

## **Product Data**

AquaSnap<sup>®</sup> Liquid Chillers with Scroll Compressors and Carrier Controls

17 to 80 Nominal Tons (60 to 281 kW)







30MPA, MPW 017-080 Liquid Chillers with Scroll Compressors and PIC6 Controls with R-32 Refrigerant

## **Features/Benefits**



Value-added features include:

- rotary scroll compression
- refrigerant R-32
- low sound
- easy to use SmartVu<sup>®</sup> PIC6 controls
- application flexibility
- energy efficiency
- modular design
- optional digital scroll compressors
- dual circuit available on select models (size 033)

#### **Installation ease**

The 30MP units are designed to reduce installation time and cost. They arrive at the job site able to fit easily through a standard 36 in. (762 mm) door opening due to their compact design. The 30MP units include fork pockets in the frame for use with forklifts or pallet jacks. Optional mobility and height

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adjustment kits allow units to quickly roll into place and mate with existing piping. Mobility kit wheels are rubber type, pivot for easy unit maneuvering, and are lockable for safety.

The 30MP height adjustment kit provides a height adjustment mechanism located in each corner of the unit to aid in leveling and facilitate connection to existing piping. The ability to roll the 30MP chiller into most elevators and through most doors combined with the ability to adjust the unit height to match existing piping can significantly lower installation expense.

A field-installed accessory, multi-unit chiller or multi-chiller controller, allows control of up to 8 units as a single, large chiller plant. This modular capability provides flexibility of operating envelope, ease of replacement, and allows the chilled water plant to grow with its facility.

The 30MP units come complete with an insulated evaporator, condenser (30MPW), compressors, controls, refrigerant charge (30MPW), EXV (electronic expansion valve) models, filter drier, sight glass, entering and leaving chilled fluid temperature sensors, evaporator water pressure access port, factory-installed evaporator flow switch, and oil charge. The unit will need only the addition of a condenser water supply (30MPW), electrical power, and chilled fluid distribution system.

The 30MPA units are designed for use with a remote condenser and include a liquid line isolation valve, liquid line solenoid valve, and have a nitrogen holding charge. The 30MPA chillers may be connected to an air-cooled, evaporative condenser(s) or even liquid condenser(s) sized to meet specific job requirements. All internal piping and wiring is complete, and since all essential controls and protective devices are installed at the factory, installation is completed in minimal time. Units are ETL and ETL, Canada listed.

# Operating reliability and serviceability

The 30MP chiller uses the same compressor sub-assemblies and heat exchangers that are proven to be reliable in AquaSnap chillers in service around the world. Each unit includes many safeties as standard, including protection from electrical overload, thermal overload, high pressure, low refrigerant charge, and low chilled fluid temperature. A factory-installed thermal dispersion switch containing no moving parts provides reliable low flow and loss of flow protection. Heat exchangers feature ANSI (American National Standards Institute) 316 stainless steel brazed-plate construction.

The modular design of the 30MP chiller allows units to be installed side by side with no clearance between units to achieve higher capacity. Since each circuit has its own dedicated power supply and controls transformer, an individual chiller can be isolated and serviced while other units continue to operate. The remaining units can provide a supply of chilled water even while a single chiller is down, providing true redundancy and ease of mind.

## PIC6 microprocessor controls

The PIC6 controls communicate in easy-to-understand English, making it as easy as possible to monitor and control each AquaSnap chiller while accurately maintaining fluid temperatures. PIC6 controls are also available in multiple languages. The PIC6 controls provide features such as chilled water temperature reset, demand limiting, compressor wear minimization and protection, temperature and pressure displays, and diagnostic functions. These controls result in higher chiller reliability, simplified training, and more productive service calls, with correspondingly lower operational and maintenance costs.

The user interface comes with a chiller pictorial display. The PIC6 display is an easy-to-use touch screen that provides simple navigation for configuration and control of AquaSnap units.







The display can be used with the touch of a finger. The PIC6 display helps technicians quickly diagnose chiller issues and helps prevent problems from occurring. All AquaSnap  $^{\rm I\!R}$  chillers are ready for use with Carrier Comfort Network<sup>®</sup> (CCN) devices, MS/TP, and BACnet<sup>™1</sup> internet protocol (IP); use of either may require additional field programming. A LON (Local Operating Network) Translator control is available as either a factory-installed option or a field-installed accessory. This device, when provided with appropriate field programming, allows interface between the network and the 30MP chiller.

# Operating efficiency and flexibility

The 30MP chillers exceed ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 90.1-2019 minimum efficiency requirements for all sizes 017-080. Models 017 and 033 are less than 15 hp/circuit code. At full load, 30MPW chillers can provide efficiencies better than 0.72 kW/ton at AHRI (Air-Conditioning, Heating, and Refrigeration Institute) standard conditions. The 30MP chillers use ultra-quiet, high-efficiency scroll compressors, operated in tandem or trio for greater

efficiency at partial loads. The 30MP chillers can also be operated with variable flow, allowing building owners to realize even greater overall system energy savings in the chilled water pumping system.

Whether in the classroom, on the production floor, or in the office, *SmartVu* controls can assist in adaptation to changing weather and business conditions. Accurate temperature control, provided by Carrier's *SmartVu* system, helps to maintain higher levels of indoor air quality, thermal comfort, and space productivity. While many chillers use only leaving fluid temperature control, the 30MP chillers utilize leaving fluid temperature control with entering fluid temperature compensation. This Carrier exclusive feature provides smart control and intelligent machine capacity staging.

## Energy management made easy

While 30MP chillers have many standard features, such as network communications capability and temperature reset based on return fluid temperature, they can also expand as needs change. Supply temperature reset based on outside air or space temperature is as easy as adding a thermistor. The energy management option allows use of changing utility rate structures with easy to use load shedding, demand limiting and temperature reset capabilities. Reset triggered via a 4 to 20 mA signal (requires EMM [energy management module] option) makes integrating from an existing building management system simple.

# Digital scroll compressors (models 017-046 only)

Digital scroll compressors are available as a factory-installed option. These compressors allow incremental unloading with capacity modulation to better match building load when compared to standard scroll compressors.

NOTE: The digital compressor option is not compatible with the medium temperature brine, hot gas bypass, or multi-unit chiller accessory options.



<sup>1.</sup> Third-party trademarks and logos are the property of their respective owners.

# Features/Benefits (cont)





## Model number nomenclature



## 30MPA, 30MPW Model Number Nomenclature

0 0 0 1

30MP W 017 6 0 -



#### Condenser Option

 $\mathbf{A}$  – Std. without Condenser (not available for sizes 017 and 033)  $\mathbf{W}$  – Std. with Condenser

#### Unit Size - Nominal Tons (kW)

 017 - 17 (60) (only available in 30MPW)
 051 - 51 (179)

 021 - 21 (74)
 056 - 56 (197)

 031 - 31 (109)
 066 - 66 (232)

 033 - 33 (116) (only available in 30MPW)
 080 - 80 (281)

 041 - 41 (144)
 046 - 46 (162)

#### Voltage Options

- **1** 575-3-60
- **2** 380-3-60
- **5** 208/230-3-60
- **6** 460-3-60

#### Sound/Mounting Options

- 0 None (Std)
- 3 Height Adjustment Kit
- 9 Mobility Kit (Wheels)
- D Height Adjustment Kit and Mobility Kit (Wheels)
- L Compressor Sound Blanket
- M Mobility Kit (Wheels) and Compressor Sound Blanket
- N Height Adjustment kit and Compressor Sound Blanket
- P Height Adjustment Kit, Mobility (Wheels) and Compressor Sound Blanket
- Q Compressor Sound Blanket with Compressor Insulation
- R Mobility Kit (wheels) Compressor Sound Blanket with Compressor Insulation
- S Height Adjustment Kit, Compressor Sound Blanket with Compressor Insulation
- T Mobility Kit (wheels), Height Adjustment Kit, Compressor Sound Blanket with Compressor Insulation

#### **Unit Design Revision**

- Design Revision Level

#### Comfort Cooling Duty/Medium Temperature Brine Option

- 0 Comfort Cooling Duty (32-60°F LCFT, 0-16°C) (Std) with refrigerant charge (MPW) or Nitrogen (MPA)
- 1 Water Manifold Piping (Comfort Cooling Duty) with Refrigerant Charge (MPW) or Nitrogen (MPA)
- Evaporator Isolation with Water Manifold Piping (Comfort Cooling Duty) with Refrigerant Charge (MPW) or Nitrogen (MPA)
- a Head Pressure Control with Water Manifold Piping (Comfort Cooling Duty) with Refrigerant Charge (MPW) or Nitrogen (MPA)
- 4 Head Pressure Control, Evaporator Isolation with Water Manifold Piping (Comfort Cooling Duty) with Refrigerant Charge (MPW) or Nitrogen (MPA)
- B Comfort Cooling Duty (32-60°F LCFT, 0-16°C) (Std) with Nitrogen Charge (MPW only)
- C Water Manifold Piping (Comfort Cooling Duty) with Nitrogen Charge (MPW only)
- D Evaporator Isolation with Water Manifold Piping (Comfort Cooling Duty) with Nitrogen Charge (MPW only)
- F Head Pressure Control with Water Manifold Piping (Comfort Cooling Duty) with Nitrogen Charge (MPW only)
- G Head Pressure Control, Evaporator Isolation with Water Manifold Piping (Comfort Cooling Duty) with Nitrogen Charge (MPW only)
- N Head Pressure Control (Single Unit) (Comfort Cooling Duty) with Refrigerant Charge (MPW) or Nitrogen (MPA)
- Q Head Pressure Control (Single Unit) (Comfort Cooling Duty) with Nitrogen Charge (MPW Only)

#### Packaging Options

- 1 Bag (Std) No Compressor Insulation with Nitrogen Charge (MPW only)
- Export Crate No Compressor Insulation with Nitrogen Charge (MPW only)
- Bag and Compressor Insulation with Nitrogen Charge (MPW only)
- Export Crating and Compressor Insulation with Nitrogen (MPW only)
- 5 Bag (Std) No Compressor Insulation with Refrigerant Charge (MPW) or Nitrogen (MPA)
- 7 Bag and Compressor Insulation with Refrigerant Charge (MPW) or Nitrogen (MPA)

#### **Controls/Communication Options**

- 1 PIC 6 (Std)
- 3 PIC 6 with Edge Remote Connectivity
- 5 PIC 6 with EMM
- 7 PIC 6 with Edge Remote Connectivity and EMM

#### **Disconnect Options**

- 0 Terminal Block (Std)
- 1 With Non-Fused Disconnect
- 2 Fused Disconnect
- 3 Terminal Block (Std) with Phase Monitor
- 4 With Non-Fused Disconnect with Phase Monitor
- 5 Fused Disconnect with Phase Monitor

#### **Capacity Control**

(Evaporator insulation is standard)

- 0 No Hot Gas Bypass (Std)
- 1 With Hot Gas Bypass
- 2 With Digital Compressor
- 3 High Interrupt
- 4 High Interrupt and Hot Gas Bypass
- 5 High Interrupt and Digital Compressor

#### LEGEND

EMM — Energy Management Module

LCFT — Leaving Chilled Fluid Temperature

Std — Standard

#### NOTES:

- a. Available with nitrogen charge (30MPW units only).
- b. Available with refrigerant charge (30MPW) or nitrogen charge (30MPA).

