commercial need. Numerous factory-installed options and field-installed accessories are available for tailoring the system to a variety of requirements. Model 30GT is made to order for new and retrofit applications.

Field-installed accessories

- **Motormaster® Head Pressure Control** permits unit operation down to -20F ambient temperature.
- **Chilled Water Flow Switch** prevents unit operation if chilled water flow stops.
- **Compressor Oil Safety Switch** package provides protection against loss of oil pressure. One is required for each chiller.
- **Gage Panel Package** provides a suction and a discharge pressure gage for each refrigerant circuit.
- **Control Transformer** provides control power where other source is not available.

Physical data

60 HERTZ

UNIT 30GT	015	020	025	030	035
COMPRESSOR	Reciprocating, Semi-Hermetic				
No. ...Type	1 06DG537	1 06E2250	1...06E7265	1...06E7275	1 06E7299
No. Cyls (ea)...Speed, Rpm (r/s)	6. 1750 (29)	4. 1750 (29)		6 .1750 (29)	
Capacity Steps	3	2		3	
Oil Charge*, Pt (L)	10 (4.7)	14 (6.6)	19 (9)	19 (9)	19 (9)
REFRIGERANT CHG, R-22					
Total, lb (kg)	25.0 (11.3)	31.0 (14.1)	43.0 (19.5)	47.0 (21.3)	57.0 (25.9)
CONDENSER FANS, Type	Propeller Type, Direct Driven				
No. ...Diameter, in. (mm)		2 30 (762)			3 .30 (762)
Total Airflow, Cfm (L/s)	10,600 (5000)		15,700 (7400)		23,700 (11,200)
Speed, Rpm (r/s)			1140 (19)		
CONDENSER COIL, Type	Horizontal, Plate Fin				
Rows...Fins/in. (Fin Spacing mm)	2 19 (1.34)	3. 17 (1.49)	2 19 (1.34)		3 17 (1.49)
Total Face Area, sq ft (m²)	23.5 (2.18)		39.2 (3.64)		58.4 (5.43)
COOLER	Shell and Tube, Direct Expansion				
Net Water Volume, gal. (L)	6.8 (25.7)		9.9 (37.5)		12.8 (48.4)
Max. Design Working Pressure, psig (kPa)			Refrigerant Side — 235 (1620) Water Side — 150 (1034)		
WATER CONNECTIONS, in.					
Inlet and Outlet			2 FPT		2½ FPT
Drain			¾ MPT		

*See Oil Charge for Carrier-approved oil

50 HERTZ

UNIT 30GT	015	020	025	030
COMPRESSOR	Reciprocating, Semi-Hermetic			
No. ...Type	1 . 06E2250	1 06E7265	1 06E7275	1 06E7299
No. Cyls (ea)...Speed, Rpm (r/s)	4 ..1450 (24.2)		6 1450 (24.2)	
Capacity Steps	2		3	
Oil Charge*, Pt (L)	14 (6.6)		19 (9)	
REFRIGERANT CHG, R-22				
Total, lb (kg)	26.0 (11.8)	35.0 (15.9)	42.0 (19.1)	49.0 (22.2)
CONDENSER FANS, Type	Propeller Type, Direct Driven			
No. ...Diameter, in. (mm)		2 . 30 (762)		
Total Airflow, Cfm (L/s)	10,600 (5000)		15,700 (7400)	
Speed, Rpm (r/s)		950 (15.8)		
CONDENSER COIL, Type	Horizontal, Plate Fin			
Rows...Fins/in. (Fin Spacing mm)	2 19 (1.324)	3 17 (1.49)	2 19 (1.34)	3 17 (1.49)
Total Face Area, sq ft (m²)	23.5 (2.18)		39.2 (3.64)	
COOLER	Shell and Tube, Direct Expansion			
Net Water Volume, gal. (L)	6.8 (25.7)		9.9 (37.5)	
Max. Design Working Pressure, psig (kPa)			Refrigerant Side — 235 (1620) Water Side — 150 (1034)	
WATER CONNECTIONS, in.				
Inlet and Outlet			2 FPT	
Drain			¾ MPT	

*See Oil Charge for Carrier-approved oil.

Base Unit Dimensions — 30GT015,020

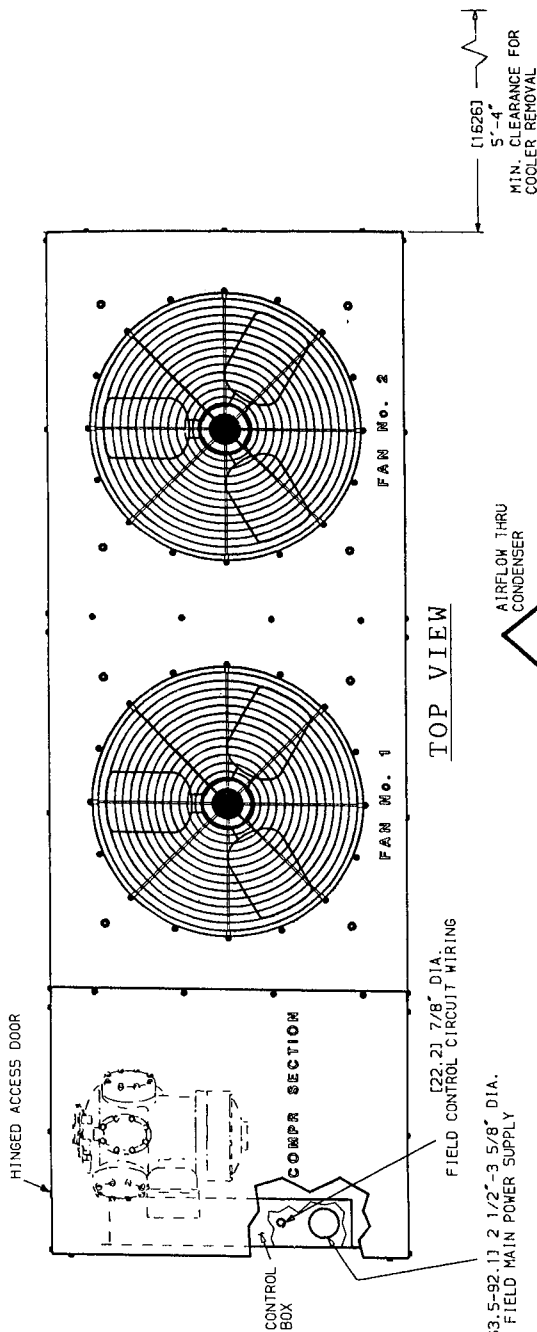
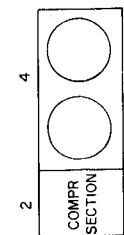
- NOTES:
1. THERE MUST BE [1220 mm] 4 FT FOR SERVICE AND FOR UNRESTRICTED AIRFLOW ON ALL SIDES OF UNIT.
 2. THERE MUST BE MINIMUM [2440 mm] 8 FT CLEAR AIR SPACE ABOVE UNIT.
 3. THE APPROXIMATE OPERATING WEIGHT OF THE UNIT IS:

60 HZ				50 HZ			
UNIT	WT LBS	WT KG		UNIT	WT LBS	WT KG	
30GT015	1640	744		30GT015	1741	790	
30GT015C	1732	786		30GT015C	1833	831	
30GT020	1821	826		30GT020	1884	846	
30GT020C	1945	882		30GT020C	1988	902	

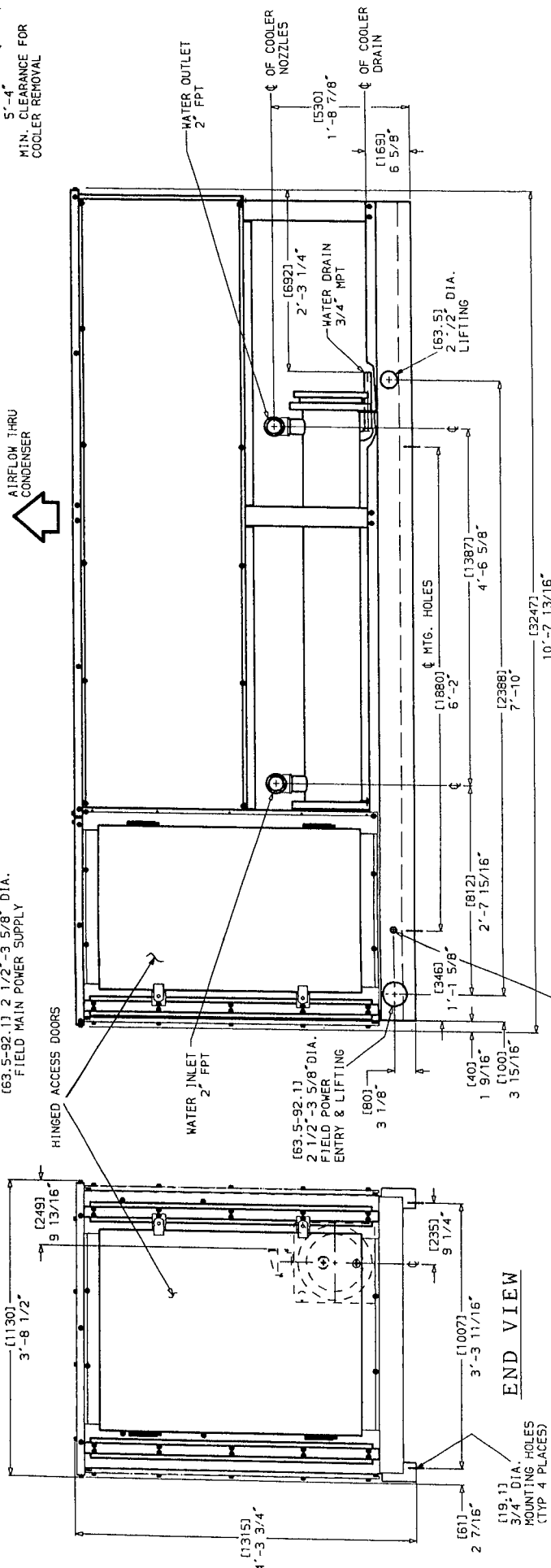
NOTE: "C" INDICATES COPPER COIL.

