# Product Data

# AquaSnap® Air-Cooled Chillers 60 Hz

60 to 150 Nominal Tons
(212 to 528 Nominal kW)


30RC 065-152 Air-Cooled Chillers with Puron® Refrigerant (R-410A) or R-32

# Features/Benefits

## Carrier's innovative chiller design provides savings at initial purchase, at installation, and for years afterward.

The AquaSnap® chiller is an effective all-in-one package that is easy to install and easy to own. AquaSnap chillers operate quietly and efficiently. Value-added features include:

- Rotary scroll compression
- Hydrofluorocarbon (HFC) Puron® refrigerant (R-410A) or HFC R-32
- Energy Efficiency Ratios (EERs) for all units meet ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) Standard 90.1-2019
- Low-sound AeroAcoustic™ fan system
- Easy to use PIC6 (Product Integrated Control 6) controls
- Optional integrated hydronic pump package, with single or dual pumps, available with or without variable-frequency drive (VFD)
- Coil design flexibility — microchannel (MCHX) and RTPF (Al/Cu) coil technology available on all units
- Evaporator design flexibility — brazed-plate available on all unit sizes or direct expansion (DX) design available on most unit sizes
- Compact unit design available for certain sizes, enabling the chiller to maintain capacity while reducing the footprint in restricted space applications
- Optional high-efficiency, variable-speed condenser fans with Greenspeed® intelligence

### Costs less right from the start

Carrier's AquaSnap chillers feature a compact, all-in-one package design that installs quickly and easily on the ground or the rooftop. The optional pump and hydronic components are already built in. This costs less than buying and installing the components individually. The chiller's fully integrated and pre-assembled hydronic system installs in minutes.

Among chillers in its class, the Aquasnap chiller is one of the easiest and least expensive to install. The pre-assembled and integrated hydronic module uses high-quality components and pumps to ensure years of reliable operation. The Aquasnap unit's high efficiency keeps energy costs down.

### AquaSnap chillers make noise in the marketplace, not the workplace

The AquaSnap chiller's AeroAcoustic fan system is extremely quiet. Much of the noise reduction is in frequencies where noise is most annoying, which makes AquaSnap chillers ideal for sound-sensitive environments. When lower ambient temperatures allow part-load operation, or during scheduled nighttime operation, the units operate with fewer fans and become even quieter. AquaSnap chillers are quiet during the day and even quieter at night.

### The savings will continue to mount

Besides being affordable to purchase and install, AquaSnap chillers are also affordable to operate.

AquaSnap chillers use ultra-quiet, high-efficiency rotary scroll compressors, operated in tandem or trios per independent circuit, for greater efficiency at partial loads.

30RC chillers with Greenspeed intelligence feature a high-efficiency, variable-speed condenser fan option, along with fine-tuned PIC6 controls, which together provide premium part-load efficiency to facilitate reduced utility costs over the lifespan of the chiller. Additionally, the lower sound levels achieved at part-load conditions can be very beneficial for sensitive acoustic applications.

### Electronic expansion valve

Electronic expansion valves allow for precise control through all operating ranges, resulting in higher efficiency and improved reliability.

### Standard DC link reactor

This feature is included in all drives for the fans when chillers with Greenspeed intelligence are selected. The use of this component mitigates customer concern over electrical system harmonics, and therefore, AC line reactors should not be required.

### Proven reliability is built in

Thousands of AquaSnap chillers are already in service around the world. This field-proven design is backed by a 12-month warranty that includes the optional hydronic system (USA and Canada only). The compressors are maintenance-free and protected by an auto-adaptive control that minimizes compressor wear. Year-round operation is standard, from –20°F (–29°C) (with optional evaporator heater, variable speed condenser fans, and wind baffles) to 125°F (52°C).

Rotary scroll compressors provide smooth, quiet, and reliable operation.

### Multiple independent circuits

Multiple independent circuits are standard on all 30RC chillers for redundancy and greater flexibility.

### All-in-one package

AquaSnap chillers provide the most comprehensive chilled water circuit available for any air-cooled chiller. Included is a brazed plate or DX evaporator, and both evaporator types may be remote mounted. The evaporator is also completely drainable with factory-installed vents and drains.

#### Electronic thermal-dispersion flow switch

A thermal-dispersion flow switch is included with all evaporators. The switch is factory installed and tested

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and contains no moving parts, thus increasing reliability.

**Strainer included (when brazed plate evaporator is selected)**

A strainer is provided with every 30RC chiller that employs a brazed plate evaporator, making the chiller installation easier and lower in cost, as well as eliminating related customer concerns. Other manufacturers also require the strainer with this type of evaporator, but they may not include it with their chillers, thus giving the impression that they offer a lower pressure drop chiller. It is important to note that the strainer is required for all brazed plate heat exchangers; therefore, not considering it from the beginning may lead to the selection of an incorrect pump for the system and an incorrect evaluation for the overall installation cost.

**Optional integrated hydronics package**

This package is more than just a pump. It is an entire chilled water system, including:

- Single/dual pumps available
- Availability of constant speed or VFD configuration
- Start-up and permanent strainer for DX pump options (start-up strainer to be removed within 24 hours after chiller start-up); permanent strainer for BPHE pump options
- Combination valve (includes isolation capability, slow regulator, and check valve)
- Freeze protection to –20°F (–29°C) (with freeze protection option)
- Internal piping
- Pressure/temperature taps
- Isolation check valves for dual pump systems

The factory-installed and tested hydronics package provides faster, simpler, and less expensive installation than purchasing components separately.

## Environmentally balanced

Carrier's Puron refrigerant (R-410A) enables customers to make a responsible decision regarding the protection of Earth's ozone layer. Puron refrigerant is an HFC refrigerant that does not contain chlorine, which is damaging to the ozone layer. This refrigerant is safe, efficient, and environmentally balanced.

In accordance with the AIM Act (American Innovation and Manufacturing), R-32 is available. R-32 has a safety class/flammability of A2L.

## Structurally sound

The chiller base rail is structurally sound, and therefore, the chiller installation requires no perimeter base rail. The pre-galvanized steel frame (with Magni-coated[1] screws) provides excellent protection for corrosion resistance.

## Novation® heat exchanger technology

The Novation heat exchanger design with MCHX condenser coil is a robust, cost effective alternative to traditional coil design. These coils are offered coated or uncoated to match coil protection to site conditions. The e-coated version of this coil can withstand an 8,000-hour salt spray test in accordance with ASTM (American Society for Testing Materials) B-117 Standard. The Carrier Electronic Catalog (E-Cat) can be used to determine whether corrosion protection is recommended for particular applications in coastal/marine environments. Following the input of the requested data, the E-Cat program output recommends the appropriate coil to be used. Other factors described in "Selection Guide: Environmental Corrosion Protection," catalog number 04-581061-01, must also be considered to determine if corrosion protection is required.

Microchannel coils are sturdier than other coil types and, thus, easier to clean without causing damage to the coil.

Due to their compact, all-aluminum design, microchannel coils will reduce overall unit operating weight by 10 to 12%. The streamlined MCHX coil reduces refrigerant charge by up to 60%.

The coil is designed with rubber isolation around the powder-painted coil frame to eliminate galvanic couples, which can cause corrosion due to dissimilar metals.

## Remote connectivity

In an ever-interconnected world, there is a need to provide communication capability to large chillers. Remote connectivity is a communication capability allowing the factory and service technicians access to the machine information from a remote location. This allows for remote diagnostics and prognostics, leading to less down time for the customer and quicker resolution of field problems. Remote connectivity is a factory-installed, secure cellular communication system that communicates information, such as the equipment parameters, operating conditions, and equipment state, to a central site (Operations Center) where the data can then be imported into various systems, like the existing North American Field Office (NAFO) web portal or mobile app. The service is dependent upon cellular coverage and customer acceptance of communication transmission.

1. Magni is a trademark of The Magni Group, Inc.

## Larger control panel availability

The selection of the upgraded control panel option provides the chiller with a 7 in. control panel in lieu of the standard 4.3 in. control panel. When the larger panel is selected, the chiller is also supplied with the capability of a Capacity Recovery feature/rapid restart, as described in the Capacity Recovery™ feature (rapid restart) section that follows.

## Capacity Recovery™ feature (rapid restart)

This optional chiller feature reduces capacity recovery time in the event of a power interruption. With the rise in data centers and critical cooling applications, focus on capacity recovery times for chiller products has increased. Capacity recovery time is defined as the time it takes to reach 100% capacity after power is restored to the chiller, given that the full cooling load is present. Capacity recovery times are the critical factor to consider in data centers, due to the consistently high loads in the space and the need to maintain temperatures. Carrier now offers a capacity recovery option, selected as the upgraded control panel option in conjunction with the selection of variable speed condenser fans, which can reduce the capacity recovery time to under 4 minutes for the 30RC chiller. Other manufacturers often discuss restart times without providing details about how long it takes to reach fully capacity, but achieving full capacity is critical to the end user. Capacity recovery is described in greater detail in the Application Data section of this publication. The selection of the upgraded control panel option results in the 30RC chiller having a 7 in. control panel in lieu of the standard 4.3 in. panel.

## 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.

# Features/Benefits (cont)

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 display with a chiller pictorial. 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 chillers are ready for use with Carrier Comfort Network® (CCN) devices and BACnet[1] 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 30RC chiller.

1. BACnet is a trademark of ASHRAE.

## Free cooling capability

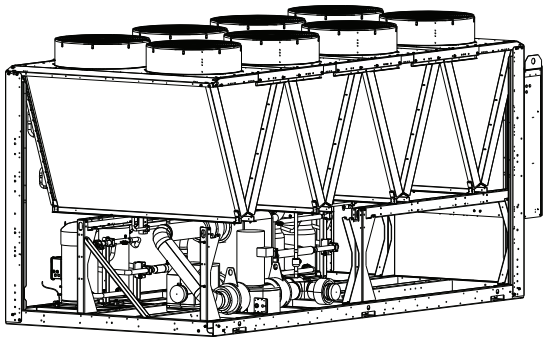
Due to the internal loads driven by people, computers, machinery, and lighting, many Heating, Ventilating, and Air Conditioning (HVAC) applications require cooling, even in colder months. Rather than always relying upon mechanical cooling to satisfy the building load, the 30RC chiller is available with another means to meet some or all of the cooling load requirement in colder weather. This alternative approach is to use a waterside economizer, sometimes known as a free cooling system. Many facilities, such as data centers, for example, are particularly interested in these types of systems.

The free cooling section is physically independent from the mechanical cooling section of the chiller, with the free cooling section located at the end of the chiller that receives the system-return chilled fluid. This physical independence of the free cooling and mechanical cooling sections, allowing air to flow independently in the free cooling section as well as the mechanical cooling section, results in both efficiency and servicing advantages compared to a "stacked" design (a design in which air must be drawn over mechanical cooling coils and free cooling coils whenever the chiller is operating).

Free cooling is available for the 30RC chiller in many different sizes. Instead of requiring the customer to install an "all or nothing" type of arrangement, the customer can determine how much free cooling they would like for each particular application. While some applications may only require a limited amount of free cooling, others may require substantially more. With the 30RC design, the amount is completely customizable.

## Optional desuperheater

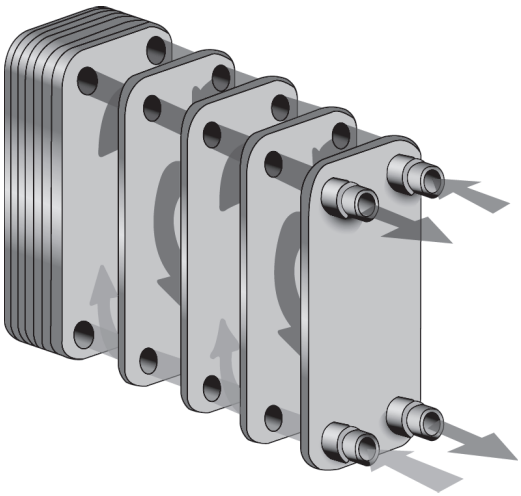
For applications with a simultaneous requirement for chilled water and tempered hot water, the use of a desuperheater is an ideal solution. The production of useful hot water in conjunction with useful chilled water can lead to a greatly improved coefficient of performance (COP).



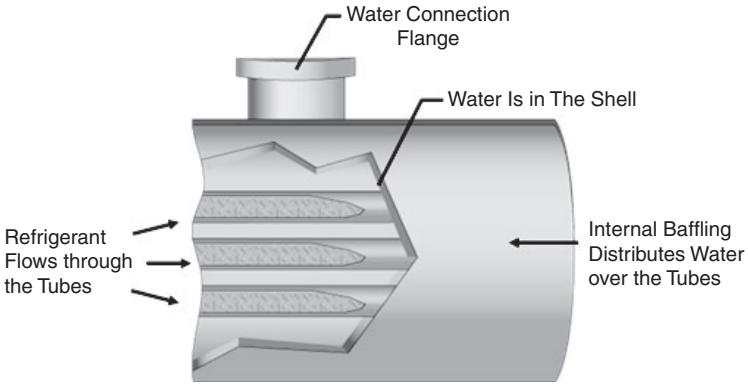
**Optional Hydronic Package**


**Carrier Controller Display**

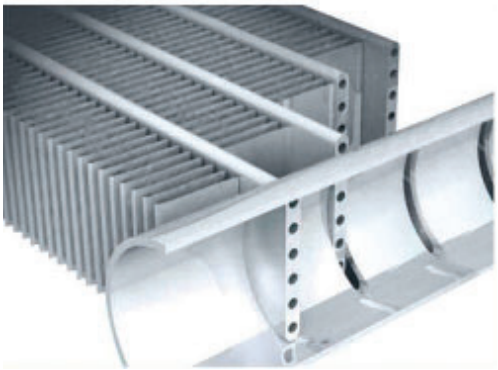
# Features/Benefits (cont)



**Brazed Plate Evaporator (Alternative Paths for Refrigerant and Water Flow)**




**Optional DX Evaporator**



**MCHX/MCHX E-Coat**

**Optional Al/Cu, Al/Cu E-Coat**

# Model number nomenclature

| Position: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Example: | 3 | 0 | R | C | - | 1 | 1 | 0 | 6 | S | - | 1 | - | - | - | - | K |

**Model**
30RC — Air-Cooled AquaSnap® Chiller

\- — Design Series

**Nominal Capacity**

**R-410A Units**:
065 090 120
070 100 130
080 110 150

**R-32 Units**:
067 092 122
072 102 132
082 112 152

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

**Tier**
S — Standard
C — Compact

**Compressor Fan and Bypass Options**
\- — Fixed Speed Condenser Fans
0 — Variable Speed Condenser Fans
2 — Fixed Speed Condenser Fans, HGBP with BPHE Evap
3 — Variable Speed Condenser Fans, HGBP with BPHE Evap
5 — Fixed Speed Condenser Fans, HGBP with DX Evap
6 — Variable Speed Condenser Fans, HGBP with DX Evap
H — Variable Speed Condenser Fans, Low LWT Fluid, MCHX Coils

**Condenser Coil Options**
\- — Aluminum Fin / Copper Tube
0 — Aluminum Fin / Copper Tube, E-Coat
1 — Microchannel
2 — Microchannel, E-coat
3 — Aluminum Fin / Copper Tube, Chicago Relief Valve
4 — Aluminum Fin / Copper Tube, E-coat, Chicago Relief Valve
5 — Microchannel, Chicago Relief Valve
6 — Microchannel, E-coat, Chicago Relief Valve
7 — Aluminum Fin/Copper Tube, Desuperheater
8 — Aluminum Fin/Copper Tube, E-Coat, Desuperheater
9 — Microchannel, Desuperheater
B — Microchannel, E-coat, Desuperheater
C — Aluminum Fin/Copper Tube, Chicago Relief Valve, Desuperheater
D — Aluminum Fin/Copper Tube, E-Coat, Chicago Relief Valve, Desuperheater
F — Microchannel, Chicago Relief Valve, Desuperheater
G — Microchannel, E-Coat, Chicago Relief Valve, Desuperheater

**Evaporator and Refrigerant Circuit Options**
\- — BPHE Evaporator, No Heater
0 — BPHE Evaporator, No Heater, Suction Line Insulation
1 — BPHE Evaporator, No Heater, Suction Service Valve
2 — BPHE Evaporator, No Heater, Suction Line Insulation, Suction Service Valve
3 — BPHE Evaporator, Heater
4 — BPHE Evaporator, Heater, Suction Line Insulation
5 — BPHE Evaporator, Heater, Suction Service Valve
6 — BPHE Evaporator, Heater, Suction Line Insultation, Suction Service Valve
8 — DX Evaporator, No Heater
9 — DX Evaporator, No Heater, Suction Line Insulation
B — DX Evaporator, No Heater, Suction Service Valve
C — DX Evaporator, No Heater, Suction Line Insulation, Suction Service Valve
D — DX Evaporator, Heater
F — DX Evaporator, Heater, Suction Line Insulation
G — DX Evaporator, Heater, Suction Service Valve
H — DX Evaporator, Heater, Suction Line Insulation, Suction Service Valve

NOTE: When an Engineered to Order (ETO) unit is provided, digits 12 through 17 will vary to match the item ordered and will not follow the standard nomenclature above.

**Security/Low Sound Options**
K — CFSP
0 — CFSP, Low Sound
2 — CFSP, Coil Trim Panels
3 — CFSP, Low Sound, Coil Trim Panels
5 — CFSP, Coil Trim Panels, Security Grilles
6 — CFSP, Low Sound, Coil Trim Panels, Security Grilles
8 — Coil Trim Panels, Security Grilles, Hail Guard (End)
9 — Low Sound, Coil Trim Panels, Security Grilles, Hail Guard (End)
C — Full Hail Guard
D — Low Sound, Full Hail Guard
G — Coil Trim Panels, Skid + Bag
H — Low Sound, Coil Trim Panels, Skid + Bag

**Controls/Communication Options**
\- — PIC6, Remote Connectivity (RC), BACnet IP
0 — PIC6, RC, EMM, BACnet IP
1 — PIC6, RC, EMM, GFI, BACnet IP
2 — PIC6, RC, GFI, BACnet IP
3 — PIC6, RC, BACnet IP, LEI Lonworks Translator (TL)
4 — PIC6, RC, EMM, BACnet IP, LEI Lonworks TL
5 — PIC6, RC, EMM, GFI, BACnet IP, LEI Lonworks TL
6 — PIC6, RC, GFI, BACnet IP, LEI Lonworks TL

**Electrical Options**
\- — Single Point, Std SCCR
0 — Single Point, Non-Fused Disconnect (NFD), Std SCCR
1 — Dual Point, Std SCCR
2 — Dual Point, Non-Fused Disconnect, Std SCCR
4 — Single Point, Non-Fused Disconnect, High SCCR
6 — Dual Point, Non-Fused Disconnect, High SCCR
7 — Single Point, Std SCCR, 7" Display
8 — Single Point, NFD, Std SCCR, 7" Display
9 — Dual Point, Std SCCR, 7" Display
B — Dual Point, NFD, Std SCCR, 7" Display
D — Single Point, NFD, High SCCR, 7" Display
G — Dual Point, NFD, High SCCR, 7" Display

**Hydronic Pump Package Options**

**BPHE Evaporator**
\- — None
0 — Single Pump, 5 HP
1 — Single Pump, 7.5 HP
2 — Single Pump, 10 HP
3 — Single Pump, 15 HP
5 — Dual Pump, 5 HP
6 — Dual Pump, 7.5 HP
7 — Dual Pump, 10 HP
8 — Dual Pump, 15 HP
B — Dual VFD-Pump, 5 HP
C — Dual VFD-Pump, 7.5 HP
D — Dual VFD-Pump, 10 HP
F — Dual VFD-Pump, 15 HP

**DX Evaporator**
J — None
K — Single Pump, 5 HP
L — Single Pump, 7.5 HP
M — Single Pump, 10 HP
N — Single Pump, 15 HP
Q — Dual Pump, 5 HP
R — Dual Pump, 7.5 HP
S — Dual Pump, 10 HP
T — Dual Pump, 15 HP
V — Dual VFD-Pump, 5 HP
W — Dual VFD-Pump, 7.5 HP
X — Dual VFD-Pump, 10 HP
Y — Dual VFD-Pump, 15 HP

LEGEND
**BPHE** — Brazed Plate Heat Exchanger
**CFSP** — Coil Face Shipping Protection
**DX** — Direct Expansion
**EMM** — Energy Management Module
**GFI** — Ground Fault Interrupter
**LEI** — Local Equipment Interface
**LWT** — Leaving-Water Temperature
**MCHX** — Microchannel Heat Exchanger
**RTPF** — Round Tube, Plate Fin
**SCCR** — Short Circuit Current Rating
**VFD** — Variable Frequency Drive

