



Advance Product Data

30GX079-160 Air-Cooled Chillers 50/60 Hz

80 to 160 Tons (285 to 565 kW)

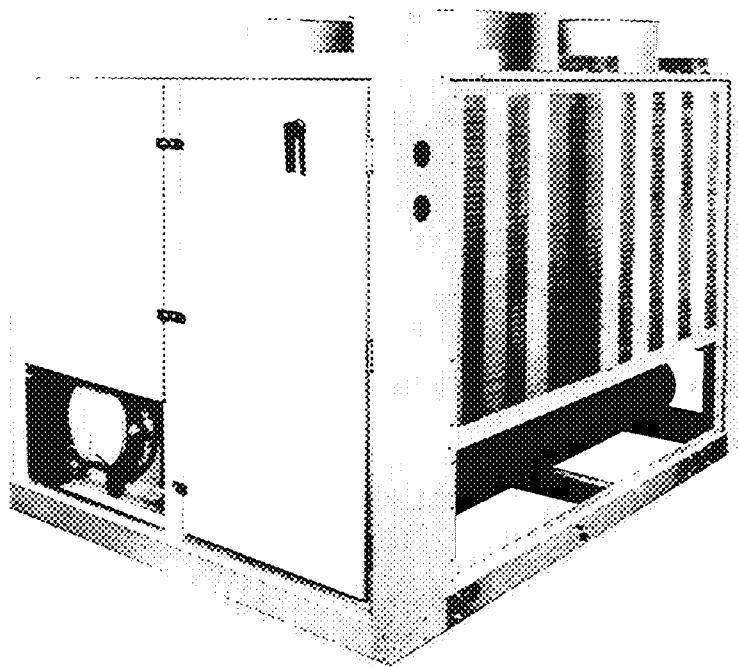
Quality Assurance



Certificate No FM 21837

Approvals:

ISO 9002
EN 29002
BS5750 PART 2
ANSI/ASQC Q92



Air-Cooled Chillers Designed From the Ground Up to Meet the Needs of Today and Tomorrow, Including:

- Compact Footprint
- Chlorine-free HFC-134a refrigerant
- Smooth rotary compression using screw compressors
- Mechanically cleanable coolers

Features/Benefits

Easy installation

The 30GX has a compact design that is up to 50% smaller than current chillers. The 30GX is delivered as a complete package for easy installation. There are no extra controls, clocks, starters, or other items to install.

The 30GX also provides a single electrical entrance (using the optional factory-installed control transformer) and quick, easy piping using either welded or victaulic-type clamp-on couplings for the cooler.

The 30GX 208/230-V and 460-v units are designed in accordance with UL (Underwriters' Laboratory, U.S.A.) and the 575-v units are designed in accordance with CSA (Canadian Standards Association) to minimize electrical inspections.

A quick start-up is assured once installation is complete, since each 30GX unit is manufactured at an ISO 9002 listed manufacturing facility to guarantee quality.

Easy to live with

The 30GX units have a quiet, low-vibration design featuring screw compression and new aerocoustic fans that reduce sound levels and improve sound quality.

The 30GX units exceed efficiency levels established by ASHRAE (American Society of Heating and Refrigeration Engineers, U.S.A.) and CSA for both full- and part-load operation, thus saving on operating costs through lower electrical costs.

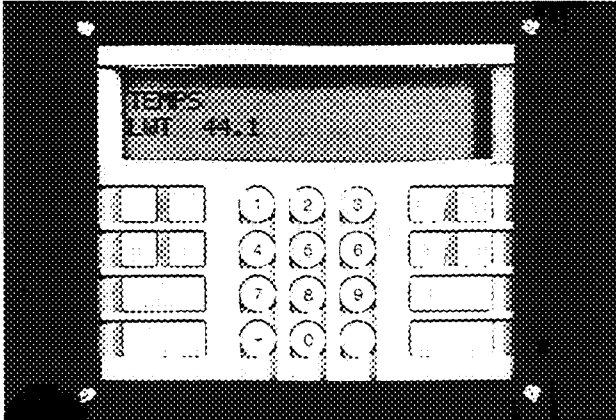
The 30GX controls are fully automatic. The leaving-fluid temperature is directly controlled, and the entering-fluid temperature is continuously monitored to detect load and flow changes.

This combination provides the most precise temperature control available. In addition, the 30GX units can handle both quick- and slow-loading applications.

The 30GX units use medium-pressure HFC-134a refrigerant to minimize stress on the compressors and ensure a long life.

From a service standpoint, the 30GX units offer the following features:

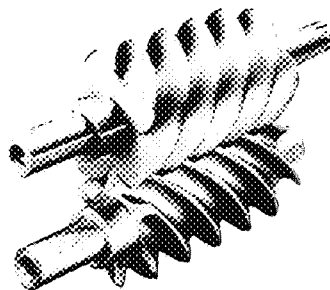
- Use of HFC-134a refrigerant, which has no planned phase-out in its future
- Mechanically-cleanable cooler
- Twin screw compressors which require no routine service or maintenance
- Suction and discharge pressures and temperatures easily accessible using either standard or accessory display module