### **Quality Assurance**

ISO 9001:2015-certified processes



## Model number nomenclature (cont)



### **30MPE Electrical Distribution Panel Model Number Nomenclature**

Electrical Distribution Panel Condenser Option A – Air-Cooled Condenser W – Water-Cooled Condenser Voltage Options 1 – 575-3-60 2 – 380-3-60 5 – 208/230-3-60 6 – 460-3-60 (Standard) 9 – 380/415-3-50 Breaker Amp Rating for each Electrical Position Positions <sup>a</sup> Breaker 8 9 10 11 Size	· · · ·
Condenser Option A – Air-Cooled Condenser W – Water-Cooled Condenser Voltage Options 1 – 575-3-60 2 – 380-3-60 5 – 208/230-3-60 6 – 460-3-60 (Standard) 9 – 380/415-3-50 Breaker Amp Rating for each Electrical Position Positions <sup>a</sup> Breaker 8 9 10 11 Size	W – Wire
A - Air-Cooled Condenser W - Water-Cooled Condenser Voltage Options 1 - 575-3-60 2 - 380-3-60 5 - 208/230-3-60 6 - 460-3-60 (Standard) 9 - 380/415-3-50 Breaker Amp Rating for each Electrical Position Positions <sup>a</sup> Breaker 8 9 10 11 Size	B – Bussbar
Voltage Options 1 – 575-3-60 2 – 380-3-60 5 – 208/230-3-60 6 – 460-3-60 (Standard) 9 – 380/415-3-50 Breaker Amp Rating for each Electrical Position Positions <sup>a</sup> Breaker 8 9 10 11 Size	Load Side L – Electrical Load Side on Left
5 - 208/230-3-60 6 - 460-3-60 (Standard) 9 - 380/415-3-50 Breaker Amp Rating for each Electrical Position Positions <sup>a</sup> Breaker 8 9 10 11 Size	R – Electrical Load Side on Right Piping/Height Adjustment/Mobility/ Packaging/Sound Options
0 0 0 0 - None 3 3 3 3 - 25 4 4 4 4 - 30 5 5 5 5 - 35 6 6 6 6 - 40 7 7 7 7 - 45 8 8 8 8 - 50 9 9 9 9 - 60 B B B B - 70 C C C C - 80	<ul> <li>0 - Water Manifold Piping/Height Adjustment Kit/ Bag (Standard)</li> <li>1 - Water Manifold Piping/Height Adjustment Kit/ Mobility Kit (Wheels)/Bag</li> <li>2 - Water Manifold Piping/Height Adjustment Kit/ Export Crate</li> <li>3 - Water Manifold Piping/Height Adjustment Kit/ Mobility Kit (Wheels)/Export Crate</li> <li>4 - Water Manifold Piping/Height Adjustment Kit/ Sound Enclosure Panels/Bag</li> <li>5 - Water Manifold Piping/Height Adjustment Kit/ Mobility Kit (Wheels)/Sound Enclosure/Bag</li> <li>6 - Water Manifold Piping/Height Adjustment Kit/ Sound Enclosure Panels/Export Crate</li> <li>7 - Water Manifold Piping/Height Adjustment Kit/ Mobility Kit (Wheels)/Sound Enclosure Panels/ Export Crate</li> </ul>
D D D – 90 F F F F – 100 G G G G – 110 H H H – 125	High Interrupt Option <sup>e</sup> 0 – Standard 1 – High <sup>d</sup>
J J J J – 150 K K K K – 175 L L L L – 200	Revision Level
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	

#### NOTES:

RRR

 The largest breaker requirement will be in position 8 and will go from largest to smallest in positions 9-11.

**R** - 400

- b. Bussbar is required when the additive amperage of the electrical distribution panel is 760 amps or higher.
- c. If the total amperage of the electrical distribution panels exceeds 600A, there is no available option for High Interrupt.
- If chillers are selected with high interrupt, then the electrical distribution panel must be selected with high interrupt, and vice versa.



### *Quality Assurance* ISO 9001:2015-certified processes

## **SEISMICOMPLIANT**\*

\* Meets IBC 2006, ASCE-7-05, CBC 2007, and OSHPD seismic requirements.

## **Physical data**



#### 30MP Units - English<sup>a,b,c</sup>

		-	-	-	-	-		_	-	-	
UNIT 30MP	017	021	031	033	041	046	051	056	066	080	
OPERATING WEIGHT (lb)											
MPA	_	723	782		1083	1147	1514	1533	1614	1659	
MPA with Manifold		988	1047		1348	1412	1779	1798	1879	1924	
MPW	677	793	1020	1078	1358	1454	1786	1805	1918	1963	
MPW with Manifold	1206	1322	1549	1607	1887	1983	2315	2334	2447	2492	
REFRIGERANT TYPE		R-32, EXV Controlled System									
Refrigerant Charge MPA <sup>d</sup> (Ib) Ckt A/Ckt B	—	8.5/—	9.4/—	—	12.6/—	12.9/—	25.4/—	27.2/—	29.7/—	36.6/—	
Refrigerant Charge MPW (Ib) Ckt A/Ckt B	9.5/—	10.75/—	21.75/—	14.5/14.5	28.75/—	35.5/—	37.0/—	39.5/—	43.0/—	47.0/—	
COMPRESSORS					Scroll, H	Hermetic					
Qty	2	2	2	2	3	3	2	2	2	2	
Speed (rpm)					35	500					
(Qty) Tons, Ckt A	9, 6	10	15	15	13	15	25	27	27, 40	40	
(Qty) Tons, Ckt B	_	—	—	15	_	—	_	_	_	—	
Oil Charge (Oz) Ckt A/Ckt B	135/—	162/—	236/—	118/118	354/—	354/—	446/—	446/—	446/—	446/—	
Oil Charge (Oz) Ckt A/Ckt B (Digital Option)	135/—	162/—	228/—	110/118	346/—	346/—	_	I	—	—	
No. Capacity Steps											
Standard	3	2	2	2	3	3	2	2	3	2	
With Hot Gas Bypass	4	3	3	3	4	4	3	3	4	3	
Digital Compressor Option	22	22	22	22	33	33		_	—	—	
Minimum Capacity Step (%)											
Standard	40	50	50	50	33	33	50	50	40	50	
With Hot Gas Bypass	20	25	34	34	21	22	40	35	33	38	
Digital Compressor Option	8	15	15	15	10	10	_	_	_	—	
Capacity (%)											
Circuit A	100	100	100	50	100	100	100	100	100	100	
Circuit B	_	—	—	50	—	—		_	—	—	
EVAPORATOR				Brazed, Di	rect-Expansio	on Plate Heat	Exchanger				
Weight (lb) (empty)	49	58	79	92	97	125	137	150	163	186	
Net Fluid Volume (gal)	1.60	1.95	2.82	2.92	3.52	4.21	4.64	5.14	5.64	6.49	
Maximum Refrigerant Pressure (psig)					6	50					
Maximum Water-Side Pressure (psig)					3	00					
CHILLED WATER CONNECTIONS	(in.)										
Inlet and Outlet, Victaulic (IPS Carbon Steel)	1.5	1.5	2	2	2	2	2	2.5	2.5	2.5	
Drain (NPT)					0.	25					
Manifold Connections, Victaulic (IPS Carbon Steel)						6					
CONDENSER (MPW Only)				В	razed Plate F	leat Exchange	er				
Weight (lb) (empty)	53	53	189	163	217	242	202	202	220	220	
Net Fluid Volume (gal)	2.00	2.00	5.60	5.90	7.10	8.00	5.20	5.20	6.30	6.30	
Maximum Refrigerant Pressure (psig)					6	50					
Maximum Water-Side Pressure					3	00					
CONDENSER WATER CONNECTI	ONS (in.)										
Inlet and Outlet, Victaulic (IPS Carbon Steel)	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	
Drain (NPT)					0.	25					
Manifold Connections, Victaulic (IPS Carbon Steel)						6					

NOTE(S):

a. Operating weight includes refrigerant operating charge and weight of fluid in the heat exchangers.
b. Manifold option adds approximately 218 lb to the operating weight of 30MPA units and 436 lb to the operating weight of 30MPW units.
c. 30MPW units are shipped with full operating charge.
d. 30MPA units (condenser-less) are shipped with nitrogen holding charge. Approximate cooler operating charge is shown.

# Physical data (cont)



### 30MP Units - English (cont) a,b,c,d

LINIT 30MP	017	021	031	033	041	046	051	056	066	080		
CONDENSER REFRIGERANT C	ONNECTION	S (in.)			•+1	040						
Liquid Line (ODS) in.	_	1.5	2	_	2	2	2.5	2.5	2.5	2.5		
Discharge	_	6	6	_	6	6	6	6	6	6		
CHASSIS DIMENSIONS (in.)		ļ	•	•	•	•	ł		4	4		
Length	59.50	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5		
Width	32	32	32	32	32	32	32	32	32	32		
Height	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8		
Height with Optional Sound Enclosure	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8		
MINIMUM SYSTEM FLUID VOLU	MINIMUM SYSTEM FLUID VOLUME (gal per ton)											
Normal Air Conditioning												
Standard	6	6	6	6	3	3	6	6	6	6		
Optional Hot Gas Bypass	4	4	4	4	3	3	4	4	4	4		
Optional Digital Compressor	3	3	3	3	3	3	—	—	—	—		
Low Outdoor Ambient Cooli	ng Operation	ı (30MPA Uni	ts)									
Standard	10	10	10	10	6	6	10	10	10	10		
Optional Hot Gas Bypass	10	10	10	10	6	6	10	10	10	10		
Optional Digital Compressor	6	6	6	6	6	6	—	_	—	—		
CAPACITY STEPS (%)												
Step 1	100	100	100	100	100	100	100	100	100	100		
Step 2	60	50	50	50	67	67	50	50	42	50		
Step 3	40	25 <sup>e</sup>	34 <sup>e</sup>	34 <sup>e</sup>	33	33	40 <sup>e</sup>	35 <sup>e</sup>	31 <sup>e</sup>	38 <sup>e</sup>		
Step 4	20 <sup>e</sup>		—	—	21 <sup>e</sup>	22 <sup>e</sup>	_	—				
MIMIMUN FLOW RATES (gpm)							-					
Evaporator	22	28	43	43	55	64	70	77	91	117		
Condenser	22	28	43	43	55	64	70	77	91	117		
MAXIMUM FLOW RATES (gpm)		i										
Evaporator	74	97	148	148	188	220	286	262	309	384		
Condenser	74	97	148	148	188	220	286	262	309	384		

NOTE(S):

a. Operating weight includes refrigerant operating charge and weight of fluid in the heat exchangers.
b. Manifold option adds approximately 218 lb to the operating weight of 30MPA units and 436 lb to the operating weight of 30MPW units.
c. 30MPW units are shipped with full operating charge.
d. Models 017 and 033 are not available in an air-cooled version.
e. With optional hot gas bypass.

## Physical data (cont)



#### 30MP Units - SIa,b,c

UNIT 30MP	017	021	031	033	041	046	051	056	066	080	
OPERATING WEIGHT (kg)											
MPA	—	328	355	—	491	520	686	695	732	752	
MPA with Manifold	—	448	475	_	611	640	807	815	852	873	
MPW	307	360	463	489	616	660	810	819	870	890	
MPW with Manifold	547	600	702	729	856	899	1050	1058	1110	1130	
REFRIGERANT TYPE		R-32, EXV Controlled System									
Refrigerant Charge MPA <sup>d</sup> (kg) Ckt A/Ckt B	_	4.9/—	4.3/—	—	5.5/—	5.2/—	11.1/—	12.3/—	13.5/—	19.0/—	
Refrigerant Charge MPW (kg) Ckt A/Ckt B	4.9/—	6.5/—	9.9/—	5.2/5.2	12.4/—	14.3/—	16.1/—	17.9/—	19.5/—	24.4/—	
COMPRESSORS					Scroll, H	Iermetic					
Qty	2	2	2	2	3	3	2	2	2	2	
Speed (rpm)					35	00					
Tons (Qty), Ckt A	9, 6	10	15	15	13	15	25	27	27, 40	40	
Tons (Qty), Ckt B	_	—	_	15	_	—	_	_	—	—	
Oil Charge (oz.) Ckt A/Ckt B	135/—	162/—	236/—	118/118	354/—	354/—	446/—	446/-	446/—	446/—	
Oil Charge (oz.) Ckt A/Ckt B (Digital Option)	135/—	162/—	228/—	110/118	346/—	346/—	_	—	_	—	
No. of Capacity Steps											
Standard	3	2	2	2	3	3	2	2	3	2	
With Hot Gas Bypass	4	3	3	3	4	4	3	3	4	3	
Digital Compressor Option	22	22	22	22	33	33	—	—	—	—	
Minimum Capacity Step (%)											
Standard	40	50	50	50	33	33	50	50	40	50	
With Hot Gas Bypass	20	25	34	34	21	22	40	35	33	38	
Digital Compressor Option	8	15	15	15	10	10	—	—	—	—	
Capacity (%)											
Circuit A	100	100	100	50	100	100	100	100	100	100	
Circuit B	_	_	_	50	_	_	_	_	_	_	
EVAPORATOR				Brazed, Di	rect-Expansio	on Plate Heat	Exchanger				
Weight (kg) (empty)	22.2	26.3	35.8	41.7	44.0	56.7	62.1	68.0	73.9	84.4	
Net Fluid Volume (L)	6.1	7.4	10.7	11.1	13.3	15.9	17.5	19.4	21.3	24.6	
Maximum Refrigerant Pressure (kPa)					48	95					
Maximum Water-Side Pressure (kPa)					20	69					
CHILLED WATER CONNECTIONS	(in.)										
Inlet and Outlet, Victaulic (IPS Carbon Steel)	1.5	1.5	2	2	2	2	2	2.5	2.5	2.5	
Drain (NPT)					0.	25					
Manifold Connections, Victaulic (IPS Carbon Steel)					(	6					
CONDENSER (MPW Only)				B	razed Plate H	leat Exchange	er				
Weight (kg) (empty)	24.0	24.0	85.7	73.9	98.4	109.8	91.6	91.6	99.8	99.8	
Net Fluid Volume (L)	7.6	7.6	21.2	22.3	26.9	30.3	19.7	19.7	23.8	23.8	
Maximum Refrigerant Pressure (kPa)					45	02					
Maximum Water-Side Pressure (kPa)					20	69					
CONDENSER WATER CONNECTION	ONS (in.)										
Inlet and Outlet, Victaulic (IPS Carbon Steel)	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	
Drain (NPT)					0.	25					
Manifold Connections, Victaulic (IPS Carbon Steel)					6	6					