# Physical data

## 30RC 065-150 R-410A — English

| UNIT 30RC | 065 | 070 | 080 C[a] | 080 | 090 | 100 | 110 | 120 C[a] | 120 | 130 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chassis Dimensions (in.)** | | | | | | | | | | | |
| **Length** | 105 | 105 | 105 | 152 | 152 | 152 | 152 | 152 | 199 | 199 | 199 |
| **Width** | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 |
| **Height** | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| **Required Pad Length** | 94 | 94 | 94 | 141 | 141 | 141 | 141 | 141 | 188 | 188 | 188 |
| **MAXIMUM ALTITUDE (ft)** | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| **SHIPPING WEIGHT (lb)[b]** | | | | | | | | | | | |
| **MCHX/BPHE** | 3409 | 3642 | 3881 | 4564 | 4640 | 4576 | 4918 | 4919 | 5623 | 6019 | 6082 |
| **MCHX/DX** | 4123 | 4335 | 4549 | 5218 | 5289 | 5294 | 5733 | — | 6456 | 6834 | 7468 |
| **AL-CU/BPHE** | 3810 | 4043 | 4281 | 5082 | 5241 | 5176 | 5518 | 5520 | 6342 | 6820 | 6882 |
| **AL-CU/DX** | 4523 | 4736 | 4949 | 5736 | 5890 | 5895 | 6333 | — | 7175 | 7635 | 8269 |
| **OPERATING WEIGHT (lb)[b]** | | | | | | | | | | | |
| **MCHX/BPHE** | 3451 | 3690 | 3936 | 4619 | 4695 | 4660 | 5024 | 5026 | 5730 | 6138 | 6217 |
| **MCHX/DX** | 4384 | 4596 | 4810 | 5479 | 5550 | 5555 | 6115 | — | 6838 | 7216 | 8081 |
| **AL-CU/BPHE** | 3852 | 4090 | 4336 | 5137 | 5296 | 5260 | 5625 | 5626 | 6448 | 6939 | 7018 |
| **AL-CU/DX** | 4784 | 4997 | 5211 | 5997 | 6151 | 6156 | 6715 | — | 7557 | 8017 | 8882 |
| **REFRIGERANT TYPE** | R-410A, EXV Controlled System | | | | | | | | | | |
| **Refrigerant Charge — R-410A[c]** | | | | | | | | | | | |
| **MCHX/BPHE, Ckt A/Ckt B (lb)** | 25.0/25.8 | 25.2/32.8 | 32.7/33.1 | 35.4/38.7 | 40.8/40.2 | 41.9/40.6 | 49.5/41.3 | 35.5/53.8 | 42.9/55.6 | 56.0/56.0 | 56.0/56.4 |
| **MCHX/DX, Ckt A/Ckt B (lb)** | 26.9/28.1 | 26.9/34.8 | 34.5/35.1 | 37.0/41.0 | 42.4/43.2 | 43.1/43.4 | 51.2/44.5 | — | 44.3/58.7 | 56.5/58.8 | 59.6/61.7 |
| **AL-CU/BPHE, Ckt A/ Ckt B (lb)** | 65.3/ 66.1 | 65.5/ 73.1 | 72.5/ 72.9 | 75.7/ 99.2 | 101.3/ 100.6 | 102.3/ 101.1 | 110.0/ 101.7 | 75.3/ 133.5 | 103.3/ 136.1 | 136.3/ 136.6 | 136.5/ 137.0 |
| **AL-CU/DX, Ckt A/Ckt B (lb)** | 67.2/ 68.7 | 67.2/ 75.4 | 74.3/ 75.3 | 77.3/ 101.8 | 102.8/ 104.0 | 103.5/ 104.2 | 111.6/ 105.3 | — | 104.7/ 139.8 | 137.4/ 139.9 | 140.2/ 142.9 |
| **COMPRESSORS — R-410A** | | | | | | | | | | | |
| **Quantity** | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 |
| **Speed (rpm)** | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| **Quantity, Ckt A** | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 |
| **Quantity, Ckt B** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| **Oil Charge (Pt, Ckt A/Ckt B)[c]** | 13.4/13.4 | 13.4/24.3 | 24.3/24.3 | 24.3/24.3 | 24.3/24.3 | 24.3/24.3 | 36.4/24.3 | 24.3/36.4 | 24.3/36.4 | 36.4/36.4 | 36.4/36.4 |
| **No. Capacity Steps** | | | | | | | | | | | |
| **Standard** | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 |
| **Optional (Maximum)** | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 |
| **Minimum Capacity Step (%)** | | | | | | | | | | | |
| **Standard** | 25 | 21 | 25 | 25 | 22 | 25 | 18 | 20 | 20 | 15 | 17 |
| **Optional** | 14 | 12 | 17 | 17 | 15 | 18 | 12 | 15 | 15 | 10 | 12 |
| **Capacity (%)** | | | | | | | | | | | |
| **Ckt A** | 50 | 43 | 50 | 50 | 44 | 50 | 55 | 40 | 40 | 44 | 50 |
| **Ckt B** | 50 | 57 | 50 | 50 | 56 | 50 | 45 | 60 | 60 | 56 | 50 |
| **EVAPORATOR** | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | |
| **Weight (empty, lb)** | 132.4 | 151.3 | 174.0 | 174.0 | 174.0 | 94.6 | 118.1 | 118.1 | 118.1 | 131.6 | 148.4 |
| **Net Fluid Volume (gal)** | 4.5 | 5.2 | 6.1 | 6.1 | 6.1 | 8.7 | 11.4 | 11.4 | 11.4 | 12.9 | 14.8 |
| **Maximum Refrigerant Pressure (psig)** | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 |
| **Maximum Water Side Pressure w/o Pumps (psig)** | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| **Maximum Water Side Pressure w/Pumps (psig)** | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| **Water Side Operating Temperatures, Maximum/ Minimum (°F)[d]** | 70/15[e] | 70/15[e] | 70/15[e] | 70/15[e] | 70/15[e] | 70/15[e] | 70/15[e] | 70/38 | 70/15[e] | 70/15[e] | 70/15[e] |
| **OPTIONAL DX COOLER** | | | | | | | | | | | |
| **Weight (empty, lb)** | 856 | 856 | 856 | 856 | 856 | 856 | 970 | 970 | 970 | 970 | 1518 |
| **Net Fluid Volume (gal)** | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 45.8 | 45.8 | 45.8 | 45.8 | 73.5 |
| **Maximum Refrigerant Pressure (psig)** | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 |
| **Maximum Water Side Pressure w/o Pumps (psig)** | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| **Maximum Water Side Pressure w/Pumps (psig)** | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| **Water Side Operating Temperatures, Maximum/ Minimum (°F)[d]** | 70/30[e] | 70/30[e] | 70/30[e] | 70/30[e] | 70/30[e] | 70/30[e] | 70/30[e] | — | 70/30[e] | 70/30[e] | 70/30[e] |

# Physical data (cont)

## 30RC 065-150 R-410A — English (cont)

| UNIT 30RC | 065 | 070 | 080 C[a] | 080 | 090 | 100 | 110 | 120 C[a] | 120 | 130 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **WATER CONNECTIONS (in.)** | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic[f]** | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 |
| **OPTIONAL DX COOLER** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 4 | 4 | 4 | 4 | 4 | 4 | 6 | — | 6 | 6 | 6 |
| **Drain (NPT)** | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | — | 3/4 | 3/4 | 3/4 |
| **CONDENSER FANS** | | | | | | | | | | | |
| **Axial Flying Bird 6 — 8 Pole Fixed Speed** | | | | | | | | | | | |
| **Fan Speed (rpm) Standard** | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 |
| **No. Blades…Diameter (in.)** | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Airflow (cfm) AL-CU Coil** | 40, 575 | 40, 575 | 40, 575 | 50,719 | 60,863 | 60,863 | 60,863 | 60,863 | 71,007 | 81,151 | 81,151 |
| **Total Airflow (cfm) MCHX Coil** | 41,906 | 41,906 | 41,906 | 52,383 | 62,860 | 62,860 | 62,860 | 62,860 | 73,336 | 83,813 | 83,813 |
| **Axial Flying Bird 6 — 6 Pole Variable Speed** | | | | | | | | | | | |
| **Fan Speed (rpm) Standard** | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 |
| **No. Blades…Diameter (in.)** | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Airflow (cfm) AL-CU Coil** | 55,877 | 55,877 | 55,877 | 69,847 | 83,816 | 83,816 | 83,816 | 83,816 | 97,785 | 111,755 | 111,755 |
| **Total Airflow (cfm) MCHX Coil** | 57,633 | 57,633 | 57,633 | 72,041 | 86,449 | 86,449 | 86,449 | 86,449 | 100,857 | 115,266 | 115,266 |
| **CONDENSER COILS** | | | | | | | | | | | |
| **No. Coils (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Face Area (sq ft)** | 110 | 110 | 110 | 137 | 164 | 164 | 164 | 164 | 192 | 219 | 219 |
| **Maximum Working Refrigerant Pressure (psig)** | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 |
| **OPTIONAL PARTIAL HEAT RECOVERY** | | | | | | | | | | | |
| **Weight (empty, lb)** | 64.8 | 78.5 | 92.2 | 92.2 | 92.2 | 92.2 | 110.6 | — | 110.6 | 129.1 | 129.1 |
| **Net Fluid Volume (gal)** | 1.00 | 1.50 | 2.00 | 2.00 | 2.00 | 2.00 | 2.66 | — | 2.66 | 3.33 | 3.33 |
| **Maximum Refrigerant Pressure (psig)** | 656 | 656 | 656 | 656 | 656 | 656 | 656 | — | 656 | 656 | 656 |
| **Maximum Water Side Pressure (psig)** | 300 | 300 | 300 | 300 | 300 | 300 | 300 | — | 300 | 300 | 300 |
| **Water Connections (in.)** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | — | 2 | 2 | 2 |
| **HYDRONIC MODULE (Optional)** | Pump(s) with pressure/temperature taps and combination valve | | | | | | | | | | |
| **Pump** | Single or Dual, 1800 or 3600 RPM | | | | | | | | | | |

NOTE(S):

a. When a “C” is shown in the chiller size, this indicates a compact unit (and digit 10 of the unit model number is a “C”).
b. Neither shipping weight nor operating weight include any options.
c. All refrigerant and oil charge values reflect the standard chiller. See the Packaged Chiller Builder Program for charge values when the low LWT Fluid option is employed (when LWT is below 38°F [3.3°C]).
d. If the EWT requirement is greater than 70°F (21.1°C), a mixing loop is required. The EWT cannot exceed 70°F (21.1°C) for extended operation. Pulldown can be accomplished from 95°F (35°C).
e. 30RC air-cooled chillers with LWT below 38°F (3.3°C) are considered brine application chillers and require selection of H in position 11. Brine application chillers are factory-installed with lower refrigerant charge and, for R-32 chillers, increased oil charge.
f. Victaulic is a registered trademark of Victaulic Company.

LEGEND

**Al-Cu** — Aluminum Fin/Copper Tube Condenser Coil
**BPHE** — Brazed Plate Heat Exchanger
**DX** — Direct Expansion
**EXV** — Electronic Expansion Valve
**MCHX** — Microchannel Heat Exchanger

# Physical data (cont)

## 30RC 067-152 R-32 — English

| UNIT 30RC | 067 | 072 | 082 | 092 C | 092 | 102 C | 102 | 112 | 122 C | 122 | 132 C | 132 | 152 C | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chassis Dimensions (in.)** | | | | | | | | | | | | | | |
| **Length** | 105 | 105 | 105 | 105 | 152 | 105 | 152 | 152 | 152 | 199 | 152 | 199 | 152 | 199 |
| **Width** | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 |
| **Height** | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| **Required Pad Length** | 94 | 94 | 94 | 94 | 141 | 94 | 141 | 141 | 141 | 188 | 141 | 188 | 141 | 188 |
| **MAXIMUM ALTITUDE (ft)** | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| **SHIPPING WEIGHT (lb)[a]** | | | | | | | | | | | | | | |
| **MCHX/BPHE** | 3409 | 3642 | 3881 | 3881 | 4640 | 3817 | 4576 | 4918 | 4919 | 5623 | 5251 | 6019 | 5309 | 6082 |
| **MCHX/DX** | 4123 | 4335 | 4549 | — | 5289 | — | 5294 | 5733 | — | 6456 | — | 6834 | — | 7468 |
| **AL-CU/BPHE** | 3810 | 4043 | 4281 | 4281 | 5241 | 4217 | 5176 | 5518 | 5520 | 6342 | 5851 | 6820 | 5910 | 6882 |
| **AL-CU/DX** | 4523 | 4736 | 4949 | — | 5890 | — | 5895 | 6333 | — | 7175 | — | 7635 | — | 8269 |
| **OPERATING WEIGHT (lb)[a]** | | | | | | | | | | | | | | |
| **MCHX/BPHE** | 3451 | 3690 | 3936 | 3936 | 4695 | 3901 | 4660 | 5024 | 5026 | 5730 | 5370 | 6138 | 5445 | 6217 |
| **MCHX/DX** | 4384 | 4596 | 4810 | — | 5550 | — | 5555 | 6115 | — | 6838 | — | 7216 | — | 8081 |
| **AL-CU/BPHE** | 3852 | 4090 | 4336 | 4336 | 5296 | 4301 | 5260 | 5625 | 5626 | 6448 | 5971 | 6939 | 6046 | 7018 |
| **AL-CU/DX** | 4784 | 4997 | 5211 | — | 6151 | — | 6156 | 6715 | — | 7557 | — | 8017 | — | 8882 |
| **REFRIGERANT TYPE** | R-32, EXV Controlled System | | | | | | | | | | | | | |
| **Refrigerant Charge[b] — R-32** | | | | | | | | | | | | | | |
| **MCHX/BPHE, Ckt A/ Ckt B (lb)** | **23.1/ 23.8** | 23.5/ 28.8 | 28.6/ 29.0 | 28.5/ 28.7 | 37.4/ 36.2 | 29.0/ 29.1 | 37.1/ 36.1 | 43.3/ 36.7 | 31.0/ 47.9 | 37.9/ 49.2 | 43.3/ 42.8 | 48.6/ 48.6 | 43.5/ 37.7 | 49.0/ 43.8 |
| **MCHX/DX, Ckt A/Ckt B (lb)** | 25.3/ 26.5 | 26.0/ 31.4 | 31.2/ 31.2 | — | 37.3/ 39.3 | — | 38.8/ 39.5 | 45.6/ 40.7 | — | 40.0/ 53.2 | — | 51.0/ 53.2 | — | 54.1/ 51.2 |
| **AL-CU/BPHE, Ckt A/ Ckt B (lb)** | 58.0/ 58.6 | 58.2/ 63.7 | 63.5/ 63.9 | 63.5/ 63.7 | 88.6/ 88.1 | 64.0/ 64.1 | 89.4/ 88.4 | 95.6/ 89.0 | 66.1/ 117.9 | 90.2/ 118.9 | 95.9/ 95.3 | 118.6/ 118.6 | 96.1/ 90.3 | 119.2/ 114.4 |
| **AL-CU/DX, Ckt A/Ckt B (lb)** | 60.2/ 61.4 | 60.2/ 66.2 | 65.4/ 66.2 | — | 90.5/ 91.6 | — | 91.1/ 91.8 | 97.9/ 93.0 | — | 92.3/ 122.9 | — | 120.7/ 122.9 | — | 123.8/ 121.0 |
| **COMPRESSORS — R-32** | | | | | | | | | | | | | | |
| **Quantity** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 5 |
| **Speed (rpm)** | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| **Quantity, Ckt A** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| **Quantity, Ckt B** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 |
| **Oil Charge[b] (Pt, Ckt A/ Ckt B)** | 14.4/ 14.4 | 14.4/ 23.2 | 23.2/ 23.2 | 23.2/ 23.2 | 23.2/ 23.2 | 23.2/ 23.2 | 23.2/ 23.2 | 34.8/ 23.2 | 23.2/ 34.8 | 23.2/ 34.8 | 34.8/ 34.8 | 34.8/ 34.8 | 34.8/ 23.2 | 34.8/ 23.2 |
| **No. Capacity Steps** | | | | | | | | | | | | | | |
| **Standard** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 5 |
| **Optional (Maximum)** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 6 | 6 |
| **Minimum Capacity Step (%)** | | | | | | | | | | | | | | |
| **Standard** | 25 | 21 | 25 | 22 | 22 | 25 | 25 | 18 | 20 | 20 | 15 | 15 | 16 | 16 |
| **Optional** | 14 | 12 | 17 | 15 | 15 | 18 | 18 | 12 | 15 | 15 | 10 | 10 | 12 | 12 |
| **Capacity (%)** | | | | | | | | | | | | | | |
| **Ckt A** | 50 | 43 | 50 | 44 | 44 | 50 | 50 | 55 | 40 | 40 | 44 | 44 | 48 | 48 |
| **Ckt B** | 50 | 57 | 50 | 56 | 56 | 50 | 50 | 45 | 60 | 60 | 56 | 56 | 52 | 52 |
| **EVAPORATOR** | | | | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | | | | |
| **Weight (empty, lb)** | 132.4 | 151.3 | 174.0 | 174.0 | 174.0 | 94.6 | 94.6 | 118.1 | 118.1 | 118.1 | 131.6 | 131.6 | 148.4 | 148.4 |
| **Net Fluid Volume (gal)** | 4.5 | 5.2 | 6.1 | 6.1 | 6.1 | 8.7 | 8.7 | 11.4 | 11.4 | 11.4 | 12.9 | 12.9 | 14.8 | 14.8 |
| **Maximum Refrigerant Pressure (psig)** | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 |
| **Maximum Water Side Pressure w/o Pumps (psig)** | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| **Maximum Water Side Pressure w/Pumps (psig)** | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| **Water Side Operating Temperatures, Max[c]/ Min (°F)** | 70/20[d] | 70/20[d] | 70/20[d] | 70/38 | 70/20[d] | 70/38 | 70/20[d] | 70/20[d] | 70/38 | 70/20[d] | 70/38 | 70/20[d] | 70/38 | 70/20[d] |
| **OPTIONAL DX COOLER** | | | | | | | | | | | | | | |
| **Weight (empty, lb)** | 856 | 856 | 856 | 856 | 856 | 856 | 856 | 970 | 970 | 970 | 970 | 970 | 1518 | 1518 |
| **Net Fluid Volume (gal)** | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 | 45.8 | 45.8 | 45.8 | 45.8 | 45.8 | 73.5 | 73.5 |
| **Maximum Refrigerant Pressure (psig)** | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 | 445 |
| **Maximum Water Side Pressure w/o Pumps (psig)** | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |

# Physical data (cont)

## 30RC 067-152 R-32 — English (cont)

| UNIT 30RC | 067 | 072 | 082 | 092 C | 092 | 102 C | 102 | 112 | 122 C | 122 | 132 C | 132 | 152 C | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **OPTIONAL DX COOLER (cont)** | | | | | | | | | | | | | | |
| **Maximum Water Side Pressure w/Pumps (psig)** | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| **Water Side Operating Temperatures, Max[c]/ Min (°F)** | 70/30[d] | 70/30[d] | 70/30[d] | — | 70/30[d] | — | 70/30[d] | 70/30[d] | — | 70/30[d] | — | 70/30[d] | — | 70/30[d] |
| **WATER CONNECTIONS (in.)** | | | | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| **OPTIONAL DX COOLER** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 4 | 4 | 4 | — | 4 | — | 4 | 6 | — | 6 | — | 6 | — | 6 |
| **Drain (NPT)** | 3/4 | 3/4 | 3/4 | — | 3/4 | — | 3/4 | 3/4 | — | 3/4 | — | 3/4 | — | 3/4 |
| **CONDENSER FANS** | | | | | | | | | | | | | | |
| **Axial Flying Bird 6 — 8 Pole Fixed Speed** | | | | | | | | | | | | | | |
| **Fan Speed (rpm) Standard** | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 |
| **No. Blades… Diameter (in.)** | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 |
| **No. Fans (Ckt A/ Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Airflow (cfm) AL-CU Coil** | 40,575 | 40,575 | 40,575 | 40,575 | 60,863 | 40,575 | 60,863 | 60,863 | 60,863 | 71,007 | 60,863 | 81,151 | 60,863 | 81,151 |
| **Total Airflow (cfm) MCHX Coil** | 41,906 | 41,906 | 41,906 | 41,906 | 62,860 | 41,906 | 62,860 | 62,860 | 62,860 | 73,336 | 62,860 | 83,813 | 62,860 | 83,813 |
| **Axial Flying Bird 6 — 6 Pole Variable Speed** | | | | | | | | | | | | | | |
| **Fan Speed (rpm) Standard** | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 |
| **No. Blades… Diameter (in.)** | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 | 9…30 |
| **No. Fans (Ckt A/ Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Airflow (cfm) AL-CU Coil** | 55,877 | 55,877 | 55,877 | 55,877 | 83,816 | 55,877 | 83,816 | 83,816 | 83,816 | 97,785 | 83,816 | 111,755 | 836,816 | 111,755 |
| **Total Airflow (cfm) MCHX Coil** | 57,633 | 57,633 | 57,633 | 57,633 | 86,449 | 57,633 | 86,449 | 86,449 | 86,449 | 100,857 | 86,449 | 115,266 | 86,449 | 115,266 |
| **CONDENSER COILS** | | | | | | | | | | | | | | |
| **No. Coils (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Face Area (sq ft)** | 110 | 110 | 110 | 110 | 164 | 110 | 164 | 164 | 164 | 192 | 164 | 219 | 164 | 219 |
| **Max Working Refrigerant Pressure (psig)** | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 | 656 |
| **OPTIONAL PARTIAL HEAT RECOVERY** | | | | | | | | | | | | | | |
| **Weight (empty, lb)** | 64.8 | 78.5 | 92.2 | — | 92.2 | — | 92.2 | 110.6 | — | 110.6 | — | 129.1 | — | 129.1 |
| **Net Fluid Volume (gal)** | 1.00 | 1.50 | 2.00 | — | 2.00 | — | 2.00 | 2.66 | — | 2.66 | — | 3.33 | — | 3.33 |
| **Maximum Refrigerant Pressure (psig)** | 656 | 656 | 656 | — | 656 | — | 656 | 656 | — | 656 | — | 656 | — | 656 |
| **Maximum Water Side Pressure (psig)** | 300 | 300 | 300 | — | 300 | — | 300 | 300 | — | 300 | — | 300 | — | 300 |
| **Water Connections (in.)** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 2 | 2 | 2 | — | 2 | — | 2 | 2 | — | 2 | — | 2 | — | 2 |
| **HYDRONIC MODULE (Optional)** | Pump(s) with pressure/temperature taps and combination valve | | | | | | | | | | | | | |
| **Pump** | Single or Dual, 1800 or 3600 RPM | | | | | | | | | | | | | |

NOTE(S):

a. Neither shipping weight nor operating weight include any options.
b. All refrigerant and oil charge values reflect the standard chiller. See the Packaged Chiller Builder Program for charge values when the low LWT Fluid option is employed (when LWT is below 38°F [3.3°C]).
c. If the EWT requirement is greater than 70°F (21.1°C), a mixing loop is required. The EWT cannot exceed 70°F (21.1°C) for extended operation. Pulldown can be accomplished from 95°F (35°C).
d. 30RC air-cooled chillers with LWT below 38°F (3.3°C) are considered brine application chillers and require selection of H in position 11. Brine application chillers are factory-installed with lower refrigerant charge and, for R-32 chillers, increased oil charge.