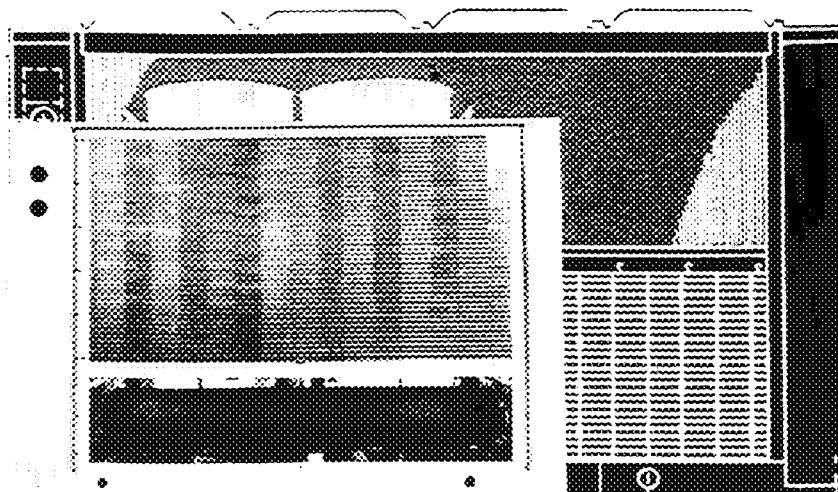
STANDARD DISPLAY MODULE



ENVIRONMENTAL LEADERSHIP



ROTARY COMPRESSOR TWIN-SCREW DESIGN



NEW 30GX

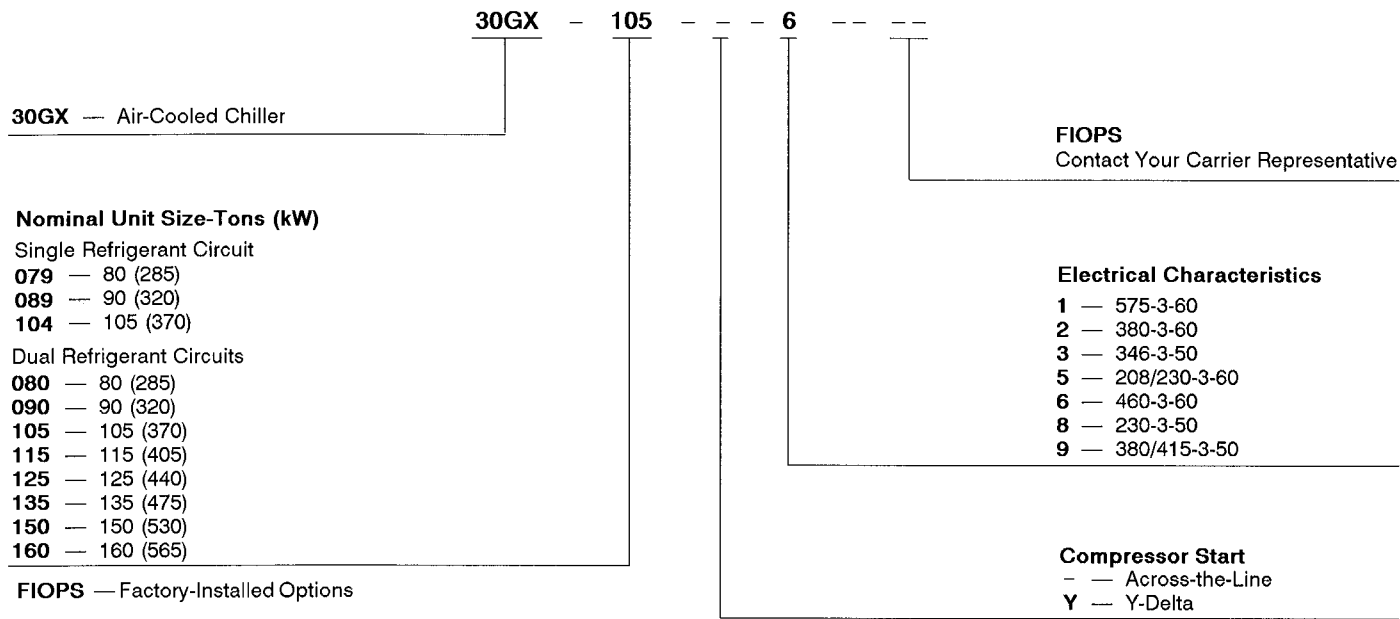
CURRENT 30GB

NEW SMALLER FOOTPRINT

Table of contents

	Page
Features/Benefits	1,2
Model Number Nomenclature	3
Physical Data	4
Options and Accessories	5
Base Unit Dimensions	6
Application Data	7,8
Selection Procedure	9
Performance Data	9,10
Electrical Data	11
Typical Piping and Wiring	12
Controls	13
Guide Specifications	14-16

Model number nomenclature



Physical data — English

UNIT SIZE	079,080	089,090	104,105	115	125	135	150	160
OPERATING WEIGHT (lb)	6288	6302	6749	7149	7265	7386	8575	8739
COMPRESSORS	Semi-Hermetic, Twin Screw							
Quantity	2	2	2	2	2	2	2	2
Nominal Capacity per Compressor (tons)	46/39	56/39	56/39	66/39	66/46	66/56	56/80	66/80
Economizer	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
No. Capacity Steps								
Standard	6	6	6	6	6	6	6	6
Optional	8	8	8	8	8	8	8	8
Minimum Step Capacity (%)								
Standard	20	20	20	20	20	20	20	20
Optional	10	10	10	10	10	10	10	10
REFRIGERANT	HFC-134a							
COOLER TYPE (Quantity)	Shell and Tube (1)							
Maximum Refrigerant Pressure (psig)	220	220	220	220	220	220	220	220
Net Fluid Volume (gal)	20.6	20.6	24.0	24.0	29.0	29.0	27.5	32.0
Maximum Fluid-Side Pressure (psig)	300	300	300	300	300	300	300	300
CONDENSER FANS	Shrouded Axial Type, Vertical Discharge							
Quantity	4	4	4	6	6	6	8	8
CONDENSER COILS	$\frac{3}{8}$ -in Copper Tubes with Aluminum Fins							
Maximum Refrigerant Pressure (psig)	450							

Physical data — SI

UNIT SIZE	079,080	089,090	104,105	115	125	135	150	160
OPERATING WEIGHT (lb)	2852	2858	3061	3242	3295	3350	3889	3963
COMPRESSORS	Semi-Hermetic, Twin Screw							
Quantity	2	2	2	2	2	2	2	2
Nominal Capacity per Compressor (kW)	162/137	197/137	197/137	232/137	232/162	232/197	197/281	232/281
Economizer	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
No. Capacity Steps								
Standard	6	6	6	6	6	6	6	6
Optional	8	8	8	8	8	8	8	8
Minimum Step Capacity (%)								
Standard	20	20	20	20	20	20	20	20
Optional	10	10	10	10	10	10	10	10
REFRIGERANT	HFC-134a							
COOLER TYPE (Quantity)	Shell and Tube (1)							
Maximum Refrigerant Pressure (kPa)	1517	1517	1517	1517	1517	1517	1517	1517
Net Fluid Volume (L)	78.0	78.0	90.8	90.8	109.7	109.7	104.1	121.1
Maximum Fluid-Side Pressure (kPa)	2068	2068	2068	2068	2068	2068	2068	2068
CONDENSER FANS	Shrouded Axial Type, Vertical Discharge							
Quantity	4	4	4	6	6	6	8	8
CONDENSER COILS	$\frac{3}{8}$ -in Copper Tubes with Aluminum Fins							
Maximum Refrigerant Pressure (kPa)	3103							

Options and accessories

ITEM	FACTORY-INSTALLED OPTION	FIELD-INSTALLED ACCESSORY
Y-Delta Start	X	
Copper Fin Condenser Coil	X	
Seacoast Condenser Coil Coating	X	
Medium Temperature Brine	X	
Suction Service Valve	X	
Non-Fused Disconnect	X	
High-Static Condenser Fans	X	
Minus-One-Pass Cooler	X	
Low-Ambient Control	X	X
Control Power Transformer	X	X
Minimum Load Control	X	X
Security Guards		X
Sound Reduction Kit		X
Vibration Isolation		X
Expanded Display		X
Victaulic Connection		X
Controls Module		X
Carrier Comfort Network Multi-Unit Control		X
Chilled Water Flow Switch		X

Factory-installed options

Y-delta start — Generally, Y-delta start is not required when using multiple compressors since the starting current is generally less than with one larger compressor using Y-delta start. However, Y-delta start is available as a factory-installed option.

Copper fin condenser coil — In this factory-installed option, the standard copper tubing with standard aluminum fins condenser coil is replaced by standard copper tubing with mechanically-bonded sine wave copper fin stock.

Seacoast condenser coil coating — This factory-applied coating protects the condenser coil from damage in applications with highly-corrosive airborne materials.

Low-ambient control — This factory-installed option permits operation of the 30GX units down to -20°F (-29°C) outdoor ambient temperature. This is also available as a field-installed accessory.

Suction service valve — The suction service valve provides easy access to the suction side of the unit to facilitate service requirements.

Medium temperature brine — The medium 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 at the factory to correct for the lower refrigeration flow rates.

Non-fused disconnect — This disconnect will provide disconnect capability for main unit power located at the unit.

Control power transformer — The transformer is sized to supply the needs of the control circuit, sourcing power from the main unit power connection. This is also available as a field-installed accessory.

High-static condenser fans — The high-static fans allow the 30GX unit to be used in applications with an external static pressure of up to 1 in. wg (250 Pa) at nominal condenser airflow. Two options are available: 0.4 in. wg (100 Pa) or 1.0 in. wg (250 Pa).

Minus-one-pass cooler — In special applications, such as high flow, low temperature rise, or reduced cooler pressure drop requirement, the factory-installed minus-one-pass cooler option will reduce the cooler pressure drop.

Minimum load control — This option allows additional capacity reduction for unit operation below the minimum step of unloading (down to 10% of the minimum unit capacity). This is also available as a field-installed accessory.

Field-installed accessories

Low-ambient control — This field-installed accessory permits operation of the 30GX units down to -20°F (-29°C) outdoor ambient temperature. This is also available as a factory-installed option.

Control power transformer — The transformer is sized to supply the needs of the control circuit, sourcing power from the main unit power connection. This is also available as a factory-installed option.

Minimum load control — This accessory allows additional capacity reduction for unit operation below the minimum step of unloading (down to 10% of the minimum unit capacity). This is also available as a factory-installed option.

Security guards — This accessory covers the condenser coils, cooler, and compressor areas to protect the unit from intrusion.

Sound reduction kit — This kit contains a sound blanket to muffle compressor noise.

Vibration isolation — Rubber isolators are field installed to reduce vibration transmission from the compressor through the floor and into the conditioned space.

Expanded display — This accessory kit contains an indoor-mounted, remote, 40 characters per line, 16-line display panel for remote unit diagnostics.