NOTE(S):

a. Operating weight includes refrigerant operating charge and weight of fluid in the heat exchangers.
b. Manifold option adds approximately 92.1 kg to the operating weight of 30MPA units and 183.7 kg to the operating weight of 30MPW units.
c. 30MPW units are shipped with full operating charge.
d. 30MPA units (condenser-less) are shipped with nitrogen holding charge. Approximate cooler operating charge is shown.

# Physical data (cont)



#### 30MP Units - SI (cont) a,b,c,d

UNIT 30MP	017	021	031	033	041	046	051	056	066	080		
CONDENSER REFRIGERAN	IT CONNECT	IONS (in.)										
Liquid Line (ODS) in.	—	1.5	2	—	2	2	2.5	2.5	2.5	2.5		
Discharge	—	6	6	—	6	6	6	6	6	6		
<b>CHASSIS DIMENSIONS (mn</b>	CHASSIS DIMENSIONS (mm)											
Length	1511	1511	1511	1511	1511	1511	1511	1511	1511	1511		
Width	813	813	813	813	813	813	813	813	813	813		
Height	1671	1671	1671	1671	1671	1671	1671	1671	1671	1671		
Height with Optional Sound Enclosure	1748	1748	1748	1748	1748	1748	1748	1748	1748	1748		
MINIMUM SYSTEM FLUID V	OLUME (L pe	er kW)										
Normal Air Conditioning	į											
Standard	6.5	6.5	6.5	6.5	3.3	3.3	6.5	6.5	6.5	6.5		
Optional Hot Gas Bypass	4.3	4.3	4.3	4.3	3.3	3.3	4.3	4.3	4.3	4.3		
Optional Digital Compressor	3.3	3.3	3.3	3.3	3.3	3.3	_	—	_	—		
Low Outdoor Ambient C	ooling Opera	tion (30MPA	Units)									
Standard	10.8	10.8	10.8	10.8	6.5	6.5	10.8	10.8	10.8	10.8		
Optional Hot Gas Bypass	10.8	10.8	10.8	10.8	6.5	6.5	10.8	10.8	10.8	10.8		
Optional Digital Compressor	6.5	6.5	6.5	6.5	6.5	6.5	—	—	—	—		
CAPACITY STEPS (%)												
Step 1	100	100	100	100	100	100	100	100	100	100		
Step 2	60	50	50	50	67	67	50	50	42	50		
Step 3	40	25 <sup>e</sup>	34 <sup>e</sup>	34 <sup>e</sup>	33	33	40 <sup>e</sup>	35 <sup>e</sup>	31 <sup>e</sup>	38 <sup>e</sup>		
Step 4	20 <sup>e</sup>	—	_	—	21 <sup>e</sup>	22 <sup>e</sup>	—	—	—	_		
MIMIMUN FLOW RATES (gp	om)				÷			÷		-		
Evaporator	1.4	1.8	2.7	2.7	3.5	4.0	4.4	4.9	5.7	7.4		
Condenser	1.4	1.8	2.7	2.7	3.5	4.0	4.4	4.9	5.7	7.4		
MAXIMUM FLOW RATES (g	pm)	-		-			-		-			
Evaporator	4.7	6.1	9.3	9.3	11.9	13.9	18.0	16.5	19.5	24.2		
Condenser	4.7	6.1	9.3	9.3	11.9	13.9	18.0	16.5	19.5	24.2		

NOTE(S):

a. Operating weight includes refrigerant operating charge and weight of fluid in the heat exchangers.
b. Manifold option adds approximately 92.1 kg to the operating weight of 30MPA units and 183.7 kg to the operating weight of 30MPW units.
c. 30MPW units are shipped with full operating charge.
d. With optional hot gas bypass.
e. Models 017 and 033 are not available in an air-cooled version.

## **Options and accessories**



ITEM	<b>OPTION</b> <sup>a</sup>	ACCESSORYb
Hot Gas Bypass	Х	Х
Digital Scroll Compressor (017 to 046 models only)	х	
High Interrupt	Х	
Condenser-less <sup>c</sup>	Х	
ЕММ	Х	Х
Vibration Isolators (Pads)		Х
Vibration Isolators (Springs)		Х
LON Translator		Х
Non-Fused Disconnect	Х	
Sound Enclosure Panels	Х	Х
Mobility Kit (Wheels)	Х	Х
Condenser Water Temperature Sensors		х
Height Adjustment (Leveling) Kit	Х	Х
Y Strainer		Х
Compressor Insulation	Х	Х
Compressor Sound Blankets	Х	Х
Water Manifold Piping	Х	
Water Manifold Victaulic Spacer Fitting Kit		х
Electrical Distribution Panel		Х
Multi-Unit/Multi-Chiller Controller		Х
Head Pressure Control <sup>d</sup>	Х	Х
Automatic Evaporator Isolation Valves <sup>e</sup>	х	

NOTE(S):

- a. Factory-installed option.
- b. Field-installed accessory.
- c. Not available for 017 and 033 units/model.
- d. Only available with Water Manifold kit option.
- e. Only available with Water Manifold kit option and Multi-Unit Controller or Multi-Chiller Controller accessory.

## **Factory-installed options**

#### Hot gas bypass

Hot gas bypass can be factory-installed to allow additional capacity reduction for unit operation below the minimum step of unloading.

NOTE: This option is not available in combination with medium temperature brine.

#### **Digital scroll compressor**

Digital scroll compressors are available as a factoryinstalled option. These compressors allow for incremental unloading with capacity modulation to better match building load when compared to standard scroll compressors. This option is not available in conjunction with the a multiunit controller, or multi-chiller controller accessory kit.

NOTE: The digital compressor option cannot be selected with the medium temperature brine option.

#### High interrupt

High interrupt is available as a factory-installed option that gives the chiller a short-circuit current rating of 65 kA (25kA at 575-v). A Class J over-current protection fuse must be installed ahead of the unit to maintain the 65 kA rating. A Class J over-current protection fuse is NOT required ahead of 017 or 033 units with the high-interrupt option. (The standard interrupt rating is 10 kA.) When a 30MP unit with high interrupt option is paired with a 30MPE panel with high interrupt option, a class J overcurrent protection fuse is required ahead of the 30MPE panel.



# **Options and accessories (cont)**





#### **Condenser-less Unit**

Applicable to the 30MPA model only and is available for use with remote condensers. The condenser-less option is not available on 017 or 033 air-cooled units.

#### Energy management module (EMM)

The energy management module is used for 4 to 20 mA leaving fluid temperature reset, cooling set point reset, 4 to 20 mA demand limit and two-step demand limit. Temperature reset lets the unit reset the leaving fluid temperature to a higher temperature during low load conditions. Temperature reset can also be accomplished based on return fluid, outdoor air, or space temperature.

The EMM option is not required when using enteringwater or outdoor-air for temperature reset. These types of reset are available with the main control board. However, an accessory thermistor is required for outdoor-air and/or space temperature reset. Demand limiting allows the unit capacity to be limited during periods of peak energy usage. Demand limit requires an external 4 to 20 mA signal or a 2-step remote pair of dry contacts. Both the 4 to 20 mA and 2-step demand limit percentage values are adjustable. This is also available as a field-installed accessory.

NOTE: This option is not available in conjunction with the multi-chiller controller accessory kit.

#### Non-fused disconnect

For wiring convenience, an electrical power disconnect for line and control power may be factory-installed.

#### Sound enclosure panels

Units may be ordered with acoustically insulated sheet metal enclosures installed around the unit to reduce radiated sound levels. Panels are also available as a fieldinstalled accessory for all 30MP units. For the 30MPE panel, the sound enclosure accessory kit will provide a uniform look for the 30MPE panel in a bank of 30MP chillers with sound enclosures.

#### Mobility kit

Wheels are shipped with the unit for field installation to aid in transportation of unit to its final installation site. Wheels are rubber type, pivot for easy unit maneuvering, and are lockable for safety. The mobility kit is also available as a separately shipped, field-installed accessory for all 30MP

#### Height adjustment (leveling) kit

A leveling adjustment mechanism is shipped with the unit and must be field-located in each corner of the unit, to facili-

eling kit is also available as a field-installed accessory.

#### **Compressor insulation**

Compressor insulation is designed to insulate the scroll

the colder compressor surface. Compressor insulation is also available as a field-installed accessory.

#### **Compressor sound blankets**

Units may be ordered with acoustically insulated sound blankets installed around the compressors to reduce radiated sound levels. Compressor sound blankets are also available as a field-installed accessory.

#### Water manifold piping

Units may be ordered with water manifold piping which allows two or more 30MP chiller modules to be piped together in parallel. Option includes combination valves (balance and isolation).

#### Head pressure control

The head pressure option provides a control board and valve that adjusts chiller head pressure by regulating condenser water flow into the chiller's condenser. This keeps the compressor in its envelope (typically) during cold weather operation.

NOTE: This option is available only with the water manifold kit.

#### Automatic evaporator isolation

Automatic evaporator isolation valves close when chiller is running at zero percent capacity. This option requires a supervisory plant controller, such as the multi-unit controller accessory.

# **Options and accessories (cont)**



## Field-installed accessories

#### **Electrical distribution panel**

The distribution panel is an electrical cabinet that is offered to provide a convenient location for circuit breakers for up to four (4) modular chillers in a 30MP multi-chiller plant. It is designed standard with a manifold package that allows it to be piped directly into the common chiller water header.

#### Mobility kit

Wheels may be field-installed on the unit to aid in transportation of unit to its final installation site. Wheels are rubber type, pivot for easy unit maneuvering, and are lockable for safety.

#### Height adjustment (leveling) kit

Leveling adjustment mechanism located in each corner of the unit, to facilitate easy installation and connection to existing piping. Leveling kit is also available as a factoryinstalled option for all 30MP units.

#### Mobility kit

Wheels may be field-installed on the unit to aid in transportation of unit to its final installation site. Wheels are rubber type, pivot for easy unit maneuvering, and are lockable for safety.

#### Multi-unit/Multi-chiller controller kit

The 30MP multi-unit controller or multi-chiller controller is used to control up to eight (8) 30MP chillers as one central plant. The multi-chiller controller operates each individual chiller by staging the machines independently to reduce energy consumption at part-load operating conditions. Additionally, options for the multi-chiller controller include: common leaving chilled water sensor, relative humidity sensor, demand limit, and outdoor air temperature reset. The multi-chiller controller is not compatible with chillers equipped with a digital compressor and energy management module (EMM). This option is not available for metric units.