LEGEND

**Al-Cu** — Aluminum Fin/Copper Tube Condenser Coil
**BPHE** — Brazed Plate Heat Exchanger
**DX** — Direct Expansion
**EXV** — Electronic Expansion Valve
**MCHX** — Microchannel Heat Exchanger

# Physical data (cont)

## 30RC 065-150 R-410A — SI

| UNIT 30RC | 065 | 070 | 080 C | 080 | 090 | 100 | 110 | 120 C | 120 | 130 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chassis Dimensions (mm)** | | | | | | | | | | | |
| **Length** | 2678 | 2678 | 2678 | 3872 | 3872 | 3872 | 3872 | 3872 | 5066 | 5066 | 5066 |
| **Width** | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 |
| **Height** | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 |
| **Required Pad Length** | 2393 | 2393 | 2393 | 3587 | 3587 | 3587 | 3587 | 3587 | 4781 | 4781 | 4781 |
| **MAXIMUM ALTITUDE (m)** | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 |
| **SHIPPING WEIGHT (kg)[a]** | | | | | | | | | | | |
| **MCHX/BPHE** | 1546 | 1652 | 1760 | 2070 | 2105 | 2075 | 2230 | 2231 | 2550 | 2730 | 2758 |
| **MCHX/DX** | 1870 | 1966 | 2063 | 2367 | 2399 | 2401 | 2600 | — | 2928 | 3099 | 3387 |
| **AL-CU/BPHE** | 1728 | 1833 | 1942 | 2305 | 2377 | 2348 | 2503 | 2503 | 2876 | 3093 | 3121 |
| **AL-CU/DX** | 2051 | 2148 | 2245 | 2602 | 2671 | 2673 | 2872 | — | 3254 | 3462 | 3750 |
| **OPERATING WEIGHT (kg)[a]** | | | | | | | | | | | |
| **MCHX/BPHE** | 1565 | 1673 | 1785 | 2095 | 2129 | 2113 | 2279 | 2279 | 2599 | 2784 | 2820 |
| **MCHX/DX** | 1988 | 2084 | 2182 | 2485 | 2517 | 2519 | 2773 | — | 3101 | 3273 | 3665 |
| **AL-CU/BPHE** | 1747 | 1855 | 1967 | 2330 | 2402 | 2386 | 2551 | 2551 | 2924 | 3147 | 3183 |
| **AL-CU/DX** | 2170 | 2266 | 2363 | 2720 | 2789 | 2792 | 3045 | — | 3427 | 3636 | 4028 |
| **REFRIGERANT TYPE** | R-410A, EXV Controlled System | | | | | | | | | | |
| **Refrigerant Charge[b] — R-410A** | | | | | | | | | | | |
| **MCHX/BPHE, Ckt A/Ckt B (kg)** | 11.4/11.7 | 11.4/14.9 | 14.8/15.0 | 16.0/17.6 | 18.5/18.2 | 19.0/18.4 | 22.5/18.7 | 16.1/24.4 | 19.4/25.2 | 25.4/25.4 | 25.4/25.6 |
| **MCHX/DX, Ckt A/Ckt B (kg)** | 12.2/12.7 | 12.2/15.8 | 15.6/15.9 | 16.8/18.6 | 19.2/19.6 | 19.5/19.7 | 23.2/20.2 | — | 20.1/26.6 | 25.6/26.6 | 27.0/28.0 |
| **AL-CU/BPHE, Ckt A/Ckt B (kg)** | 29.6/30.0 | 29.7/33.2 | 32.9/33.1 | 34.3/45.0 | 45.9/45.6 | 46.4/45.8 | 49.9/46.1 | 34.2/60.6 | 46.8/61.7 | 61.8/61.9 | 61.9/62.1 |
| **AL-CU/DX, Ckt A/Ckt B (kg)** | 30.5/31.1 | 30.5/34.2 | 33.7/34.1 | 35.1/46.2 | 46.6/47.2 | 46.9/47.3 | 50.6/47.8 | — | 47.5/63.4 | 62.3/63.4 | 63.6/64.8 |
| **COMPRESSORS — R-410A** | | | | | | | | | | | |
| **Quantity** | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 |
| **Speed (r/s)** | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 |
| **Quantity, Ckt A** | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 |
| **Quantity, Ckt B** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| **Oil Charge[b] (L, Ckt A/Ckt B)** | 7.6/7.6 | 7.6/13.8 | 13.8/13.8 | 13.8/13.8 | 13.8/13.8 | 13.8/13.8 | 20.7/13.8 | 13.8/20.7 | 13.8/20.7 | 20.7/20.7 | 20.7/20.7 |
| **No. Capacity Steps** | | | | | | | | | | | |
| **Standard** | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 |
| **Optional (Maximum)** | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 |
| **Minimum Capacity Step (%)** | | | | | | | | | | | |
| **Standard** | 25 | 21 | 25 | 25 | 22 | 25 | 18 | 20 | 20 | 15 | 17 |
| **Optional** | 14 | 12 | 17 | 17 | 15 | 18 | 12 | 15 | 15 | 10 | 12 |
| **Capacity (%)** | | | | | | | | | | | |
| **Ckt A** | 50 | 43 | 50 | 50 | 44 | 50 | 55 | 40 | 40 | 44 | 50 |
| **Ckt B** | 50 | 57 | 50 | 50 | 56 | 50 | 45 | 60 | 60 | 56 | 50 |
| **EVAPORATOR** | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | |
| **Weight (empty, kg)** | 60.0 | 68.6 | 78.9 | 78.9 | 78.9 | 42.9 | 53.6 | 53.6 | 53.6 | 59.7 | 67.3 |
| **Net Fluid Volume (L)** | 17.0 | 19.7 | 23.1 | 23.1 | 23.1 | 32.9 | 43.1 | 43.1 | 43.1 | 48.8 | 56.0 |
| **Maximum Refrigerant Pressure (kPa)** | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 |
| **Maximum Water Side Pressure w/o Pumps (kPa)** | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 |
| **Maximum Water Side Pressure w/ Pumps (kPa)** | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |
| **Water Side Operating Temperatures, Maximum[c] / Minimum (°C)** | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ 3.3 | 21.1/ –9.4[d] | 21.1/ –9.4[d] | 21.1/ –9.4[d] |
| **OPTIONAL DX COOLER** | | | | | | | | | | | |
| **Weight (empty, kg)** | 388.2 | 388.2 | 388.2 | 388.2 | 388.2 | 388.2 | 439.9 | 439.9 | 439.9 | 439.9 | 688.4 |
| **Net Fluid Volume (L)** | 118.5 | 118.5 | 118.5 | 118.5 | 118.5 | 118.5 | 173.4 | 173.4 | 173.4 | 173.4 | 278.2 |
| **Maximum Refrigerant Pressure (kPa)** | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 |
| **Maximum Water Side Pressure w/o Pumps (kPa)** | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 |
| **Maximum Water Side Pressure w/ Pumps (kPa)** | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |
| **Water Side Operating Temperatures, Maximum[c] / Minimum (°C)** | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] |
| **WATER CONNECTIONS (in.)** | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 |
| **OPTIONAL DX COOLER** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 4 | 4 | 4 | 4 | 4 | 4 | 6 | — | 6 | 6 | 6 |
| **Drain (NPT)** | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | — | 3/4 | 3/4 | 3/4 |

# Physical data (cont)

## 30RC 065-150 R-410A — SI (cont)

| UNIT 30RC | 065 | 070 | 080 C | 080 | 090 | 100 | 110 | 120 C | 120 | 130 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CONDENSER FANS** | | | | | | | | | | | |
| **Axial Flying Bird 6 — 8 Pole Fixed Speed** | | | | | | | | | | | |
| **Fan Speed (r/s) Standard** | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| **No. Blades…Diameter (mm)** | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Airflow (L/s) AL-CU Coil** | 19,149 | 19,149 | 19,149 | 23,937 | 28,724 | 28,724 | 28,724 | 28,724 | 33,511 | 38,299 | 38,299 |
| **Total Airflow (L/s) MCHX Coil** | 19,778 | 19,778 | 19,778 | 24,722 | 29,666 | 29,666 | 29,666 | 29,666 | 34,611 | 39,555 | 39,555 |
| **Axial Flying Bird 6 — 6 Pole Variable Speed** | | | | | | | | | | | |
| **Fan Speed (r/s) Standard** | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| **No. Blades…Diameter (mm)** | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Airflow (L/s) AL-CU Coil** | 26,371 | 26,371 | 26,371 | 32,964 | 39,557 | 39,557 | 39,557 | 39,557 | 46,149 | 52,742 | 52,742 |
| **Total Airflow (L/s) MCHX Coil** | 27,200 | 27,200 | 27,200 | 34,000 | 40,799 | 40,799 | 40,799 | 40,799 | 47,559 | 54,399 | 54,399 |
| **CONDENSER COILS** | | | | | | | | | | | |
| **No. Coils (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 3/2 | 3/3 | 3/3 | 3/3 | 2/4 | 3/4 | 4/4 | 4/4 |
| **Total Face Area (sq m)** | 10.2 | 10.2 | 10.2 | 12.7 | 15.2 | 15.2 | 15.2 | 15.2 | 17.8 | 20.3 | 20.3 |
| **Max Working Refrigerant Pressure (kPa)** | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 |
| **OPTIONAL PARTIAL HEAT RECOVERY** | | | | | | | | | | | |
| **Weight (empty, kg)** | 29.4 | 35.6 | 41.8 | 41.8 | 41.8 | 41.8 | 50.2 | — | 50.2 | 58.6 | 58.6 |
| **Net Fluid Volume (L)** | 3.78 | 5.67 | 7.56 | 7.56 | 7.56 | 7.56 | 10.08 | — | 10.08 | 12.60 | 12.60 |
| **Maximum Refrigerant Pressure (kPa)** | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | — | 4523 | 4523 | 4523 |
| **Maximum Water Side Pressure (kPa)** | 2068 | 2068 | 2068 | 2068 | 2068 | 2068 | 2068 | — | 2068 | 2068 | 2068 |
| **Water Connections (in.)** | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | — | 2 | 2 | 2 |
| **HYDRONIC MODULE (Optional)** | Pump(s) with pressure/temperature taps and combination valve | | | | | | | | | | |
| **Pump** | Single or Dual, 29.2 or 58.3 r/s | | | | | | | | | | |

NOTE(S):

a. Neither shipping weight nor operating weight include any options.
b. All refrigerant and oil charge values reflect the standard chiller. See the Packaged Chiller Builder Program for charge values when the low LWT Fluid option is employed (when LWT is below 38°F [3.3°C]).
c. If the EWT requirement is greater than 70°F (21.1°C), a mixing loop is required. The EWT cannot exceed 70°F (21.1°C) for extended operation. Pulldown can be accomplished from 95°F (35°C).
d. 30RC air-cooled chillers with LWT below 38°F (3.3°C) are considered brine application chillers and require selection of H in position 11. Brine application chillers are factory-installed with lower refrigerant charge and, for R-32 chillers, increased oil charge.

LEGEND

**Al-Cu** — Aluminum Fin/Copper Tube Condenser Coil
**BPHE** — Brazed Plate Heat Exchanger
**DX** — Direct Expansion
**EXV** — Electronic Expansion Valve
**MCHX** — Microchannel Heat Exchanger

# Physical data (cont)

## 30RC 067-152 R-32 — SI

| UNIT 30RC | 067 | 072 | 082 | 092 C | 092 | 102 C | 102 | 112 | 122 C | 122 | 132 C | 132 | 152 C | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chassis Dimensions (mm)** | | | | | | | | | | | | | | |
| **Length** | 2678 | 2678 | 2678 | 2678 | 3872 | 2678 | 3872 | 3872 | 3872 | 5066 | 3872 | 5066 | 3872 | 5066 |
| **Width** | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 |
| **Height** | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 |
| **Required Pad Length** | 2393 | 2393 | 2393 | 2393 | 3587 | 2393 | 3587 | 3587 | 3587 | 4781 | 3587 | 4781 | 3587 | 4781 |
| **MAXIMUM ALTITUDE (m)** | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 | 3,048 |
| **SHIPPING WEIGHT (kg)[a]** | | | | | | | | | | | | | | |
| **MCHX/BPHE** | 1546 | 1652 | 1760 | 1760 | 2105 | 1731 | 2075 | 2230 | 2231 | 2550 | 2381 | 2730 | 2408 | 2758 |
| **MCHX/DX** | 1870 | 1966 | 2063 | — | 2399 | — | 2401 | 2600 | — | 2928 | — | 3099 | — | 3387 |
| **AL-CU/BPHE** | 1728 | 1833 | 1942 | 1942 | 2377 | 1912 | 2348 | 2503 | 2503 | 2876 | 2654 | 3093 | 2680 | 3121 |
| **AL-CU/DX** | 2051 | 2148 | 2245 | — | 2671 | — | 2673 | 2872 | — | 3254 | — | 3462 | — | 3750 |
| **OPERATING WEIGHT (kg)[a]** | | | | | | | | | | | | | | |
| **MCHX/BPHE** | 1565 | 1673 | 1785 | 1785 | 2129 | 1769 | 2113 | 2279 | 2279 | 2599 | 2435 | 2784 | 2469 | 2820 |
| **MCHX/DX** | 1988 | 2084 | 2182 | — | 2517 | — | 2519 | 2773 | — | 3101 | — | 3273 | — | 3665 |
| **AL-CU/BPHE** | 1747 | 1855 | 1967 | 1967 | 2402 | 1951 | 2386 | 2551 | 2551 | 2924 | 2708 | 3147 | 2742 | 3183 |
| **AL-CU/DX** | 2170 | 2266 | 2363 | — | 2789 | — | 2792 | 3045 | — | 3427 | — | 3636 | — | 4028 |
| **REFRIGERANT TYPE** | R32, EXV Controlled System | | | | | | | | | | | | | |
| **Refrigerant Charge[b] — R-32** | | | | | | | | | | | | | | |
| **MCHX/BPHE, Ckt A/ Ckt B (kg)** | 10.5/ 10.8 | 10.7/ 13.1 | 13.0/ 13.1 | 12.9/ 13.0 | 17.0/ 16.4 | 13.2/ 13.2 | 16.8/ 16.4 | 19.7/ 16.6 | 14.1/ 21.7 | 17.2/ 22.3 | 19.7/ 19.4 | 22.0/ 22.0 | 19.7/ 17.1 | 22.2/ 19.9 |
| **MCHX/DX, Ckt A/ Ckt B (kg)** | 11.5/ 12.0 | 11.8/ 14.2 | 14.1/ 14.1 | — | 16.9/ 17.8 | — | 17.6/ 17.9 | 20.7/ 18.4 | — | 18.1/ 24.1 | — | 23.1/ 24.1 | — | 24.5/ 23.2 |
| **AL-CU/BPHE, Ckt A/ Ckt B (kg)** | 26.3/ 26.6 | 26.4/ 28.9 | 28.8/ 29.0 | 28.8/ 28.9 | 40.2/ 39.9 | 29.0/ 29.1 | 40.6/ 40.1 | 43.4/ 40.3 | 30.0/ 53.5 | 40.9/ 53.9 | 43.5/ 43.2 | 53.8/ 53.8 | 43.6/ 40.9 | 54.1/ 51.9 |
| **AL-CU/DX, Ckt A/Ckt B (kg)** | 27.3/ 27.8 | 27.3/ 30.0 | 29.7/ 30.0 | — | 41.1/ 41.6 | — | 41.3/ 41.6 | 44.4/ 42.2 | — | 41.9/ 55.8 | — | 54.7/ 55.8 | — | 56.2/ 54.9 |
| **COMPRESSORS — R-32** | | | | | | | | | | | | | | |
| **Quantity** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 5 |
| **Speed (r/s)** | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 | 58.3 |
| **Quantity, Ckt A** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| **Quantity, Ckt B** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 |
| **Oil Charge[b] (L, Ckt A/Ckt B)** | 8.2/ 8.2 | 8.2/ 13.2 | 13.2/ 13.2 | 13.2/ 13.2 | 13.2/ 13.2 | 13.2/ 13.2 | 13.2/ 13.2 | 19.8/ 13.2 | 13.2/ 19.8 | 13.2/ 19.8 | 19.8/ 19.8 | 19.8/ 19.8 | 19.8/ 13.2 | 19.8/ 13.2 |
| **No. Capacity Steps** | | | | | | | | | | | | | | |
| **Standard** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 5 | 5 |
| **Optional (Maximum)** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 6 | 6 |
| **Minimum Capacity Step (%)** | | | | | | | | | | | | | | |
| **Standard** | 25 | 21 | 25 | 22 | 22 | 25 | 25 | 18 | 20 | 20 | 15 | 15 | 16 | 16 |
| **Optional** | 14 | 12 | 17 | 15 | 15 | 18 | 18 | 12 | 15 | 15 | 10 | 10 | 12 | 12 |
| **Capacity (%)** | | | | | | | | | | | | | | |
| **Ckt A** | 50 | 43 | 50 | 44 | 44 | 50 | 50 | 55 | 40 | 40 | 44 | 44 | 48 | 48 |
| **Ckt B** | 50 | 57 | 50 | 56 | 56 | 50 | 50 | 45 | 60 | 60 | 56 | 56 | 52 | 52 |
| **EVAPORATOR** | | | | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | | | | |
| **Weight (empty, kg)** | 60.0 | 68.6 | 78.9 | 78.9 | 78.9 | 42.9 | 42.9 | 53.6 | 53.6 | 53.6 | 59.7 | 59.7 | 67.3 | 67.3 |
| **Net Fluid Volume (L)** | 17.0 | 19.7 | 23.1 | 23.1 | 23.1 | 32.9 | 32.9 | 43.1 | 43.1 | 43.1 | 48.8 | 48.8 | 56.0 | 56.0 |
| **Maximum Refrigerant Pressure (kPa)** | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 |
| **Maximum Water Side Pressure w/o Pumps (kPa)** | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 |
| **Maximum Water Side Pressure w/Pumps (kPa)** | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |
| **Water Side Operating Temperatures, Maximum[c] / Minimum (°C)** | 21.1/ –6.7[d] | 21.1/ –6.7[d] | 21.1/ –6.7[d] | 21.1/ 3.3 | 21.1/ –6.7[d] | 21.1/ 3.3 | 21.1/ –6.7[d] | 21.1/ –6.7[d] | 21.1/ 3.3 | 21.1/ –6.7[d] | 21.1/ 3.3 | 21.1/ –6.7[d] | 21.1/ 3.3 | 21.1/ –6.7[d] |
| **OPTIONAL DX COOLER** | | | | | | | | | | | | | | |
| **Weight (empty, kg)** | 388.2 | 388.2 | 388.2 | 388.2 | 388.2 | 388.2 | 388.2 | 439.9 | 439.9 | 439.9 | 439.9 | 439.9 | 688.4 | 688.4 |
| **Net Fluid Volume (L)** | 118.5 | 118.5 | 118.5 | 118.5 | 118.5 | 118.5 | 118.5 | 173.4 | 173.4 | 173.4 | 173.4 | 173.4 | 278.2 | 278.2 |
| **Maximum Refrigerant Pressure (kPa)** | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 | 3068 |
| **Maximum Water Side Pressure w/o Pumps (kPa)** | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 | 2069 |

# Physical data (cont)

## 30RC 067-152 R-32 — SI (cont)

| UNIT 30RC | 067 | 072 | 082 | 092 C | 092 | 102 C | 102 | 112 | 122 C | 122 | 132 C | 132 | 152 C | 152 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **OPTIONAL DX COOLER (cont)** | | | | | | | | | | | | | | |
| **Maximum Water Side Pressure w/Pumps (kPa)** | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |
| **Water Side Operating Temperatures, Maximum[c] / Minimum (°C)** | 21.1/ –1.1[d] | 21.1/ –1.1[d] | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] | — | 21.1/ –1.1[d] |
| **WATER CONNECTIONS (in.)** | | | | | | | | | | | | | | |
| **STANDARD BPHE** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| **OPTIONAL DX COOLER** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 4 | 4 | 4 | — | 4 | — | 4 | 6 | — | 6 | — | 6 | — | 6 |
| **Drain (NPT)** | 3/4 | 3/4 | 3/4 | — | 3/4 | — | 3/4 | 3/4 | — | 3/4 | — | 3/4 | — | 3/4 |
| **CONDENSER FANS** | | | | | | | | | | | | | | |
| **Axial Flying Bird 6 — 8 Pole Fixed Speed** | | | | | | | | | | | | | | |
| **Fan Speed (r/s) Standard** | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| **No. Blades…Diameter (mm)** | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Airflow (L/s) AL-CU Coil** | 19,149 | 19,149 | 19,149 | 19,149 | 28,724 | 19,149 | 28,724 | 28,724 | 28,724 | 33,511 | 28,724 | 38,299 | 28,724 | 38,299 |
| **Total Airflow (L/s) MCHX Coil** | 19,778 | 19,778 | 19,778 | 19,778 | 29,666 | 19,778 | 29,666 | 29,666 | 29,666 | 34,611 | 29,666 | 39,555 | 29,666 | 39,555 |
| **Axial Flying Bird 6 — 6 Pole Variable Speed** | | | | | | | | | | | | | | |
| **Fan Speed (r/s) Standard** | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| **No. Blades…Diameter (mm)** | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 | 9…762 |
| **No. Fans (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Airflow (L/s) AL-CU Coil** | 26,371 | 26,371 | 26,371 | 26,371 | 39,557 | 26,371 | 39,557 | 39,557 | 39,557 | 46,149 | 39,557 | 52,742 | 39,557 | 52,742 |
| **Total Airflow (L/s) MCHX Coil** | 27,200 | 27,200 | 27,200 | 27,200 | 40,799 | 27,200 | 40,799 | 40,799 | 40,799 | 47,599 | 40,799 | 54,399 | 40,799 | 54,399 |
| **CONDENSER COILS** | | | | | | | | | | | | | | |
| **No. Coils (Ckt A/Ckt B)** | 2/2 | 2/2 | 2/2 | 2/2 | 3/3 | 2/2 | 3/3 | 3/3 | 2/4 | 3/4 | 3/3 | 4/4 | 3/3 | 4/4 |
| **Total Face Area (sq m)** | 10.2 | 10.2 | 10.2 | 10.2 | 15.2 | 10.2 | 15.2 | 15.2 | 15.2 | 17.8 | 15.2 | 20.3 | 15.2 | 20.3 |
| **Max Working Refrigerant Pressure (kPa)** | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 | 4523 |
| **OPTIONAL PARTIAL HEAT RECOVERY** | | | | | | | | | | | | | | |
| **Weight (empty, kg)** | 29.4 | 35.6 | 41.8 | — | 41.8 | — | 41.8 | 50.2 | — | 50.2 | — | 58.6 | — | 58.6 |
| **Net Fluid Volume (L)** | 3.78 | 5.67 | 7.56 | — | 7.56 | — | 7.56 | 10.08 | — | 10.08 | — | 12.6 | — | 12.6 |
| **Maximum Refrigerant Pressure (kPa)** | 4523 | 4523 | 4523 | — | 4523 | — | 4523 | 4523 | — | 4523 | — | 4523 | — | 4523 |
| **Maximum Water Side Pressure (kPa)** | 2068 | 2068 | 2068 | — | 2068 | — | 2068 | 2068 | — | 2068 | — | 2068 | — | 2068 |
| **Water Connections (in.)** | | | | | | | | | | | | | | |
| **Inlet and Outlet, Victaulic** | 2 | 2 | 2 | — | 2 | — | 2 | 2 | — | 2 | — | 2 | — | 2 |
| **HYDRONIC MODULE (Optional)** | Pump(s) with pressure/temperature taps and combination valve | | | | | | | | | | | | | |
| **Pump** | Single or Dual, 29.2 or 58.3 r/s | | | | | | | | | | | | | |

NOTE(S):

a. Neither shipping weight nor operating weight include any options.
b. All refrigerant and oil charge values reflect the standard chiller. See the Packaged Chiller Builder Program for charge values when the low LWT Fluid option is employed (when LWT is below 38°F [3.3°C]).
c. If the EWT requirement is greater than 70°F (21.1°C), a mixing loop is required. The EWT cannot exceed 70°F (21.1°C) for extended operation. Pulldown can be accomplished from 95°F (35°C).
d. 30RC air-cooled chillers with LWT below 38°F (3.3°C) are considered brine application chillers and require selection of H in position 11. Brine application chillers are factory-installed with lower refrigerant charge and, for R-32 chillers, increased oil charge.