Victaulic connection — The kit contains a victaulic-type cooler connection to replace the standard weld-type connection.

Controls module — The controls module permits additional unit functions from an external signal, such as temperature reset (from outdoor air, the occupied space, Carrier Comfort Network input, or from a 4-20 mA signal) and demand limiting (2 steps available using a 4-20 mA signal or remote contact closure, each from 0 to 100%).

Carrier Comfort Network multi-unit control — This accessory allows sequencing of between 2 and 8 chillers and pumps.

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

Base unit dimensions

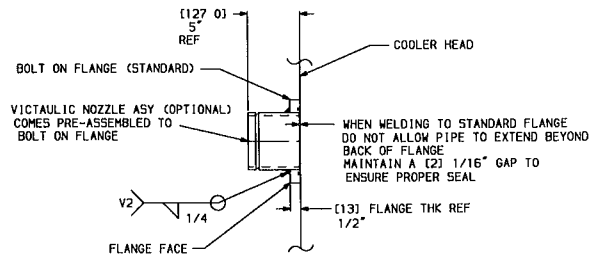
UNIT 30GX	A	B	C	D	E	F	G	H	J	K	L
079,080	[812] 2'-7 ³ / ₃₂ "	[1351] 4'-5 ³ / ₁₆ "	[2896] 9'-6"	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[101.6] 4"	[276] 10 ⁷ / ₈ "	[514] 1'-8 ¹ / ₄ "	[1875] 6'-1 ³ / ₁₆ "	[493] 1'-7 ³ / ₈ "	3
089,090	[812] 2'-7 ³ / ₃₂ "	[1351] 4'-5 ³ / ₁₆ "	[2896] 9'-6"	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[101.6] 4"	[276] 10 ⁷ / ₈ "	[514] 1'-8 ¹ / ₄ "	[1875] 6'-1 ³ / ₁₆ "	[493] 1'-7 ³ / ₈ "	3
104,105	[812] 2'-7 ³ / ₃₂ "	[1351] 4'-5 ³ / ₁₆ "	[2896] 9'-6"	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[127] 5"	[276] 10 ⁷ / ₈ "	[514] 1'-8 ¹ / ₄ "	[1875] 6'-1 ³ / ₁₆ "	[493] 1'-7 ³ / ₈ "	3
115	[816] 2'-8 ¹ / ₈ "	[1458] 4'-9 ³ / ₈ "	[3337] 10'-11 ³ / ₈ "	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[127] 5"	[209] 11 ⁷ / ₁₆ "	[551] 1'-9 ¹ / ₁₆ "	[2346] 7'-8 ³ / ₈ "	[500] 1'-7 ¹ / ₁₆ "	3
125	[816] 2'-8 ¹ / ₈ "	[1458] 4'-9 ³ / ₈ "	[3337] 10'-11 ³ / ₈ "	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[127] 5"	[290] 11 ⁷ / ₁₆ "	[551] 1'-9 ¹ / ₁₆ "	[2346] 7'-8 ³ / ₈ "	[500] 1'-7 ¹ / ₁₆ "	3
135	[816] 2'-8 ¹ / ₈ "	[1458] 4'-9 ³ / ₈ "	[3337] 10'-11 ³ / ₈ "	[2578] 8'-5 ¹ / ₂ "	[83] 3 ¹ / ₄ "	[127] 5"	[290] 11 ⁷ / ₁₆ "	[551] 1'-9 ¹ / ₁₆ "	[2346] 7'-8 ³ / ₈ "	[500] 1'-7 ¹ / ₁₆ "	3
150	[859] 2'-9 ¹³ / ₁₆ "	[1925] 6'-3 ¹³ / ₁₆ "	[4250] 13'-11 ⁵ / ₁₆ "	[3366] 11'-0 ¹ / ₂ "	[92] 3 ⁵ / ₈ "	[127] 5"	[276] 10 ⁷ / ₈ "	[514] 1'-8 ¹ / ₄ "	[3061] 10'-1 ¹ / ₂ "	[593] 1'-11 ³ / ₈ "	2
160	[859] 2'-9 ¹³ / ₁₆ "	[1925] 6'-3 ¹³ / ₁₆ "	[4250] 13'-11 ⁵ / ₁₆ "	[3366] 11'-0 ¹ / ₂ "	[92] 3 ⁵ / ₈ "	[127] 5"	[290] 11 ⁷ / ₁₆ "	[551] 1'-9 ¹ / ₁₆ "	[3061] 10'-1 ¹ / ₂ "	[593] 1'-11 ³ / ₈ "	2

LEGEND

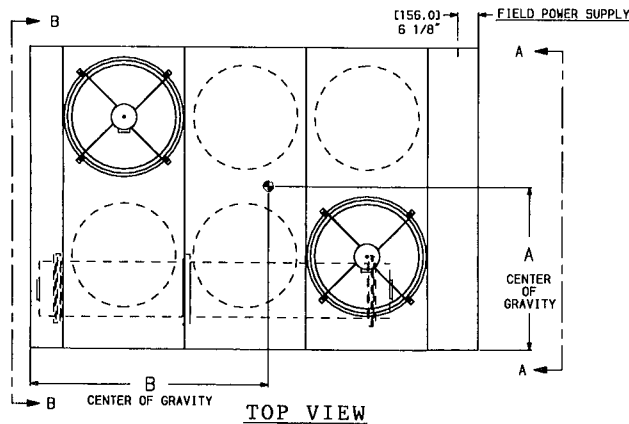
THK — Thickness

NOTES:

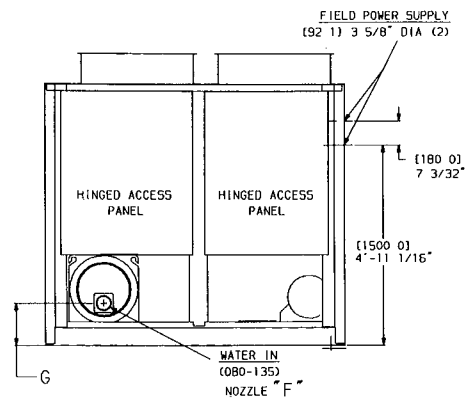
- Unit must have clearances for airflow as follows:
Top — Do not restrict in any way
Ends — [1524 mm] 5 ft (from solid surface)
Sides — [1829 mm] 6 ft
- Dimensions in [] are in millimeters.



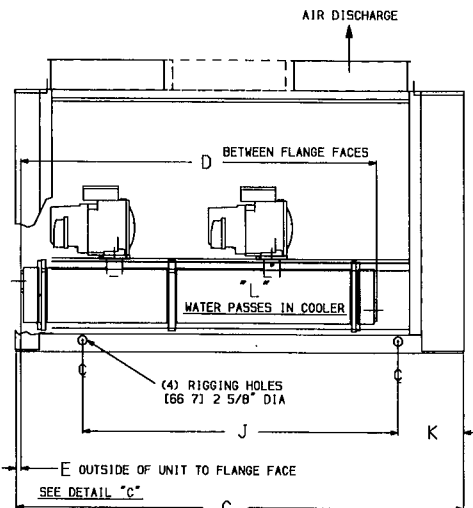
DETAIL "C"
NOZZLE CONNECTIONS



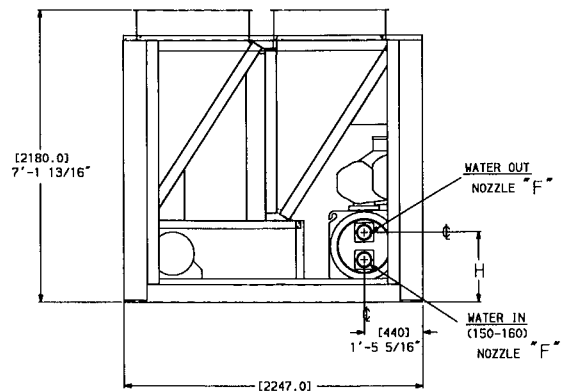
TOP VIEW



VIEW A-A
CONTROL BOX END



SIDE VIEW



VIEW B-B
END OPPOSITE CONTROL BOX

Application data

UNIT OPERATING RANGES

ITEM	MINIMUM	MAXIMUM
Cooler Leaving Fluid Temperature Standard Optional*	40 F (5 C)	60 F (15 C)
Cooler Entering Fluid Temperature†	45 F (7.2 C)	70 F (21 C)
Cooler Flow Rates 079-090 104-115 125-150 160	89 gpm (5.6 L/s) 99 gpm (6.3 L/s) 124 gpm (7.8 L/s) 151 gpm (9.5 L/s)	—
Cooler Loop Volume	2 gal/ton** (2 L/kW)	—
Outdoor Ambient Operating Temperature Standard Optional	0 F (–17 C) –20 F (–29 C)	125 F (51 C)†† 125 F (51 C)††

*For applications requiring operation at less than 40 F (5 C), the units require the use of antifreeze and may require one of the optional brine units. Contact your local Carrier representative for more information.