APPROX. OPER. WT (lb)
AT SUPPORT POINTS

	60 HZ				Tot.
	1	2	3	4	
015	510	376	434	320	1640
015C	539	397	458	338	1732
020	574	423	474	350	1821
020C	613	451	507	374	1945



TOP VIEW



SIDE VIEW

30GT506095
A

Base Unit Dimensions — 30GT025,030

NOTES:

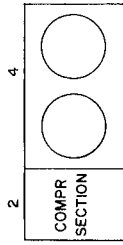
1. THERE MUST BE [1220 mm] 4 FT FOR SERVICE AND FOR UNRESTRICTED AIRFLOW ON ALL SIDES OF UNIT.
2. THERE MUST BE MINIMUM [2440 mm] 8 FT CLEAR AIR SPACE ABOVE UNIT.
3. THE APPROXIMATE OPERATING WEIGHT OF THE UNIT IS:

60 HZ				50 HZ			
UNIT	WT LBS	WT KG		UNIT	WT LBS	WT KG	
30GT025	2170	984		30GT025	2183	995	
30GT025C	2324	1054		30GT025C	2347	1065	
30GT030	2268	1029		30GT030	2332	1058	
30GT030C	2474	1122		30GT030C	2538	1151	

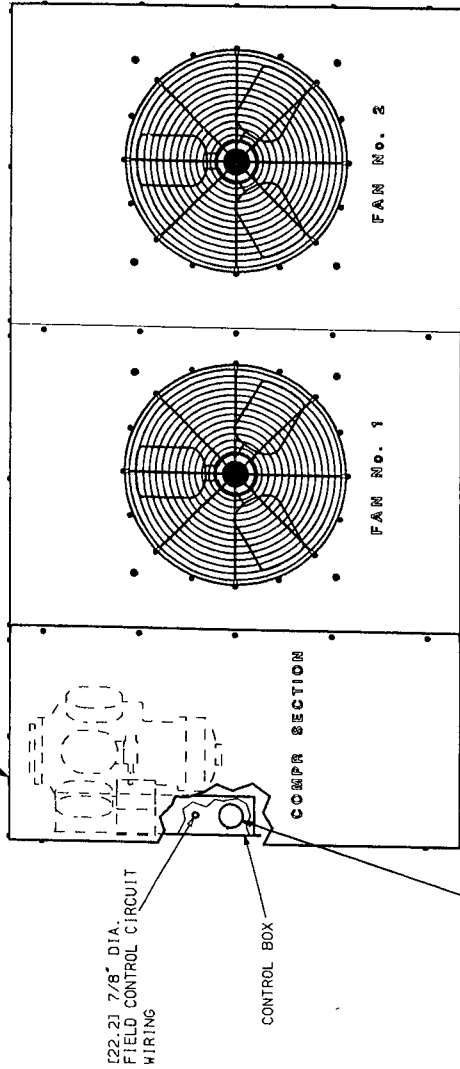
NOTE: "C" INDICATES COPPER COIL.

APPROX. OPER. WT (lb)
AT SUPPORT POINTS

60 HZ				50 HZ			
1	2	3	4	1	2	3	4
025	584	501	584	025	584	501	584
025C	626	536	626	025C	626	536	626
030	611	523	611	030	611	523	611
030C	666	571	666	030C	666	571	666



HINGED ACCESS DOOR



TOP VIEW

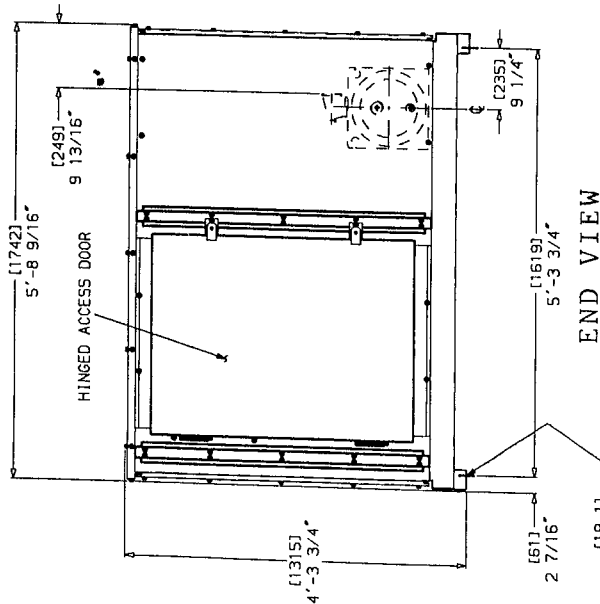
[63.5-92.1] 2 1/2\"-3 5/8\" DIA.
FIELD MAIN POWER SUPPLY



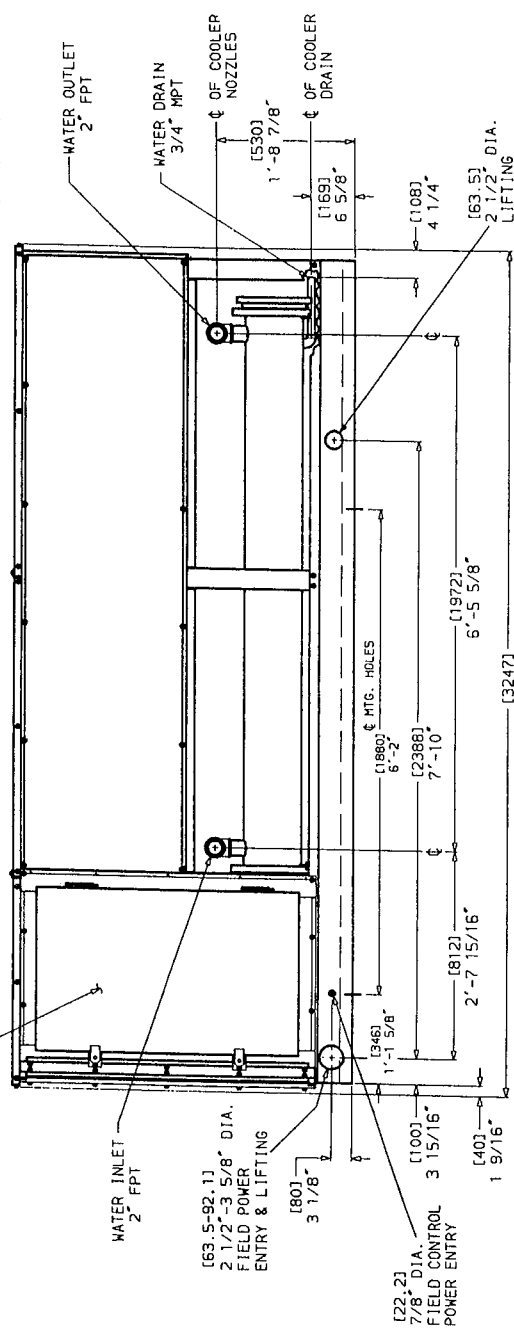
HINGED ACCESS DOOR

AIRFLOW THRU
CONDENSER

[2235] 7\"-4\"
MIN. CLEARANCE FOR
COOLER REMOVAL



END VIEW



SIDE VIEW

30GT506096
REV A

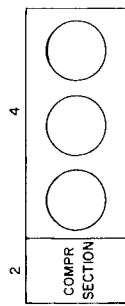
Base Unit Dimensions — 30GT035

NOTES:

1. THERE MUST BE (1220 mm) 4 FT FOR SERVICE AND FOR UNRESTRICTED AIRFLOW ON ALL SIDES OF UNIT.
2. ABOVE UNIT MUST BE MINIMUM (2440 mm) 8 FT CLEAR AIR SPACE.
3. THE APPROXIMATE OPERATING WEIGHT OF THE UNIT IS:

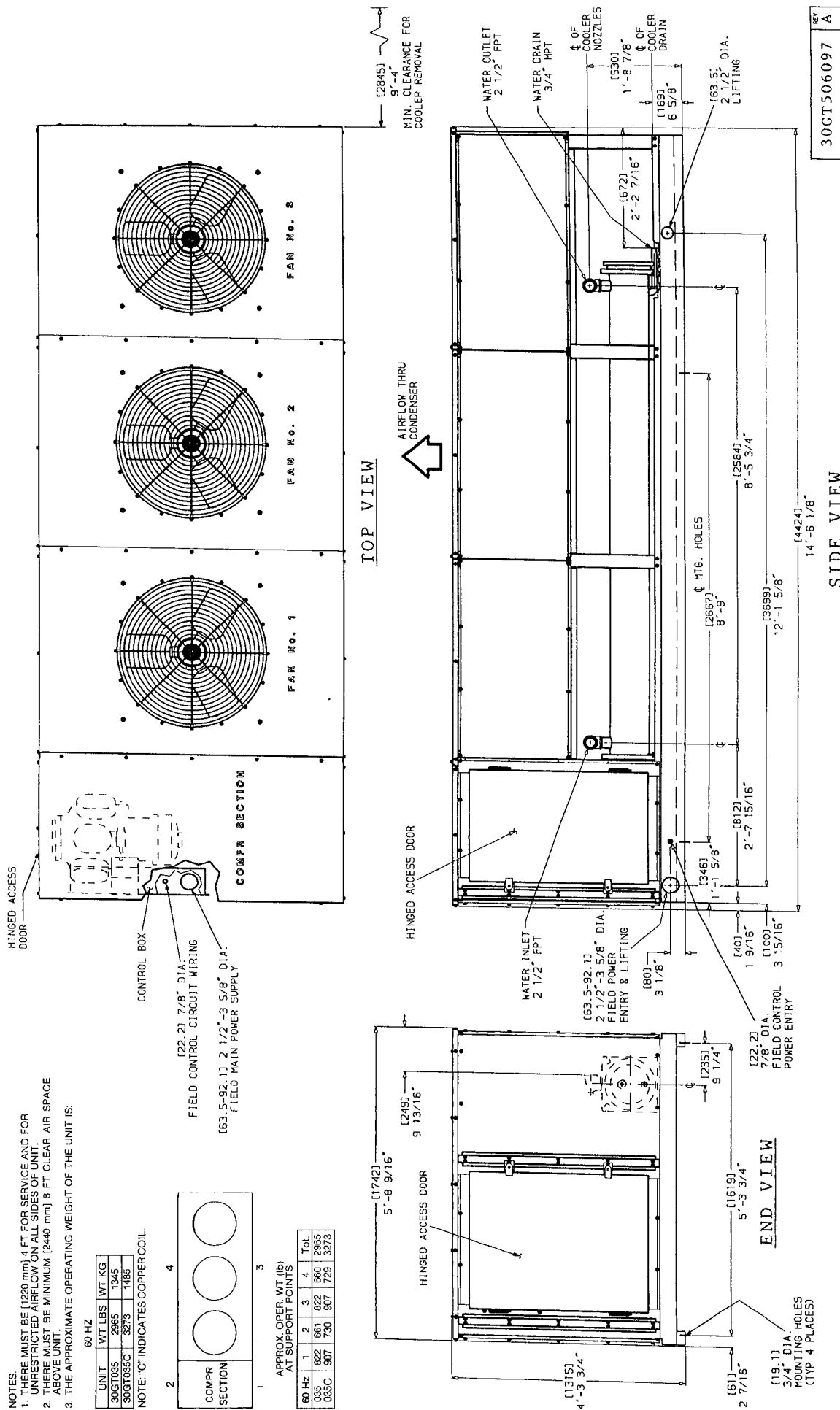
UNIT	WT. LBS.	WT. KG.
30GT035	2965	1345
30GT035C	3273	1485

NOTE: "C" INDICATES COPPER COIL.