LEGEND

**Al-Cu** — Aluminum Fin/Copper Tube Condenser Coil
**BPHE** — Brazed Plate Heat Exchanger
**DX** — Direct Expansion
**EXV** — Electronic Expansion Valve
**MCHX** — Microchannel Heat Exchanger

# Physical data (cont)

## 09FC Free Cooling Design[a] — English[b]

| UNIT 09FC (FREE COOLING) | 020 | 030 | 040 | 050 | 060 | 070 | 080 |
|---|---|---|---|---|---|---|---|
| **CHASSIS DIMENSIONS (in.) [c]** | | | | | | | |
| **Length** | 100 | 147 | 194 | 241 | 288 | 335 | 382 |
| **Width** | 88 | 88 | 88 | 88 | 88 | 88 | 88 |
| **Height** | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| **SHIPPING WEIGHT (lb) [d]** | 3535 | 5042 | 6610 | 8379 | 9886 | 11433 | 12939 |
| **OPERATING WEIGHT (lb) [e]** | 4352 | 6258 | 8226 | 10411 | 12318 | 14265 | 16171 |
| **FREE COOLING ARRANGEMENT** | | | | | | | |
| **No. Coils (Al/Cu or Al/Cu E-Coat)** | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| **Chilled Fluid Volume (gal.)** | 98 | 146 | 194 | 243 | 291 | 339 | 387 |
| **Maximum Fluid-Side Pressure (psig)** | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| **FREE COOLING FANS** | Shrouded Axial Type, Vertical Discharge | | | | | | |
| **Maximum Fan Speed (rpm)** | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 |
| **No. Fans** | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| **WATER CONNECTIONS [f]** | | | | | | | |
| **Customer Inlet Connection Size (parallel free cooling configuration), Victaulic (in.)** | 6 | 6 | 6 | 8 | 8 | 8 | 8 |
| **Customer Inlet Connection Size (series free cooling configuration), Victaulic (in.)** | N/A | N/A | N/A | 6 | 6 | 6 | 6 |
| **Drain (NPT, in.)** | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 |

## 09FC Free Cooling Design[a] — SI[b]

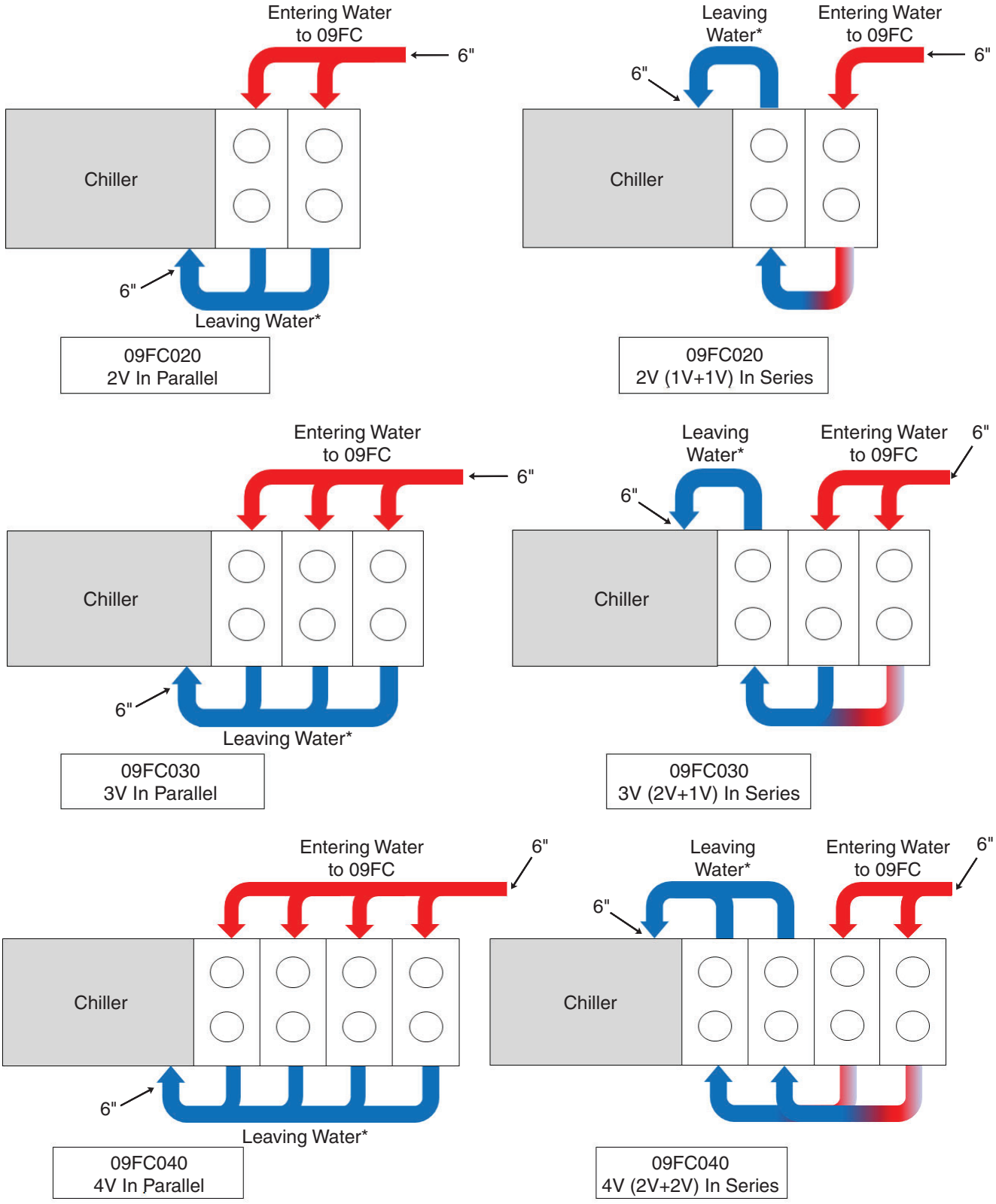
| UNIT 09FC (FREE COOLING) | 020 | 030 | 040 | 050 | 060 | 070 | 080 |
|---|---|---|---|---|---|---|---|
| **CHASSIS DIMENSIONS (mm)[c]** | | | | | | | |
| **Length** | 2535 | 3729 | 4923 | 6117 | 7311 | 8505 | 9699 |
| **Width** | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 | 2236 |
| **Height** | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 | 2513 |
| **SHIPPING WEIGHT (kg)[d]** | 1603 | 2287 | 2998 | 3801 | 4484 | 5186 | 5869 |
| **OPERATING WEIGHT (kg)[e]** | 1974 | 2839 | 3731 | 4722 | 5587 | 6471 | 7335 |
| **FREE COOLING ARRANGEMENT** | | | | | | | |
| **No. Coils (Al/Cu or Al/Cu E-Coat)** | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| **Chilled Fluid Volume (L)** | 371 | 553 | 734 | 886 | 1060 | 1283 | 1465 |
| **Maximum Fluid-Side Pressure (kPa)** | 1724 | 1724 | 1724 | 1724 | 1724 | 1724 | 1724 |
| **FREE COOLING FANS** | Shrouded Axial Type, Vertical Discharge | | | | | | |
| **Maximum Fan Speed (r/s)** | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| **No. Fans** | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
| **WATER CONNECTIONS[f]** | | | | | | | |
| **Customer Inlet Connection Size (parallel free cooling configuration), Victaulic (in.)** | 6 | 6 | 6 | 8 | 8 | 8 | 8 |
| **Customer Inlet Connection Size (series free cooling configuration), Victaulic (in.)** | N/A | N/A | N/A | 6 | 6 | 6 | 6 |
| **Drain (NPT, in.)** | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 |

NOTE(S):

a. These data are only applicable to 30RC chillers which employ free cooling. When the 30RC is integrated with the 09FC free cooling design, the Physical Data for the complete assembly is altered by the information shown here. See the examples at the end of this section.
b. Depending upon the operating conditions, a given size of 30RC has the ability to be integrated with different sizes of the 09FC (free cooling section).
c. More accurate dimensions may be obtained in the Chiller Submitted Drawing Manager or by contacting your Carrier sales representative
d. Free cooling section shipping weight includes the base 09FC unit plus coil trim panels. The shipping weight is equal to the operating weight minus the weight of the fluid in the 09FC coils.
e. Free cooling section operating weight includes the base 09FC unit plus coil trim panels. The addition of other options or accessories will slightly increase the weight of the free cooling section of the chiller.
f. The outlet connection (supply chilled fluid) for the application will be the 30RC evaporator leaving water connection size as shown in the 30RC Physical Data page.

# Physical data (cont)

**Free Cooling (09FC) Schematic Piping Configurations**




See the 09FC Installation Instructions for specific piping detail.

* The free cooling section leaving water temperature is the chiller entering water temperature.

# Physical data (cont)

### Free Cooling Integrated with 30RC Example (English)
### 30RC 150 (MCHX and Standard, Brazed Plate Evaporator, Greenspeed Intelligence, and No Pumps) Including 09FC020

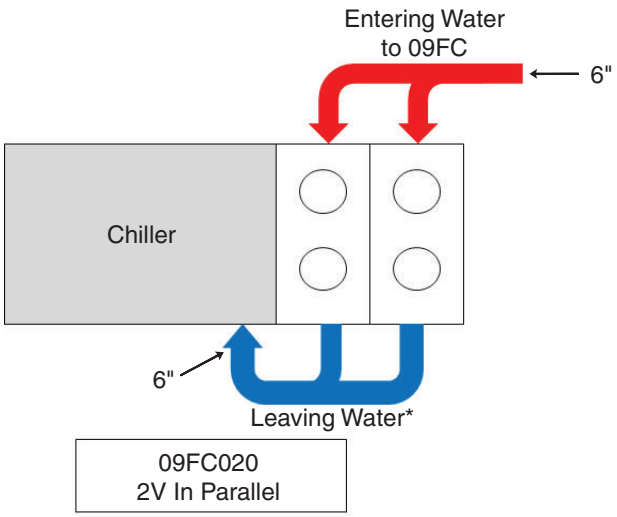
Note that this free cooling module (size 020) may be offered in either a series or a parallel arrangement, and the data shown here are accurate for both piping arrangements.

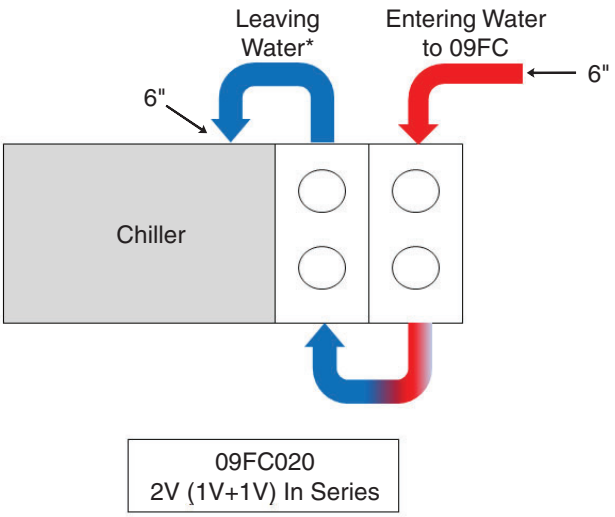
| 30RC UNIT | MECHANICAL COOLING SECTION | FREE COOLING SECTION | COMPLETE UNIT |
|---|---|---|---|
| **CHASSIS DIMENSIONS (in.)** | | | |
| **Length** | 199 | 100 | 299 (plus piping allowance)[a] |
| **Width** | 88 | 88 | 88 |
| **Height** | 99 | 99 | 99 |
| **SHIPPING WEIGHT (lb)** | 6,082 | 3,535 | 9,617 |
| **OPERATING WEIGHT (lb)** | 6,217 | 4,352 | 10,569 |
| **REFRIGERANT TYPE (Standard Evaporator)** | R-410A | — | R-410A |
| **Refrigerant Charge (lb) Ckt A/ Ckt B (MCHX)** | 56.0/56.4 | — | 56.0/56.4 |
| **COMPRESSOR (Hermetic Scroll)** | | | |
| **Quantity** | 6 | — | 6 |
| **Full Load Capacity Split Ckt A/Ckt B** | 50/50 | — | 50/50 |
| **Minimum Capacity (%)[b]** | < 17 | — | < 17 |
| **EVAPORATOR & FREE COOLING (Fluid Volume and Pressure)** | | | |
| **Net Fluid Volume (gal.)** | 14.8 | 98 | 112.8 |
| **Maximum Refrigerant Pressure (psig)** | 445 | — | 445 |
| **Maximum Fluid-Side Pressure (psig)** | 300 (without pump) | 250 | 250 (without pump)[c] |
| **COIL QUANTITY (Mechanical Cooling and Free Cooling Sections)** | | | |
| **No. Coils** | 4/4[d] | 4 | 12 |
| **FANS** | Shrouded Axial Type, Vertical Discharge | | |
| **Maximum Fan Speed (rpm)** | 1,140 | 1,140 | 1,140 |
| **No. Fans (Ckt A/ Ckt B or total for Free Cooling Section)** | 4/4 | 4 | 12 |
| **WATER CONNECTIONS** | | | |
| **Drain (NPT, in.)** | 3/4 | 1/4 | See Columns to the Left |
| **Evaporator Outlet, Victaulic (in.)** | 5 | — | 5 |
| **Free Cooling Arrangement Inlet, (in.)** | — | 6 | 6 |

NOTE(S):

a. The complete unit length may be up to 12 inches longer for some chiller sizes when a brazed plate evaporator is employed. See the 30RC Installation Instructions for more information.
b. Using only the mechanical cooling portion of the chiller.
c. The maximum unit fluid-side pressure is the smaller value of the fluid containing vessels, which is the free cooling section when no pumps are employed.
d. This indicates the number of coils in Ckt A/Ckt B.

### Applicable Piping Schematic for Example Shown Above




See the 09FC Installation Instructions for specific piping detail.

* The free cooling section leaving water temperature is the chiller entering water temperature.

# Physical data (cont)

### Free Cooling Integrated with 30RC EXAMPLE (SI)
### 30RC 150 (MCHX and Standard, Brazed Plate Evaporator, Greenspeed Intelligence, and No Pumps) Including 09FC020

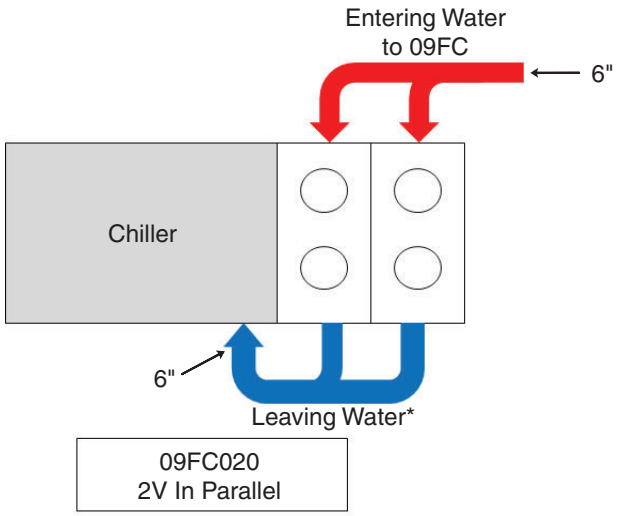
Note that this free cooling module (size 020) may be offered in either a series or a parallel arrangement, and the data shown here are accurate for both piping arrangements.

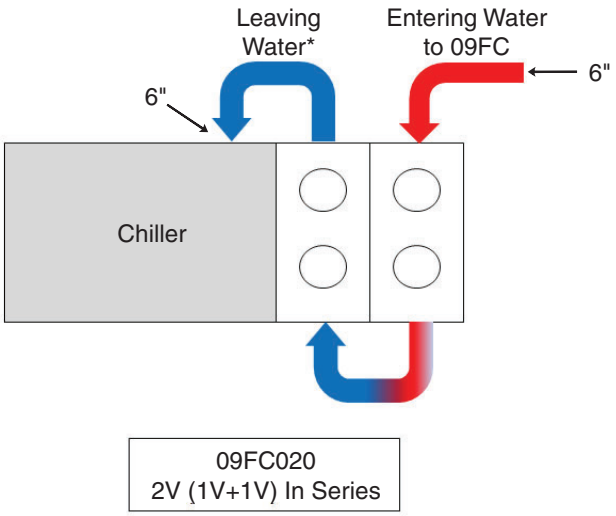
| 30RC UNIT | MECHANICAL COOLING SECTION | FREE COOLING SECTION | COMPLETE UNIT |
|---|---|---|---|
| **CHASSIS DIMENSIONS (mm)** | | | |
| **Length** | 5066 | 2535 | 7601 (plus piping allowance)[a] |
| **Width** | 2236 | 2236 | 2236 |
| **Height** | 2513 | 2513 | 2513 |
| **SHIPPING WEIGHT (kg)** | 2758 | 1603 | 4361 |
| **OPERATING WEIGHT (kg)** | 2820 | 1974 | 4794 |
| **REFRIGERANT TYPE (Standard Evaporator)** | R-410A | — | R-410A |
| **Refrigerant Charge (kg) Ckt A/ Ckt B (MCHX)** | 25.4/25.6 | — | 25.4/25.6 |
| **COMPRESSOR (Hermetic Scroll)** | | | |
| **Quantity** | 6 | — | 6 |
| **Full Load Capacity Split Ckt A/Ckt B** | 50/50 | — | 50/50 |
| **Minimum Capacity (%)[b]** | < 17 | — | < 17 |
| **EVAPORATOR & FREE COOLING (Fluid Volume and Pressure)** | | | |
| **Net Fluid Volume (L)** | 56 | 371 | 427 |
| **Maximum Refrigerant Pressure (kPa)** | 3068 | — | 3068 |
| **Maximum Fluid-Side Pressure (kPa)** | 2069 (without pump) | 1724 | 1724 (without pump)[c] |
| **COIL QUANTITY (Mechanical Cooling and Free Cooling Sections)** | | | |
| **No. Coils** | 4/4[d] | 4 | 12 |
| **FANS** | Shrouded Axial Type, Vertical Discharge | | |
| **Maximum Fan Speed (r/s)** | 19 | 19 | 19 |
| **No. Fans (Ckt A/ Ckt B or total for Free Cooling Section)** | 4/4 | 4 | 12 |
| **WATER CONNECTIONS** | | | |
| **Drain (NPT, in.)** | 3/4 | 1/4 | See Columns to the Left |
| **Evaporator Outlet, Victaulic (in.)** | 5 | — | 5 |
| **Free Cooling Arrangement Inlet, (in.)** | — | 6 | 6 |

NOTE(S):

a. The complete unit length may be up to 305 mm longer for some chiller sizes when a brazed plate evaporator is employed. See the 30RC Installation Instructions for more information.
b. Using only the mechanical cooling portion of the chiller.
c. The maximum unit fluid-side pressure is the smaller value of the fluid containing vessels, which is the free cooling section when no pumps are employed.
d. This indicates the number of coils in Ckt A/Ckt B.

### Applicable Piping Schematic for Example Shown Above




See the 09FC Installation Instructions for specific piping detail.

* The free cooling section leaving water temperature is the chiller entering water temperature.

# Options and accessories

| ITEM | FACTORY-INSTALLED OPTION | FIELD-INSTALLED ACCESSORY |
|---|---|---|
| **CONDENSER COIL OPTIONS** | | |
| **MCHX E-Coated** | X | |
| **Aluminum Fin/Copper Tube** | X | |
| **Aluminum Fin/Copper Tube, E-Coated** | X | |
| **CONTROLS/COMMUNICATION OPTIONS** | | |
| **Energy Management Module (EMM)** | X | X |
| **LON (Local Operating Network) Translator Control** | X | X |
| **Dual Chiller Accessory Kit** | | X |
| **Upgraded Control Panel (Includes 7 in. Control Panel Display and ability to enable Capacity Recovery™ / rapid restart capability when variable speed condenser fans are included)** | X | |
| **Fan VFD Display** | | X |
| **EVAPORATOR OPTIONS** | | |
| **Direct Expansion Shell-and-Tube Evaporator** | X | |
| **Freeze Protection — Evaporator Heaters** | X | |
| **CRN Evaporator (Canada Only)** | X | |
| **ELECTRICAL OPTIONS** | | |
| **Dual Point Power** | X | |
| **Unit-Mounted Main Disconnect, Non-Fused** | X | |
| **Convenience Outlet (Not Available at 380 volt)** | X | |
| **High SCCR (Includes Non-Fused Disconnect)[a]** | X | |
| **HYDRONICS OPTION** | | |
| **Hydronic Pump Package (150 psig [1034 kPa] With or Without VFD)** | X | |
| **REFRIGERATION CIRCUIT OPTIONS** | | |
| **High-Efficiency Variable Condenser Fans** | X | |
| **Compressor Suction Service Valve** | X | |
| **Minimum Load Control (Not Available with Leaving Fluid Temperature <38°F [<3.3°C])** | X | |
| **Suction Line Insulation** | X | |
| **Chicago Relief Valve** | X | |
| **Desuperheater (Not Available with Dual Pump Option or on Most Compact Tier Units)** | X | |
| **Low LWT Fluid** | X | |
| **SECURITY/LOW SOUND OPTIONS** | | |
| **Low Sound — Compressor Sound Reduction Blankets** | X | X |
| **Condenser Coil Trim Panels** | X | X |
| **Security Grilles** | X | |
| **Full Hail Guard** | X | |
| **Security Grilles (Sides) and Hail Guard (Ends)** | X | |
| **Wind Baffles[b]** | | X |

NOTE(S):

a. High SCCR (65 kA for all voltages except 575-v, 35kA for 575-v).
b. Wind baffle accessory is not available when the chiller is equipped with the full hail guard or security grilles (sides) and hail guard (ends). This is because hail guards covering the unit ends function as wind baffles.

LEGEND

**E-Coated** — Epoxy Coating Applied to Entire Coil Assembly
**EMM** — Energy Management Module
**LON** — Local Operating Network
**MCHX** — Microchannel Heat Exchanger
**VFD** — Variable Frequency Drive

# Options and accessories (cont)

## Factory-Installed Options

### Condenser Coil

Condenser coil options are available to match coil construction to the site conditions for the best durability. Contact your Carrier sales representative for more information.