#### Hot gas bypass (HGBP)

Hot gas bypass can be field-installed to allow additional capacity reduction for unit operation below the minimum step of unloading. This accessory cannot be used in combination with medium temperature brine.

#### Water manifold Victaulic spacer fitting kit

This kit consists of Victaulic fittings and spacer pipe to allow for easy installation of water manifold units.

#### Vibration isolators

Isolators are installed on the base of the unit to reduce vibration transmission from the unit through the floor. This

package consists of 6 resilient pads or 6 springs for each model.

#### LON (Local operating network) translator control

The LON translator control provides an interface between the unit and a local operating network (i.e., LonWorks<sup>1</sup> FT-10A ANSI/EIA-709.1).

#### Condenser water temperature sensors

This sensor accessory allows measurement of condenser water entry and leaving temperatures.

#### Energy management module (EMM)

The energy management module is used for 4 to 20 mA leaving fluid temperature reset, cooling set point reset, 4 to 20 mA demand limit and two-step demand limit. Temperature reset lets the unit reset the leaving fluid temperature to a higher temperature during low load conditions. Temperature reset can also be accomplished based on return fluid, outdoor air or space temperature.

The EMM accessory is not required when using enteringwater or outdoor-air for temperature reset. These types of reset are available with the main control board. However, an accessory thermistor is required for outdoor air and/or space temperature reset. Demand limiting allows the unit capacity to be limited during periods of peak energy usage. Demand limit requires an external 4 to 20 mA signal or a 2-step remote pair of dry contacts. Both the 4 to 20 mA and 2-step demand limit percentage values are adjustable. This is also available as a factory-installed option.

NOTE: This option is not compatible with the multi-unit controller or multi-chiller controller accessory kit.

#### Y strainer

A strainer with a minimum of 40 mesh must be installed within 10 ft (3 m) of the heat exchanger fluid inlet to prevent debris from clogging or damaging the heat exchanger. The Y strainer is required and is available as an accessory. The Y strainer is available in sizes from 1-1/2 to 6 inches.

#### Compressor insulation

Compressor insulation is available as an accessory for field installation to insulate the scroll compressors and prevent water vapor from condensing on the colder compressor surface.

#### **Compressor sound blankets**

Units may be ordered with acoustically insulated sound blankets installed around the compressors to reduce radiated sound levels. Compressor sound blankets are also available as a factory-installed option.

<sup>1.</sup> Third-party trademarks and logos are the property of their respective owners.



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### Dimensions - 30MPW 017-031 With Manifold (Standard Unit)







ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	30MPW 033T UNIT ASSY	2000000000000	REV
U.S. ECCN:EAR99	1 OF 2	09/13/23	-	-	30MF 00000300	-













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## 23











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# **Application data**



This unit uses R-32 refrigerant classified as A2L semi-flammable. Unit should be stored outdoors unless placed in an equipment room as defined by ASHRAE 15 or space large enough to dissipate a refrigerant leak. Requirements for storage and installation are defined in the unit installation manual. Inspect under shipping tarps, bags, or crates to be sure water has not collected during transit. Keep protective shipping covers in place until machine is ready for installation.

## **Unit location**

Unit should be level (particularly in its major lengthwise dimension) to ensure proper oil return. It should be determined prior to installation if any special treatment is required to ensure a level installation.

The unit should be located indoors in an area where the temperature is between 50 and  $104^{\circ}F$  (10 and  $40^{\circ}C$ ).

### **Evaporator fluid temperature**

- 1. *Maximum* sustained leaving chilled-fluid temperature (LCWT) is 60°F (16°C). For sustained operation, entering-fluid temperature should not exceed 75°F (23.9°C). Unit can start and pull down with up to 95°F (35°C) entering-fluid temperature due to the pressure limiting feature of the expansion valve.
- Minimum LCWT for standard units is 32°F (0°C). For temperatures above 32°F (0°C) and below 40°F (4°C), ensure the chilled water loop has a suitable brine solution. For applications with LCWT below 32°F (0°C) the medium temperature brine option must be selected. Refer to Medium Temperature Brine Option section.

### **Condenser water temperature**

Below are the maximum condenser leaving water temperatures. These values are based on an evaporator maximum leaving water temperature of  $60^{\circ}$ F.

- 1. 30MPW021-031, 30MPW041-046, 30MPW051-080: *Maximum* leaving condenser-water temperature is 140°F (60°C).
- 2. 30MPW033: *Maximum* leaving condenser-water temperature is 104°F (40°C).
- 3. 30MPW017: *Maximum* leaving condenser-water temperature is 115°F (43°C).

# Evaporator and liquid-cooled condenser flow range

Ratings and performance data in this publication are for a cooling temperature rise of  $10^{\circ}$ F (5.6°C) and are suitable for a range from 5 to  $15^{\circ}$ F (2.7 to  $8.3^{\circ}$ C) temperature rise without adjustment. Units may be operated at a different temperature range, provided flow limits are not exceeded and corrections to capacity, etc. are made. For minimum flow rates, see Minimum Evaporator and Condenser Flow Rates and Minimum Fluid Volume in Circulation tables on page 28. High flow rate is limited by the pressure drop that can be tolerated.

### Minimum evaporator flow

The minimum evaporator flow (maximum evaporator temperature rise) for standard units is shown in Minimum Evaporator and Condenser Flow Rates and Minimum Fluid Volume



In Circulation tables on page 29. When gpm (L/s) required is lower (or rise is higher), follow these recommendations:

- 1. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature rise.
- 2. Chilled fluid may be recirculated to raise flow rate. However, the mixed temperature entering evaporator must be maintained at a minimum of at least 5°F (2.8°C) above the leaving chilled fluid temperature. Recirculation flow is shown below.



# Maximum evaporator flow (5 gpm/ton or $< 5^{\circ}F$ rise [0.09 L/s • kW or < 2.7 C rise])

The maximum evaporator flow results in practical maximum pressure drop through evaporator.

The return fluid may bypass the evaporator to keep pressure drop through the evaporator within acceptable limits. This permits a higher  $\Delta T$  with lower fluid flow through evaporator and mixing after evaporator.

Bypass flow is shown below.



## Variable evaporator flow rates

These variable rates may be applied to standard chillers. However, the unit will attempt to maintain a constant leaving chilled-fluid temperature. In such cases, minimum fluid loop volume must be in excess of 3 gallons per ton (3.2 L per kW), and flow rate must change in steps of less than 10% per minute. Apply 6 gallons per ton (6.5 L per kW) fluid loop volume minimum if flow rate changes more rapidly.

### Minimum liquid-cooled condenser flow

This value (maximum rise) is shown in Minimum Evaporator and Condenser Flow Rates and Minimum Fluid Volume in Circulation tables below. Condensers may be piped in series. Ensure leaving-water temperature does not exceed the maximum allowed as listed in Condenser Water Temperature on.



## Chilled fluid loop volume

For temperature stability and accuracy, the minimum fluid loop volume in circulation must equal or exceed the values listed in the Minimum Evaporator and Condenser Flow Rates and Minimum Fluid Volume in Circulation tables below.

	EVAPO	RATOR	CONDENSER			
UNIT SIZE	Gal/Min	L/s	Gal/Min	L/s		
30MP017	22	1.4	22	1.4		
30MP021	28	1.8	30	1.9		
30MP031	43	2.7	46	2.9		
30MP033	43	2.7	46	2.9		
30MP041	55	3.5	58	3.7		
30MP046	64	4.0	69	4.4		
30MP051	70	4.5	74	4.7		
30MP056	77	4.9	79	5.0		
30MP066	84	5.4	99	6.2		
30MP080	91	5.8	118	7.4		

#### Minimum Evaporator and Condenser Flow Rates

#### **Minimum Fluid Volume in Circulation**

30MP UNIT SIZE	N AIR CO APF gal/to	IORMAI ONDITIC PLICATI on (L pe	_ DNING ON r kW)	PROCESS COOLING OR LOW AMBIENT OPERATION APPLICATION gal/ton (L per kW)			
	Std Unit	HGBP	Digital	Std Unit	HGBP	Digital	
017,021,031,033	6 (6.5)	4 (4.3)	3 (3.3)	10 (10.8)	10 (10.8)	6 (6.5)	
041,046	3 (3.3)	3 (3.3)	3 (3.3)	6 (6.5)	6 (6.5)	6 (6.5)	
051,056,066,080	6 (6.5)	4 (4.3)		10 (10.8)	10 (10.8)	-	

LEGEND

HGBP — Hot Gas Bypass

For process jobs where accuracy is vital or for operation at outdoor ambient temperatures below  $32^{\circ}$ F (0°C) with low unit loading conditions, there should be from 6 to 10 gal. per ton (6.5 to 10.8 L per kW). To achieve this volume, it is often necessary to install a tank in the loop. The tank should be baffled to ensure there is no stratification, and that water (or brine) entering the tank is adequately mixed with liquid in the tank.

## **Fouling factor**

The factor used to calculate tabulated ratings was 0.00010  $ft^2 \cdot hr \cdot F/Btuh (0.000018 m^2 \cdot k/W)$ . As fouling factor is increased, unit capacity decreases and compressor power increases. To determine selections at other fouling factors, use the chiller selection program.



### **30MPA** remote condenser requirements

- 1. If multiple units are connected to a single condenser, ensure each refrigerant circuit has its own head pressure control.
- Condenser must provide 15°F (8.3°C) subcooling, a maximum of 40°F (22.2°C) difference between saturated condensing temperature and outdoor ambient temperature (to prevent overload at high ambient temperatures), and a minimum of 20°F (11.1°C) difference (to ensure subcooling).
- 3. Do not manifold independent refrigerant circuits into a single condenser.
- 4. If air-cooled condenser is located below chiller, refer to the condenser manufacturer's performance data for available liquid lift.
- 5. Refer to condenser installation instructions for location guidelines.

### **Oversizing chillers**

Oversizing chillers by more than 15% at design conditions must be avoided as the system operating efficiency should not be adversely affected (resulting in greater and/or excessive electrical demand and cycling of compressors). When future expansion of equipment is anticipated, install a single chiller to meet present load requirements and install a second chiller 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, rather than operating a single chiller at or near its minimum recommended value.

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

### Strainers

A 40 mesh strainer must be installed in the evaporator and condenser fluid inlet lines, within 10 ft (3 m) of the heat exchanger in each line, between the pump and the chiller.



## **Parallel chillers**

When required chiller capacity is greater than can be supplied by a single 30MP chiller, or where stand-by capability is desired, chillers may be installed in parallel. Units may be of the same or different sizes. However, evaporator and condenser flow rates must be balanced to ensure proper flow to each chiller. When the optional water manifold kit is selected, as is required by selection of the multi-unit controller, or multi-chiller controller, the chillers are piped in parallel.

## **Series chillers**

Where a large temperature drop (greater than  $25^{\circ}$ F [13.9°C]) is desired and higher fluid pressure drop across the evaporator can be tolerated, chillers may be installed in series. The leaving fluid temperature sensors need not be relocated. However, the evaporator minimum entering fluid temperature limitations should be considered for the chillers located downstream of other chillers. Condensers should be piped in parallel to maximize capacity and efficiency. This should also minimize condenser pressure drop and saturated condensing temperatures. However, if condensers are piped in series, ensure that the leaving water temperature does not exceed 140°F (60.0°C). NOTE: For 017 and 033 models, the leaving water temperature cannot exceed 115°F (43.3°C) or 104°F (40°C), respectively.

### **Energy management**

Demand limiting and load shedding are popular techniques used to reduce peak electric demands typically experienced during hot summer days; when air conditioning loads are highest. When utility electricity demands exceed a certain level, electrical loads are turned off to keep the peak demands below a prescribed maximum limit. Unit unloading will reduce electrical demand while allowing the chiller to operate under part-load capacity and maintain partial chilled fluid cooling. The energy management module can be added to accomplish this.

Electrical demand may be limited by unloading the chiller to a predetermined percentage of the load. One stage of unloading can be initiated by a remote signal to significantly reduce the chiller power consumption. This power reduction applies to the full load power at nominal conditions. The demand limit control should not be cycled less than 10 minutes on and 5 minutes off.