APPROX. OPER. WT. (lb)
AT SUPPORT POINTS

60 HZ	1	2	3	4	Tot.
035	822	661	822	660	2965
035C	907	730	907	729	3273



30GT506097 A

Selection procedure (with example) — English

I Determine job requirements.

Given:

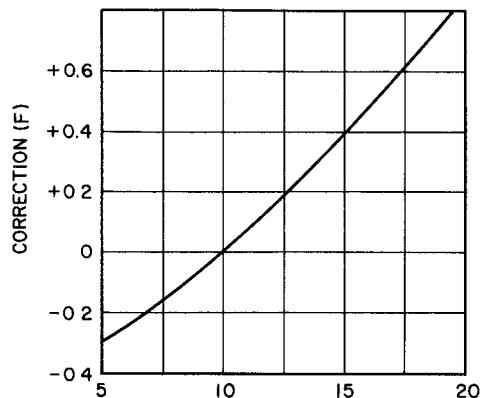
Cooling Load 26 Tons
 Leaving Chilled Water Temperature (LCWT) 44 F
 Chilled Water Temperature Rise 10 F
 Fouling Factor (Cooler) 0.00025
 Condenser Entering Air Temperature 95 F

NOTE: For other than 10 F temperature rise, data corrections must be made; also, on some units a change of controls is necessary. Refer to Application Data for correction procedure and information on controls.

II Determine capacity, unit size, power input, and cooler flow and pressure drop.

Enter Performance Ratings table at 95 F condenser entering air temperature and 44 F LCWT. Under Cap. heading, 26.6 tons is nearest to and greater than given load (26 tons). Read directly from table:

Unit 30GT030
 Capacity 26.6 tons
 Power Input 30.5 kW
 Cooler Flow 63.8 Gpm
 Cooler Pressure Drop 8.0 ft water



COOLER CHILLED WATER TEMPERATURE RISE (F)
 Above 10 F, ADD correction to design LCWT,
 below 10 F, SUBTRACT.

Selection procedure (with example) — SI

I Determine job requirements.

Given:

Cooling Load 90 kW
 Leaving Chilled Water Temperature (LCWT) 7 C
 Chilled Water Temperature Rise 6 C
 Fouling Factor (Cooler) 8.8×10^{-5}
 Condenser Entering Air Temperature 35 C

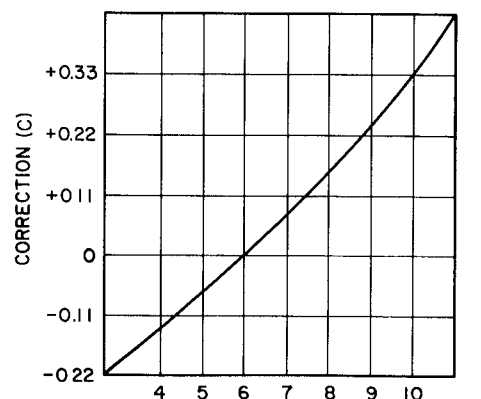
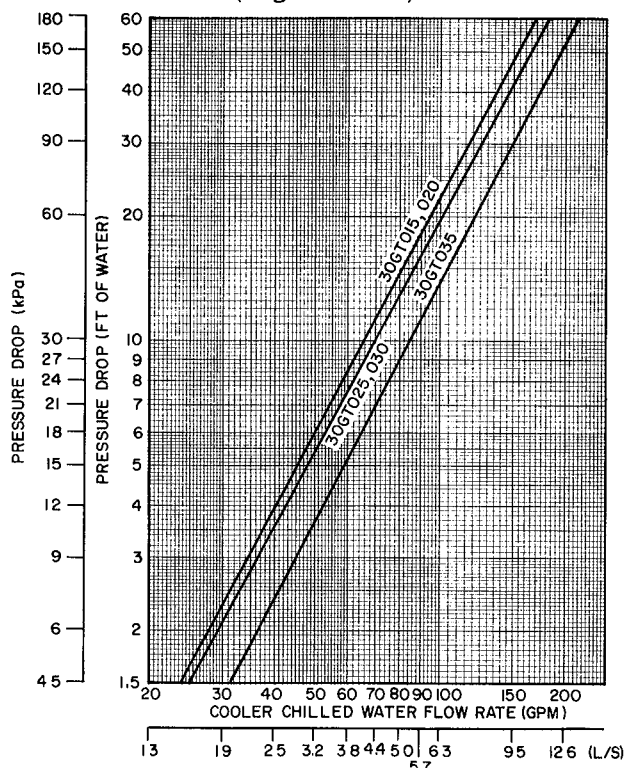
NOTE: For other than 5.6 C temperature rise, data corrections must be made; also, on some units, a change of controls is necessary. Refer to Application Data for correction procedure and information on controls.

II Determine capacity, unit size, power input, and cooler flow and pressure drop.

Enter Performance Ratings table at 35 C condenser entering air temperature and 7 C LCWT. Under Cap. heading, 96.1 kW is nearest to and greater than given load (90 kW). Read directly from table:

Unit 30GT030
 Capacity 96.1 kW
 Power Input 31.0 kW
 Cooler Flow 4.10 L/s
 Cooler Pressure Drop 24.0 kPa

TOTAL COOLER PRESSURE DROP (With Nozzles) (English and SI)



COOLER CHILLED WATER TEMPERATURE RISE (C)
 Above 6 C, ADD correction to design LCWT,
 below 6 C, SUBTRACT

Performance data

COOLING CAPACITIES — 60 Hz (English)

LCWT	UNIT 30GT	CONDENSER ENTERING AIR TEMPERATURE (F)														
		85			95			105			115			125		
		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	015	13.8	13.0	33.1	13.1	14.0	31.3	12.3	15.1	29.5	11.5	16.0	27.6	10.8	17.0	25.8
	020	17.1	17.9	40.9	15.9	18.9	38.1	14.7	19.8	35.3	13.5	20.5	32.4	12.3	21.1	29.5
	025	23.8	24.7	57.0	22.3	26.2	53.4	20.8	27.5	49.8	19.3	28.7	46.2	17.8	29.8	42.7
	030	26.2	27.7	62.6	24.6	29.2	58.9	23.0	30.5	55.1	21.4	31.7	51.2	19.8	32.6	47.4
	035	33.9	36.4	81.2	32.1	38.5	77.0	30.4	40.4	72.7	28.6	42.2	68.4	26.7	43.8	64.0
42	015	14.4	13.2	34.4	13.6	14.3	32.5	12.8	15.4	30.7	12.0	16.4	28.8	11.2	17.4	26.9
	020	17.8	18.3	42.6	16.6	19.4	39.7	15.4	20.3	36.9	14.1	21.1	33.9	12.9	21.7	30.9
	025	24.8	25.3	59.4	23.2	26.8	55.6	21.7	28.1	51.9	20.2	29.4	48.3	18.6	30.6	44.6
	030	27.2	28.3	65.1	25.6	29.8	61.4	24.0	31.2	57.5	22.4	32.5	53.6	20.7	33.5	49.5
	035	35.2	37.1	84.3	33.3	39.3	79.9	31.5	41.3	75.5	29.7	43.1	71.1	27.8	44.8	66.6
44	015	14.9	13.5	35.7	14.1	14.6	33.8	13.3	15.7	31.9	12.5	16.8	29.9	11.7	17.8	28.0
	020	18.5	18.7	44.4	17.3	19.8	41.4	16.0	20.8	38.4	14.8	21.6	35.5	13.5	22.3	32.4
	025	25.8	25.8	61.8	24.2	27.4	58.0	22.6	28.8	54.1	21.0	30.1	50.4	19.5	31.4	46.7
	030	28.3	28.9	67.8	26.6	30.5	63.8	25.0	32.0	59.9	23.3	33.3	55.9	21.6	34.4	51.8
	035	36.4	37.8	87.3	34.6	40.0	82.9	32.6	42.1	78.3	30.8	44.1	73.8	28.9	45.9	69.3
46	015	15.5	13.7	37.1	14.7	14.9	35.2	13.8	16.0	33.1	13.0	17.1	31.1	12.1	18.2	29.1
	020	19.2	19.1	46.1	18.0	20.3	43.1	16.7	21.3	40.1	15.4	22.2	37.0	14.1	22.9	33.9
	025	26.8	26.4	64.2	25.1	28.0	60.3	23.5	29.5	56.4	21.9	30.9	52.5	20.3	32.2	48.7
	030	29.4	29.5	70.4	27.7	31.2	66.4	26.0	32.7	62.3	24.3	34.1	58.2	22.5	35.3	54.0
	035	37.7	38.5	90.5	35.8	40.8	85.9	33.9	43.0	81.4	31.9	45.0	76.6	30.0	46.9	71.9
48	015	16.1	14.0	38.5	15.2	15.2	36.5	14.4	16.4	34.5	13.5	17.5	32.4	12.6	18.6	30.3
	020	20.0	19.5	47.9	18.7	20.7	44.9	17.4	21.8	41.8	16.1	22.7	38.7	14.8	23.5	35.5
	025	27.8	27.0	66.8	26.1	28.7	62.7	24.5	30.2	58.7	22.8	31.7	54.7	21.2	33.0	50.8
	030	30.5	30.1	73.1	28.8	31.8	69.1	27.0	33.5	64.9	25.3	34.9	60.6	23.5	36.2	56.4
	035	39.1	39.2	93.8	37.1	41.6	89.0	35.1	43.9	84.2	33.1	46.0	79.4	31.1	47.9	74.7
50	015	16.6	14.2	39.9	15.8	15.5	37.9	14.9	16.7	35.8	14.0	17.9	33.7	13.1	19.0	31.5
	020	20.7	19.9	49.7	19.4	21.2	46.6	18.1	22.3	43.5	16.8	23.3	40.3	15.4	24.1	37.0
	025	28.9	27.6	69.3	27.1	29.3	65.1	25.4	30.9	61.0	23.7	32.4	57.0	22.0	33.8	52.9
	030	31.6	30.7	75.8	29.8	32.5	71.7	28.1	34.2	67.4	26.3	35.7	63.1	24.4	37.1	58.7
	035	40.4	39.9	97.1	38.4	42.4	92.3	36.4	44.7	87.4	34.3	46.9	82.5	32.3	49.0	77.5
55	015	18.2	14.9	43.7	17.3	16.3	41.5	16.3	17.6	39.2	15.4	18.8	36.9	14.4	20.0	34.7
	020	22.7	20.9	54.5	21.3	22.3	51.3	19.9	23.6	47.9	18.5	24.7	44.5	—	—	—
	025	31.6	29.1	76.0	29.8	31.0	71.6	27.9	32.7	67.1	26.1	34.4	62.8	—	—	—
	030	34.5	32.3	83.0	32.7	34.3	78.5	30.8	36.2	74.1	28.9	37.8	69.5	—	—	—
	035	44.0	41.8	105.7	41.8	44.5	100.5	39.7	47.0	95.3	37.5	49.4	90.1	35.3	51.6	84.8
60	015	19.8	15.6	47.6	18.8	17.0	45.2	17.8	18.4	42.8	16.8	19.8	40.4	—	—	—
	020	24.7	22.0	59.4	23.3	23.5	56.0	21.8	24.9	52.5	—	—	—	—	—	—
	025	34.5	30.7	82.9	32.5	32.7	78.2	—	—	—	—	—	—	—	—	—
	030	37.6	33.9	90.5	35.7	36.1	85.8	33.7	38.1	81.1	—	—	—	—	—	—
	035	47.6	43.6	114.6	45.4	46.5	109.1	43.1	49.3	103.7	40.8	51.9	98.1	—	—	—