### Compressor Suction Service Valve

The compressor suction service valve provides additional isolation of the compressor from the cooler vessel for service. Standard refrigerant discharge isolation and liquid valves enable service personnel to store the refrigerant charge in the cooler or condenser during servicing.

### Suction Line Insulation

Suction line insulation is tubular, closed-cell insulation. This option is required on applications with leaving fluid temperatures below 38°F (3.3°C) and recommended for areas with high dewpoints, where condensation may be a concern.

### Hydronic Pump Package

The hydronic pump package option adds circulating pumps, a combination valve (isolation, modulation, and check), startup strainer, Victaulic[1] field piping connections, insulation, and pressure/temperature taps. The pumps are available in single or dual (lead/lag controlled) versions. This package also includes a heater and insulation for freeze protection to –20°F (–29°C).

### High-Efficiency Variable Condenser Fans

High-efficiency variable condenser fans control the speed of all fans, improving part load efficiency and sound levels. Additionally, high-efficiency variable condenser fans maintain head pressure control down to –20°F (–29°C) ambient temperature with the use of glycol and wind baffles. Varying the speed of all fans on a circuit to a prescribed speed provides accurate head pressure control to the most efficient point, while achieving optimum usage of the coils to accomplish excellent part load efficiency. These fans are the key component of the 30RC chiller with Greenspeed® intelligence.

### Direct Expansion Shell-and-Tube Evaporator

The direct expansion shell-and-tube evaporator provides an alternative to the brazed plate evaporator and may often be ideal for replacement applications. A CRN certified shell-and-tube evaporator is also available, and this provides minor evaporator modifications to meet Canadian code. The shell-and-tube evaporator is not available on compact unit models.

### Dual Point Power

Dual point power provides the chiller with 2 sources of 3-phase power, and this may be beneficial for replacement jobs and/or wire sizing considerations.

### Unit-Mounted Non-Fused Disconnect

The unit-mounted non-fused disconnect option provides non-fused disconnect capability for power and control located at the unit. This option is included with the high SCCR option.

### Minimum Load Control

The minimum load control option allows additional capacity reduction for unit operation below the minimum step of unloading (down to 10% of the full load unit capacity, depending on unit size). This option is not available on applications with leaving fluid temperatures less than 38°F (3.3°C) or on compact tier units (except size 080).

### Low LWT Fluid

This option is required for all applications with a leaving chilled fluid temperature below 38°F (3.3°C). For R-410A applications, this option results in a different refrigerant charge compared to standard comfort-cooling applications. When R-32 is employed, both refrigerant and oil charge quantities are affected. The use of this option also requires the chiller to be provided with suction line insulation.

### Security Grilles

Security grilles protect the unit from damage with coated wire grilles with openings of 1 by 4 in. (25 by 102 mm). The security grille option includes the condenser coil trim panel option.

### Condenser Coil Trim Panels

Condenser coil trim panels provide an aesthetic, finished appearance for the condenser coil ends of the cooler/pump connection side of the unit while protecting the coil headers.

### Security Grilles (Sides) and Hail Guard (Ends)

This option consists of louvered panels on the ends of the machine and security grilles on the sides of the machine. These coverings firmly fasten to the machine frame and provide complete coverage from the top to the bottom of the unit. Note that this factory option also functions as a wind baffle, and the wind baffle accessory is not available when this option is selected.

### High SCCR

High SCCR devices allow the chiller to tolerate a 65 kA (35kA for 575-v) short circuit current for a brief period of time while protecting downstream components. The high SCCR provides a higher level of protection than standard chiller components. This option includes the unit-mounted non-fused disconnect option. The standard SCCR rating for all models is 25 kA for all voltages other than 575-v and 10 kA for 575-v.

### Chicago Relief Valve

This option consists of relief valves to meet Chicago code requirements.

### Full Hail Guard

The full hail guard consists of louvered panels on the sides and ends of the machine. These hail guards firmly fasten to the machine, and they provide coverage from the top to the bottom of the unit. Coil trim panels are not available with the full hail guard because this hail guard covers all coil tubing. Note that this factory option also functions as a wind baffle, and the wind baffle accessory is not available when this option is selected.

### Desuperheater

This option adds a device which produces tempered hot water while chilled water is being produced. This device is not available with the dual pump option (only single pump) and is not available with compact-tier units (except size 080).

### Low Sound

Low sound provides compressor sound blankets on each compressor to reduce unit sound levels.

1. Victaulic is a trademark of Victaulic Company.

# Options and accessories (cont)

### Freeze Protection Evaporator Heaters

Freeze protection evaporator heaters provide protection from evaporator freeze — up to –20°F (–29°C) ambient temperature.

### Energy Management Module

The energy management module provides energy management capabilities to minimize chiller energy consumption. Several features are provided with this module, including leaving fluid temperature reset; cooling set point reset or demand limit control from a 4 to 20 mA signal; 2-step demand limit control, from 0 to 100%, activated by a remote contact closure (one-step demand limit does not require the energy management module); and discrete input for "Ice Done" indication for ice stage system interface.

### Convenience Outlet

The convenience outlet includes a 4-amp GFI (ground fault interrupt) receptacle with independent fuse protection. The convenience outlet is a 115-v female receptacle. Not available on 380-v units.

### LON Translator Control

The LON translator control provides an interface between the chiller and a Local Operating Network (LON, i.e., LonWorks[1] FT-10A ANSI/EIA-709.1). Field programming is required.

### Upgraded Control Panel

The upgraded control panel option provides the chiller with 2 additional features. Firstly, it provides a 7 in. control panel in lieu of the standard 4.3 in. control panel. Additionally, the chiller is provided with the ability to enable the Capacity Recovery/rapid restart capability (when variable speed condenser fans are provided).

1. LonWorks is a registered trademark of Echelon Corporation.

## Field-Installed Accessories

### Low Sound

Low sound provides compressor sound blankets on each compressor to reduce unit sound levels.

### Energy Management Module

The energy management module provides energy management capabilities to minimize chiller energy consumption. Several features are provided with this module, including leaving fluid temperature reset; cooling set point reset or demand limit control from a 4 to 20 mA signal; 2-step demand limit control, from 0 to 100%, activated by a remote contact closure (one-step demand limit does not require the energy management module); and discrete input for "Ice Done" indication for ice stage system interface.

### LON Translator Control

The LON translator control provides an interface between the chiller and a Local Operating Network (LON, i.e., LonWorks FT-10A ANSI/EIA-709.1). Field programming is required.

### Condenser Coil Trim Panels

Condenser coil trim panels provide an aesthetic, finished appearance for the condenser coil ends of the cooler/pump connection side of the unit while protecting the coil header.

### Wind Baffles

Wind baffles consist of louvered panels which facilitate operation down to –20°F (–29°C) when used in conjunction with high-efficiency variable condenser fans.

### Dual Chiller Accessory Kit

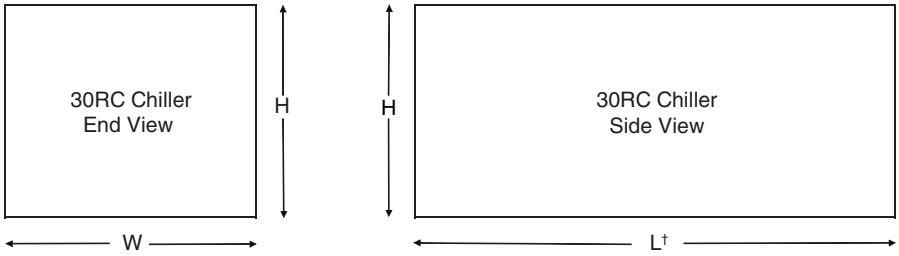
The dual chiller accessory kit provides the additional hardware (thermistors, wells, and connectors) required for applications with 2 chillers running in parallel.

### Fan VFD Display

Units with fan VFD's are not provided with a VFD display as standard. The fan VFD display provides additional information and may be used as a service tool.

# Dimensions

## Chiller Layout Dimensions — English




| 30RC CHILLER SIZE | 065<br>067<br>070<br>072<br>080 C*<br>082<br>092 C*<br>102 C* | | | 080<br>090<br>092<br>100<br>102<br>110<br>112<br>120 C*<br>122 C*<br>132 C*<br>152 C* | | | 120<br>122<br>130<br>132<br>150<br>152 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chiller Dimensions** | **L (Length)†** | **W (Width)** | **H (Height)** | **L (Length)†** | **W (Width)** | **H (Height)** | **L (Length)†** | **W (Width)** | **H (Height)** |
| **(in.)** | 105 | 88 | 99 | 152 | 88 | 99 | 199 | 88 | 99 |

* When a “C” is shown in the chiller size, this indicates a compact unit (and digit 10 of the unit model number is a “C”).

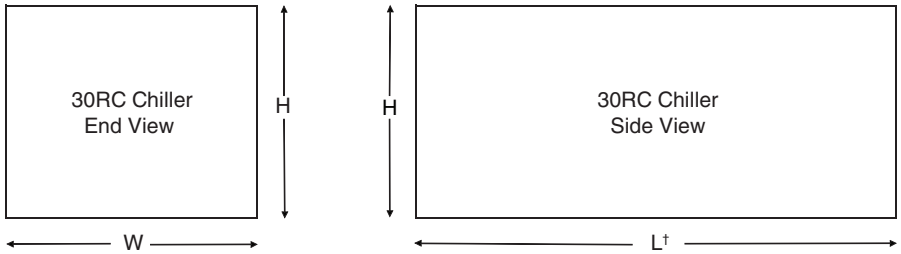
† The chiller length shown in this chart does not include a free cooling section. When free cooling is employed, the additional length can be evaluated with the information presented in the Physical Data portion of this publication.

NOTES:

1) The dimensions presented here are intended to determine the suitability of a given chiller for a given space. Detailed dimensions, including chilled-water piping locations/details, contact surface locations, electrical connection locations, and other relevant data, are presented in the Chiller Submittal Drawing Manager.
2) When determining the suitability of a given chiller for a space, do not forget to consider the availability of adequate airflow to that location. Airflow guidelines and clearances are presented in the Application Section of this publication.

# Dimensions (cont)

## Chiller Layout Dimensions — SI




| 30RC CHILLER SIZE | 065<br>067<br>070<br>072<br>080 C*<br>082<br>092 C*<br>102 C* | | | 080<br>090<br>092<br>100<br>102<br>110<br>112<br>120 C*<br>122 C*<br>132 C*<br>152 C* | | | 120<br>122<br>130<br>132<br>150<br>152 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chiller Dimensions** | **L (Length)†** | **W (Width)** | **H (Height)** | **L (Length)†** | **W (Width)** | **H (Height)** | **L (Length)†** | **W (Width)** | **H (Height)** |
| **(mm)** | 2678 | 2236 | 2513 | 3872 | 2236 | 2513 | 5066 | 2236 | 2513 |

* When a “C” is shown in the chiller size, this indicates a compact unit (and digit 10 of the unit model number is a “C”).

† The chiller length shown in this chart does not include a free cooling section. When free cooling is employed, the additional length can be evaluated with the information presented in the Physical Data portion of this publication.

NOTES:

1) The dimensions presented here are intended to determine the suitability of a given chiller for a given space. Detailed dimensions, including chilled-water piping locations/details, contact surface locations, electrical connection locations, and other relevant data, are presented in the Chiller Submittal Drawing Manager.
2) When determining the suitability of a given chiller for a space, do not forget to consider the availability of adequate airflow to that location. Airflow guidelines and clearances are presented in the Application Section of this publication.

# Selection procedure

Carrier's NACO (North American Commercial Operations) Packaged Chiller Builder Program provides quick, easy selection of Carrier's air-cooled liquid 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)

- If the LWT is less than 40°F (4.4°C), loop freeze protection to a minimum of 30°F (16.6°C) below the LWT set point is required.
- If the LWT requirement is greater than 70°F (21.1°C), a mixing loop is required.

Entering water temperature (EWT)

- If the EWT requirement is greater than 70°F (21.1°C), a mixing loop is required. The EWT cannot exceed 70°F (21.1°C) for extended operation. Pulldown can be accomplished from 95°F (35°C).

Evaporator flow rate or evaporator delta-T

- The evaporator delta-T must fall between 3 and 20°F (1.7 and 11°C) while still meeting both the fluid min/max temperature requirements and the fluid min/max flow requirements.
- For larger or smaller delta-T applications, a mixing loop is required.
- If the evaporator flow is variable, then the rate of change of flow should not exceed 10% per minute. A loop volume of greater than 3 gallons per ton (3.25 L per kW) is recommended.

Evaporator pressure drop

- A high evaporator pressure drop can be expected when the evaporator delta-T is low. A mixing loop can help to alleviate this situation.
- A low evaporator pressure drop can be expected when the evaporator delta-T is high.

Water quality, fouling factor

- Poor water quality can increase evaporator fouling.
- 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 quality water (and lower fouling factors).

Operation below 32°F (0°C)

- Variable speed condenser fans are required.
- Wind baffles are required.
- Consider higher loop volumes, 6 to 10 gallons per nominal ton (6.5 to 10.75 L per kW).
- Loop freeze protection with glycol is strongly recommended to a minimum of 15°F (8°C) below lowest anticipated ambient temperature.
- Chilled water pump control is strongly recommended; otherwise, override capability is required.
- Consider using free cooling to reduce mechanical cooling load and increase overall system efficiency.

Chiller idle below 32°F (0°C)

- Loop freeze protection with glycol is strongly recommended to a minimum of 15°F (8°C) below lowest anticipated ambient temperature.
- Chilled water pump control is strongly recommended; otherwise, override capability is required.
- Drain the evaporator — this will require a small amount of glycol for residual water. Evaporator heaters (if provided) will need to be disconnected.

Ambient temperature

- Highest allowable ambient air temperature is 125.6°F (52°C) for all standard units (may be different for compact units).
- Lowest allowable ambient temperature for the standard unit to start and operate is 32°F (0°C). With the inclusion of wind baffles, as well as variable speed condenser fans, units are capable of starting as low as –13°F (–25°C) and operating as low as –20°F (–29°C) ambient temperature.

Evaporator capacity requirements

- Do not oversize the chillers by more than 15% at design conditions.
- If evaporator capacity control is required below the standard minimum step of unloading, the minimum load control option should be employed.

Coil corrosion requirements

- Coastal application
- Industrial application
- Coastal/industrial application
- Urban application
- Farming

NOTE: See NACO Packaged Chiller Builder and appropriate selection guides for more information.

# Selection procedure (cont)

## AquaSnap® pump selection

Several pump sizes are available for each AquaSnap chiller size to provide flexibility in matching water system requirements. A dual pump option is also available for primary/standby operation. The Carrier Packaged Chiller Builder Program must be used for pump selection.

Proper water system design is critical; cooling loads, water pressure drops and proper water line sizing must be accounted for in order to ensure proper system operation. Incorrect or incomplete analysis/design of the water loop could lead to low water flow, loss of water temperature control, and excessive cycling of chiller compressors.

### Pump Impeller Sizes[a]

| UNIT 30RC | PUMP Hp | SINGLE PUMP | | | | DUAL PUMP | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Option Code[b] (BPHE/DX) | RPM | Impeller Dia. (in.) | Pump Curve | Option Code[a] (BPHE/DX) | RPM | Impeller Dia. (in.) | Pump Curve |
| 065/067 070/072 | 5 | 0/K | 1750 | 7.43 | I | 5/Q | 1750 | 7.67 | V |
| | 7.5 | 1/L | 1750 | 8.17 | I | 6/R | 1750 | 8.17 | V |
| | 10 | 2/M | 3450 | 5.27 | II | 7/S | 3450 | 5.72 | VI |
| 080/082 090/092 100/102 110/112 120/122 130/132 | 5 | 0/K | 1750 | 7.43 | I | 5/Q | 1750 | 7.67 | V |
| | 7.5 | 1/L | 1750 | 8.17 | I | 6/R | 1750 | 8.17 | V |
| | 10 | 2/M | 3450 | 5.27 | II | 7/S | 3450 | 5.27 | VII |
| | 15 | 3/N | 3450 | 5.84 | II | 8/T | 3450 | 5.91 | VII |
| 150/152 | 7.5 | 1/L | 1750 | 7.18 | III | 6/R | 3450 | 4.93 | VII |
| | 10 | 2/M | 3450 | 5.27 | II | 7/S | 3450 | 5.27 | VII |
| | 15 | 3/N | 3450 | 4.96 | IV | 8/T | 3450 | 4.96 | VIII |

NOTE(S):

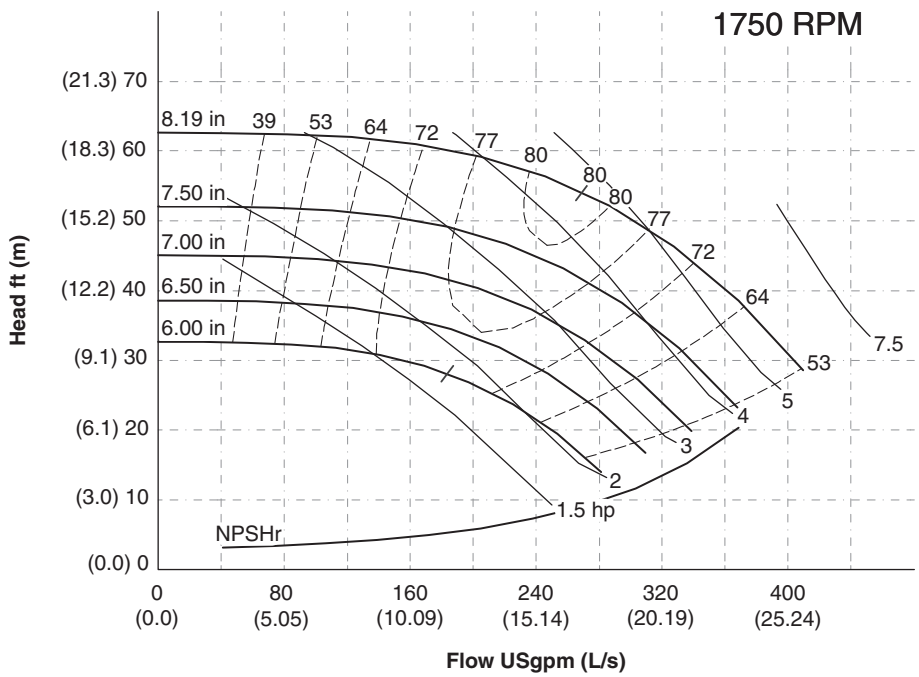
a. Pump Selections are chiller size dependent. For example, dual pump 6 on a 30RC150 chiller is not the same as dual pump 6 on a 30RC130 chiller.
b. Option Code refers to the Hydronics Option (position 14) in the model number. See model number nomenclature for option identification.