### Vibration isolation

All compressors are isolated. External vibration isolation is not generally required, but is available for 30MP units as an accessory, if desired.

# Evaporator and liquid-cooled condenser freeze protection

If chiller or fluid lines are in an area where ambient conditions fall below 40°F (4.4°C), it is recommended that an antifreeze (brine) solution be added to protect the unit and fluid piping to a temperature  $15^{\circ}$ F (8.3°C) below the lowest anticipated ambient temperature. In applications where the leaving evaporator fluid temperature is below 32°F (0°C), the medium temperature brine option should be selected so that the freeze point is at least  $15^{\circ}$ F (8.3°C)

below the evaporator leaving fluid temperature and below the suction temperature at the evaporator.

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

If not protected with an antifreeze solution, draining evaporator and outdoor piping is recommended if system is not to be used during freezing weather conditions.

### Water system overview

A system installed incorrectly such that air is not handled properly can develop pipe leaks, vent leaks, or air in pipes, and may behave as an open system and thus have unsatisfactory operation. Pump seal wear can also cause leaks that cause poor system operation.

Proper system design and installation procedures should be followed closely. The system must be constructed with pressure tight components and thoroughly tested for installation leaks.

Installation of water systems should follow sound engineering practice as well as applicable local and industry standards. Improperly designed or installed systems may cause unsatisfactory operation and/or system failure. Consult a water treatment specialist or appropriate literature for information regarding filtration, water treatment, and control devices.

Water quality should be maintained within the limits indicated in the Water Quality Characteristics and Limitations table.

#### Water Quality Characteristics and Limitations

QUALITY LIMITATION
70 – 300 ppm
Less than 70 ppm
Greater than 1.0
10 – 500 μS/cm
7.5 – 9.0
Less than 2 ppm
Less than 300 ppm
Less than 1 ppm
Less than 0.05 ppm
Less than 5 ppm
4.0 - 8.5
Less than 100 ppm
Less than 0.2 ppm
Less than 0.2 ppm
Less than 0.1 ppm

NOTE(S):

The term pH refers to the acidity, basicity, or neutrality of the water supply. Below 7.0 pH, the water is considered to be acidic. Above 7.0 pH, water is considered to be basic. Neutral water contains a pH of 7.0.

b. Dissolved carbon dioxide can either be calculated from the pH and total alkalinity values (shown below) or measured on the site using a test kit. Dissolved Carbon Dioxide, PPM = TA x 2[(6.3-pH)/0.3] where TA = Total Alkalinity, PPM as CaCO3.

a. Sulfides in the water quickly oxidize when exposed to air, requiring that no agitation occur as the sample is taken. Unless tested immediately at the site, the sample will require stabilization with a few drops of one Molar zinc acetate solution, allowing accurate sulfide determination up to 24 hours after sampling. A low pH and high alkalinity cause system problems, even when both values are within the ranges shown.



## **30MPA Refrigerant Piping**

### Single Circuit Line 30MPA Line Sizing Chart<sup>a,b</sup>

	UN REFRIG CONNE	NIT GERANT CTIONS		ΤΟΤΑ ΙΝΤΙ	L LINEA ERCONN ft	AR LENG IECTING (m)	STH OF PIPE	
30MPA UNIT	(CHILLER CONNECTION SIZE) ODS		0- (0-1 Equiv Length	50 5.4) 7. Pipe 1 = 75 ft	50-100 ) (15.4-30.9 ipe Equiv. Pip /5ft Length = 15		100-200 (30.5-61.0) Equiv. Pipe Length = 300 ft	
	L (in.)	D (in.)	L (in.)	L (in.) D (in.)		D (in.)	L (in.)	D (in.)
021	1/2	1-3/8	5/8	1-3/8	5/8	1-3/8	7/8	1-3/8
031	5/8	1-3/8	7/8	1-3/8	7/8	1-3/8	7/8	1-3/8
041	5/8	1-5/8	7/8	1-5/8	7/8	1-5/8	1-1/8	1-5/8
046	5/8	1-5/8	7/8	1-5/8	7/8	1-5/8	1-1/8	1-5/8
051	1-1/8	1-5/8	1-1/8	1-5/8	1-1/8	2-1/8	1-3/8	2-1/8
056	1-1/8	1-5/8	1-1/8	1-5/8	1-1/8	2-1/8	1-3/8	2-1/8
066	1-1/8	1-5/8	1-1/8	2-1/8	1-1/8	2-1/8	1-3/8	2-5/8
080	1-1/8	1-5/8	1-1/8	2-1/8	1-1/8	2-1/8	1-3/8	2-5/8

NOTE(S):

 Shaded areas indicate double discharge riser required if unit is equipped with hot gas bypass or operation below 40°F (4.4°C) LWT (leaving water [fluid] temperature).

b. Use Type K tubing for discharge lines with 1-5/8 in. OD or larger. This is required for the elevated temperatures associated with R-32 refrigerant.

LEGEND

- **D** Discharge Line Size (discharge line size is equal to the chiller
- Connection size).
   Liquid Line Size (liquid line size is equal to or greater than the chiller connection size).
- connection size).

### **Double Discharge Riser Data**

30MPA UNIT	TOTAL LINEAR LENGTH OF INTERCONNECTING PIPE ft (m) 0 - 200 (0 - 61.0)		MINIMUM TONNAGE WITH DOUBLE RISER
	Riser A D (in.)	Riser B D (in.)	
021	7/8	1-1/8	1.86
031	7/8	1-1/8	1.86
041	7/8	1-3/8	1.86
046	7/8	1-3/8	1.86
051	1-5/8	1-5/8	3.16
056	1-5/8	1-5/8	3.16
066	1-5/8	2-1/8	3.16
080	1-5/8	2-1/8	3.16

#### Liquid Line Refrigerant Chart

PIPE DIAMETER (in.)	POUNDS PER 10 LINEAR FEET (kg per 3 m)	
1/2	0.6 (0.27)	
5/8	1.0 (0.45)	
7/8	2.0 (0.91)	
1-1/8	3.5 (1.58)	
1-3/8	5.1 (2.32)	





### Insulation

Insulation for 30MP units includes compressor insulation (available as either factory-installed option or field-installed accessory), and factory-installed insulation of suction line to compressors, evaporator, and expansion valve and the line running from expansion valve to evaporator. Field-supplied and installed insulation is recommended for water lines.

As indicated in the Condensation vs Relative Humidity table, the factory insulation provides excellent protection against condensation under most operating conditions. If temperatures in the equipment area exceed the maximum design conditions, extra insulation is recommended.

#### Condensation vs Relative Humidity<sup>a</sup>

	ROOM DRY-BULB TEMP			
AMOUNT OF	80°F (27°C)	90°F (32°C)	100°F (38°C)	
CONDENSATION	% Relative Humidity			
None	80	76	70	
Slight	87	84	77	
Extensive	94	91	84	

NOTE(S):

a. These approximate figures are based on 35°F (1.7°C) saturated suction temperature. A 2°F (1.1°C) change in saturated suction temperature changes the relative humidity values by 1% in the same direction.



## **Selection procedure**



Carrier's NG packaged selection program provides quick, easy selection of Carrier's liquid-cooled chillers. The program considers specific temperature, fluid and flow requirements among other factors such as fouling and altitude corrections. Before selecting a chiller, consider the following points:

Leaving water (fluid) temperature (LWT):

- The LWT must be at least 40°F (4.4°C) or greater for fresh water applications.
- If the LWT requirement is greater than 60°F (15.5°C), a mixing loop is required.

Entering water (fluid) temperature (EWT):

• If the EWT requirement is greater than  $70^{\circ}F(21.1^{\circ}C)$ , a mixing loop is required. The EWT should not exceed  $75^{\circ}F(23.9^{\circ}C)$  for extended operation. Pull-down can be accomplished from  $95 F(35^{\circ}C)$ .

Evaporator flow rate or evaporator delta-T:

- The evaporator delta-T (EWT LWT) must fall between 5 and 20°F (2.8 and 11.1°C) while still meeting the maximum entering requirements.
- For larger or smaller delta-T applications, a mixing loop is required. If the evaporator flow is variable, the rate of

change of flow should not exceed 10% per minute. The loop volume in circulation must equal or exceed 3 gallons per nominal ton (3.2 L per kW) of cooling for temperature stability and accuracy in normal air-conditioning applications.

In process cooling applications, there should be 6 to 10 gallons per ton (6.5 to 10.8 L per kW). To achieve this loop volume, it is often necessary to install a tank in the loop. The tank should be baffled to ensure there is no stratification, and that water (or brine) entering the tank is adequately mixed with liquid in the tank. See "Chilled fluid loop volume" on page 28.

Water quality, fouling factor:

- Poor water quality can increase the evaporator fouling factor.
- Higher than standard fouling factors lead to lower capacity and higher input kW from a given chiller size compared to running the same application with better water quality (and lower fouling factors).

## **Performance data**



#### **Evaporator and Condenser Pressure Drop Curves**

#### Evaporator Water Pressure Drop Curve - English



#### Evaporator Water Pressure Drop Curve - SI



## Performance data (cont)





Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI



## **Performance data (cont)**



#### **Evaporator and Condenser Pressure Drop Curves (cont)**

Evaporator Water Pressure Drop Curve – English



#### Evaporator Water Pressure Drop Curve - SI



## **Performance data (cont)**



### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Evaporator Pressure Drop Curve, Unit Size MPW 033 Only - English



#### Evaporator Water Pressure Drop Curve, Unit Size 033 Only - SI




### **Evaporator and Condenser Pressure Drop Curves (cont)**

### Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI



### **Evaporator and Condenser Pressure Drop Curves (cont)**



Evaporator Water Pressure Drop Curve - English

### Evaporator Water Pressure Drop Curve - SI



NOTE: Pressure drop curves assume water temperature of 68°F (20°C).



### **Evaporator and Condenser Pressure Drop Curves (cont)**

### Evaporator Water Pressure Drop Curve — English



#### Evaporator Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**





#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Condenser Water Pressure Drop Curve — English



#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**





#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

Condenser Water Pressure Drop Curve, Unit Size MPW 033 Only - English



### Condenser Water Pressure Drop Curve, Unit Size MPW 033 Only - SI







### Condenser Water Pressure Drop Curve - English



#### Condenser Water Pressure Drop Curve - SI



NOTE: Pressure drop curves assume water temperature of 68°F (20°C).



### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Condenser Water Pressure Drop Curve — English



#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

Condenser Water Pressure Drop Curve - English



#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Condenser Water Pressure Drop Curve - English



#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

### Condenser Water Pressure Drop Curve - English



#### Condenser Water Pressure Drop Curve - SI





### **Evaporator and Condenser Pressure Drop Curves (cont)**

#### Condenser Water Pressure Drop Curve - English



#### Condenser Water Pressure Drop Curve - SI



## **Electrical data**



30MP UNIT SIZE	UNIT VOLTAGE		U	UNIT					
	Voltage (3-Phase)	MCA	MOCP	ICF	REC FUSE SIZE				
	208/230	48.2	70	282	60				
047	380	35.6	50	185	45				
017	460	24.1	35	139	30				
	575	20.8	30	101	25				
	208/230	75.4	100	299	90				
004	380	41.5	50	191	50				
021	460	35.2	50	156	40				
	575	26.3	35	119	30				
	208/230	116.5	150	416	150				
024	380	66.8	90	256	80				
031	460	55.3	70	207	70				
	575	44.3	60	166	50				
	208/230	106.2	150	406	125				
022	380	66.3	90	255	80				
033	460	51.4	70	203	60				
	575	43.8	60	165	50				
041	208/230	158.8	200	434	175				
	380	83.0	100	221	90				
	460	69.3	90	184	80				
	575	55.5	70	147	60				
	208/230	168.4	200	468	200				
046	380	96.6	125	286	110				
046	460	79.9	100	231	90				
	575	64.1	80	185	70				
	208/230	178.3	250	654	200				
051	380	92.8	125	359	110				
051	460	84.2	110	301	100				
	575	66.9	90	242	80				
	208/230	171.1	225	651	200				
056	380	104.5	150	364	125				
056	460	91.4	125	304	110				
	575	69.8	100	243	80				
	208/230	236.1	350	901	300				
066	380	131.6	175	526	150				
000	460	125.8	175	430	150				
	575	91.4	125	334	110				
	208/230	288.1	400	953	350				
080	380	153.3	200	547	175				
000	460	153.3	200	457	175				
	575	108.7	150	352	125				

## Electrical Data - 30MP Standard R-32 Units

LEGEND

ICF — Maximum instantaneous current flow during starting.

kcmil — Thousand circular mils

 LRA
 — Locked Rotor Amps

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

430-24.