Cap. — Total Capacity (MBtuh)

kW — Compressor Kilowatts

NOTE: Above ratings based on cooler water temperature drop of 10 F, 00025 fouling factor in cooler, and Refrigerant 22. The conditions are 95 F condenser entering air temperature (dry-bulb), 44 F leaving chilled water temperature.

Ratings are in accordance with ARI Standard 590-86

Performance data (cont)

COOLING CAPACITIES — 60 Hz (SI)

LCWT	UNIT 30GT	CONDENSER ENTERING AIR TEMPERATURE (C)														
		30			35			40			45			50		
		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	015	48.1	13.0	2.1	45.7	14.0	1.9	43.3	14.9	1.8	40.8	15.8	1.7	38.4	16.6	1.6
	020	59.6	18.0	2.5	55.8	18.9	2.4	51.9	19.7	2.2	48.1	20.3	2.1	44.3	20.9	1.9
	025	83.0	24.8	3.5	78.1	26.1	3.3	73.3	27.3	3.1	68.5	28.4	2.9	63.9	29.3	2.7
	030	91.3	27.8	3.9	86.4	29.1	3.7	81.3	30.3	3.5	76.1	31.4	3.2	71.0	32.3	3.0
	035	118.6	36.6	5.1	112.9	38.5	4.8	107.2	40.2	4.6	101.4	41.8	4.3	95.5	43.2	4.1
5	015	49.8	13.3	2.1	47.3	14.3	2.0	44.9	15.2	1.9	42.3	16.1	1.8	39.8	17.0	1.7
	020	61.7	18.4	2.6	58.0	19.3	2.5	54.1	20.1	2.3	50.1	20.8	2.1	46.2	21.4	2.0
	025	86.0	25.3	3.7	81.0	26.7	3.5	76.1	27.9	3.2	71.3	29.0	3.0	66.4	30.0	2.8
	030	94.7	28.3	4.0	89.6	29.7	3.8	84.4	31.0	3.6	79.2	32.1	3.4	73.8	33.0	3.1
	035	122.5	37.2	5.2	116.7	39.2	5.0	110.9	41.0	4.7	105.0	42.6	4.5	99.1	44.2	4.2
6	015	51.6	13.5	2.2	49.0	14.5	2.1	46.5	15.5	2.0	43.9	16.4	1.9	41.3	17.3	1.8
	020	64.1	18.7	2.7	60.1	19.7	2.6	56.2	20.6	2.4	52.2	21.3	2.2	48.1	21.9	2.1
	025	89.2	25.9	3.8	84.0	27.2	3.6	79.0	28.5	3.4	74.0	29.7	3.2	69.0	30.7	2.9
	030	98.0	28.9	4.2	92.9	30.3	4.0	87.6	31.6	3.7	82.2	32.8	3.5	76.7	33.8	3.3
	035	126.8	37.9	5.4	120.6	39.9	5.1	114.6	41.7	4.9	108.6	43.5	4.6	102.6	45.1	4.4
7	015	53.4	13.7	2.3	50.7	14.8	2.2	48.1	15.8	2.1	45.5	16.8	1.9	42.8	17.7	1.8
	020	66.4	19.1	2.8	62.4	20.1	2.7	58.3	21.0	2.5	54.3	21.8	2.3	50.2	22.5	2.1
	025	92.4	26.4	3.9	87.2	27.8	3.7	81.9	29.1	3.5	76.8	30.3	3.3	71.8	31.5	3.1
	030	101.6	29.5	4.3	96.1	31.0	4.1	90.8	32.3	3.9	85.3	33.5	3.6	79.8	34.6	3.4
	035	130.7	38.5	5.6	124.5	40.6	5.3	118.5	42.5	5.1	112.3	44.3	4.8	106.1	46.0	4.5
8	015	55.2	14.0	2.4	52.5	15.1	2.2	49.8	16.1	2.1	47.1	17.1	2.0	44.4	18.0	1.9
	020	68.7	19.5	2.9	64.7	20.5	2.8	60.6	21.5	2.6	56.4	22.3	2.4	52.2	23.0	2.2
	025	95.7	26.9	4.1	90.4	28.4	3.9	85.0	29.7	3.6	79.7	31.0	3.4	74.5	32.2	3.2
	030	105.1	30.0	4.5	99.7	31.6	4.3	94.2	33.0	4.0	88.5	34.3	3.8	82.9	35.4	3.5
	035	135.1	39.2	5.8	128.8	41.3	5.5	122.4	43.3	5.2	116.1	45.2	5.0	109.7	46.9	4.7
9	015	57.0	14.2	2.4	54.3	15.3	2.3	51.5	16.4	2.2	48.7	17.4	2.1	45.9	18.4	2.0
	020	71.1	19.8	3.0	67.0	20.9	2.9	62.8	21.9	2.7	58.6	22.8	2.5	54.3	23.5	2.3
	025	99.0	27.5	4.2	93.5	29.0	4.0	88.1	30.4	3.8	82.7	31.7	3.5	77.4	32.9	3.3
	030	108.6	30.6	4.6	103.2	32.2	4.4	97.5	33.7	4.2	91.8	35.0	3.9	86.0	36.2	3.7
	035	139.4	39.9	6.0	132.9	42.0	5.7	126.4	44.1	5.4	119.9	46.0	5.1	113.4	47.8	4.8
10	015	58.9	14.4	2.5	56.1	15.6	2.4	53.3	16.7	2.3	50.5	17.7	2.2	47.6	18.8	2.0
	020	73.6	20.2	3.1	69.3	21.3	3.0	65.1	22.4	2.8	60.8	23.3	2.6	56.5	24.1	2.4
	025	102.4	28.0	4.4	96.8	29.6	4.1	91.2	31.0	3.9	85.8	32.4	3.7	80.3	33.6	3.4
	030	112.3	31.2	4.8	106.6	32.8	4.6	101.0	34.4	4.3	95.2	35.8	4.1	89.3	37.0	3.8
	035	143.8	40.5	6.1	137.2	42.8	5.9	130.6	44.9	5.6	123.8	46.9	5.3	117.2	48.8	5.0
13	015	64.9	15.2	2.8	61.9	16.4	2.6	58.8	17.6	2.5	55.7	18.8	2.4	52.7	19.9	2.3
	020	81.2	21.4	3.5	76.7	22.6	3.3	72.2	23.7	3.1	67.6	24.8	2.9	—	—	—
	025	113.2	29.7	4.8	107.1	31.4	4.6	101.1	33.0	4.3	95.2	34.5	4.1	—	—	—
	030	123.8	32.9	5.3	117.8	34.8	5.0	111.7	36.5	4.8	105.4	38.0	4.5	—	—	—
	035	157.5	42.6	6.7	150.5	45.0	6.4	143.3	47.3	6.1	136.3	49.5	5.8	129.1	51.6	5.5
16	015	71.1	16.0	3.0	67.9	17.3	2.9	64.7	18.6	2.8	61.0	19.8	2.6	57.4	20.9	2.5
	020	89.1	22.6	3.8	84.4	23.9	3.6	79.7	25.2	3.4	—	—	—	—	—	—
	025	124.3	31.5	5.3	117.9	33.3	5.0	—	—	—	—	—	—	—	—	—
	030	135.9	34.8	5.8	129.5	36.8	5.5	—	—	—	—	—	—	—	—	—
	035	171.8	44.6	7.4	164.3	47.3	7.0	156.8	49.9	6.7	149.3	52.3	6.4	—	—	—

Cap. — Total Capacity (Kilowatts)

kW — Compressor Kilowatts

NOTE. Above ratings based on cooler water temperature drop of 5.5 C, .000044 fouling factor in cooler, and Refrigerant 22. The conditions are 35 C condenser entering air temperature (dry-bulb), 7 C leaving chilled water temperature

COOLING CAPACITIES — 50 Hz (English)