LEGEND

**BPHE** — Brazed Plate Heat Exchanger
**DX** — Direct Expansion

# Selection procedure (cont)

### Pump Curve I for Hydronic Package Single Pump (Fresh Water)

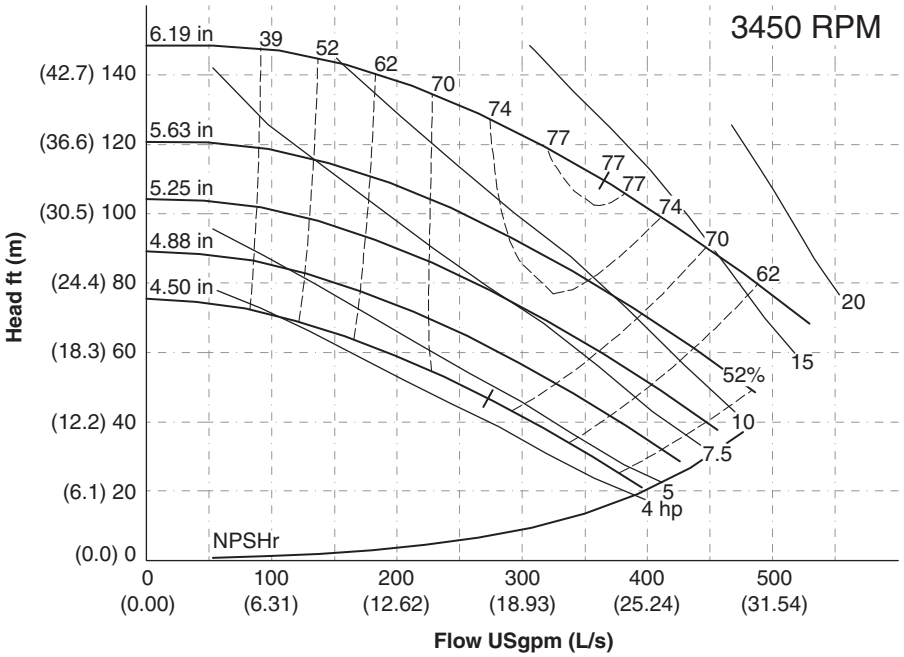



LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

### Pump Curve II for Hydronic Package Single Pump (Fresh Water)



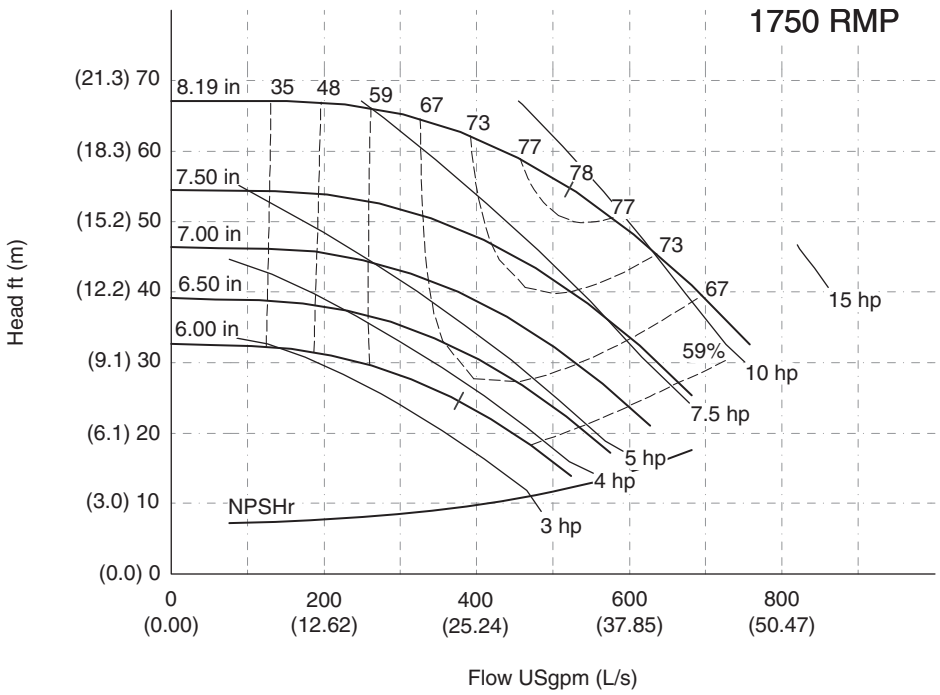

LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

# Selection procedure (cont)

### Pump Curve III for Hydronic Package Single Pump (Fresh Water)

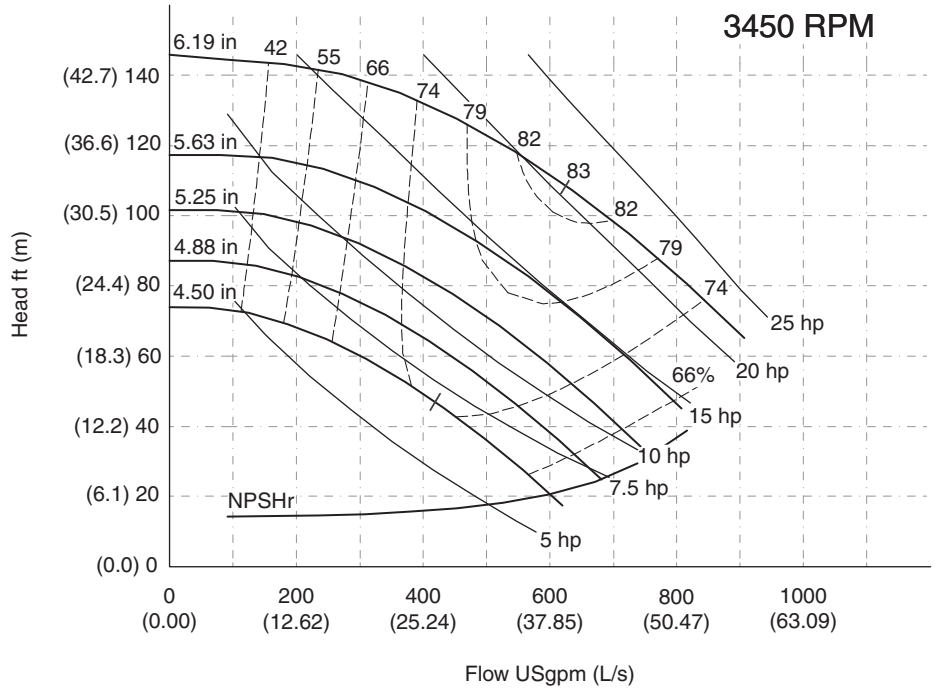



LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

### Pump Curve IV for Hydronic Package Single Pump (Fresh Water)



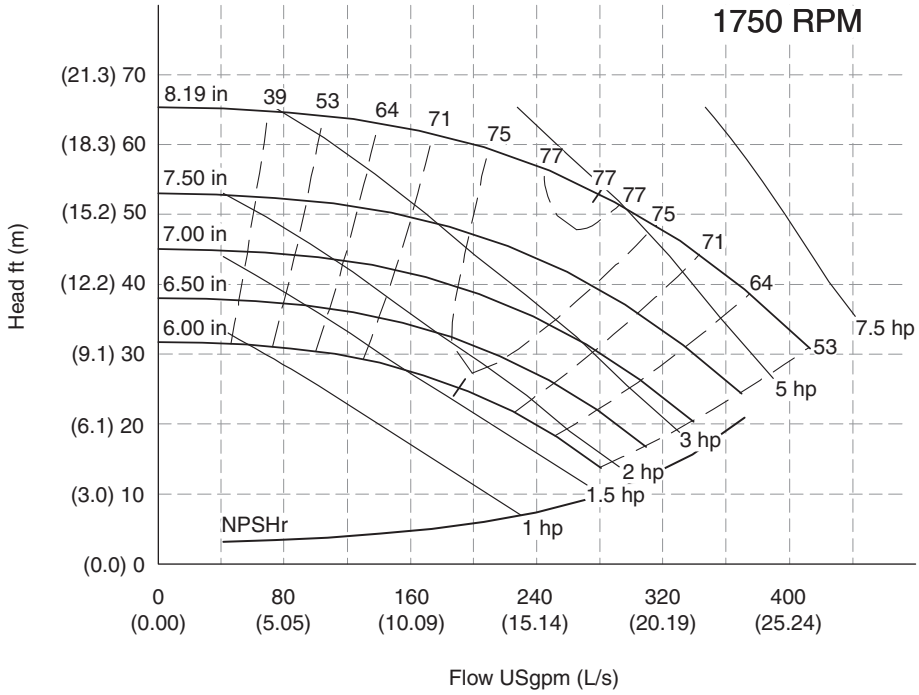

LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

# Selection procedure (cont)

### Pump Curve V for Hydronic Package Dual Pump (Fresh Water)

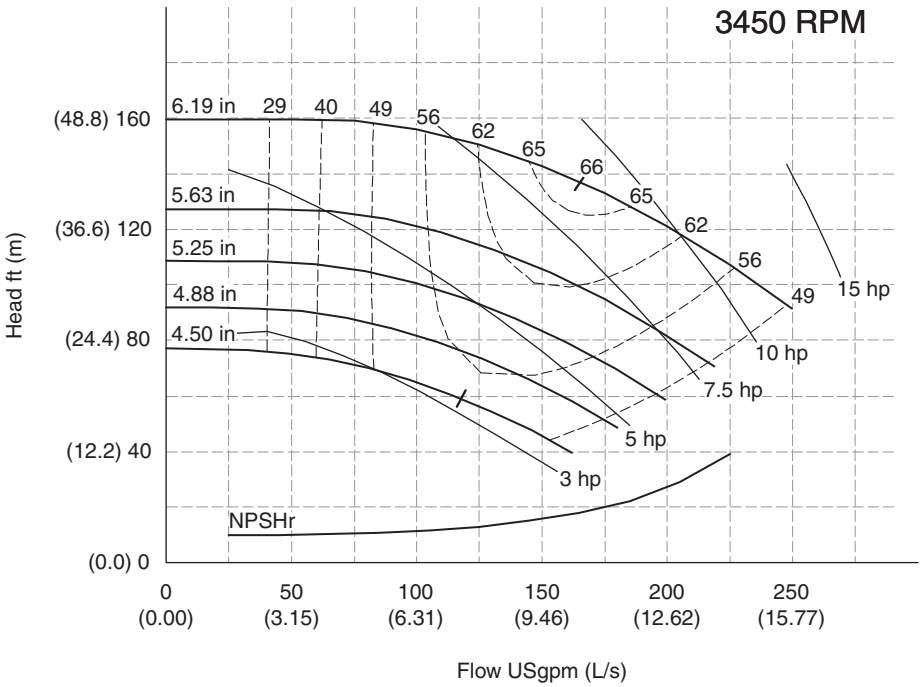



LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

### Pump Curve VI for Hydronic Package Dual Pump (Fresh Water)



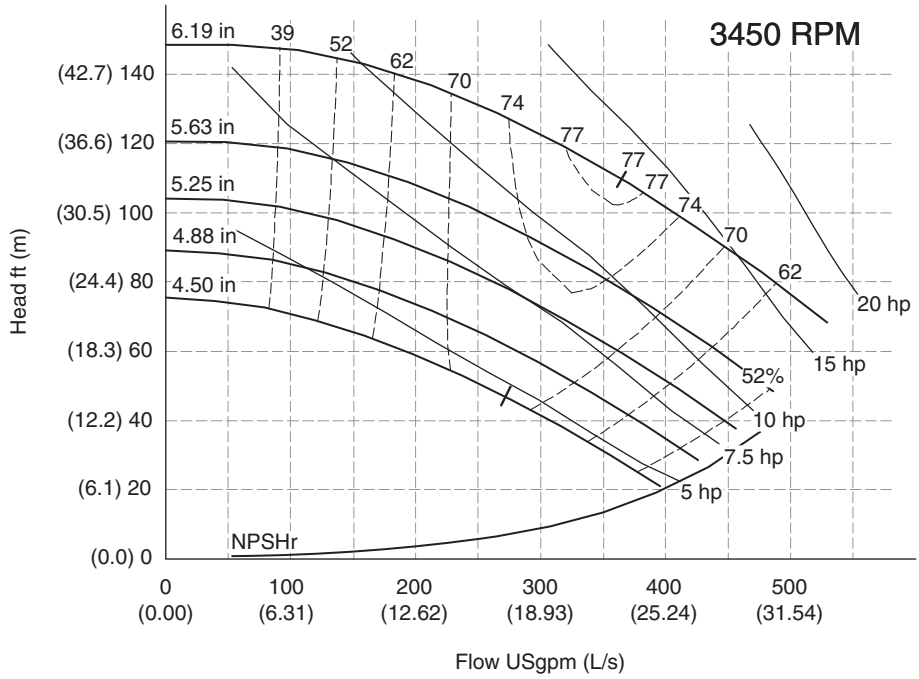

LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

# Selection procedure (cont)

### Pump Curve VII for Hydronic Package Dual Pump (Fresh Water)

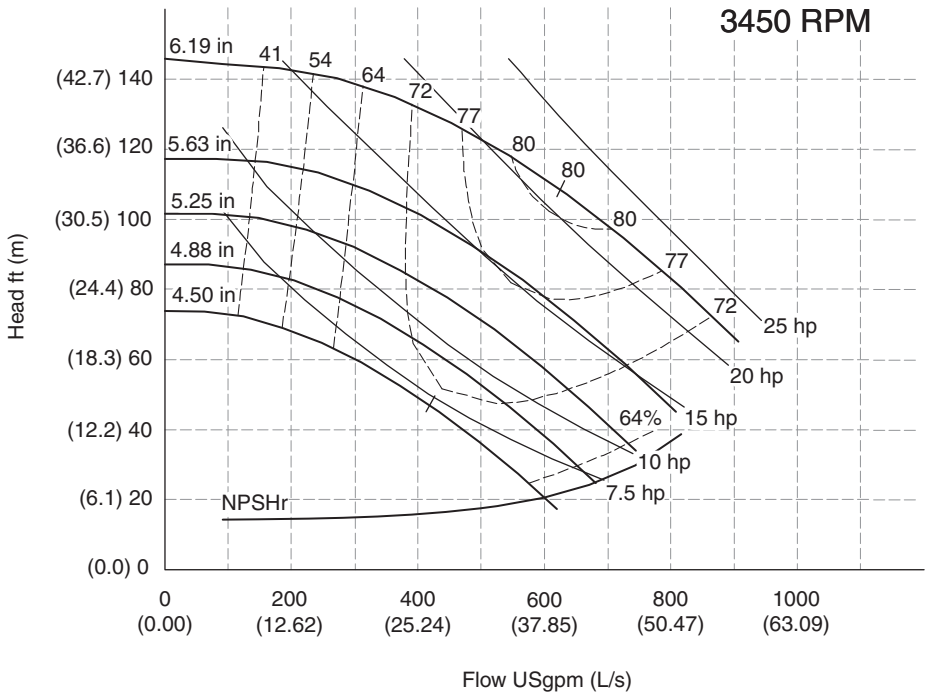



LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

### Pump Curve VIII for Hydronic Package Dual Pump (Fresh Water)



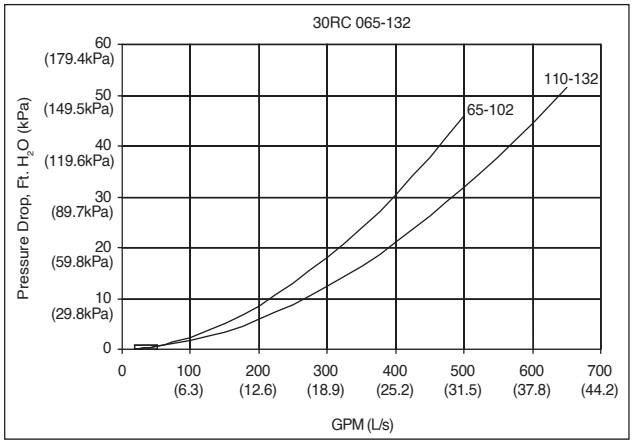

LEGEND

**NPSHr —** Net Positive Suction Head (Pressure) Required

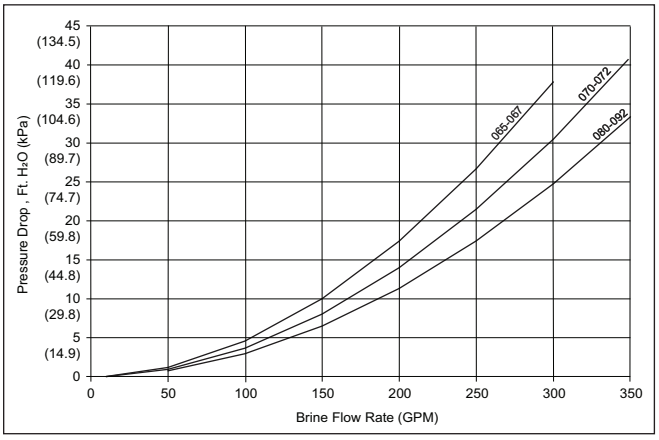
NOTE: Refer to model number nomenclature on page 6 for option identification and Pump Impeller Sizes table on page 25 for more information.

# Selection procedure (cont)

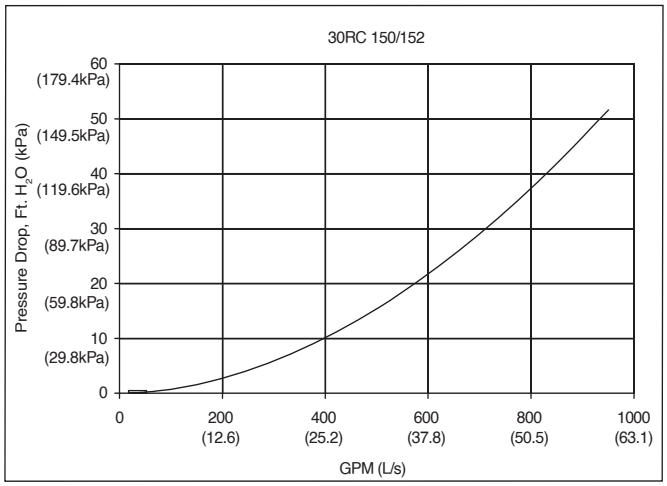
### 30RC 065-130/067-132 DX Evaporator Pressure Drop Curves



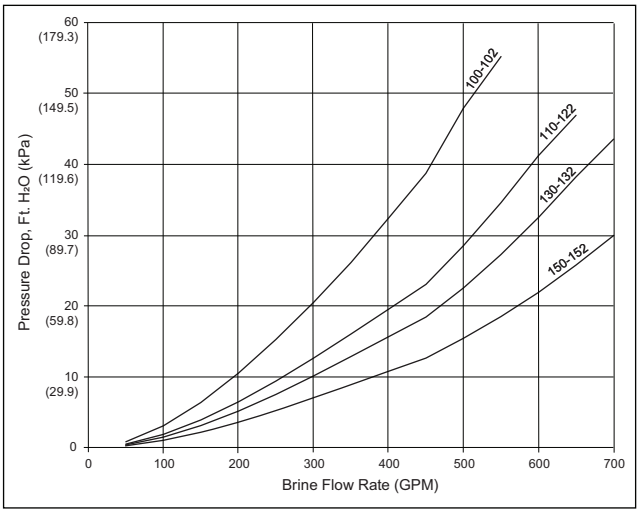

### 30RC 065-092 BPHE Pressure Drop Curve




### 30RC 150/152 DX Evaporator Pressure Drop Curve

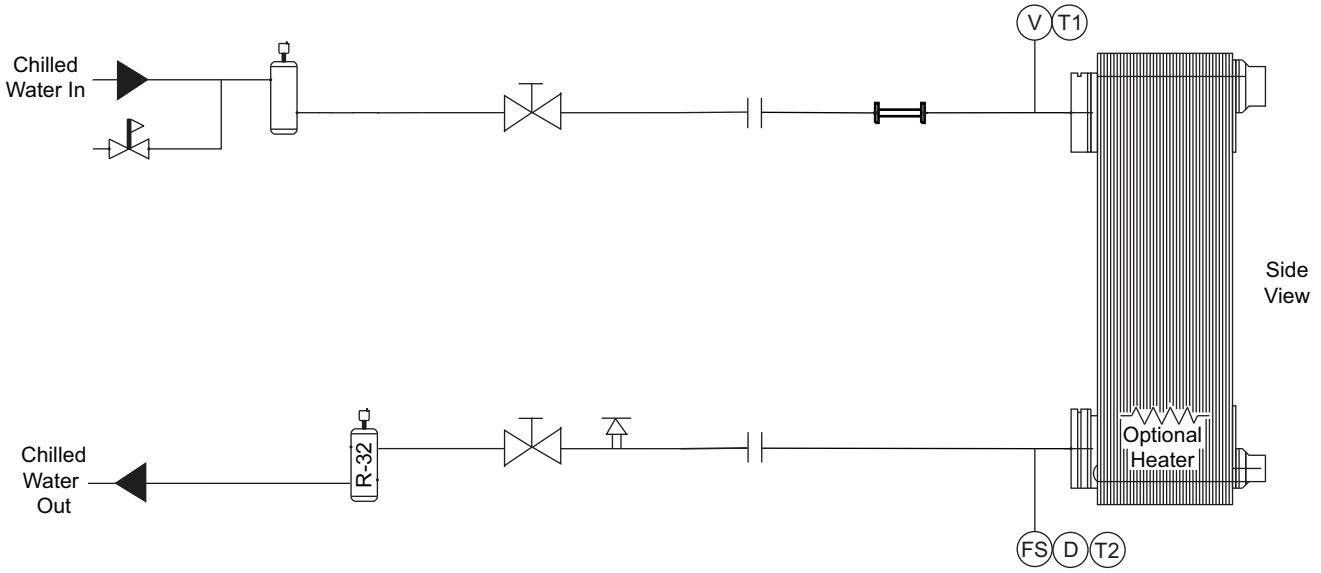



### 30RC 100-152 BPHE Pressure Drop Curve



# Typical piping diagrams

## Typical Piping Diagram for 30RC BPHE without Hydronic Package




LEGEND
**D** — Drain, 1/4 in. NPT
**FS** — Flow Switch
**PP** — Pipe Plug, 1/4 in. NPT
**T1** — Entering Water Thermistor
**T2** — Leaving Water Thermistor
**V** — Vent, 1/4 in. NPT

* Field-supplied and installed.

Pressure Reducing Fill Valve*

Air Separator with Vent*

Isolation Valve*

Flexible Connections*

Strainer:
16 mesh for 5 in. pipe
20 mesh for 3 in. pipe

Pressure Relief*

R-32 Air Separator with Vent*
(required for R-32 units only)

## Typical Piping Diagram for 30RC DX Cooler without Hydronic Package

LEGEND
**D** — Drain, 3/4 in. NPT
**FS** — Flow Switch
**PP** — Pipe Plug, 1/4 in. NPT
**T1** — Entering Water Thermistor
**T2** — Leaving Water Thermistor
**V** — Vent, 1/4 in. NPT

* Field-supplied and installed.

Flexible Connections*

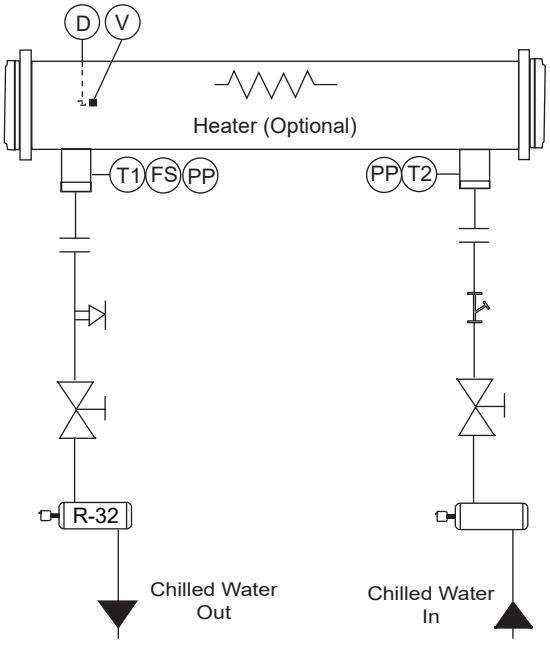
20 Mesh Strainer*

Isolation Valve*

Air Separator with Vent*

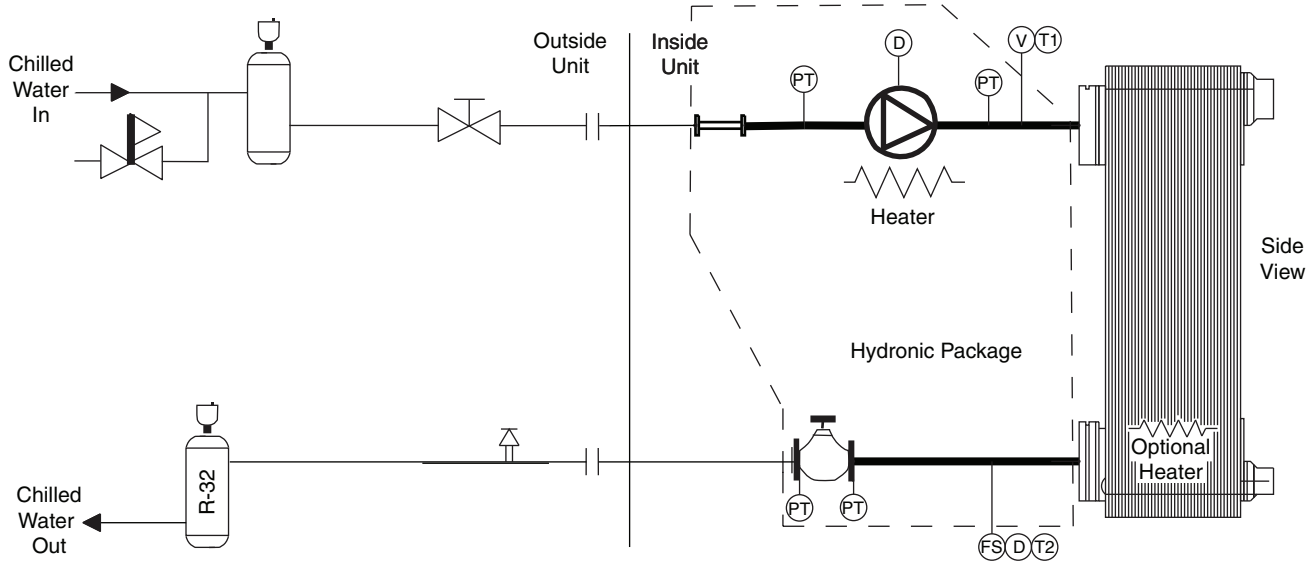
R-32 Air Separator with Vent*
(required for R-32 units only)

Pressure Relief*



# Typical piping diagrams (cont)

**Typical Piping Diagram for 30RC BPHE with Hydronic Package — Single Pump**



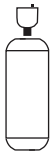

LEGEND

**D** — Drain, 1/4 in. NPT
**E** — Expansion Tank Connection, 3/4 in. NPT
**FS** — Flow Switch
**PT** — Pressure/Temperature Tap
**T1** — Entering Water Thermistor
**T2** — Leaving Water Thermistor

* Field-supplied and installed.