**MOCP** — Maximum Overcurrent Protection

**REC FUSE** Recommended dual element fuse amps (150% of compressor RLA). Size up to the next standard fuse size.

RLA — Rated Load Amps



# **Electrical data (cont)**



		UNIT VOLTAGE		UNIT						
	Voltage	SUPPLIED				105				
UNIT SIZE	(v-Ph-Hz)	Min.	Max.	MCA	MOCP	ICF	REC FUSE SIZE			
	208/230-3-60	187	253	48.2	70	257	60			
047	380-3-60	342	418	33.6	50	147	40			
017	460-3-60	414	506	24.1	35	139	30			
	575-3-60	518	633	20.6	30	101	25			
	208/230-3-60	187	253	73.6	100	297	90			
024	380-3-60	342	418	42.2	60	191	50			
021	460-3-60	414	506	36.0	50	156	45			
	575-3-60	518	633	27.2	35	119	35			
031	208/230-3-60	187	253	124.1	175	416	150			
	380-3-60	342	418	65.6	90	255	80			
	460-3-60	414	506	56.0	80	207	70			
	575-3-60	518	633	48.0	70	166	60			
	208/230-3-60	187	253	94.5	125	406	110			
022	380-3-60	342	418	65.1	90	254	80			
033	460-3-60	414	506	47.3	60	203	60			
	575-3-60	518	633	47.5	60	165	60			
	208/230-3-60	187	253	156.5	200	432	175			
044	380-3-60	342	418	83.8	100	221	100			
041	460-3-60	414	506	71.4	90	193	80			
	575-3-60	518	633	57.4	70	147	70			
	208/230-3-60	187	253	175.9	225	468	200			
046	380-3-60	342	418	95.3	110	284	110			
040	460-3-60	414	506	80.6	100	231	90			
	575-3-60	518	633	67.8	90	185	80			

### Electrical Data - 30MP Digital Compressor Option R-32 Units <sup>a</sup>

NOTE(S):

a. Digital scroll is not available on sizes 051-080.

LEGEND

ICF — Maximum instantaneous current flow during starting.

LRA — Locked Rotor Amps

- $\rm MCA$  Minimum Circuit Amps (for wire sizing). Complies with NEC, Section 430-24.
- **MOCP** Maximum Overcurrent Protection
- RLA Rated Load Amps



# **Electrical data (cont)**



30MP UNIT	VOLTAGE	COMPRESSORS												
SIZE	(v-Ph-Hz)	A1				A2			A3			B1		
		Ton	RLA	LRA	Ton	RLA	LRA	Ton	RLA	LRA	Ton	RLA	LRA	
	208/2303-3-60		25	265		17	166					—	_	
047	380-3-60		19	173		12	94					_	_	
017	460-3-60	9	12	130	0	9	75			_	—	_	_	
	575-3-60		11	94		7	54					_	_	
	208/230-3-60		34	265		34	265				-	—	_	
004	380-3-60	10	18	173	10	18	173					_		
021	460-3-60	10	16	140	10	16	140					_	_	
	575-3-60		12	108		12	108					_	_	
	208/230-3-60		51	364		51	364					—		
004	380-3-60	4-	29	226	45	29	226					_		
031	460-3-60	15	24	182	15	24	182	_				_		
	575-3-60		19	146		19	146					_		
	208/230-3-60		42	364		—			—	_	15	42	364	
	380-3-60	4-	29	226		—				_		29	226	
033	460-3-60	15	21	182	—							21	182	
	575-3-60	1	19	146		_				_		19	146	
	208/230-3-60	- 13	48	336	13	48	336		48	336		_	-	
041	380-3-60		25	169		25	169	4.0	25	169		_	_	
	460-3-60		21	141		21	141	- 13	21	141		_	-	
	575-3-60		17	113		17	113		17	113		_	-	
	208/230-3-60		51	364		51	364		51	364		_	_	
	380-3-60	15	29	226	15	29	226	4-	29	226		_	_	
046	460-3-60		24	182		24	182	15	24	182		_	_	
	575-3-60		19	146		19	146		19	146		_		
	208/230-3-60		79	574		79	574		_	_	- -	_	_	
0.74	380-3-60	0-	41	317		41	317			_		_	-	
051	460-3-60	25	37	263	25	37	263					_		
	575-3-60	1	30	212		30	212			_		_	_	
	208/230-3-60		76	574		76	574		—	_		—	-	
050	380-3-60	07	46	317	07	46	317					_		
056	460-3-60	27	40	263	27	40	263			_		_	_	
	575-3-60		31	212		31	212			_		_	-	
	208/230-3-60		76	574		128	824					_		
	380-3-60		46	317		68	479			_		_	_	
066 -	460-3-60	27	40	263	40	68	389	1 —	—	—	1 —	—	_	
	575-3-60	1	31	212	1	48	303	1	_	_	1	_	_	
	208/230-3-60		128	824		128	824		_	—		—	_	
	380-3-60	10	68	479	10	68	479			—		—	_	
080	460-3-60	40	68	389	40	68	389		_	_		_	_	
-	575-3-60	1	48	303		48	303			—		—	_	

## Electrical Data — 30MP Standard Compressor Units (R-32) <sup>a</sup>

NOTE(S):

a. Digital scroll is not available on sizes 051-080.

LEGEND

LRA — Locked Rotor Amps MCA — Minimum Circuit Amps (for wire sizing). Complies with NEC, Section 430-24.

**MOCP** — Maximum Overcurrent Protection

RLA — Rated Load Amps



# **Electrical data (cont)**



## Electrical Data — 30MP Digital Compressor Option Units (R-32)

30MP		COMPRESSORS												
UNIT		A1				A2			A3			B1		
SIZE	V-F11-F12	Ton	RLA	LRA	Ton	RLA	LRA	Ton	RLA	LRA	Ton	RLA	LRA	
	208/230-3-60		25	240		17	166		_	_		_	_	
047	380-3-60		17	135	0	12	94		_	_	_			
017	460-3-60	9	12	130	0	9	75		_	_				
	575-3-60		11	94		7	54		_	_			_	
	208/230-3-60		32	240	10	34	265		_	_				
004	380-3-60	10	19	152		18	173		_	_				
021	460-3-60	10	16	140	10	16	140	1 —	_	_			_	
	575-3-60		12	108		12	108		_	_				
	208/230-3-60		57	340	15	51	364		_	_				
031	380-3-60	- 15	28	196		29	226	_	_	_			_	
	460-3-60		25	173		24	182		_	_				
	575-3-60		22	132		19	146		_	—			_	
	208/230-3-60	- 15	42	340		-	_	_	_	_	- 15	51	364	
022	380-3-60		28	196			—		_	—		29	226	
033	460-3-60		21	173		_	—		_	_		24	182	
	575-3-60		22	132		_	_		_	_		19	146	
	208/230-3-60		46	300		48	336		48	336	-	_	_	
0.44	380-3-60	10	26	139	10	25	169	13	25	169		_	_	
041	460-3-60	13	23	150	13	21	141		21	141		_	_	
	575-3-60		18	109		17	113		17	113				
	208/230-3-60		57	340		51	364		51	364		_	_	
046	380-3-60	15	28	196	45	29	226	45	29	226			_	
040	460-3-360	15	25	173	15	24	182	15	24	182		_	_	
F	575-3-60	1	22	132	1	19	146		19	146			_	

LEGEND

LRA — Locked Rotor Amps

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

MOCP — Maximum Overcurrent Protection RLA — Rated Load Amps



# Controls



The controls consist of 24-v control circuits. The 24-v circuit provides control power for the PIC6, all safeties, and the interlock relays.

## Microprocessor

The PIC6 controls overall unit operation. Its central executive routine controls a number of processes simultaneously. These include internal timers, reading inputs, analog to digital conversions, display control, diagnostic control, output relay control, demand limit, capacity control, and temperature reset. Some processes are updated almost continuously, other processes are updated every 2 to 3 seconds, and some every 30 seconds.

The microprocessor routine is started by switching the Emergency ON-OFF switch (switch 2) to ON position.

## **Touch Screen display**

Standard control includes a display that shows all of the PIC6 control codes (with expandable clear language), plus set points, time of day, and temperatures.



## Off cycle

For units equipped with crankcase heaters, the heaters remain energized during an off cycle and any time all of the compressors in the circuit are off.

## Start-up

When the unit Enable/Off/Remote switch is set to the ENABLE position, the 24-v control circuit will be energized. When there is a call for cooling and all safety devices are satisfied, the compressor will be started after a delay.

## **Capacity control**

The 30MP 021, 031, 033, 051, and 080 units use identical tandem compressors, and have 2 standard stages of capacity control. The 30MP 041 and 046 units use identical trio compressors, and have 3 standard stages of capacity control. The 30MP 017 and 056-066 units use uneven tandem compressors, have 3 standard stages of capacity control.

When the leaving fluid temperature rises above the set point, the control will begin to add stages of capacity by starting a compressor. The control uses a leaving-water temperature control with entering water compensation routine and will add additional stages of capacity as required to meet the required load. If the unit is equipped with hot gas bypass, the hot gas bypass solenoid and a compressor for the circuit will be energized as the first stage of capacity. When the leaving-fluid temperature starts falling below the set point, the control will remove stages of capacity to match the decrease in building load.

On units equipped with the digital compressor option, the controls integrate the modulation of the digital compressor into the capacity routine to match cooling load requirements. The digital compressor provides 22 capacity steps on unit sizes 017, 021, 031. The digital compressor provides 33 capacity steps on unit sizes 041 and 046.

The digital scroll option provides better capacity control by incrementally modulating capacity effectively, increasing the number of compression stages compared to chillers that are not equipped with this option.

The digital scroll compressor is not a variable speed device. Instead, it modulates the capacity output by allowing the scroll sets to separate during operation, alternating between full capacity and zero capacity. Utilizing a fixed timeframe ratio, the percentage of time that the scroll set is engaged is the percentage capacity of that compressor.

There are two major advantages to this type of capacity control.

- There is closer capacity control operation with all the available capacity steps compared to the on/off cycling control of conventional scrolls.
- There is much less wear on digital scrolls compared to standard scroll compressors because the digital scrolls are not subject to as many shutdown/restart cycles as conventional scrolls. Digital scrolls, rather than shutting off, tend to remain on as they vary to deliver the correct capacity.

## Dual chiller control

The PIC6 controller allows 2 chillers (piped in parallel) to operate as a single chilled water plant with standard control functions coordinated through the primary chiller controller. This standard feature requires a communication link between the 2 chillers and an additional thermistor and well in the common supply line.

## Multi-unit/Multi-chiller control

The 30MP multi-unit controller or multi-chiller controller accessory allows for control of up to (8) 30MP chillers (piped in parallel) as one central plant. The multi-unit controller or multi-chiller controller accessory requires a thermistor, in a well, in the common chilled water supply line. Both the thermistor and well are included in the multi-unit controller or multi-chiller controller accessory kit.

## Safeties

### Loss of charge

This safety will lock out the compressor if the refrigerant pressure falls below the minimum permittable level. See base unit controls and troubleshooting literature for loss of charge logic.

### **High-pressure cutout**

This protection will lock out the compressor if the compressor discharge pressure rises above the cutout setting. See Base Unit Controls and Troubleshooting literature for pressure settings.

### **Compressor circuit breakers**

Provided for short circuit protection.

# **Controls (cont)**

### Sensor failure protection

Failures are detected for all thermistors by the microprocessor.

#### Loss-of-flow protection

Loss-of-flow protection is provided by monitoring the standard proof-of-flow switch.

#### **Compressor anti-cycling**

This feature limits compressor cycling.