LCWT	UNIT 30GT	CONDENSER ENTERING AIR TEMPERATURE (F)														
		85			95			105			115			125		
		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	015	14.8	15 0	35 4	13 8	15 9	33 0	12.7	16 6	30 5	11 7	17.3	28 1	10 7	17 8	25.6
	020	19.0	20 8	45 4	17 8	21 9	42 6	16.6	22 9	39.8	15 5	23.9	37 0	14.3	24 7	34 2
	025	22.7	23 4	54 4	21.4	24 7	51 2	20.0	25 9	47.8	18 6	26 9	44 5	17.2	27 8	41.1
	030	28.9	33 0	69 1	27.3	34 6	65 4	25.8	36 0	61.6	24 2	37.3	57.9	22 6	38 5	54.2
42	015	15.4	15 4	36 9	14 4	16 3	34 4	13.3	17 1	31 9	12 2	17.7	29 3	11 2	18 3	26.8
	020	19 7	21 3	47 2	18 5	22 4	44.3	17.3	23 5	41 4	16 1	24.5	38.5	14 9	25 4	35 7
	025	23 7	23 9	56 7	22 3	25.3	53.3	20 8	26 5	49.9	19 4	27.6	46.4	17 9	28 5	42 9
	030	30 0	33 8	71 8	28.4	35 4	68 0	26 8	36 9	64.2	25 2	38.2	60.3	23.6	39 5	56 5
44	015	16 0	15 7	38 4	14 9	16.6	35 8	13 9	17 4	33 3	12 8	18.2	30 7	11 7	18 7	28 1
	020	20 5	21 8	49 1	19 2	23 0	46 1	18.0	24 1	43 1	16 8	25 1	40.2	15 5	26 0	37.2
	025	24 6	24 4	58 9	23 1	25 8	55 5	21 7	27 1	52.0	20 2	28 3	48 5	18 7	29 2	44 9
	030	31 1	34.6	74.6	29 5	36 2	70 6	27 8	37 8	66 7	26 2	39 2	62 8	24.5	40 5	58 8
46	015	16.6	16 0	39 9	15 6	17 0	37 3	14 5	17 9	34 7	13 4	18 6	32 1	12 2	19 2	29 4
	020	21 3	22 3	51 0	20 0	23 5	47 9	18 7	24 7	44 8	17 4	25 7	41 8	16 2	26 7	38 8
	025	25.5	24 9	61 3	24 1	26 4	57 7	22 6	27 7	54 2	21.1	28 9	50 5	19 5	30 0	46 9
	030	32 3	35 4	77 5	30 6	37 1	73 4	28 9	38 7	69 3	27.2	40.2	65 3	25 5	41 6	61 2
48	015	17 3	16 3	41 4	16 2	17 3	38 8	15 1	18 3	36 2	13 9	19 1	33 4	12 8	19 7	30 7
	020	22 1	22 8	53 0	20.7	24 1	49 8	19 4	25 3	46 6	18.1	26 4	43 5	16 8	27.4	40 4
	025	26 5	25 4	63 6	25 0	26 9	60 0	23 5	28 4	56 3	21.9	29 6	52 6	20.4	30 7	48 9
	030	33 4	36 2	80 3	31 7	38 0	76.2	30.0	39.6	71 9	28.2	41 2	67 8	—	—	—
50	015	17 9	16 6	43 0	16 8	17 7	40.3	15.7	18 7	37 6	14 5	19 5	34 9	13 4	20.2	32 1
	020	22 9	23 3	54 9	21.5	24 6	51 7	20.2	25.9	48 5	18 8	27 0	45 3	—	—	—
	025	27 5	25 9	66 0	26.0	27 5	62.4	24 4	29.0	58 6	22 8	30 3	54 8	21.2	31.5	50 9
	030	34 7	37 0	83.3	32.9	38 9	78 9	31 1	40 6	74.7	29 3	42.2	70.4	—	—	—
55	015	19.6	17 5	47 2	18 5	18 6	44 4	17.2	19 7	41 5	16 0	20 7	38.5	—	—	—
	020	24 9	24 6	59 9	23 5	26 1	56 5	22.1	27 4	53 1	20 7	28.7	49.7	—	—	—
	025	30 1	27 2	72 3	28 4	29.0	68 4	26.8	30 6	64 4	—	—	—	—	—	—
	030	37 8	39 1	90 8	35 9	41.1	86 3	34.0	43 0	81 8	—	—	—	—	—	—
60	015	21 4	18 4	51 4	20 2	19 6	48 5	18 9	20 8	45.5	—	—	—	—	—	—
	020	27 1	26 0	65 2	25 6	27.6	61 6	—	—	—	—	—	—	—	—	—
	025	32 8	28 5	78 9	31 1	30.5	74 8	—	—	—	—	—	—	—	—	—
	030	41 0	41 4	98 7	39 0	43 5	93 9	—	—	—	—	—	—	—	—	—

Cap. — Total Capacity (MBtuh)

kW — Compressor Kilowatts

NOTE Above ratings based on cooler water temperature drop of 10 F, 00025 fouling factor in cooler, and Refrigerant 22 The conditions are 95 F condenser entering air temperature (dry-bulb), 44 F leaving chilled water temperature

Ratings are in accordance with ARI Standard 590-86

Performance data (cont)

COOLING CAPACITIES — 50 Hz (SI)

LCWT	UNIT 30GT	CONDENSER ENTERING AIR TEMPERATURE (C)														
		30			35			40			45			50		
		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	015	51.4	15.1	2.2	48.2	15.9	2.1	44.9	16.5	1.9	41.6	17.1	1.8	38.3	17.5	1.7
	020	66.2	20.9	2.9	62.5	21.9	2.7	58.6	22.8	2.5	54.9	23.6	2.4	51.2	24.4	2.2
	025	79.2	23.5	3.4	74.7	24.6	3.2	70.3	25.7	3.0	65.9	26.6	2.9	61.4	27.4	2.7
	030	101.1	33.2	4.4	95.9	34.5	4.2	91.0	35.8	3.9	86.0	37.0	3.7	81.0	38.1	3.5
5	015	53.3	15.4	2.3	50.0	16.2	2.2	46.7	16.9	2.0	43.3	17.5	1.9	40.0	18.0	1.7
	020	68.6	21.4	3.0	64.7	22.4	2.8	60.9	23.3	2.6	57.0	24.2	2.5	53.2	25.0	2.3
	025	82.1	23.9	3.6	77.6	25.1	3.4	73.0	26.2	3.2	68.5	27.2	3.0	63.8	28.0	2.8
	030	104.6	33.9	4.5	99.5	35.3	4.3	94.2	36.6	4.1	89.2	37.8	3.9	84.0	39.0	3.6
6	015	55.2	15.7	2.4	51.9	16.5	2.3	48.5	17.2	2.1	45.0	17.9	2.0	41.6	18.4	1.8
	020	71.0	21.8	3.1	67.1	22.9	2.9	63.1	23.8	2.7	59.2	24.7	2.6	55.2	25.6	2.4
	025	85.0	24.4	3.7	80.5	25.6	3.5	75.8	26.8	3.3	71.1	27.8	3.1	66.4	28.7	2.9
	030	108.2	34.6	4.7	102.9	36.1	4.5	97.7	37.4	4.2	92.3	38.7	4.0	87.1	39.9	3.8
7	015	57.3	16.0	2.5	53.8	16.8	2.3	50.4	17.6	2.2	46.9	18.3	2.0	43.3	18.8	1.9
	020	73.5	22.3	3.2	69.4	23.3	3.0	65.3	24.4	2.8	61.4	25.3	2.7	57.4	26.2	2.5
	025	88.1	24.8	3.8	83.4	26.2	3.6	78.7	27.4	3.4	73.9	28.4	3.2	69.0	29.4	3.0
	030	111.8	35.3	4.9	106.4	36.9	4.6	101.1	38.3	4.4	95.7	39.6	4.2	90.2	40.8	3.9
8	015	59.3	16.3	2.6	55.8	17.2	2.4	52.3	18.0	2.3	48.7	18.7	2.1	45.1	19.3	2.0
	020	76.1	22.7	3.3	71.9	23.9	3.1	67.6	24.9	2.9	63.5	25.9	2.8	59.5	26.8	2.6
	025	91.2	25.3	4.0	86.3	26.7	3.8	81.5	27.9	3.5	76.6	29.0	3.3	71.7	30.0	3.1
	030	115.6	36.1	5.0	110.1	37.6	4.8	104.5	39.1	4.5	99.1	40.5	4.3	93.5	41.8	4.1
9	015	61.3	16.6	2.7	57.8	17.5	2.5	54.3	18.3	2.4	50.6	19.1	2.2	46.9	19.7	2.0
	020	78.7	23.2	3.4	74.4	24.4	3.2	70.0	25.4	3.0	65.8	26.4	2.9	61.6	27.4	2.7
	025	94.4	25.8	4.1	89.5	27.2	3.9	84.4	28.5	3.7	79.5	29.7	3.5	74.4	30.7	3.2
	030	119.4	36.8	5.2	113.9	38.5	5.0	108.1	40.0	4.7	102.4	41.4	4.5	96.8	42.7	4.2
10	015	63.4	16.9	2.8	59.8	17.8	2.6	56.2	18.7	2.4	52.5	19.5	2.3	48.7	20.2	2.1
	020	81.3	23.7	3.5	76.9	24.9	3.3	72.5	26.0	3.2	68.1	27.0	3.0	63.8	28.0	2.8
	025	97.6	26.2	4.2	92.6	27.7	4.0	87.5	29.1	3.8	82.3	30.3	3.6	77.2	31.4	3.4
	030	123.4	37.6	5.4	117.5	39.3	5.1	111.8	40.9	4.9	105.9	42.3	4.6	100.1	43.7	4.4
13	015	70.0	17.8	3.1	66.2	18.9	2.9	62.3	19.8	2.7	58.4	20.7	2.5	—	—	—
	020	89.3	25.2	3.9	84.6	26.5	3.7	80.0	27.7	3.5	—	—	—	—	—	—
	025	107.6	27.7	4.7	102.2	29.3	4.5	96.8	30.8	4.2	—	—	—	—	—	—
	030	135.6	40.0	5.9	129.4	41.8	5.6	123.2	43.5	5.4	—	—	—	—	—	—
16	015	76.9	18.8	3.4	72.9	19.9	3.2	68.8	21.0	3.0	—	—	—	—	—	—
	020	97.8	26.7	4.3	92.8	28.1	4.0	—	—	—	—	—	—	—	—	—
	025	118.1	29.2	5.1	112.0	31.0	4.9	—	—	—	—	—	—	—	—	—
	030	148.3	42.5	6.5	—	—	—	—	—	—	—	—	—	—	—	—

Cap. — Total Capacity (Kilowatts)

kW — Compressor Kilowatts

NOTE: Above ratings based on cooler water temperature drop of 5.5 C, 0.00044 fouling factor in cooler, and Refrigerant 22. The conditions are 35 C condenser entering air temperature (dry-bulb), 7 C leaving chilled water temperature.