†For applications requiring operation at less than 45 F (7.2 C), contact your local Carrier representative for unit selection using the Carrier electronic catalog.

**Unit may not control temperatures effectively at this volume.

††Depending on the actual operating conditions, the 30GX chiller may not operate at full capacity above 115 F (46.1 C).

NOTES:

1. The 30GX units will start with loop temperatures up to 95 F (35 C).
2. Where winds of 5 mph (2.2 m/s) or greater are anticipated at outdoor ambient temperatures below 32 F (0 C), field-supplied wind baffles are required.

Application data (cont)

CONVERSION TABLE

METRIC TECH	X	=	ENGLISH UNIT	X	=	SI UNIT
Acceleration						
m/s ²				1 0		m/s ²
m/s ²	3 281		ft/s ²	0 3048		m/s ²
Area						
cm ²				100		mm ²
cm ²	0 1550		in ²	645 2		mm ²
m ²				1 0		m ²
m ²	10.76		ft ²	0 09290		m ²
Energy						
kcal				4 187		kJ
kcal	3.968		Btu	1 055		kJ
kgf·m				9 807		J
kgf·m	7.233		ft lbf	1 356		J
kW·h				3.600		MJ
kW·h	3412		Btu	1.055 x 10 ⁻³		MJ
Torque or Bending Moment Conversion Factors						
kgf·m	9 807					N·m
kgf·m	86 80		lbf·in	0 1130		N·m
kgf·m	7 233		lbf·ft	1 356		N·m
Force						
kgf				9 807		N
kgf	2.205		lbf	4 448		N
Length						
μm				1 0		μm
μm	39.37		micro-inch	0 0254		μm
mm				1 0		mm
mm	0 03937		in	25 4		mm
mm	0 003281		ft	304 8		mm
m				1.0		m
m	3.281		ft	0.3048		m
m	1.094		yd	0 9144		m
Mass						
g				1 0		g
g	0 03527		oz	28.35		g
kg				1 0		kg
kg	2 205		lb	0 4536		kg
tonne, Mg				1 0		tonne, Mg
tonne, Mg	1.102		U.S. ton (2000 lb)	0 9072		tonne, Mg
Mass/Time						
kg/h				0 0002778		kg/s
kg/h	0 03674		lb/min	0 00756		kg/s
Mass/Volume						
kg/dm ³ , kg/L				1000		kg/m ³
kg/dm ³ , kg/L	62 43		lb/ft ³	16 02		kg/m ³
Power						
kcal/h				1 163		W
kcal/h	3.968		Btu/h	0.2931		W
HP metric				0 7355		kW
HP metric	0.9863		HP(550 $\frac{\text{ft}\cdot\text{lb}}{\text{s}}$)	0 7457		kW
Mcal/h				1 163		kW
Mcal/h	0 3307		Ton refr	3 517		kW
Pressure						
mm w.g. 4°C				0 009806		kPa
mm w.g. 4°C	0.03937		in H ₂ O 39 2°F	0 2491		kPa
mm Hg 0°C				0 1333		kPa
mm Hg 0°C	0 03937		in Hg 32°F	3 386		kPa
kgf/cm ²				98 07		kPa
kgf/cm ²	14 22		psi	6 895		kPa
mH ₂ O	3 281		ft H ₂ O	2 989		kPa
Specific Enthalpy						
kcal/kg				4 187		kJ/kg
kcal/kg	1 800		Btu/lb	2 326		kJ/kg

PREFIXES		
M	MEGA	10 ⁶
k	KILO	10 ³
d	DECI	10 ⁻¹
c	CENTI	10 ⁻²
m	MILLI	10 ⁻³
μ	MICRO	10 ⁻⁶

METRIC TECH	X	=	ENGLISH UNIT	X	=	SI UNIT
Specific Heat						
kcal/kg °C				4 187		kJ/kg °C
kcal/kg °C	1 0		Btu/lb °F	4 187		kJ/kg °C
Steam Rate						
kg/kW h				1 0		kg/kW h
kg/kW h	1 644		lb/h HP	0 6083		kg/kW h
kg/Mcal				0.8598		kg/kW h
kg/Mcal	6 666		lb/h Ton	0 1290		kg/kW h
Temperature Interval						
°C				1 0		K
°C	1 8		°F	0.5556		K
Thermal Conductivity						
kcal/m h °C				1 163		W/m °C
kcal/m h °C	8 064		Btu·in/ft ² h °F	0 1442		W/m °C
kcal/m h °C	0 6720		Btu·ft/ft ² h °F	1 731		W/m °C
Thermal Resistance						
m ² °C h/kcal				0 8598		m ² °C/W
m ² °C h/kcal	4 882		ft ² h °F/Btu	0 1761		m ² °C/W
Heat Transfer Coeff.						
kcal/m ² h °C				1 163		W/m ² °C
kcal/m ² h °C	0 2048		Btu/ft ² h °F	5 678		W/m ² °C
Velocity						
m/s				1 0		m/s
m/s	3 281		ft/s	0 3048		m/s
m/s	196.9		ft/min	0 00508		m/s
Viscosity						
cP				1 0		mPa s
cP	2 089x10 ⁻⁵		lbf/ft ²	47880		mPa s
cSt				1.0		mm ² /s
cSt	1.076x10 ⁻⁵		ft ² /s	92903.		mm ² /s
Volume						
mm ³				1 0x10 ⁻⁶		L
mm ³	6 102x10 ⁻⁵		in ³	0 01639		L
L				1 0		L
L	0 03531		ft ³	28.32		L
m ³				1 0		m ³
m ³	1 308		yd ³	0 7646		m ³
L	0 2642		U S gal	3 785		L
L	2 113		U.S. pint	0 4732		L
mL, cm ³				1 0		mL
mL, cm ³	0 03381		U S oz	29 57		mL
Volume/Time						
m ³ /h				0 2778		L/s
m ³ /h	0 5886		ft ³ /min	0 4719		L/s
m ³ /h	4 403		U S gal/min	0.06309		L/s
L/h				2 778x10 ⁻⁴		L/s
L/h	4 403x10 ⁻³		U S gal/min	0.06309		L/s
(m ³ /h)/						
(1000 kcal/h)	1 780		cfm/ton	0 1342		L/s · kW

METRIC TECH	CONVERSION FACTOR	=	ENGLISH UNIT	CONVERSION FACTOR	=	SI UNIT
Temperature						
°C				°C+273 15		K
°C	(°C x 1 8) + 32		°F	(°F - 32) ÷ 1.8		°C

UNITS		
m	METER	cP
cal	CALORIE	cSt
kg	KILOGRAM (mass)	HP metric =
kgf	KILOGRAM - FORCE	(PS, CV, ch) METRIC
kP	KILOGRAM FORCE	HORSEPOWER
L	LITER	MILLIMETERS
°C	DEGREES CELSIUS	mm w g
K	KELVIN	mm CE
W	WATT	mm Hg
Pa	PASCAL	tonne =
J	JOULE	1000 kg
N	NEWTON	kg FRIGORIE
h	HOUR	100 kPa
		bar =