### **Freeze protection**

This safety feature is provided by monitoring the leaving fluid temperature. If the leaving chilled-fluid temperature falls below the unit freeze point, then the unit will shut off immediately.

### **Diagnostics**

Microprocessor may be put through a service test (see Controls, Start-Up, Operation, Service and Troubleshooting literature) without additional equipment or tools. Service test confirms microprocessor is functional, informs observer through display the condition of each sensor and switch in chiller, and allows observer to check for proper operation of control and compressor(s).

### Sensors

The standard unit is provided with entering fluid, leaving fluid, suction pressure, and discharge pressure transducers. Additional sensors can be added for condenser entering water temperature, leaving water temperature, space temperature, outdoor air temperature, or suction gas temperature to provide additional diagnostics and control features.

### **Default settings**

To facilitate quick start-ups, all chillers with PIC6 controls are pre-configured with a default setting that assumes stand-alone operation supplying  $44^{\circ}F$  (6.7°C) chilled water.

Configuration setting will be based on any options or accessories included with the unit at the time of manufacturing. Date and time are set to U.S.A. eastern time-zone and will need reconfiguring based on location and local time-zone. If operation based on occupancy scheduling is desired, this will also need to be set during installation.

## **Remote alarm**

A 24-v alarm signal will be provided to a remote location in the event of a lockout condition.

### **Demand limit switch**

Demand limiting can be accomplished through switch input or by a field-supplied 4 to 20 mA signal. For either option, Energy Management Module option (also available as an accessory) is required. The field-supplied, normally open contacts (single or pair) can be used to reduce the total chiller electrical demand during times of peak usage.

This is accomplished by reducing the number of capacity stages. In a similar manner, a field-supplied 4 to 20 mA signal can also be used to reduce the total capacity of the chillers.

### Hot gas bypass

The hot gas bypass provides an additional stage of capacity control below the minimum standard step of capacity.

## **Capacity control steps**

Refer to the Capacity Control Steps table below for capacity control steps for standard units.

NOTE: If the optional factory-installed hot gas bypass is used, one more stage of unloading will be added and the units will be able to operate with an additional steps of capacity.

#### Capacity Control Steps<sup>a</sup>

UNIT 30MP	CONTROL STEPS	PERCENT DISPLACEMENT
	1	20 <sup>b</sup>
017	2	40
017	3	60
	4	100
	1	25 <sup>b</sup>
021	2	50
	3	100
	1	34 <sup>b</sup>
031	2	50
	3	100
	1	34 <sup>b</sup>
033	2	50
	3	100
	1	21 <sup>b</sup>
044	2	33
041	3	67
	4	100
	1	22 <sup>b</sup>
046	2	33
046	3	67
	4	100
	1	41 <sup>b</sup>
051	2	50
	3	100
	1	41 <sup>b</sup>
056	2	50
	3	100
	1	31 <sup>b</sup>
066	2	38
	3	100
	1	44 <sup>b</sup>
080	2	50
	3	100

NOTE(S):

a. For digital compressor, see pages 7-10.

b. Optional hot gas bypass.





#### NOTES:

- Chiller must be installed *levelly* to maintain proper compressor oil return.
   Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick
- Not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
   All wiring must comply with applicable local and national codes.
   All piping must follow standard piping techniques. Refer to Carrier System Design Manual or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) handbook for details.
   See Application Data section on page for minimum system fluid volume. This system may require the addition of a holding tank to ensure adequate volume.
- 6. Operating environment Chiller should be installed in an indoor environment where the ambient temperature is between 50 and 104°F (10 and 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.

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# **Typical wiring and piping (cont)**



Carrier

#### NOTES:

- 1. Chiller must be installed *levelly* to maintain proper compressor oil return (level adjustment kit included with manifold piping kit [option]). 2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping
- shown are for a quick overview of system and are not in accordance with recognized standards.
- 3. All wiring must comply with applicable local and national codes.
- All piping must follow standard piping techniques. Refer to Carrier System Design Manual or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) handbook for details.
- 5. See Application Data section on page 28 for minimum system fluid volume. This system may require the addition of a holding tank to ensure adequate volume.
- 6. Operating environment Chiller should be installed in an indoor environment where the ambient temperature is between 50 and 104°F (10 and 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.

# **Typical wiring and piping (cont)**



#### NOTES:

- 1. Chiller must be installed *levelly* to maintain proper compressor oil return.
- 2. Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards.
- 3. All wiring must comply with applicable local and national codes.
- 4. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigeranting, and Air-Conditioning Engineers) handbook for details on proper piping sizes and design.
- 5. See Application Data section on page 27 for minimum system fluid volume. This system may require the addition of a holding tank to ensure adequate volume.
- 6. Hot gas lines should rise above refrigerant level in condenser circuit. With 30MPA/09RC matched condensers; this is accomplished internally in the 09DP unit. Double riser may be required; Check 30MPA line sizing chart. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle.
- 7. Pitch all horizontal lines downward in the direction of refrigerant flow.
- 8. For piping lengths greater than 50 ft (15.2 m), provide support to liquid and gas lines near the connections to the condenser coil.
- 9. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration.
- 10. Operating environment Chiller should be installed in an indoor environment where the ambient temperature is between 50 and 104°F (10 and 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.
- 11. Inverted trap required at condenser for 09RCM065-130.

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# Typical wiring and piping (cont)



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#### NOTES

Chiller must be installed levelly to maintain proper compressor oil return (level adjustment kit included with manifold piping kit (option).

- Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. 2.
- 3
- 4.
- Wiring and piping shown are general points-of-connection guides only and are not intended for a specific installation. Wiring and piping shown are for a quick overview of system and are not in accordance with recognized standards. All wiring must comply with applicable local and national codes. All piping must follow standard piping techniques. Refer to Carrier System Design Manual part 3, Carrier E20-II software Refrigerant Piping program, or appropriate ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) handbook for details on proper piping sizes and design. See Application Data section on page 27 for minimum system fluid volume. This system may require the addition of a holding tank to ensure adequate volume. Hot gas lines should rise above refrigerant level in condenser circuit. With 30MPA/09DP matched condensers, this is accomplished internally in the 09DP unit. Double riser may be required; Check 30MPA line sizing chart. Trap should be installed on hot gas lines to prevent condenser oil and refrigerant vapor migration from accumulating in the compressor during off cycle. Pitch all horizontal lines downward in the direction of refrigerant flow. For piping lengths greater than 50 ft (15.2 m) provide support to liquid and gas lines near the connections to the condenser coil 5.
- 6. 7
- For piping lengths greater than 50 ft (15.2 m), provide support to liquid and gas lines near the connections to the condenser coil. For pressure relief requirements, see latest revision of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration. Operating environment Chiller should be installed in an indoor environment where the ambient temperature is between 50 and 104°F (10 and 40°C) with a a
- 10.
- 11. relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.
- Inverted trap required at condenser for 09DPM065-130. 12

# **Typical wiring schematics**



- NOTES: 1. FIGLED-SUPPLIED CONTROL CONDUCTORS TO BE AT LEAST ISAWG (AMEBICAN WIRE GAGE) (S. VMATUMUM). 2. EACH DIGTAL OUTPUT LOOP SHALL BE LIMITED TO A MAXIMUM OF IA AC FNS STEADY-STAT # 24VAC. LIGHT LOOP RELAY IS RECOMMENDED AND THE COLL VOLTAGE OF RELAY IS 24VAC. PORE SUPPLY SHALL BE PROVIDED BY CUSTOMER FUSED TANSFORMER. 3. EACH DISCRETE INPUT LOOP IS POWERED BY CUSTOMER FUSED TANSFORMER. 3. EACH DISCRETE INPUT LOOP IS POWERED BY CUSTOMER FUSED TANSFORMER. 3. EACH DISCRETE INPUT LOOP IS POWERED BY CUSTOMER FUSED TANSFORMER. 3. EACH DISCRETE INPUT LOOP IS POWERED BY CUSTOMER AND HAC COLL VOLTAGE OF FELAY IS 3. EACH DISCRETE INPUT LOOP IS POWERED BY CUSTOMER SUPPLY. FIELD OPTIONAL CONTACTS OF SWITCH AUGULT HAVE 24VAC FORENT IS GOMA. NOWINAL CURRENT IS 10MA. SWITCHES WITH GOLD PLATED BITURCATED CONTACTS ARE RECOMMENDED. I THE ANALOG INPUTS SUPPORTS S//10 KT CHERNISTORS, JOH-20MS ESORS AND SVOS SINGORS. IF 100K IS USED IT WILL REQUIRE A SOFTWARE CONVERSION TABLE TO CONVERT TO 10K. FOR DETAILS REFER TO THE CONTROLS. OPTRATIONS, AND TROUBLE SHOOTING MANUAL AND MATCH WITH SOFTWARE. 5. EACH AMALG GUTPUT LOOP SUPPORTS 0/4-20MA SUD TAGE OUTPUT. THE ANALOG OUTPUT LOOP IS POWERED BY 10B BOARD. DO NOT SUPPLY EXTERNAL POWER. FOR DETAILS REFER TO THE CONTROLS. OPTRATIONS, AND TROUBLE SHOOTING MANUAL AND MATCH WITH SOFTWARE. 6. DRY TYPE CONTACT, RATED SWITCHING LOAD 230VAC/5A OR 24VDC/5A. 7. GROUND SHIELDS AT SIGNAL GENERATING DEVICES

- ALL FIELD INTERLOCK CONTACTS MUST HAVE A MINIMAL RATING OF 24024VAC SEALED.
   IF MOTOR PROTECTOR IS USED REMOVE JUMPER FROM ASSOCIATED TERMINAL BLOCKS
   IF CHILLED WATER PUMP INTERLOCK OR COMEXNER PUMP INTERLOCK IS USED REMOVE JUMPER ACROSS ASSOCIATED TERMINAL BLOCKS
   FACTORY INSTALLED WIRING MUST ALSO FOLLOW THE APPILANCE CODES, ALL WIRING MUST BL RATED TO SDERRE C
   COMPRESSOR ADD FAN MOORS ARE THERMALLY PROTECTED THREE PHASE MOTORS PROTECTED AGAINST PRIVARY SINGLE PHASE CONDITIONS
   COMPRESSOR ADD FAN MOORS ARE THERMALLY PROTECTED THREE PHASE MOTORS PROTECTED AGAINST PRIVARY SINGLE PHASE CONDITIONS
   COMPRESSOR COMPRESSOR 031 (230V GNLT).
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# **Typical wiring schematics (cont)**



# **Typical wiring schematics (cont)**





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# **Typical wiring schematics (cont)**





# **Guide specifications**

## **Scroll Liquid Chillers**

## HVAC Guide Specifications

Size Range: 17 to 80 Tons (60 to 281 kW)

## Carrier Model Numbers: 30MPA, MPW

## Part 1 — General

1.01 SYSTEM DESCRIPTION

Microprocessor controlled liquid-cooled condenser (30MPW) or condenser-less (30MPA) liquid chiller utilizing scroll type compressors.

- 1.02 QUALITY ASSURANCE
  - A. Unit performance shall be rated per AHRI (Air-Conditioning, Heating and Refrigeration Institute) Standard 550/590 and 551/591, latest edition (U.S.A.) at standard rating conditions.
  - B. All units shall be ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 90.1-2016-2019 compliant.
  - C. Unit construction shall comply with ANSI (American National Standards Institute)/ASHRAE 15 Safety Standard (latest revision) and NEC (National Electrical Code).
  - D. The management system governing the manufacturing of this product is ISO 9001:2015 certified.
  - E. Unit shall be ETL and ETL, Canada certified.
- 1.03 DELIVERY, STORAGE AND HANDLING
  - A. Unit shall be shipped factory-assembled with all piping and wiring, precharged with a complete operating charge of R-32 (30MPW) or a holding charge of nitrogen (30MPA) and shall be stored and handled according to manufacturer's recommendations.
  - B. Unit controls shall be capable of withstanding 130°F (66°C) storage temperatures in the control compartment.
  - C. Chiller and starter should be stored outdoors, protected from construction dirt and moisture. An inspection should be conducted under shipping tarps, bags, or crates to be sure water has not collected during transit. Protective shipping covers should be kept in place until machine is ready for installation.