Electrical Data

60 HERTZ

MODEL 30GT		UNIT								COMPRESSOR		FAN MOTORS†		CONTROL CIRCUIT	
		Volts	Ph	Hz	Supplied*		MCA	MOCP (Fuse)	ICF	RLA	LRA	FLA (ea)	Qty	Volts-Ph-Hz	Amps
					Min	Max									
015	500	208/230	3	60	187	254	76.9	125	269.6	55.8	266	3.6	2	115-1-60	7
	200	380	3	60	342	418	42.9	70	148.4	28.9	145	3.4	2	220-1-60	7
	600	460	3	60	414	508	35.7	60	121.8	25.7	120	1.8	2	115-1-60	7
	100	575	3	60	518	632	29.6	45	98.4	19.9	96	2.4	2	115-1-60	7
020	500	208/230	3	60	187	254	92.1	150	348.6	68	345	3.6	2	115-1-60	7
	200	380	3	60	342	418	50.1	80	194.4	34.6	191	3.4	2	220-1-60	7
	600	460	3	60	414	508	46.9	80	174.8	34.7	173	1.8	2	115-1-60	7
	100	575	3	60	518	632	40.9	60	122.4	28.9	120	2.4	2	115-1-60	7
025	500	208/230	3	60	187	254	124.6	200	452.2	89.8	446	6.2	2	115-1-60	7
	200	380	3	60	342	418	63.7	100	250.4	45.5	247	3.4	2	220-1-60	7
	600	460	3	60	414	508	60.7	100	226.1	43.6	223	3.1	2	115-1-60	7
	100	575	3	60	518	632	50.5	80	166.4	36.5	164	2.4	2	115-1-60	7
030	500	208/230	3	60	187	254	145.5	250	512.2	106	506	6.2	2	115-1-60	7
	200	380	3	60	342	418	72.5	125	283.4	52.6	280	3.4	2	220-1-60	7
	600	460	3	60	414	508	68.7	110	256.1	50	253	3.1	2	115-1-60	7
	100	575	3	60	518	632	52.9	90	178.4	38.5	176	2.4	2	115-1-60	7
035	500	208/230	3	60	187	254	203.0	350	702.4	147	690	6.2	3	115-1-60	7
	200	380	3	60	342	418	109.6	175	388.8	79.5	382	3.4	3	220-1-60	7
	600	460	3	60	414	508	91.0	150	351.2	65.4	345	3.1	3	115-1-60	7
	100	575	3	60	518	632	78.6	125	280.8	57.1	276	2.4	3	115-1-60	7

50 HERTZ

MODEL 30GT		UNIT								COMPRESSOR		FAN MOTORS†		CONTROL CIRCUIT	
		Volts	Ph	Hz	Supplied*		MCA	MOCP (Fuse)	ICF	RLA	LRA	FLA (ea)	Qty	Volts-Ph-Hz	Amps
					Min	Max									
015	800	230	3	50	198	254	82.5	125	253.6	60.3	250	3.6	2	230-1-50	7
	300	346	3	50	311	380	46.9	80	202.6	33.3	200	2.6	2	200/220-1-50	7
	900	400	3	50	342	400	50.2	80	176.4	34.7	173	3.4	2	230-1-50	7
020	800	230	3	50	198	254	103.4	175	345.6	76.9	342	3.6	2	230-1-50	7
	300	346	3	50	311	380	61.3	100	261.6	44.9	259	2.6	2	200/220-1-50	7
	900	400	3	50	342	400	61.3	100	226.4	43.6	223	3.4	2	230-1-50	7
025	800	230	3	50	198	254	114.6	200	369.6	85.9	366	3.6	2	230-1-50	7
	300	346	3	50	311	380	72.5	125	296.6	53.9	294	2.6	2	200/220-1-50	7
	900	400	3	50	342	400	69.3	110	256.4	50.0	253	3.4	2	230-1-50	7
030	800	230	3	50	198	254	138.6	225	548.6	105	545	3.6	2	230-1-50	7
	300	346	3	50	311	380	104.6	175	402.6	79.5	400	2.6	2	200/220-1-50	7
	900	400	3	50	342	400	88.6	150	348.4	65.4	345	3.4	2	230-1-50	7

- FLA** — Full Load Amps
ICF — Maximum Instantaneous Current Flow during starting (the point in the 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)
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (complies with National Electrical Code [NEC], Section 430-24)
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

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

†All fans are protected by a single circuit breaker

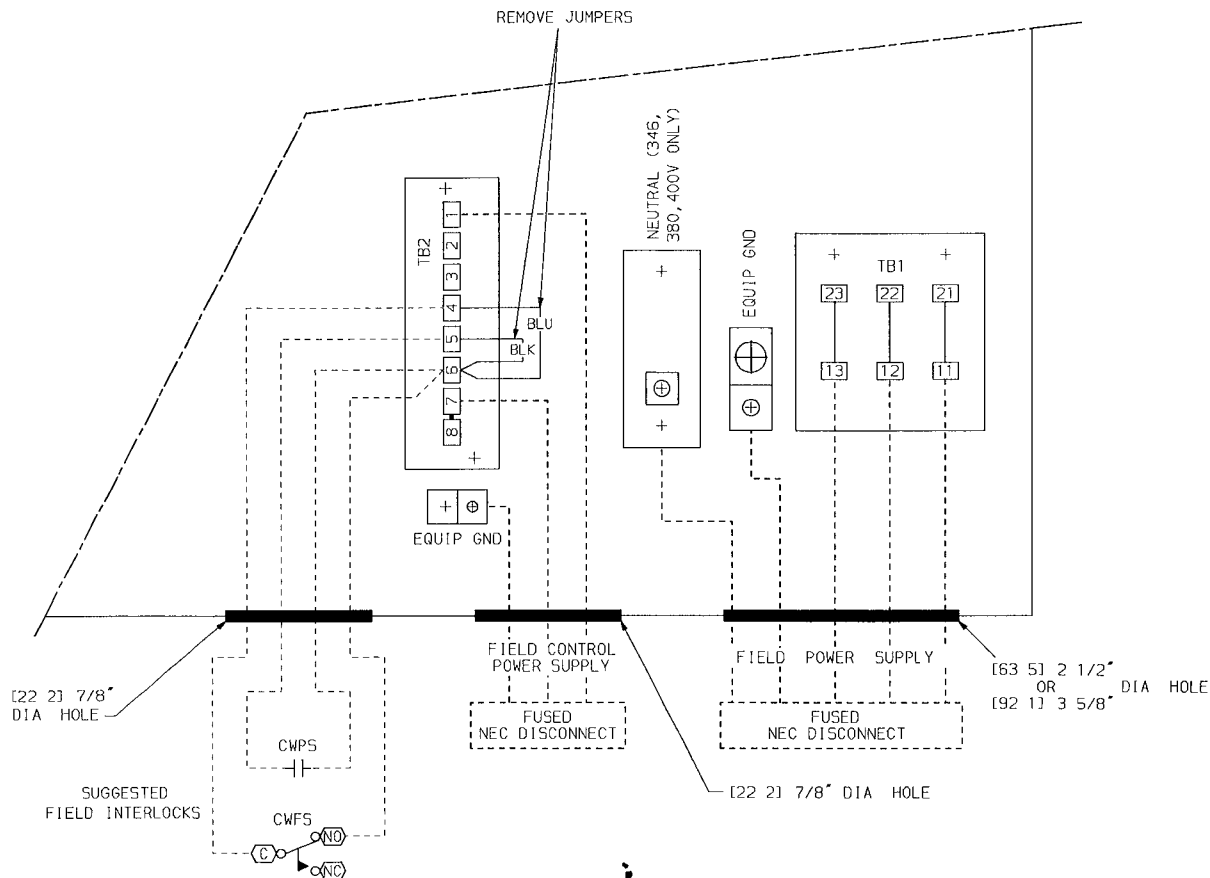
General wiring notes

1. The 115-1-60 or 230-1-50 control circuit power must be from a separate source, through a field-supplied fused disconnect rated at 7 amps.
2. Crankcase and cooler heaters are wired in the control circuit so they are always operable as long as control power supply disconnect is on, even if any safety device is open or unit stop-start switch is off. Heaters are wired ahead of stop-start switch. They are protected by 7-amp fuse in control power supply disconnect.
3. *The control circuit field supply disconnect should never be open except when unit is being serviced or is to be down for a prolonged period in which case cooler should*

be drained. When operation is resumed, crankcase heater should be energized for 24 hours before start-up

4. Power entry is at one end only.
5. Maximum field wire sizes allowed by lugs on terminal block are:
350 MCM for models 30GT030, 035 (208/230-3-60) and 30GT030 (230-3-50).
2/0 AWG for all other models.
6. Terminals for field power supply are suitable for copper, copper-clad aluminum or aluminum conductors. Insulation must be rated 167 F (75 C) minimum.

Typical Wiring Schematic



NOTES:

1. FACTORY WIRING IS IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (N.E.C., U.S.) ANY FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES
2. CONNECT SEPARATE SOURCE OF CONTROL POWER FROM FIELD SUPPLIED FUSED DISCONNECT TO TERMINALS 1 & 7 OF TB2. NEUTRAL SIDE MUST BE CONNECTED TO TERMINAL 7. THIS PROVIDES POWER FOR THE UNIT CONTROL CIRCUIT, COOLER HEATER AND COMPRESSOR CRANKCASE HEATER
3. ALL FIELD INTERLOCK CONTACTS MUST HAVE MINIMUM RATING OF 360 VA PILOT DUTY PLUS CAPACITY REQUIRED FOR FIELD INSTALLED EQUIPMENT. REMOVE WIRE BETWEEN TERMINALS TB2-4 & 6 WHEN CHILLED WATER FLOW SWITCH IS FIELD-INSTALLED. REMOVE WIRE BETWEEN TERMINAL TB2-5 & 6 WHEN INSTALLING CHILLED WATER PUMP STARTER AUXILIARY INTERLOCK CONTACT
4. FOR INTERNAL UNIT WIRING REFERENCE WIRING BOOK
5. VOLTAGE REQUIREMENTS:

MAIN POWER	CONTROL POWER
208/230-3-60	115-1-60
460-3-60	115-1-60
575-3-60	115-1-60
380-3-60	220-1-60
230-3-50	230-1-50
346-3-50	200/220-1-50
400-3-50	230-1-50

LEGEND:

- CWFS - CHILLED WATER FLOW SWITCH
- CWPS - CHILLED WATER PUMP STARTER
- AUXILIARY CONTACT
- TB - TERMINAL BLOCK
- FIELD POWER WIRING
- FIELD CONTROL WIRING
- FACTORY INSTALLED WIRING

30GT506098

Controls

Head pressure control

Factory-furnished fan cycling control — On all units, fan no. 2 is cycled by a fan cycling pressure switch that responds to variations in discharge pressure. Fan no. 3 on 30GT035 units is controlled by outdoor air temperature through an air temperature switch. See table on Minimum Outdoor Operating Temperature on pages 7 and 10.