Selection procedure

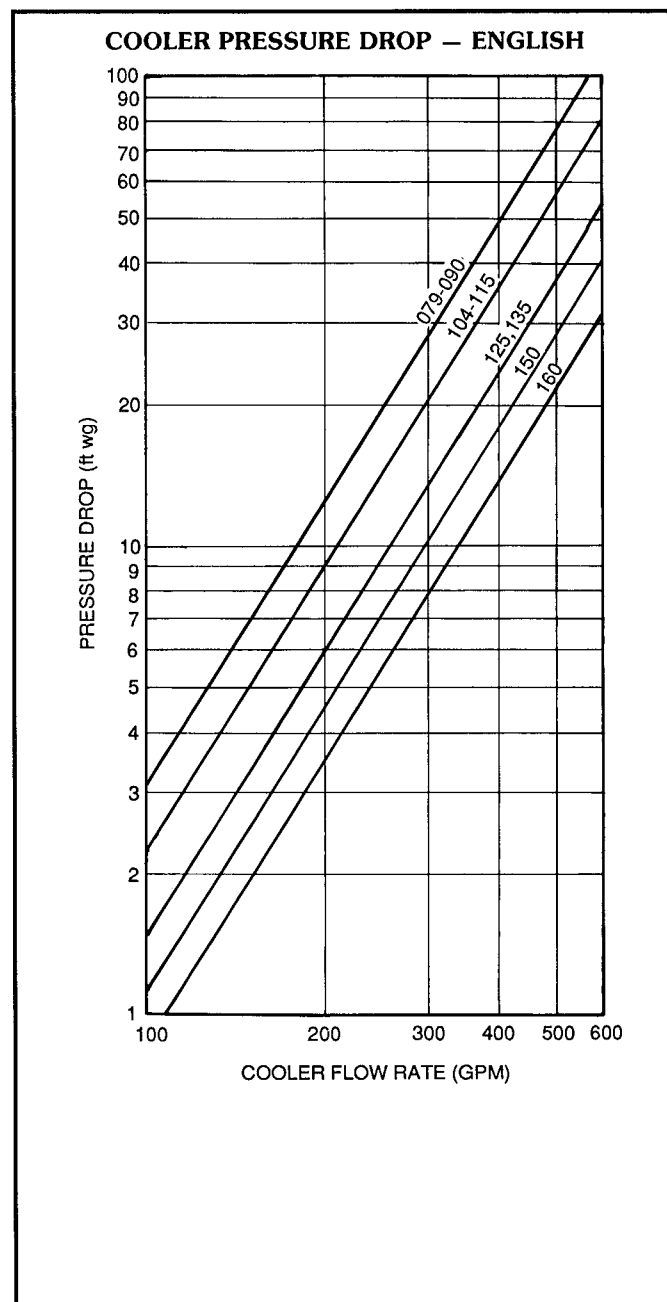
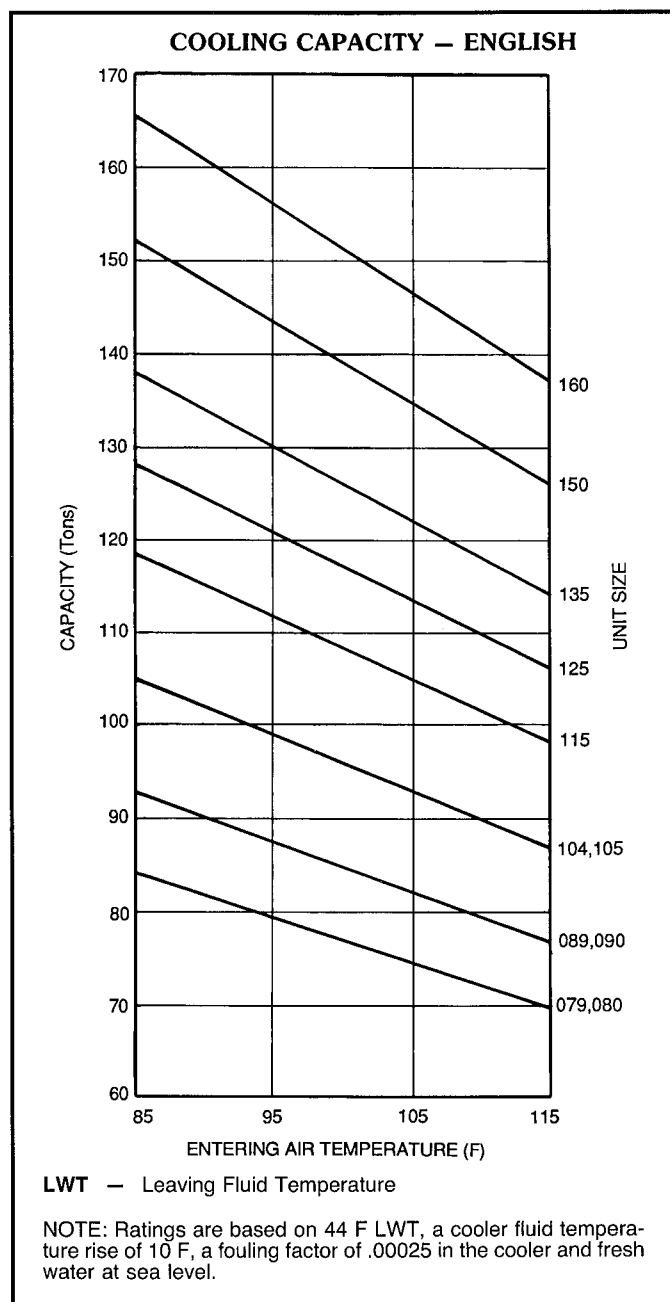
Carrier's electronic selection program provides quick, easy computer selection of Carrier chillers. It considers specific temperature and flow requirements and other factors, such as fouling and altitude correction. To select a chiller manually for your particular application, follow the procedure below.

The Cooling Capacity graphs on this page and page 10 show the unit capacity at 44 F (6.7 C) leaving chilled fluid temperature at various design outdoor ambient conditions (for estimation purposes only).