## Part 2 — Products

## 2.01 EQUIPMENT

A. General:

Single-piece liquid chiller consisting of compressor(s), BPHE (brazed-plate heat exchanger) evaporator, condenser (30MPW only), controls, safeties, and any hardware required before start-up.

- B. Unit Cabinet:
  - 1. Frame shall be of heavy-gauge galvanized steel with an electrostatically applied baked enamel finish.
  - 2. The unit shall pass through a standard 36 in. (914 mm) door and shall not exceed 59.5 in. (1511 mm) in length.



- C. Compressor:
  - 1. Fully hermetic scroll type compressors.
  - 2. Direct drive, 3500 rpm (58 r/s), protected by line break device, suction gas cooled motor.
  - 3. External vibration isolation rubber in shear.
  - 4. Staging of compressors shall provide unloading capability. Digital compressor unloading is optional.
  - 5. (If required) Unit shall be rated for no more than 15 hp per refrigeration circuit.
- D. Evaporator:
  - 1. Evaporator shall be rated for a maximum refrigerant pressure of 650 psig (3482 kPa).
  - 2. Shall be single-pass, ANSI type 316 stainless steel, brazed plate construction.
  - 3. Shall be insulated with 3/4 in. (19 mm) closed-cell, polyvinyl-chloride foam with a maximum K factor of 0.28.
  - 4. Unit shall be provided with a factory-installed flow switch.
  - 5. Unit shall be provided with entering and leaving chilled water temperature sensors and water pressure access port.
  - 6. A strainer with a minimum of 20 mesh must be installed within 10 ft (3 m) of the heat exchanger fluid inlet of the chiller closest to the chiller water return header to prevent debris from clogging the heat exchanger. This strainer shall be required and shall be available as an accessory. For chillers installed in a modular configuration, the strainer shall be within 10 ft (3 m) of the fluid inlet of the chiller at the end of the "bank" of chillers.
- E. Brazed-Plate Condenser:
  - 1. Condenser shall be rated for a maximum refrigerant pressure of 650 psig (4506 kPa). Shall be tested for a maximum water-side pressure of 300 psig (2068 kPa).
  - 2. Single-pass, liquid-cooled, ANSI type 316, stainless-steel brazed-plate construction that shall provide positive subcooling of liquid refrigerant.
  - Unit shall be equipped with Victaulic water connections.
  - 4. A strainer with a minimum of 40 mesh must be installed within 10 ft (3 m) of heat exchanger fluid inlet of the chiller closest to the chiller water return header to prevent debris from clogging the heat exchanger. This strainer shall be required and shall be available as an accessory. For chillers installed in a modular configuration, the strainer shall be within 10 ft (3 m) of the fluid inlet of the chiller at the end of the "bank" of chillers.
- F. Refrigerant Components:
  - 1. Each chiller shall contain the following: sight glass; filter drier; liquid line solenoid valve (30MPA); liquid line isolation valve (30MPA); expansion valve;

# **Guide specifications (cont)**



charging port, and either one or two refrigerant circuits.

- Per circuit, the expansion valve EXV (electronic expansion valve) shall be located within 12 in. (125 mm) of the evaporator with no bend between expansion valve and evaporator in accordance with evaporator manufacturer recommendation.
- G. 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.
      - Thermistor is installed to measure evaporator entering and leaving fluid temperatures.
      - 5) Terminal block for temporary and/or permanent interface to the Carrier Comfort Network<sup>®</sup> or similar building system control.
    - b. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
    - c. Control transformer to serve all controllers, contactors, relays, and control components.
    - d. Replaceable solid-state relay panels and controllers.
    - e. Pressure transducers (used to calculate saturated suction temperature and saturated condensing temperature).
    - f. Terminals shall be provided in the control box for wiring of accessory field-installed condenser temperature sensors.
    - g. Unit controls shall be capable of performing the following functions:
      - Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature.
      - 2) Limiting of the chilled fluid temperature pulldown rate at start-up to 1°F (0.5 °C) per minute to prevent excessive demand spikes (charges) at start-up.
      - 3) Seven-day time schedule.
      - 4) Leaving chilled fluid temperature reset from return fluid.
      - 5) Dual chiller control for parallel chiller applications (common leaving chilled water sensor required).
      - 6) Timed maintenance scheduling to signal maintenance activities.
  - 2. Diagnostics:
    - a. The control panel shall include, as standard, a display:
      - 1) Color touch screen display.

- 2) Display shall allow a user to navigate through menus, select desired options, and modify data.
- b. Features of the display shall include:
  - Multiple connection ports for USB, Ethernet, or BACnet<sup>™1</sup>IP, Modbus<sup>1</sup>-RTU (Remote Terminal Unit), LEN (local equipment network), and Carrier Comfort Network<sup>®</sup> (CCN) connections. NOTE: BACnet IP may require additional programming.
  - 2) Automatic reporting of alarms over email.
  - 3) Ability to graphically plot trends of system performance and conditions over time.
  - 4) Graphical summary display of current chiller operation and water conditions.
  - 5) Display shall allow access to configuration, maintenance, service, set point, time schedules, alarm history, and status data.
  - 6) Three levels of password protection against unauthorized access to configuration and maintenance information, and display set up parameters.
  - Full compatibility with the Carrier Comfort Network<sup>®</sup> (CCN) system to provide email alarm notification and to provide network capability to fully monitor and control chiller.
  - 8) Display shall be capable of displaying the last 50 alarms, with clear full text description and time and date stamp, and will store a snapshot of operating conditions before and after the 10 most recent alarms.
  - 9) Display run hours and number of starts for machine and individual compressors.
  - 10) The control system shall allow software upgrade without the need for new hard-ware modules.
- 3. Safeties:
  - a. Unit shall be equipped with sensors 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 fluid flow detection.
    - 3) Low chilled fluid temperature protection.
    - 4) Low control voltage (to unit) protection.
    - 5) High-pressure switch.
    - 6) Reverse rotation. Optional phase loss monitor required for unit sizes 017-046.
    - 7) Overcurrent protection.

<sup>1.</sup> Third-party trademarks and logos are property of their respective owners.

# **Guide specifications (cont)**

- 8) Loss of phase. Optional phase loss monitor required for unit sizes 017-046.
- b. Compressors shall be equipped with the following protections:
  - 1) High discharge temperature protection.
  - 2) Electrical overload through the use of IEC contactors and motor overload protection through internal compressor overload or external current overload.
  - 3) Circuit breakers shall open all 3 phases in the event of an overload in any one phase (single-phasing condition).
  - 4) Circuit breakers for short circuit protection.
- H. Operating Characteristics:
  - 1. Unit shall be capable of starting with up to 95°F (35°C) fluid temperature entering the evaporator.
  - 2. Unit shall be capable of operating with variable evaporator fluid flow, up to 10% change in flow rate per minute.
- I. Electrical Requirements:
  - 1. Single-point electrical power connection with compressors factory-wired to a terminal block in the control panel. Compressor sensors and system pressure transducers shall be factory-wired to the unit controller.
  - 2. Control interface shall be accessed through low voltage terminal strip or terminal strip.
- J. Chilled Water Circuit:
  - 1. Chilled water circuit shall be rated for 300 psig (2068 kPa).
  - 2. Solid-state flow switch with integral relay shall be factory-installed and wired.
- K. Special Features:

Certain standard features are not applicable when the features designated by \* are specified. For assistance in amending the specifications, contact your Carrier representative.

1. Hot Gas Bypass:

This factory-installed option shall permit chiller to provide an additional step of capacity reduction over standard.

2. Sound Enclosure Panels:

This acoustic package shall be either factoryinstalled or field-installed and shall entirely enclose the compressor section to further reduce radiated sound. For the 30MPE panel, the sound enclosure panels will provide a uniform look for the 30MPE panel in a bank of 30MP chillers with sound enclosure panels.

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- 3. Mobility Kit (Wheels):

This package shall be factory-supplied for field installation and shall include 6 swivel wheels for easy unit mobility.

4. Height Adjustment Kit:

The units shall be shipped with a high adjustment mechanism located in each corner of the unit to aid in leveling the chiller and to facilitate connections to existing piping.

5. Vibration Isolators (Resilient Pads):

Vibration isolators shall be field-installed before the unit is set into its final location and shall reduce vibration transmission through the mounting area of the chiller.

6. Vibration Isolators (Springs):

Vibration isolators shall be field-installed before the unit is set into its final location and shall reduce vibration transmission through the mounting area of the chiller.

7. Non-Fused Disconnect:

The non-fused disconnect shall be factory-installed and shall disconnect all power to the unit (including control circuit power).

8. Fused Disconnect:

The fused disconnect shall be factory-installed and shall disconnect all power to the unit (including control circuit power).

- 9. Brine:
  - a. Special modifications shall be made at the factory to permit operation with leaving chilled fluid temperatures between 15 and  $32^{\circ}F$  (-9.4 and 0.0°C).
  - b. Unit shall be provided with a factory-installed liquid line solenoid (per refrigerant circuit) to be used in medium temperature brine and condenser-less applications.
- 10. Strainer:

A Y strainer shall be available in sizes  $1.5 \mbox{ to } 6$  in. with a minimum of  $40 \mbox{ mesh}$  for field installation.

11. Energy Management Module (EMM):

A factory or field-installed module shall provide the following energy management capabilities: 4 to 20 mA signals for leaving fluid temperature reset, cooling set point or demand limit control; 2-point demand limit control (from 15% to 100%) activated by a remote contact closure; and discrete input for "Ice Done" indication for ice storage system interface.

EMM shall be capable of:

- a. Leaving temperature reset from space temperature, outdoor temperature, or 4 to 20 mA signal.
- b. Demand limit or load shed via field-supplied 4 to 20 mA signal or 2-step discrete contact closure.

# **Guide specifications (cont)**



12. BACnet<sup>™</sup>1 Translator Control:

Unit shall be supplied with field-installed interface between the chiller and a BACnet Local Area Network (LAN, i.e., MS/TP EIA-485).

13. LON Translator Control:

Unit shall be supplied with field-installed interface between the chiller and a Local Operating Network (LON, i.e., LonWorks<sup>1</sup> FT-10A ANSI/EIA-709.1).

- 14. Digital Compressor Option: Shall provide factory-installed digital compressor to provide additional steps of capacity (digital is not available on sizes 051-080).
- 15. Compressor Insulation:

Compressor insulation is designed to insulate scroll compressors and prevent water vapor from condensing on the colder compressor surface.

16. High Interrupt Option:

Shall provide factory-installed high interrupt option that gives the chiller a short-circuit current rating of 65 kA (25 kA at 575-v).

17. Compressor Sound Blankets:

Units can be ordered with acoustically insulated sound blankets installed around the compressors to reduce radiated sound levels.

18. Water Manifold Piping Option:

Shall provide piping that allows more than one 30MP chiller module to be piped together in parallel. Manual isolation/throttling combination valves. Contact your Carrier representative for automatic valve options. 19. BACnet Communication Option:

Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu<sup>®</sup> Open control system or a BACnet building automation system.

20. Multi-Chiller Controller:

Shall provide an accessory panel that allows for the control of up to eight (8) chillers, as a single, modular unit, from a common AppController control system.

- a. Multi-Chiller Controller shall come pre-configured from the factory with a common leaving chilled water thermistor.
- b. Multi-Chiller Controller shall be compatible with multiple, non-identical chillers, watermanifold piping, and BACnet communication options.
- 21. Head Pressure Control Option:

Shall provide factory-installed modulating water valve to allow minimum of  $50^{\circ}$ F ( $10^{\circ}$ C) entering condenser water temperature. Shall be factory wired to the unit control panel.

22. Automatic Evaporator Isolation Option:

Shall provide factory-installed open/closed water valve. Valve shall be open when unit control mode is enabled. Valve shall be closed when unit control mode is disable. Shall be factory wired to the unit control panel.

23. Electrical Distribution Panel:

An electrical cabinet for chiller breakers and disconnects for up to four (4) modules in a 30MP multi-chiller plant, shall be able to accommodate identical chillers, and designed to be piped directly into the common chiller water header.

<sup>1.</sup> Third-party trademarks and logos are the property of their respective owners.



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