Motormaster® accessory package — Motormaster control is used in addition to fan cycling to permit operation of unit down to -20 F (-28.9 C) outdoor air temperature when properly applied. (Proper application requires unit observe minimum flow rate, water loop volume and system load, as described in Application section.) Motormaster control varies the speed of the noncycling fan motor on all units.

Winter start control — On all units, an auxiliary switch in timer bypasses low-pressure switch for 2-1/2 minutes on start-up to avoid nuisance tripout in cold weather.

Capacity control system — Multiple-step controller responds to return chilled water temperature to cycle compressor and control compressor unloading and loading steps through factory-set 10 F (5.6 C) cooling range.

Solenoid operated cylinder bank unloader(s), energized by the multiple-step controller, varies compressor capacity by unloading and loading cylinders to match cooling load requirements.

Hot gas bypass valve, standard on 30GT015 50 Hz and 30GT020 60 Hz units, is energized by multiple-step controller. Valve allows hot gas to pass directly into cooler circuit on final step of unloading. Hot gas bypass maintains constant suction pressure and permits unit to operate at lower loads with less compressor cycling. See Minimum Outdoor Operating Temperatures, pages 7 and 10.

Sequence of Operation

At start-up, with the water temperature controller (WTC) calling for cooling and all safety devices satisfied, the control circuit switch is closed. With minimal demand for cooling, only the first WTC switch is made. The timer motor starts, the liquid line solenoid valve opens, and condenser fan no. 1 starts. Fans no. 2 and 3 start if high side pressure is higher than 260 psig (1793 kPa). After a delay by Time Guard® of 12 seconds (or longer, depending on the timer position), the compressor starts, unloaded. As cooling demand increases, unit capacity increases as follows:

Units with two-step controller — The second WTC switch makes: the compressor loads and the unit is operating at full capacity.

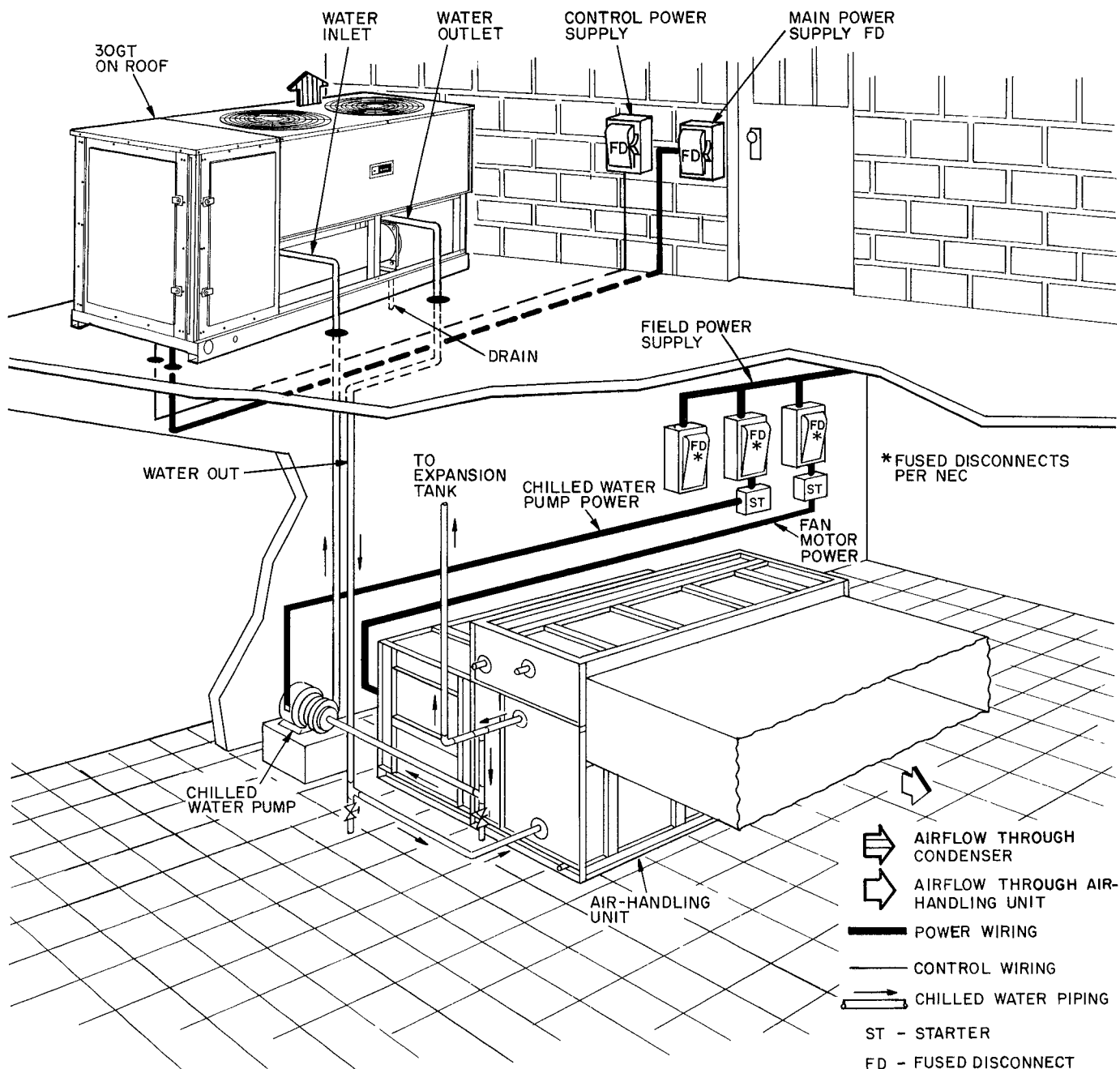
Units with three-step controller — The second WTC switch makes: one compressor unloader is de-energized increasing the capacity

The third WTC switch makes: the second compressor unloader is de-energized increasing the unit to full capacity.

All units — A pumpout relay (POR) in the control circuit is energized when WTC no. 1 switch makes. A set of normally open POR contacts closes, completing a compressor control circuit which bypasses the WTC switches.

As cooling demand is satisfied, WTC switches break in descending sequence. The LLS valve closes, stopping the flow of liquid refrigerant to the cooler and subsequent suction gas to the compressor. After the last WTC switch breaks, the compressor continues to run because of the WTC switch bypass. With no refrigerant returning to the compressor, low side pumpout takes place and the compressor shuts down on low-pressure control. The compressor does not restart until the WTC again calls for cooling.

Typical piping and wiring



NOTES.

1 Wiring and piping shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation

2 All wiring must comply with applicable local and national codes.

3 All piping must follow standard piping techniques. Refer to Carrier System Design Manual for details

Application data

Cooler flow range

Ratings and performance data in this publication are for a cooling range of 10 F (5.6 C). 30GT chillers with electro-mechanical control may be operated at an 8 to 12 F (4.4 to 6.6 C) temperature range provided flow limits are not exceeded. If another range is wanted, a change of controls is needed. For minimum flow rates, see flow rate table.

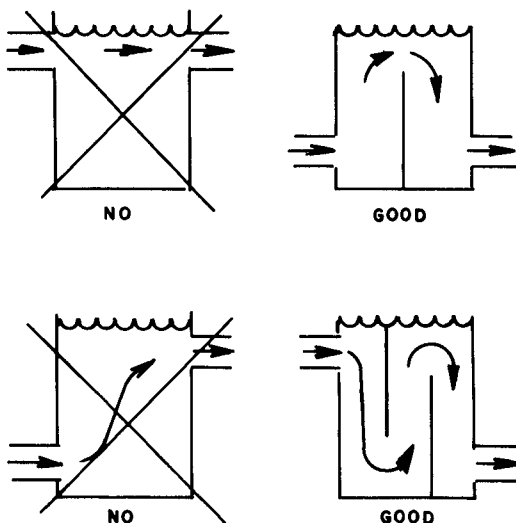
Minimum cooler flow (maximum cooler temperature range) for standard units is shown in Minimum Cooler Flow Rate table. When gpm (L/s) required is lower (or range higher), follow recommendations below:

- Multiple smaller chillers may be applied in series, each providing a portion of the design temperature range.
- Cooler water may be recirculated to raise flow rate. However, mixed water temperature entering cooler must be maintained above 36 F (2.2 C) to avoid shut-down by low water temperature safety thermostat.
- Special cooler baffling is required to allow minimum flow rate to be reduced 12%.

MINIMUM/MAXIMUM COOLER FLOW RATES
AND MINIMUM LOOP VOLUME

UNIT 30GT	MIN FLOW		MAX FLOW		MIN LOOP VOLUME	
	Gpm	L/s	Gpm	L/s	G	L
015	25	2	294	19	45	171
020	25	2	294	19	60	228
025	30	2	356	22	75	285
030	30	2	356	22	90	342
035	34	2	406	26	105	399

Water loop volume — Quantity of water should range from 3 to 6 gallons per nominal ton of cooling (3.25 to 6.5 liters per kW) for temperature stability and accuracy in normal air conditioning applications. (For example, a 30GT025 would require 75 gallons [285 liters] in circulation in system loop — see table.) For process 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 insure that there is no stratification and that water (or brine) entering tank is thoroughly mixed with liquid in the tank.



Cooler fouling factor used to calculate tabulated ratings was .00025 ft² • hr • °F/Btu (0.000044 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

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
2,000	610	0.99	1.01
4,000	1220	0.98	1.02
6,000	1830	0.97	1.03
8,000	2440	0.96	1.04
10,000	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

Draining the cooler and outdoor piping is recommended if system is not to be used during freezing weather conditions.

In areas that experience subfreezing weather conditions, ethylene glycol (or other suitable brine) should be added to the system to protect cooler against loss of power.

Use only antifreeze solutions approved for heat exchanger duty. Use of automotive antifreezes is not recommended because of fouling that can occur once their relatively short-lived inhibitor breaks down.

Application data (cont)

Low ambient operation

Standard 30GT chillers start and operate at 35 F (2 C) and above at loads above minimum chiller capacity step.

30GT chillers start and operate at ambients down to -20 F (-28.9 C) with following field provisions:

Motormaster® head pressure control and its associated components must be added for operation below 32 F (0°C). (Wind baffles and special winter start controls are not normally needed.)

Antifreeze solution must be added to water loop in an amount sufficient to protect loop down to 15 F (8 C) below lowest expected ambient temperature.

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.

▲ WARNING

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

Consult your local Carrier representative for complete details.