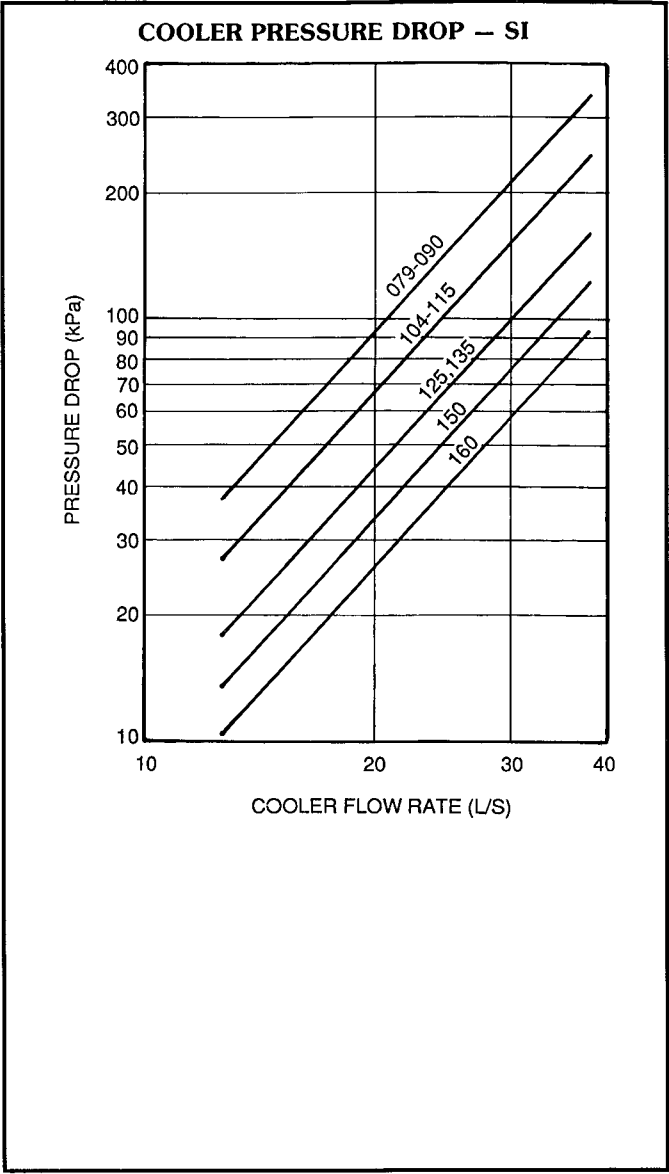
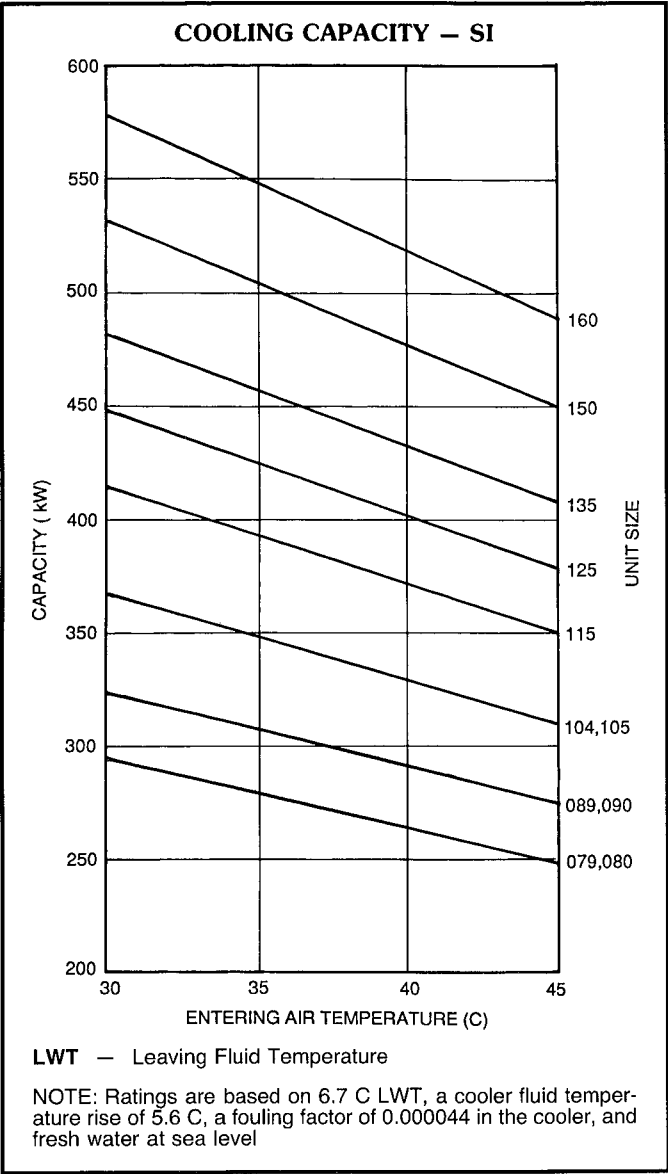
Performance data

To manually select the appropriate chiller size

1. Review the Application Data section on page 7 to ensure the chiller will be operating within achievable parameters.
2. Plot the design capacity required at the design entering-air temperature on the Cooling Capacity graphs on this page and page 10.
3. Select the chiller identified by the nearest unit capacity line.
4. See graphs on this page and page 10 for cooler pressure drop of the selected chiller.



Performance data (cont)



Electrical data*

UNIT 30GX	VOLTAGE			POWER CIRCUIT		CONTROL CIRCUIT		
	Nameplate	Supplied		MCA	MOCP	Voltage	MCA	MOCP
		Min	Max					
079,080	208/230-3-60	187	253	250/242	450/400	115-1-60	30	30
	460-3-60	414	506	214	300	115-1-60	30	30
	575-3-60	518	633	176	250	115-1-60	30	30
	380-3-60	342	418	250	350	230-1-60	15	15
	230-3-50	207	253	235/229	400/350	230-1-50	15	15
	346-3-50	325	380	283	400	230-1-50	15	15
	308/415-3-50	342	440	241	300	230-1-50	15	15
089,090	208/230-3-60	187	253	286/242	450/400	115-1-60	30	30
	460-3-60	414	506	231	250	115-1-60	30	30
	575-3-60	518	633	189	225	115-1-60	30	30
	380-3-60	342	418	270	300	230-1-60	15	15
	230-3-50	207	253	274/229	450/350	230-1-50	15	15
	346-3-50	325	380	309	450	230-1-50	15	15
	308/415-3-50	342	440	264	350	230-1-50	15	15
104,105	208/230-3-60	187	253	250/222	450/350	115-1-60	30	30
	460-3-60	414	506	206	300	115-1-60	30	30
	575-3-60	518	633	170	225	115-1-60	30	30
	380-3-60	342	418	241	350	230-1-60	15	15
	230-3-50	207	253	235/208	400/350	230-1-50	15	15
	346-3-50	325	380	271	350	230-1-50	15	15
	380/415-3-50	342	440	231	300	230-1-50	15	15
115	208/230-3-60	187	253	286/222	500/350	115-1-60	30	30
	460-3-60	414	506	223	300	115-1-60	30	30
	575-3-60	518	633	183	250	115-1-60	30	30
	380-3-60	342	418	261	350	230-1-60	15	15
	230-3-50	207	253	274/208	450	230-1-50	15	15
	346-3-50	325	380	297	400	230-1-50	15	15
	380/415-3-50	342	440	254	350	230-1-50	15	15
125	208/230-3-60	187	253	286/253	500/400	115-1-60	30	30
	460-3-60	414	506	237	300	115-1-60	30	30
	575-3-60	518	633	196	250	115-1-60	30	30
	380-3-60	342	418	278	400	230-1-60	15	15
	230-3-50	207	253	274/242	450/400	230-1-50	15	15
	346-3-50	325	380	318	450	230-1-50	15	15
	380/415-3-50	342	440	270	350	230-1-50	15	15
135	208/230-3-60	187	253	286/283	500/450	115-1-60	30	30
	460-3-60	414	506	248	350	115-1-60	30	30
	575-3-60	518	633	205	250	115-1-60	30	30
	380-3-60	342	418	291	400	230-1-60	15	15
	230-3-50	207	253	274/273	450/450	230-1-50	15	15
	346-3-50	325	380	334	450	230-1-50	15	15
	380/415-3-50	342	440	284	400	230-1-50	15	15
150	208/230-3-60	187	253	294/336	450/600	115-1-60	30	30
	460-3-60	414	506	277	400	115-1-60	30	30
	575-3-60	518	633	231	300	115-1-60	30	30
	380-3-60	342	418	326	450	230-1-60	15	15
	230-3-50	207	253	285/333	450/500	230-1-50	15	15
	346-3-50	325	380	192/221	300/350	230-1-50	15	15
	380/415-3-50	342	440	323	450	230-1-50	15	15
160	208/230-3-60	187	253	330/336	500/600	115-1-60	30	30
	460-3-60	414	506	291	400	115-1-60	30	30
	575-3-60	518	633	242	300	115-1-60	30	30
	380-3-60	342	418	342	450	230-1-60	15	15
	230-3-50	207	253	324/333	500/500	230-1-50	15	15
	346-3-50	325	380	218/221	350/350	230-1-50	15	15
	380/415-3-50	342	440	341	450	230-1-50	15	15

LEGEND

MCA — Minimum Circuit Ampacity (for wire sizing)
MOCP — Maximum Overcurrent Protection

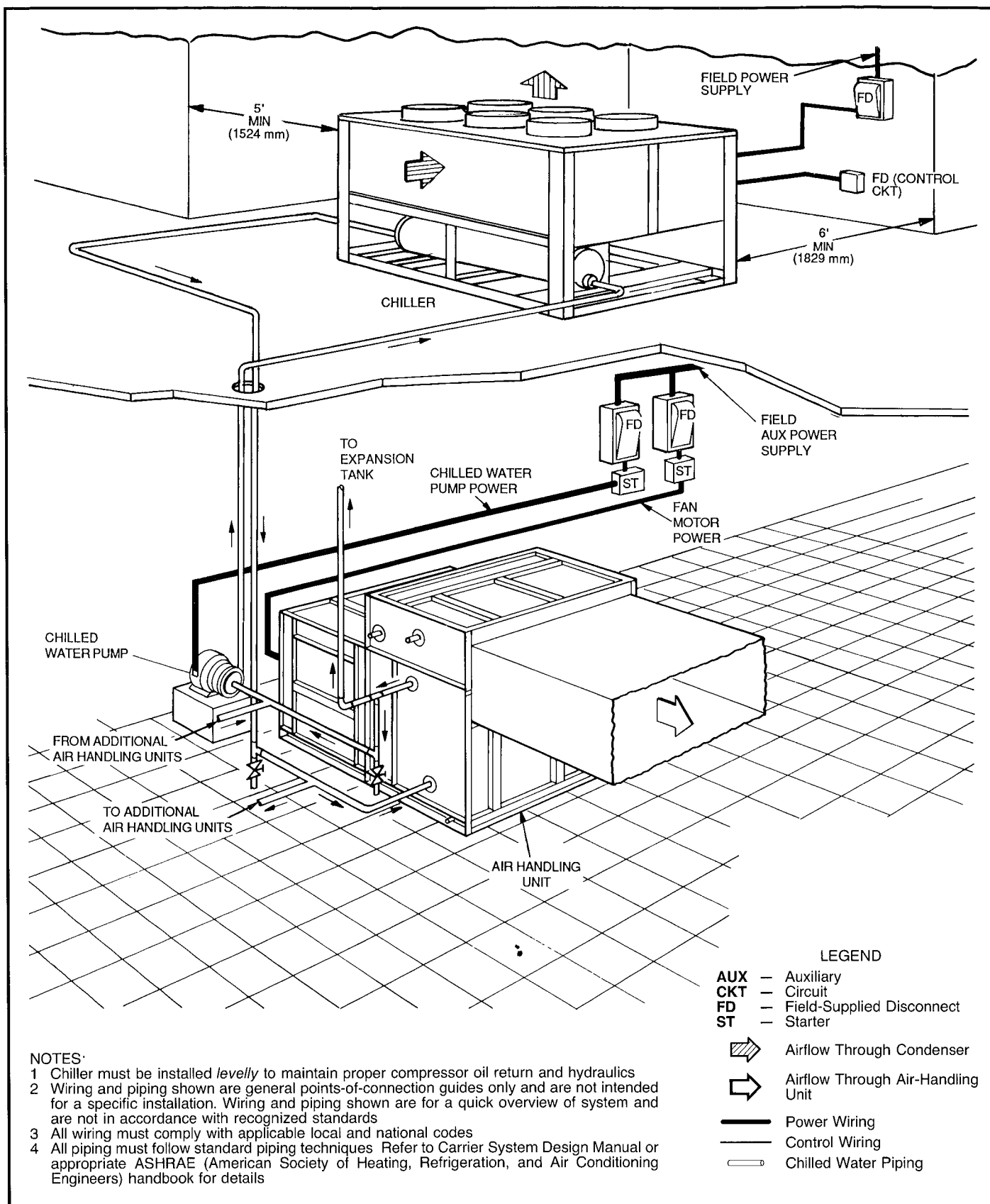
*Refer to Carrier's electronic catalog for most current electrical data.

NOTES:

1. Main power must be supplied from a field-supplied fused electrical service with a (factory- or field-installed) disconnect located in sight from the unit.
2. Cooler heater, oil 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.

3. Maximum incoming wire size for each terminal block is 500 kcmil.
4. Maximum allowable phase imbalance is voltage 2%, amps 5%.
5. All units have one main power block except the 208/230-v units, which have 2. The 208/230-v units have 6 parallel conductors (2 rows of 3), while all other units have 3 parallel conductors.
6. —/— values indicate Circuit A/Circuit B

Typical piping and wiring



Controls

The standard microprocessor-based control in the 30GX units provides the following functions

- leaving fluid temperature control (using both entering and leaving fluid sensors)
- 7 day time sequence of both pump and chiller
- temperature reset from return fluid (standard) or from outdoor ambient (accessory), occupied space temperature (accessory), 4-20 mA signal (accessory), or via the optional Carrier Comfort Network (CCN).
- automatic compressor lead-lag switching based on compressor accumulated run times and number of cycles.
- automatic temperature range across the cooler adjustment
- fully automatic control of the chiller components

A standard 2-line, 24-character per line display is used to accomplish the following (see figure below)

- set schedules and set points
- identify operating mode
- display current temperatures and pressures being used by the control for internal calculations
- identify abnormal (alarm or alert) conditions

An accessory 16-line, 40-character per line display is also available (see figure below) This accessory displays the same information as the standard display, but has the advantage of being able to display multiple points simultaneously

Sequence of operation

The control has a 44 F (6.2 C) leaving fluid temperature (LWT) set point as shipped from the factory. If temperature reset or demand limiting is in effect, this set point may change.

Off cycle — If oil sump temperature of the circuit of the selected compressor is not more than 35 F (19 C) greater than the saturated suction temperature of the same circuit, then the oil heater is energized. If the ambient temperature drops below 36 F (2 C), the cooler heater will be energized.

Start-up — The circulating pump is energized (either externally or by the internal time clock). The chiller starts. (If the flow switch is applied, the chiller will start after the flow has been proven) The compressor starts unloaded, and the condenser fans are energized

NOTE: Which compressor starts first is determined by the automatic lead/lag feature.

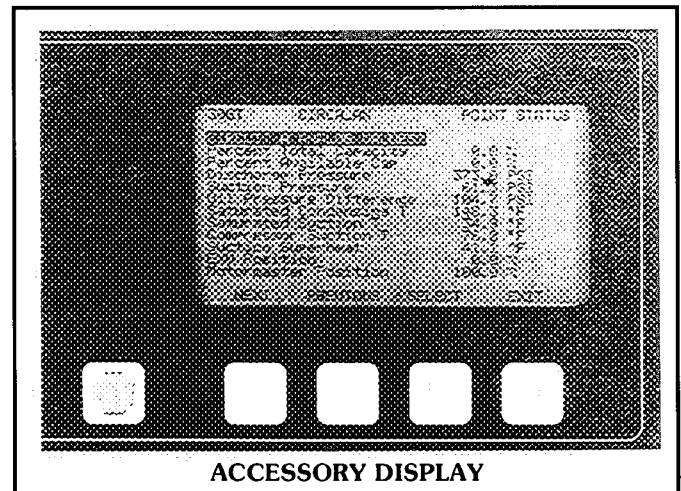
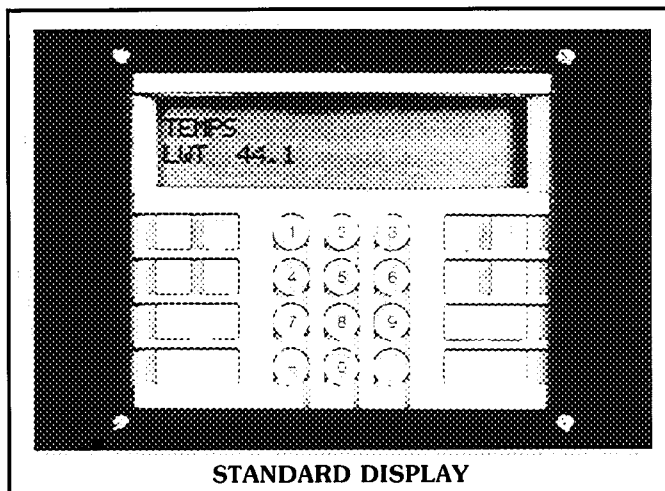
If the entering fluid temperature is 85 F (29 C) or higher, the maximum operating pressure (MOP) feature limits the suction to keep the chiller on line

Normal operation — The entering fluid temperature sensor senses changes in entering fluid temperature to anticipate changes in the cooling load Based on leaving fluid temperature, the control will add or delete capacity to maintain a constant leaving fluid temperature

Transition to off — The chiller unloads once the “time-to-stop” signal has been given This signal can be either internal or external.