Ethylene glycol

Ethylene glycol may be added to the chilled water to protect system as shown in following curve. Unit performance data must be corrected as indicated. Examples follow:

Example — English

I Determine concentration of ethylene glycol required to protect system to -10 F (at zero flow).

Given:

Unit 30GT030
Condenser Entering Air Temperature 95 F
Leaving Chilled Water Temperature 44 F
Chilled Water Temperature Rise 10 F
Chilled Water Flow 63.8 Gpm
Cooler Pressure Drop 8.0 ft water
Capacity 26.6 tons
Power Input 30.5 kW

From curve, read 40% concentration at -10 F solution crystallization point.

II Correct unit capacity.

From curve, read 0.95 capacity correction at 40% concentration.

$$\begin{aligned}\text{Corrected Capacity} &= 0.95 \times \text{Given Capacity} \\ &= 0.95 \times 26.6 = 25.3 \text{ tons}\end{aligned}$$

III Correct chilled water flow.

From curve, read 1.15 Gpm correction at 40% concentration.

Chilled Water Flow (at corrected capacity)

$$= \frac{\text{Tons} \times 24}{\text{Rise } ^\circ\text{F}} = \frac{25.3 \times 24}{10} = 60.6 \text{ Gpm}$$

Chilled Water Flow (40% solution)

$$= \frac{\text{Water}}{\text{Flow}} = 1.15 = 60.6 \times 1.15$$

$$= 69.74 \text{ Gpm}$$

IV Correct cooler pressure drop.

From curve, read 1.33 cooler pressure drop correction at 40% concentration.

From Cooler Pressure Drop curve, pressure drop for 69.74 Gpm of water is 10.0 ft water. Pressure drop for 40% solution = $1.33 \times \text{pressure drop for water} = 1.33 \times 10.0 = 13.3 \text{ ft water}$.

V Correct compressor power input.

On Power Correction curve, read 0.97 correction factor at 40% concentration.

$$\begin{aligned}\text{Corrected power input} &= 0.97 \times 30.8 \\ &= 29.6 \text{ kW}\end{aligned}$$

Example — SI

I Determine concentration of ethylene glycol required to protect system to -23 C (at zero flow).

Given:

Unit 30GT030
Condenser Entering Air Temperature 35 C
Leaving Chilled Water Temperature 7 C
Chilled Water Temperature Rise 6 C
Chilled Water Flow 4.1 L/s
Cooler Pressure Drop 24.0 kPa
Capacity 96.1 kW
Power Input 31.0 kW

From curve, read 40% concentration at -23 C solution crystallization point.

II Correct unit capacity.

From curve, read 0.95 capacity correction at 40% concentration.

$$\begin{aligned}\text{Corrected Capacity} &= 0.95 \times \text{Given Capacity} \\ &= 0.95 \times 96.1 = 91.3 \text{ kW}\end{aligned}$$

III Correct chilled water flow.

From curve, read 1.15 Gpm correction at 40% concentration.

Chilled Water Flow (at corrected capacity)

$$= \frac{\text{Capacity (kW)}}{4.2 \times \text{Rise } ^\circ\text{C}} = \frac{91.3}{4.2 \times 6} = 3.62 \text{ L/s}$$

Chilled Water Flow (40% solution)

$$= \frac{\text{Water}}{\text{Flow}} \times 1.15 = 3.62 \times 1.15$$

$$= 4.16 \text{ L/s}$$

IV Correct cooler pressure drop.

From curve, read 1.33 cooler pressure drop correction at 40% concentration.

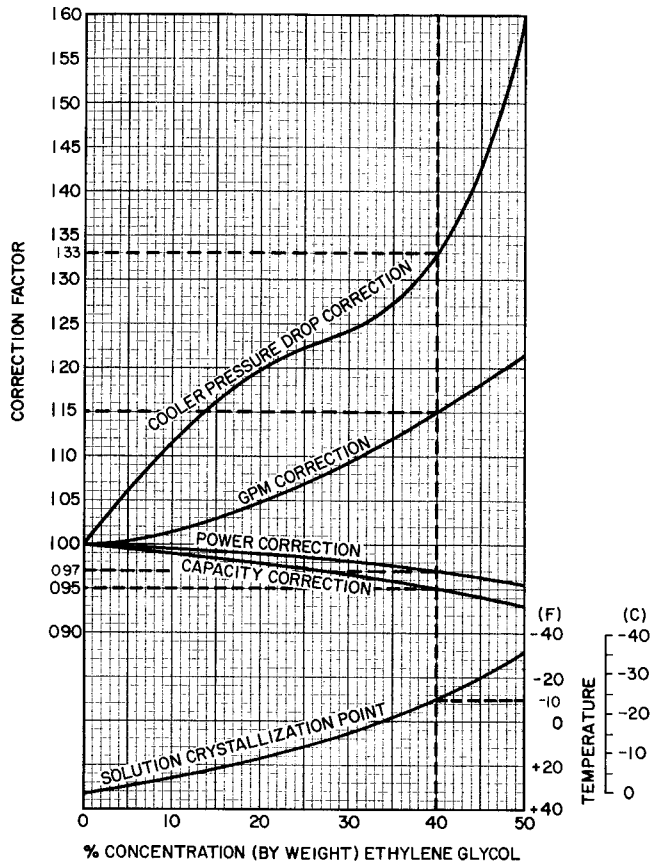
From Cooler Pressure Drop curve, pressure drop for 4.16 L/s of water is 27.2 kPa. Pressure drop for 40% solution = $1.33 \times \text{pressure drop for water} = 1.33 \times 27.2 = 36.2 \text{ kPa}$.

V Correct compressor power input.

On Power Correction curve, read 0.97 correction factor at 40% concentration.

$$\begin{aligned}\text{Corrected power input} &= 0.97 \times 31.0 \\ &= 30.1 \text{ kW}\end{aligned}$$

ETHYLENE GLYCOL PERFORMANCE CORRECTION FACTORS AND SOLUTION CRYSTALLIZATION POINTS



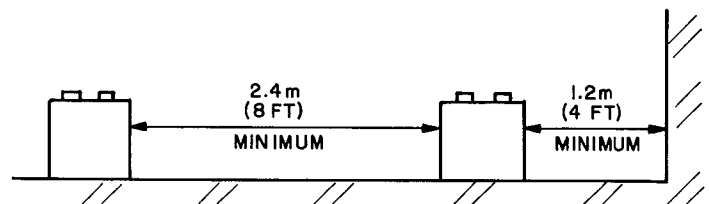
Oversizing chillers

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.

Multiple chillers

Where chillers capacities greater than 35 tons (123 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 ($> 25\text{ F}$ [13.9 C]) is desired, chillers may be installed in *series*. Water temperature sensors need not be removed for multiple chiller operation. An 8-ft (2.4-m) separation is required between units for airflow, and a 4-ft (1.2-m) distance is required from units to obstructions. See figure. See dimensional drawings for service clearances.



MULTIPLE UNIT SEPARATION

CAPACITY CONTROL STEPS

UNIT 30GT	HERTZ	CONTROL STEPS	% CAP.	OPER CYL	TEMPERATURE, F (C)*	
					Cut-in	Cutout
015	50	†	—	2	—	—
020	60	1 2	50 100	2 4	47 5 (8.6) 53.5 (11.9)	44‡ (6.7) 50 (10.0)
015	60	1 2 3	33 67 100	2 4 6	47 0 (8.3)	44‡ (6.7)
020	50				50 5 (10.3)	47 5 (8.6)
025	50/60				54 0 (12.2)	51 (10.6)
030						
035	60					

*Return chilled water temperature

†Uses hot gas bypass

‡Design set point

Guide specifications

Reciprocating Air-Cooled Liquid Chiller

HVAC Guide Specifications — Section 15703

Size Range: 15 to 35 Tons, Nominal

Carrier Model Number: 30GT

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Electrically controlled air-cooled liquid chiller utilizing reciprocating compressor and thermal 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, U.S.) and ASME applicable codes.
- C. Unit cabinet shall be capable of withstanding Federal Test Method Standard No. 141 (method 6061) 500 hour salt spray test.
- D. 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).
- E. Air cooled condenser coils shall be leak tested at 150 psig (1034 kPa) and pressure tested at 480 psig (3309 kPa).

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be shipped as a single package only.
- B. Unit shall be stored and handled per unit manufacturer's recommendations.

1.04 WARRANTY

(FOR INCLUSION BY SPECIFYING ENGINEER.)

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. Compressor:

- 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 rps).

E. Cooler:

- 1. Shell-and-tube type with removable heads.
- 2. Tubes shall be seamless copper type rolled into tube sheets.
- 3. Equipped with threaded type water connections.
- 4. Shell shall be insulated with 3/4-in. (17 mm) closed cell PVC foam of maximum K factor 0.28.
- 5. Equipped with electric heater along the shell under the insulation to protect against cooler freeze-up.

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:

Refrigeration circuit components shall include hot gas muffler, high side pressure relief device, liquid line shutoff valve, suction and discharge shutoff valves, filter drier, moisture indicating sight glass, thermal type expansion valve, complete operating charge of refrigerant R-22 and compressor oil.

H. Controls and Safeties:

1. Controls:

- a. Unit controls shall include the following minimum components.
 - 1) Power and control circuit terminal blocks.
 - 2) Stop-Start control switch.
 - 3) Leaving chilled water temperature controller.
 - 4) Head pressure controller.
 - 5) Single pumpout controller.

b. Capable of performing the following functions:

- 1) Pumpout at end of every circuit cycle.
- 2) Capacity control based on return chilled water temperature.

2. Safeties:

- a. Unit shall be equipped with 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.
- b. Compressor 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.

I. Operating Characteristics:

1. Unit shall be capable of starting and running fully loaded at outdoor ambient temperatures up to 115 degrees F (46.1 C) per maximum load criteria of ARI Standard 590.
2. Unit shall be capable of starting up with 95 degrees 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 three (3) phase type with permanently lubricated bearings and class B insulation.

K. Electrical Requirements:

1. Unit primary electrical power supply shall be connected to a single point.
2. Unit shall operate on three (3) phase, 60 cycle power at the voltage shown in the equipment schedule.

L. Special Features:

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

*

1. Low Ambient Operation:

Unit shall be capable of starting and running at outdoor ambient temperatures down to -20 F (28.9 C) with the addition of brine in the cooler circuit and motormaster.

2. Pressure Gages:

Unit shall be equipped with suction and discharge pressure gages with manual shutoff valves.

*

3. Condenser:

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