Safeties — The 30GX control as shipped from the factory automatically deenergizes any active compressor that experiences any of the following

- electrical overload
- overtemperature
- high pressure
- low pressure
- loss of charge
- phase loss
- phase reversal (control prevents compressor start)
- voltage imbalance
- ground current
- loss of flow
- freeze indication



Guide specifications

Air-Cooled Liquid Chiller

HVAC Guide Specifications

Size Range **80 to 160 Tons (285 to 565 kW) Nominal**
Carrier Model Number **30GX**

Part 1 — General

1.01 SYSTEM DESCRIPTION

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

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 590, latest revision (U.S.A.).
- B Unit construction shall comply with ASHRAE 15 Safety Code, NEC, and ASME applicable codes (U.S.A. codes).
- C. Unit shall be manufactured at an ISO 9002-listed facility.
- D Unit shall be fully tested at the factory.

1.03 DELIVERY, STORAGE AND HANDLING

- A Unit controls shall be capable of withstanding 150 F (66 C) storage temperatures in the control compartment
- B. Unit shall be stored and handled per unit manufacturer's recommendations

Part 2 — Products

2 01 EQUIPMENT

A General.

Factory assembled, single-piece, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (HFC-134a), and special features required prior to field start-up.

B. Unit Cabinet

Galvanized steel casing (zinc phosphatized) with an electrostatically applied baked enamel finish (where applicable).

C. Fans:

- 1. Condenser fans shall be direct-driven, 11-blade, shrouded-axial type, and shall be statically and dynamically balanced with inherent corrosion resistance. Air shall be discharged vertically upward.
- 2. Fans shall be protected by coated steel wire safety guards

D. Compressors.

- 1 Semi-hermetic twin-screw compressors with internal muffler and check valve.
- 2 Each compressor shall be equipped with a discharge shutoff valve.

E. Cooler:

- 1. Cooler shall be tested and stamped in accordance with ASME code (U.S.A.) for a refrigerant working-side pressure of 220 psig (1517 kPa) and a minimum fluid-side pressure of 300 psig (2068 kPa).

- 2. Mechanically cleanable shell-and-tube type with removable heads.
- 3 Tubes shall be internally-enhanced, seamless-copper type, and shall be rolled into tube sheets
- 4 Equipped with weld-on water connections
- 5 Shell shall be insulated with 3/4-in (19 mm) closed-cell, polyvinyl-chloride foam with a maximum K factor of 0.28.
- 6. Equipped with electric heaters in the shell heads to protect against cooler freeze-up
- 7. Shall have a cooler drain and vent

F. Condenser.

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

G Refrigeration Components:

Refrigerant circuit components shall include oil separator, high and low side pressure relief device, discharge and liquid line shutoff valves, filter drier, moisture indicating sight glass, expansion valve, refrigerant economizer, and complete operating charge of both refrigerant HFC-134a and compressor oil.

H. Controls, Safeties, and Diagnostics:

1 Controls:

- a. Unit controls shall include as a minimum: microprocessor, LOCAL/ENABLE-STOP switch, 2-line, 24-character per line diagnostic display with keypad
- b Shall be capable of performing the following functions:
 - 1) Automatic compressor lead/lag switching
 - 2) Capacity control based on leaving chilled fluid temperature with return fluid temperature sensing
 - 3) Limit the chilled fluid temperature pulldown rate at start-up to an adjustable range of .1° F to 2° F (.05° C to 1.1° C) per minute to prevent excessive demand spikes at start-up.
 - 4) Seven-day time scheduling of pump(s) and chiller(s)

2. Diagnostics.

- a. Display module shall be capable of displaying set points, time, system status (including temperatures, pressures, and percent loading), and any alarm or alert conditions.
- b Control module, in conjunction with the microprocessor, shall be capable of displaying the output of a run test to verify operation of every switch, sensor, potentiometer, fan, and compressor before chiller is started.

3. Safeties:

- a. Unit shall be equipped with all necessary components, and in conjunction with the control system shall provide the unit with protection against the following:
 - 1) Loss of refrigerant charge.
 - 2) Low fluid flow
 - 3) Low chilled fluid temperature.
 - 4) Low oil (each compressor circuit)
 - 5) Voltage imbalance
 - 6) Ground current.
 - 7) Thermal overload
 - 8) Pressure overload
 - 9) Electrical overload.
 - 10) Single-phasing.
- b. Fan motors shall have inherent overcurrent protection.

I. Operating Characteristics

1. Unit shall be capable of starting and running at outdoor ambient temperatures from 0 to 125 F (–17 to 46.1 C)
2. Unit shall be capable of starting up with 95 F (35 C) entering fluid temperature to the cooler.

J. Motors:

Condenser fan motors shall be 3-phase type with permanently-lubricated bearings and class B insulation.

K. Electrical Requirements.

- 1 Unit primary electrical power supply shall enter the unit at a single location (208/230 v has 2 power poles).
2. Unit shall operate on 3-phase power at the voltage shown in the equipment schedule.
- 3 Control voltage shall be 115-v (60 Hz) or 230-v (50 Hz), single-phase, separate power supply.
4. Unit shall be shipped with factory control and power wiring installed.

L. Special Features:

Certain standard features are not applicable when the features designed by * are specified. For assistance in amending the specifications, contact your Carrier Sales office.

1. Y-Delta Starter:

Unit shall have a factory-installed, Y-Delta starter to minimize electrical inrush current.

* 2. Low-Ambient Operation:

Unit shall be capable of starting and running at outdoor ambient temperatures down to –20 F (–29 C) with the addition of antifreeze in the cooler circuit, wind baffles, and field- or factory-installed low-ambient kit.

3 Sound Reduction Package:

Unit shall have field-installed sound reduction package that includes compressor enclosure.

4. Vibration Isolation:

Unit shall be supplied with rubber-in-shear vibration isolators for field installation.

5. Control Power Transformer

Unit shall be supplied with a field (or factory) installed transformer that will allow supply control circuit power from the main unit power supply.

6. Non-Fused Disconnect:

Unit shall be supplied with factory-installed, non-fused electrical disconnect for main power supply.

7. Chilled Water Flow Switch:

Unit shall be supplied with field-installed differential pressure type proof-of-flow sensing switch.

8 Minus-One-Pass Cooler.

Unit shall be supplied with factory-installed feature allowing one less cooler pass than standard units to provide lower cooler pressure drop (or single side piping installations).

9. Victaulic Kit

Unit shall be supplied with victaulic-type cooler connections (field installed).

10. Copper Condenser Coil Fin Material:

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

11 Seacoast Condenser:

Unit shall be factory equipped with a coated condenser coil.

12. Expanded Display:

Unit shall be supplied with indoor-mounted, remote, 40-character per line, 16-line display panel for field installation.

13. Temperature Reset:

Unit shall reset leaving chilled fluid temperature based on return fluid temperature, outdoor ambient temperature, space temperature, 4-20 mA external signal, or Carrier Comfort Network input

NOTE: The accessory control module is necessary to provide this function.

14. Carrier Comfort Network Multi-Unit Control.

Field-installed control shall sequence between 2 and 8 chillers and pumps.

15 Medium Temperature Brine Option:

Unit shall be factory modified to start and operate at leaving chilled fluid temperatures of between 15 F (–9 C) and 40 F (5 C)

Guide specifications (cont)

16 Suction Service Valve:

Unit shall have factory-installed isolation valve located between the cooler and compressor suction connections.

17. Minimum Load Control:

Unit shall be equipped with factory (or field) installed, microprocessor-controlled, minimum-load control that shall permit unit operation down to 10% capacity.

18. Demand Limit Control:

Unit shall be equipped with a 2-point demand limit control (from 0 to 100%), which shall be activated by a remote contact closure or a 4-20 mA signal.

NOTE: The accessory control module is necessary to provide this function.

19. Security Guards

Unit shall be supplied with factory (or field) installed, PVC-coated grilles protecting the condenser, cooler, and compressor.

* 20. High-Static Condenser Fans.

Unit shall have factory-installed condenser fans capable of generating 0.4 in. wg (100 Pa) or 1.0 in. wg (250 Pa) external static pressure at nominal condenser airflow