Pressure Reducing Fill Valve*

Air Separator with Vent* (required for R-32 units only)


Air Separator with Vent*


Isolation Valve


Pressure Relief*


Flexible Connections*


Strainer:
16 mesh for 5 in. pipe
20 mesh for 3 in. pipe


Combination Valve


Pump

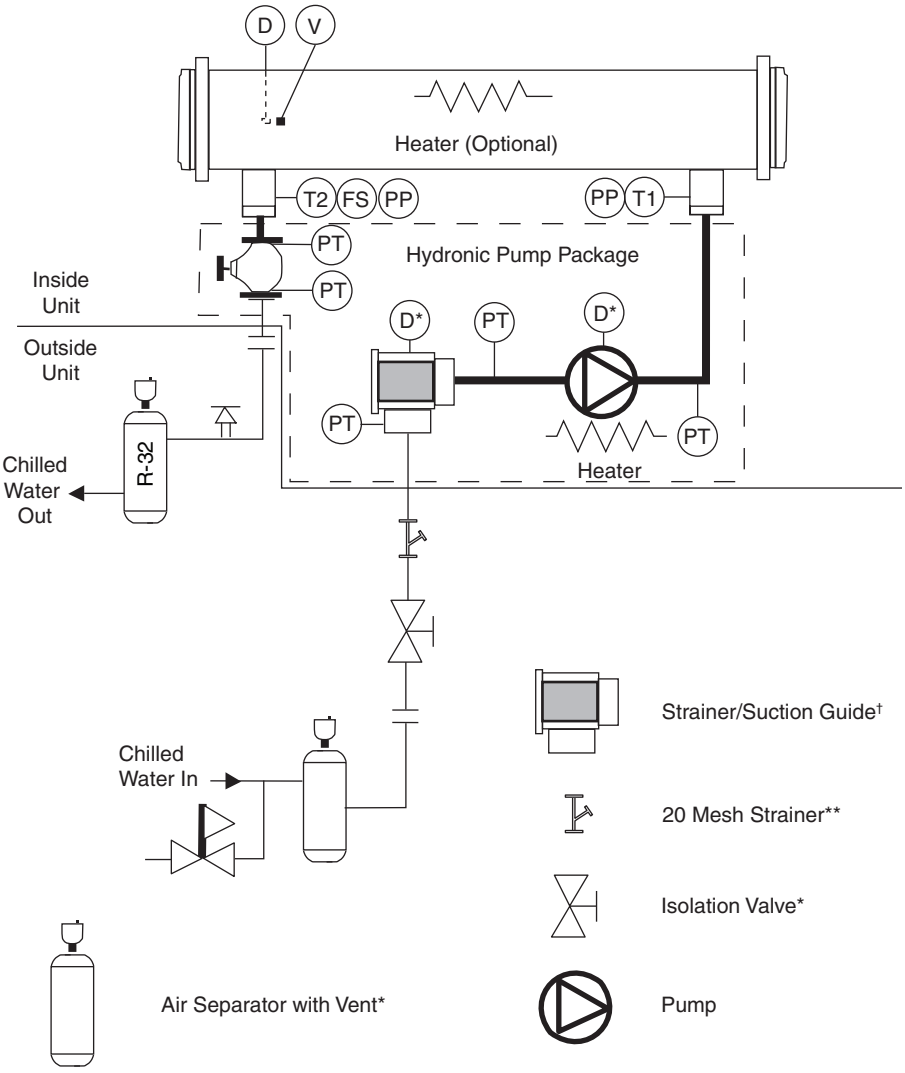
# Typical piping diagrams (cont)

**Typical Piping Diagram for 30RC DX Cooler with Hydronic Package — Single Pump**

LEGEND

**D** — Drain, 3/4 in. NPT
**D*** — Drain, 1/4 in. NPT
**E** — Expansion Tank Connection, 3/4 in. NPT
**FS** — Flow Switch
**PP** — Pipe Plug, 1/4 in. NPT
**PT** — Pressure/Temperature Tap
**T1** — Entering Water Thermistor
**T2** — Leaving Water Thermistor
**V** — Vent, 1/4 in. NPT
— Indicates items provided with the optional hydronic pump package

* Field-supplied and installed.
† Factory-installed option.
** Required within 10 ft. (3 m) of cooler in addition to suction strainer for open loop systems.





Air Separator with Vent* (required for R-32 units only)

Pressure Reducing Fill Valve*

Pressure Relief*

Combination Valve

Flexible Connections*



Strainer/Suction Guide†



20 Mesh Strainer**

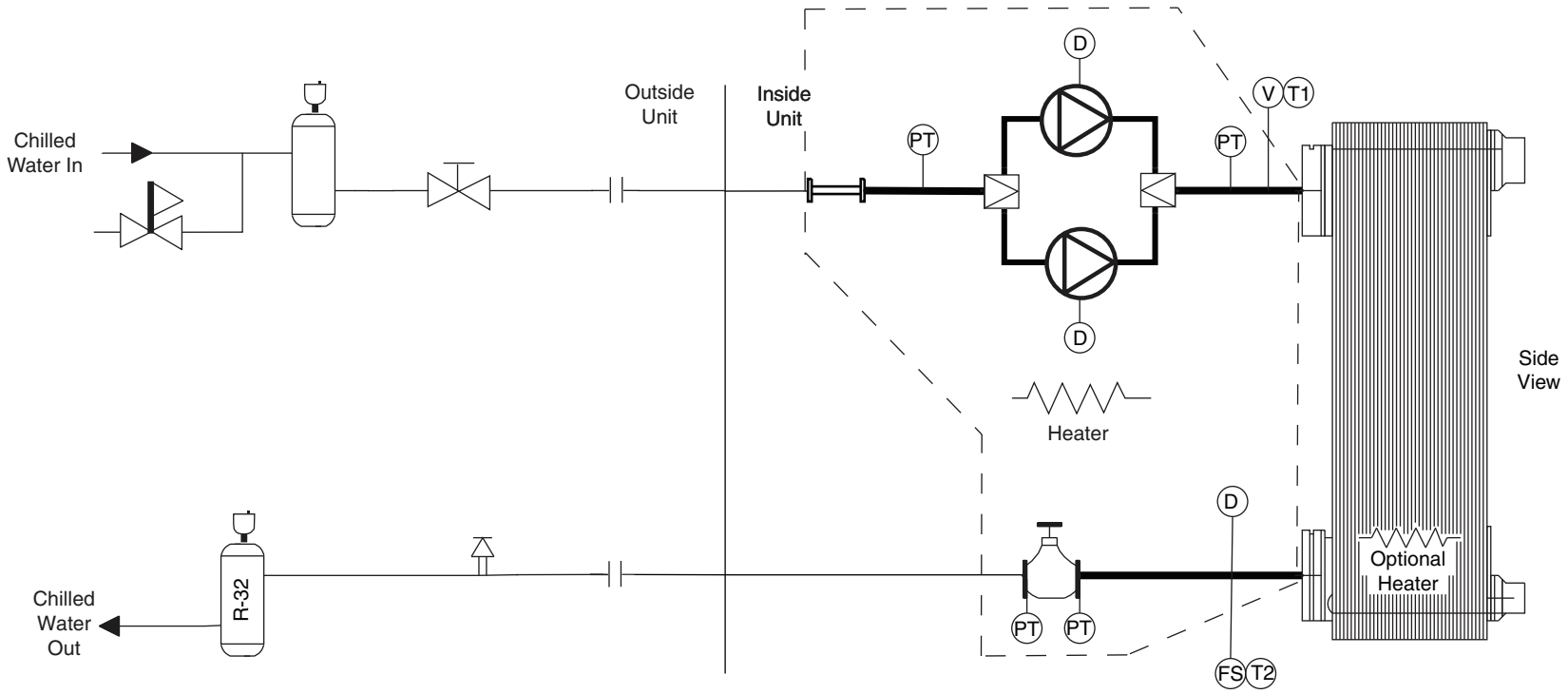


Isolation Valve*



Pump

## Typical Piping Diagram for 30RC BPHE with Hydronic Package — Dual Pumps




LEGEND

**D** — Drain, 1/4-in. NPT
**E** — Expansion tank connection, 3/4-in. NPT
**FS** — Flow switch
**PT** — Pressure / temperature tap
**V** — Vent, 1/4-in. NPT
**T1** — Entering water thermistor
**T2** — Leaving water thermistor

* Field-supplied and installed.

Pressure Reducing Fill Valve*


Air Separator with Vent*
(required for R-32 units only)

Air Separator with Vent*

Isolation Valve*

Pressure Relief*

Flexible Connections*

Strainer:
16 mesh for 5 in. pipe
20 mesh for 3 in. pipe

Reverse Flow Check
Valve/Service Valve

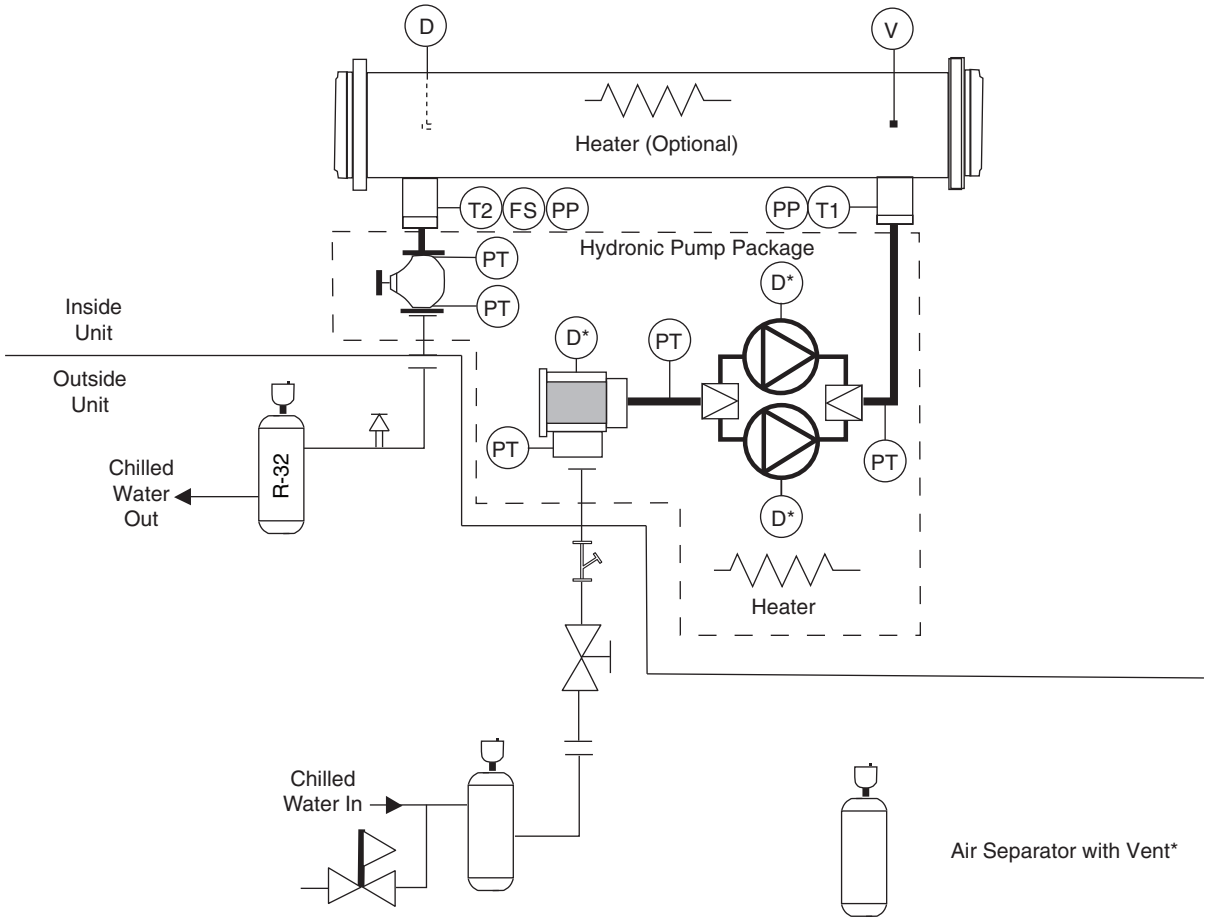
Service Valve

Combination Valve

Pump

# Typical piping diagrams (cont)

**Typical Piping Diagram for 30RC DX Cooler with Hydronic Package — Dual Pumps**

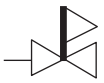



LEGEND

**D** — Drain, 3/4 in. NPT
**D*** — Drain, 1/4 in. NPT
**E** — Expansion Tank Connection, 3/4 in. NPT
**FS** — Flow Switch
**PP** — Pipe Plug, 1/4 in. NPT
**PT** — Pressure/Temperature Tap
**T1** — Entering Water Thermistor
**T2** — Leaving Water Thermistor
**V** — Vent, 1/4 in. NPT
— Indicates items provided with the optional hydronic pump package.

* Field-supplied and installed.
† Factory-installed option.
** Required within 10 ft. (3 m) of cooler in addition to suction strainer for open loop systems.


Air Separator with Vent* (required for R-32 units only)



Pressure Reducing Fill Valve*



Pressure Relief*

Combination Valve†

Flexible Connections*



Air Separator with Vent*

Strainer/Suction Guide†

20 Mesh Strainer**

Isolation Valve*

Reverse Flow Check Valve/Service Valve†

Service Valve†

Pump†

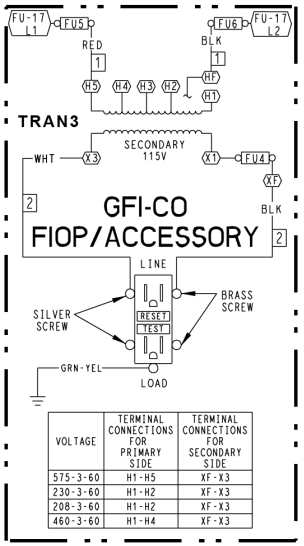
# Control and Power Wiring Schematic, 30RC 065-152

NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH UL60335-2-40 STANDARDS. FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. WIRING FOR MAIN FIELD SUPPLY MUST BE RATED 75°C MINIMUM. USE COPPER FOR ALL UNITS. INCOMING WIRE SIZE RANGE FOR THE TERMINAL BLOCK IS #4 AWG TO #500 KCMIL. INCOMING WIRE SIZE RANGE OF NON-FUSED DISCONNECT IS:
   400A — QTY 2, #2/0 AWG TO 250 KCMIL, OR QTY 1, #2/0 AWG TO 500 KCMIL
   600A — QTY 2, #2 AWG TO 500 KCMIL
   800A — QTY 3, #3/0 AWG TO 400 KCMIL, OR QTY 2, 500 KCMIL TO 750 KCMIL
3. TERMINALS 9 AND 10 OF TB5 ARE FOR FIELD EXTERNAL CONNECTIONS FOR REMOTE ON-OFF. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
4. TERMINALS 1 AND 2 OF TB5 ARE FOR EXTERNAL CONNECTIONS OF CHILLED WATER PUMP INTERLOCK. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
5. TERMINALS 11 AND 13 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 1 (PMP1) STARTER. TERMINALS 13 AND 15 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 2 (PMP2) STARTER. THE MAXIMUM LOAD ALLOWED FOR THE CHILLED WATER PUMP RELAY IS 5VA SEALED, 10VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
6. TERMINALS 12 AND 13 OF TB5 ARE FOR AN ALARM RELAY. THE MAXIMUM LOAD ALLOWED FOR THE ALARM RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
7. TERMINALS 8 AND 13 OF TB5 ARE FOR A RUN RELAY. THE MAXIMUM LOAD ALLOWED FOR THE RUN RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
8. MAKE APPROPRIATE CONNECTIONS TO TB6 AS SHOWN FOR ENERGY MANAGEMENT BOARD OPTIONS. THE CONTACTS FOR OCCUPANCY OVERRIDE, DEMAND LIMIT AND ICE DONE OPTIONS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
9. TERMINALS 11 AND 17 OF TB6 ARE FOR A SHUTDOWN RELAY. THE MAXIMUM LOAD ALLOWED FOR THE SHUTDOWN RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
10. TERMINALS 11 AND 16 OF TB6 ARE FOR AN ALERT RELAY. THE MAXIMUM LOAD ALLOWED FOR THE ALERT RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.

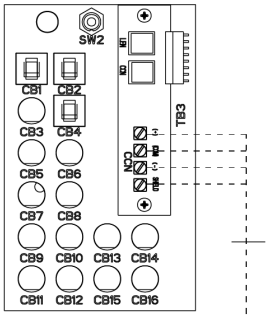
LEGEND

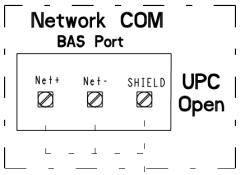
| | |
|---|---|
| **A** | — ALARM |
| **ALM R** | — ALARM RELAY |
| **BAS** | — BUILDING AUTOMATION SYSTEM |
| **EMM** | — ENERGY MANAGEMENT |
| **FIOP** | — FACTORY INSTALLED OPTION |
| **GFI-CO** | — GROUND FAULT INTERCEPTOR |
| **HGB** | — HOT GAS BYPASS |
| **MLV** | — MINIMUM LOAD VALVE |
| **NEC** | — NATIONAL ELECTRICAL CODE |
| **PMP** | — CHILLED WATER PUMP |
| **RUN R** | — RUN RELAY |
| **SHD R** | — SHUTDOWN RELAY |
| **SW** | — SWITCH |
| **TB** | — TERMINAL BLOCK |
| **UPC** | — UNIVERSAL PROTOCOL CARD |

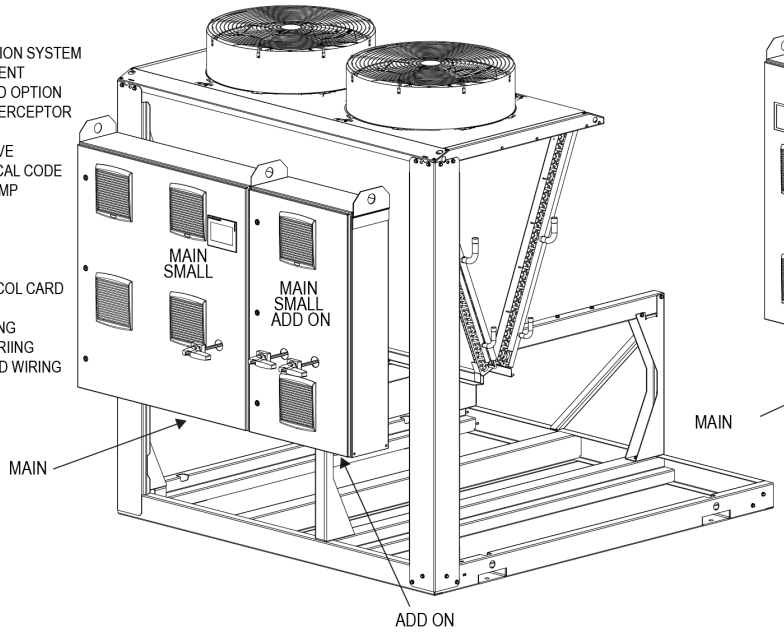
▪ ▪ FIELD POWER WIRING
– – FIELD CONTROL WIRIING
——— FACTORY-INSTALLED WIRING




| VOLTAGE | TERMINAL CONNECTIONS FOR PRIMARY SIDE | TERMINAL CONNECTIONS FOR SECONDARY SIDE |
|---|---|---|
| 575-3-60 | H1-H5 | XF-X3 |
| 230-3-60 | H1-H2 | XF-X3 |
| 208-3-60 | H1-H2 | XF-X3 |
| 460-3-60 | H1-H4 | XF-X3 |



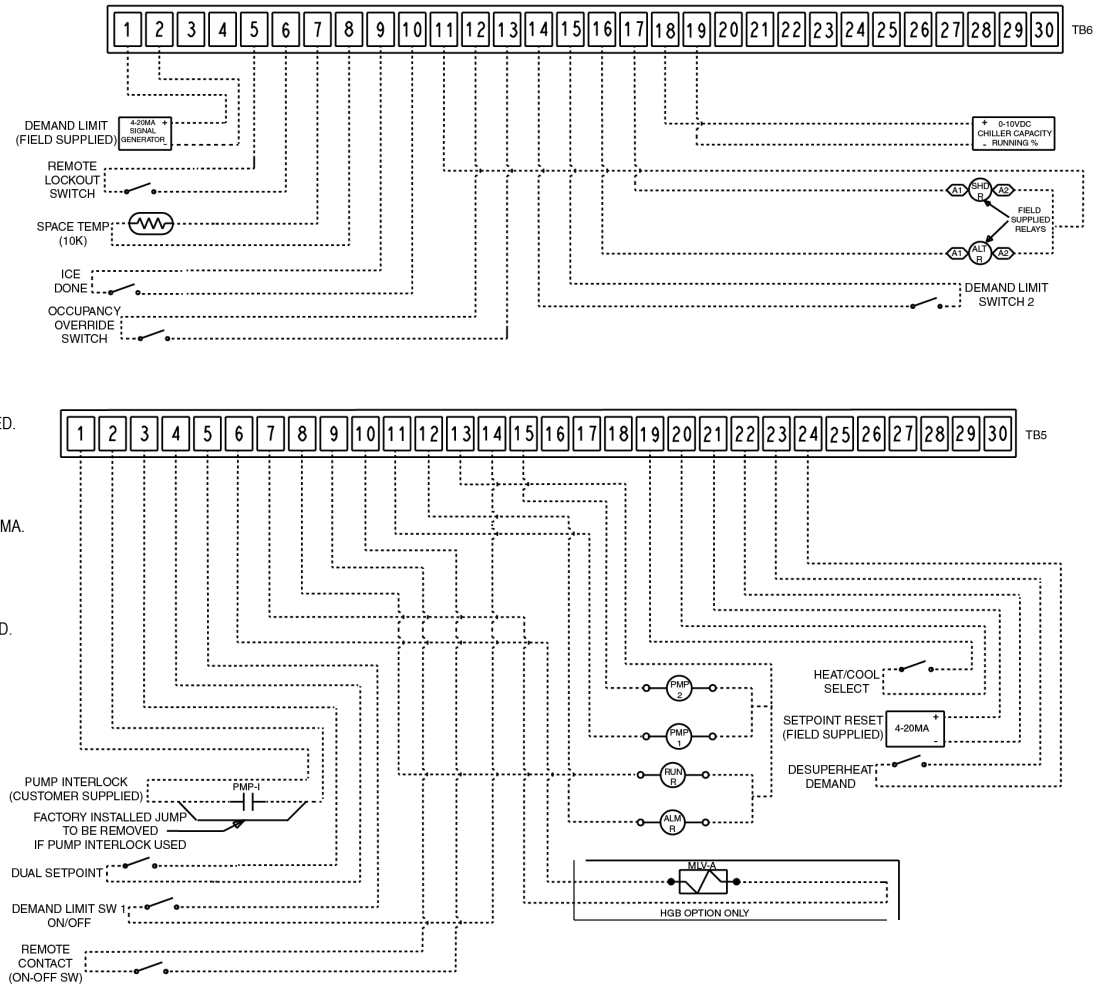
## Control and Power Wiring Schematic, 30RC 065-152 (cont)

NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH UL60335-2-40 STANDARDS. FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. WIRING FOR MAIN FIELD SUPPLY MUST BE RATED 75°C MINIMUM. USE COPPER FOR ALL UNITS. INCOMING WIRE SIZE RANGE FOR THE TERMINAL BLOCK IS #4 AWG TO #500 KCMIL. INCOMING WIRE SIZE RANGE OF NON-FUSED DISCONNECT IS:
   400A — QTY 2, #2/0 AWG TO 250 KCMIL, OR QTY 1, #2/0 AWG TO 500 KCMIL
   600A — QTY 2, #2 AWG TO 500 KCMIL
   800A — QTY 3, #3/0 AWG TO 400 KCMIL, OR QTY 2, 500 KCMIL TO 750 KCMIL
3. TERMINALS 9 AND 10 OF TB5 ARE FOR FIELD EXTERNAL CONNECTIONS FOR REMOTE ON-OFF. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
4. TERMINALS 1 AND 2 OF TB5 ARE FOR EXTERNAL CONNECTIONS OF CHILLED WATER PUMP INTERLOCK. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
5. TERMINALS 11 AND 13 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 1 (PMP1) STARTER. TERMINALS 13 AND 15 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 2 (PMP2) STARTER. THE MAXIMUM LOAD ALLOWED FOR THE CHILLED WATER PUMP RELAY IS 5VA SEALED, 10VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
6. TERMINALS 12 AND 13 OF TB5 ARE FOR AN ALARM RELAY. THE MAXIMUM LOAD ALLOWED FOR THE ALARM RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
7. TERMINALS 8 AND 13 OF TB5 ARE FOR A RUN RELAY. THE MAXIMUM LOAD ALLOWED FOR THE RUN RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
8. MAKE APPROPRIATE CONNECTIONS TO TB6 AS SHOWN FOR ENERGY MANAGEMENT BOARD OPTIONS. THE CONTACTS FOR OCCUPANCY OVERRIDE, DEMAND LIMIT AND ICE DONE OPTIONS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
9. TERMINALS 11 AND 17 OF TB6 ARE FOR A SHUTDOWN RELAY. THE MAXIMUM LOAD ALLOWED FOR THE SHUTDOWN RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
10. TERMINALS 11 AND 16 OF TB6 ARE FOR AN ALERT RELAY. THE MAXIMUM LOAD ALLOWED FOR THE ALERT RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.

LEGEND

| | |
|---|---|
| **A** | — ALARM |
| **ALM R** | — ALARM RELAY |
| **BAS** | — BUILDING AUTOMATION SYSTEM |
| **EMM** | — ENERGY MANAGEMENT |
| **FIOP** | — FACTORY INSTALLED OPTION |
| **GFI-CO** | — GROUND FAULT INTERCEPTOR |
| **HGB** | — HOT GAS BYPASS |
| **MLV** | — MINIMUM LOAD VALVE |
| **NEC** | — NATIONAL ELECTRICAL CODE |
| **PMP** | — CHILLED WATER PUMP |
| **RUN R** | — RUN RELAY |
| **SHD R** | — SHUTDOWN RELAY |
| **SW** | — SWITCH |
| **TB** | — TERMINAL BLOCK |
| **UPC** | — UNIVERSAL PROTOCOL CARD |

▪ ▪ FIELD POWER WIRING
– – FIELD CONTROL WIRIING
——— FACTORY-INSTALLED WIRING



## Control and Power Wiring Schematic, 30RC 065-152 (cont)

NOTES:
1. FACTORY WIRING IS IN ACCORDANCE WITH UL60335-2-40 STANDARDS. FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. WIRING FOR MAIN FIELD SUPPLY MUST BE RATED 75°C MINIMUM. USE COPPER FOR ALL UNITS. INCOMING WIRE SIZE RANGE FOR THE TERMINAL BLOCK IS #4 AWG TO #500 KCMIL. INCOMING WIRE SIZE RANGE OF NON-FUSED DISCONNECT IS:
   400A — QTY 2, #2/0 AWG TO 250 KCMIL, OR QTY 1, #2/0 AWG TO 500 KCMIL
   600A — QTY 2, #2 AWG TO 500 KCMIL
   800A — QTY 3, #3/0 AWG TO 400 KCMIL, OR QTY 2, 500 KCMIL TO 750 KCMIL
3. TERMINALS 9 AND 10 OF TB5 ARE FOR FIELD EXTERNAL CONNECTIONS FOR REMOTE ON-OFF. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
4. TERMINALS 1 AND 2 OF TB5 ARE FOR EXTERNAL CONNECTIONS OF CHILLED WATER PUMP INTERLOCK. THE CONTACTS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
5. TERMINALS 11 AND 13 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 1 (PMP1) STARTER. TERMINALS 13 AND 15 OF TB5 ARE FOR CONTROL OF CHILLED WATER PUMP 2 (PMP2) STARTER. THE MAXIMUM LOAD ALLOWED FOR THE CHILLED WATER PUMP RELAY IS 5VA SEALED, 10VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
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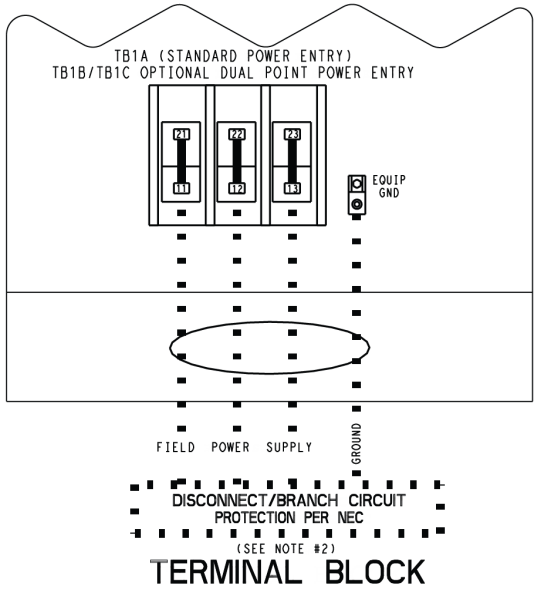
8. MAKE APPROPRIATE CONNECTIONS TO TB6 AS SHOWN FOR ENERGY MANAGEMENT BOARD OPTIONS. THE CONTACTS FOR OCCUPANCY OVERRIDE, DEMAND LIMIT AND ICE DONE OPTIONS MUST BE RATED FOR DRY CIRCUIT APPLICATION CAPABLE OF HANDLING A 24VAC LOAD UP TO 50MA.
9. TERMINALS 11 AND 17 OF TB6 ARE FOR A SHUTDOWN RELAY. THE MAXIMUM LOAD ALLOWED FOR THE SHUTDOWN RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.
10. TERMINALS 11 AND 16 OF TB6 ARE FOR AN ALERT RELAY. THE MAXIMUM LOAD ALLOWED FOR THE ALERT RELAY IS 10VA SEALED, 25VA INRUSH AT 24V. FIELD POWER SUPPLY IS NOT REQUIRED.

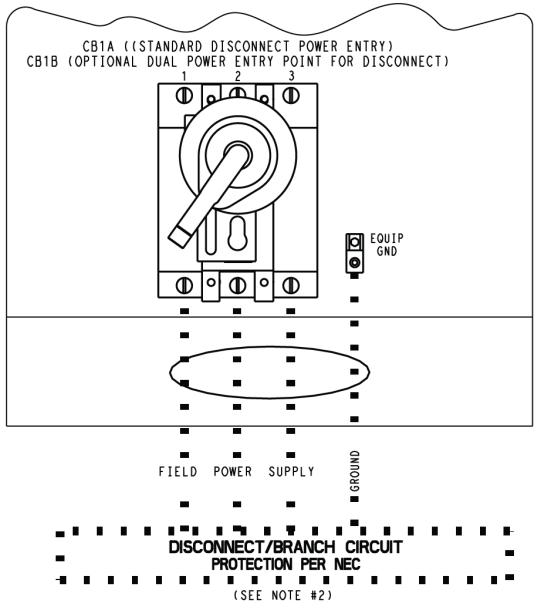
LEGEND

| | |
|---|---|
| **A** | — ALARM |
| **ALM R** | — ALARM RELAY |
| **BAS** | — BUILDING AUTOMATION SYSTEM |
| **EMM** | — ENERGY MANAGEMENT |
| **FIOP** | — FACTORY INSTALLED OPTION |
| **GFI-CO** | — GROUND FAULT INTERCEPTOR |
| **HGB** | — HOT GAS BYPASS |
| **MLV** | — MINIMUM LOAD VALVE |
| **NEC** | — NATIONAL ELECTRICAL CODE |
| **PMP** | — CHILLED WATER PUMP |
| **RUN R** | — RUN RELAY |
| **SHD R** | — SHUTDOWN RELAY |
| **SW** | — SWITCH |
| **TB** | — TERMINAL BLOCK |
| **UPC** | — UNIVERSAL PROTOCOL CARD |

- ▪ ▪ FIELD POWER WIRING
- \- \- FIELD CONTROL WIRIING
- ——— FACTORY-INSTALLED WIRING




TERMINAL BLOCK




NON-FUSED DISCONNECT

# Electrical data

## Control and Power Connections, 30RC065-152

| 30RC UNIT SIZE | FANS | VOLTAGE | INCOMING POWER TYPE AND CONNECTION | CONTROL BOX | MAIN POWER ENTRANCE |
|---|---|---|---|---|---|
| 065 STD<br>070 STD<br>080 STD<br>090 STD<br>100 STD<br>110 STD<br>120 COMPACT<br>120 STD<br>067 STD<br>072 STD<br>082 STD<br>092 STD<br>102 STD<br>112 STD<br>122 COMPACT<br>122 STD | Fixed Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | Variable Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |

# Electrical data (cont)

## Control and Power Connections, 30RC065-152 (cont)

| 30RC UNIT SIZE | FANS | VOLTAGE | INCOMING POWER TYPE AND CONNECTION | CONTROL BOX | MAIN POWER ENTRANCE |
|---|---|---|---|---|---|
| 080 COMPACT<br>092 COMPACT<br>102 COMPACT | Fixed Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | Variable Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Non-Fused Disconnect | Small Main | Main |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |

# Electrical data (cont)

## Control and Power Connections, 30RC065-152 (cont)

| 30RC UNIT SIZE | FANS | VOLTAGE | INCOMING POWER TYPE AND CONNECTION | CONTROL BOX | MAIN POWER ENTRANCE |
|---|---|---|---|---|---|
| 130 STD<br>132 COMPACT<br>132 STD<br>150 STD<br>152 STD<br>152 COMPACT | Fixed Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Small Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Small Main | |
| | | | Dual Point Power with Terminal Block | Small Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Small Main with Side | Side |
| | Variable Speed Fans | 208/230V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 380V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 460V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |
| | | 575V | Single Point Power with Terminal Block | Large Main | Main |
| | | | Single Point Power with Non-Fused Disconnect | Large Main | |
| | | | Dual Point Power with Terminal Block | Large Main | |
| | | | Dual Point Power with Non-Fused Disconnect | Large Main with Side | Side |

## Microprocessor

The Carrier Controller microprocessor controls overall unit operation and controls a number of processes simultaneously. These processes include internal timers, reading inputs, analog to digital conversions, fan control, display control, diagnostic control, output relay control, demand limit, capacity control, head pressure control, and temperature reset. Some processes are updated almost continuously, others every 2 to 3 seconds, and some every 30 seconds. The microprocessor routine is started by switching the Emergency ON-OFF switch to the ON position. Pump control of external pumps (where configured) will energize the evaporator pump to the internal (or CCN) time schedule (or input occupied signal from external system).

Where dual pumps are utilized, only one pump will be operated at a time. The control will start the pump with the least hours. When the unit receives a call for cooling (based on a deviation from chilled water set point), the unit stages up in capacity to maintain the evaporator fluid set point. The first compressor starts 1 to 3 minutes after the call for cooling. The Carrier Controller microprocessor controls the capacity of the chiller by cycling compressors at a rate to satisfy actual dynamic load conditions. The control maintains the leaving-fluid temperature set point shown on the Carrier Controller display through intelligent cycling. Accuracy depends on loop volume, loop flow rate, load, outdoor-air temperature, number of stages, and particular stage being cycled off. No adjustment for cooling range or cooler flow rate is required, because the control automatically compensates for cooling range by measuring both the return-fluid temperature and leaving-fluid temperature. This is referred to as leaving-fluid temperature control with return-fluid temperature compensation.

The basic logic for determining when to add or remove a stage is a time band integration of deviation from set point plus rate of change of leaving-fluid temperature. When the leaving-fluid temperature is close to the set point and slowly moving closer, logic prevents the addition of another stage.

If 1°F per minute (0.6°C per minute) pulldown control has been selected (adjustable setting), no additional steps of capacity are added as long as the difference between the leaving-fluid temperature and set point is greater than 4°F (2.2°C) and the rate of change in leaving-fluid temperature is greater than the selected pulldown control rate. If it has been less than 90 seconds since the last capacity change, then compressors will continue to run unless a safety device trips. This prevents rapid cycling and also helps return oil during short on periods.

## Control Sequence

### Off Cycle

If the ambient temperature is below the trip point (default value of 37.4°F [3°C] for fresh water), then the evaporator heaters (if installed) are also energized.

### Start-Up

After the control circuit switches on, the prestart process takes place, and then the microprocessor checks itself, starts the pump (if configured), and waits for the temperature to stabilize. The controlled pulldown feature limits compressor loading on start-up to reduce demand on start-up and unnecessary compressor usage. The microprocessor limits supply-fluid temperature decrease (start-up only) to 1°F (0.6°C) per minute.

### Capacity Control

On the first call for cooling, the microprocessor starts initial compressor and fan stage on lead circuit.

As additional cooling is required, additional compressors are energized.

The speed at which capacity is added or reduced is controlled by temperature deviation from set point and rate of temperature change of chilled fluid.

The controls respond to the supply chilled water temperature to cycle the compressors to match cooling load requirements.

The minimum load control valve (if equipped and only available on circuit A) is energized by SIOB-A. The valve allows hot gas to pass directly into the evaporator circuit on the final step of unloading, permitting the unit to operate at lower loads with less compressor cycling.

## Sensors

Thermistors are used to control temperature-sensing inputs to the microprocessor. No additional thermistor sensors are required for optional leaving chilled water temperature, return water, or outdoor air reset.

The following temperature sensors are provided on 30RC units:

- Evaporator leaving chilled fluid temperature (LWT)
- Evaporator entering fluid (return) temperature (EWT)
- Outside air temperature (OAT)
- Space temperature (optional with EMM board)

Two refrigerant pressure transducers are used in each circuit for sensing suction and discharge pressure. The microprocessor uses these inputs to control capacity and fan cycling.

The pressure transducers above are also used to calculate the following values:

- Saturated condensing temperature
- Evaporator saturation temperature

## Additional Information

Detailed information on controls and operation is available in the Controls, Start-Up, Operation, Service, and Troubleshooting guide included with each unit. Packaged Service Training programs are also available. Contact your local Carrier representative for more information.

## High-Efficiency Variable Condenser Fans (30RC Chillers with Greenspeed® Intelligence Only)

All fans on a circuit run at the same speed and are controlled by a VFD with special CCN software to maintain SCT (saturated condensing temperature) set point. The set point is calculated from operating conditions and adjusted to the most efficient operating point. The high-efficiency variable condenser fan option uses Danfoss VLT 102 variable frequency drives. Drives are connected to the LEN communication bus. Fan speed is determined by the chiller controller and communicated to the drive to provide excellent part load efficiency and reduced sound level operation over the life of the chiller.

## Dual Chiller Control

The Carrier Controller allows 2 chillers (piped in parallel) to operate as a single chilled water plant, with standard control functions coordinated through the master chiller controller. This standard control feature requires a communication link between the 2 chillers, and in the case of parallel chillers, requires an additional thermistor and well for each chiller.

## Carrier Controller Microprocessor

The dynamic Carrier Controller microprocessor keeps the chiller online during periods of extreme operating conditions. If the saturated suction temperature is 68°F (10°C) or higher, then the maximum operating pressure (MOP) feature limits the suction to keep the chiller online, which may limit the chiller to reach 100% capacity at high ambient conditions. The controller will equalize run time on each circuit through the lead/lag feature if hot gas bypass is not equipped. If hot gas bypass is equipped, run equalization is disabled since minimum load control is only available on circuit A. If a circuit becomes disabled, the controller will automatically set the active circuit to lead, keeping the chiller online at a reduced capacity.

**Capacity Control Steps[a]**

| UNIT 30RC | STANDARD CAPACITY STEPS (%) |
|---|---|
| 065-067 | 0, 25, 50, 75, 100 |
| 070-072 | 0, 21, 50, 71, 100 |
| 080-082 | 0, 25, 50, 75, 100 |
| 090-092 | 0, 22, 50, 72, 100 |
| 100-102 | 0, 25, 50, 75, 100 |
| 110-112 | 0, 18, 41, 59, 82, 100 |
| 120-122 | 0, 20, 40, 60, 80, 100 |
| 130-132 | 0, 15, 35, 50, 69, 85, 100 |
| 150 | 0, 17, 33, 50, 67, 83, 100 |
| 152 | 0, 16, 42, 58, 94, 100 |

NOTE(S):

a. Capacity control steps may vary due to compressor sequencing.

### Low Temperature Override

This feature prevents LCWT (leaving chilled water [fluid] temperature) from overshooting the set point and possibly causing a nuisance trip-out by the freeze protection.

### High Temperature Override

This feature allows the chiller to add capacity quickly during rapid load variations.

## Temperature Reset

Reset reduces compressor power usage at part load when design LCWT is not necessary. Humidity control should be considered since higher coil temperatures resulting from reset will reduce latent heat capacity. Four reset options are offered, based on the following:

- Return fluid temperature increases LCWT set point as return (or entering) fluid temperature decreases (indicating load decrease). Option may be used in any application where return fluid provides accurate load indication. A limitation of return fluid reset is that LCWT may only be reset to value of design return fluid temperature.
- Outdoor air temperature increases the LCWT as outdoor ambient temperature decreases (indicating load decrease). This reset should be applied only where outdoor ambient temperature is an accurate indication of load.
- Space temperature increases the LCWT as space temperature decreases (indicating load decrease). This reset should be applied only where space temperature is an accurate indication of load. An accessory space temperature thermistor is required. The unit must be equipped with the energy management module and the space thermistor accessory.
- The control system is also capable of temperature reset based on an externally powered 4 to 20 mA signal. Temperature reset by this method requires a Building Management System (BMS) to determine the amount of reset required and signal the unit.

The energy management module is required for 4 to 20 mA signal temperature reset for outdoor air temperature or space temperature. Return fluid temperature does not require this module.

For details on applying a reset option, refer to the Controls, Start-Up, Operation, Service, and Troubleshooting literature shipped with the unit. Obtain ordering part numbers for reset option from the Packaged Chiller Builder program or contact your local Carrier representative.

## Safety

### Abnormal Conditions

All control safeties in the chiller operate through the compressor protection board or control relay and microprocessor. Loss of feedback signal to the SIOB boards will cause the compressor(s) to shut down. For other safeties, the microprocessor makes an appropriate decision to shut down a compressor due to a safety trip or bad sensor reading and shows the appropriate failure code on the display.

### Low-Pressure Safety

Safety cuts out if system pressure drops below minimum.

### High-Pressure Cutout

Switch shuts down compressors if compressor discharge pressure increases to 641 psig (4420 kPa) for R-410A or 630 psig (4344 kPa) for R-32.

### Compressor Anti-Cycling

This feature limits compressor cycling.

### Loss of Flow Protection

Proof of flow switches are standard and installed on all 30RC chillers.

### Sensor Failures

Failures are detected by the microprocessor.

# Controls (cont)

## Accessory Controls

Demand can be limited by controlling the chiller capacity through the demand limit control (the energy management module is required for this function). This FIOP/accessory interfaces with the microprocessor to control the unit so that the chiller's kW demand does not exceed its setting. It is activated from an external switch or a 4 to 20 mA signal.

The standard Carrier Controller microprocessor is programmed to accept various accessory temperature reset options (based on outdoor air temperature [standard], return-fluid temperature [standard], or a 4-20 mA signal from an external Building Management System), that resets the LCWT. The energy management module (EMM) is only required for the temperature reset that is initiated by space temperature.

## Demand Limit

If the demand limit is applied, it limits the total power draw of unit to a selected point by controlling the number of operational compressors during periods of peak electrical demand.

The energy management module is required for either 3-step or 4 to 20 mA demand limit.

## Electronic Expansion Valve (EXV)

The EXV controls refrigerant flow to the evaporator for different operating conditions by varying an orifice size to increase or decrease the flow area through the valve based on microprocessor input. The orifice is positioned by a stepper motor through approximately 600 discrete steps and is monitored every 10 seconds. The EXV maintains an approximate 9°F (5°C) refrigerant superheat entering the compressor.

## Diagnostics

The microprocessor may be put through a service test (see Controls, Start-Up, Operation, Service, and Troubleshooting literature). Service test confirms microprocessor is functional, informs observer through displaying the condition of each sensor and switch in the chiller, and allows observer to check for proper operation of fans and compressors.

## Default Settings

To facilitate quick start-ups, 30RC chillers employing the Carrier Controller microprocessor are pre-configured with a default setting that assumes stand-alone operation supplying 44°F (6.6°C) chilled water.

Configuration settings 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, schedule must be set during installation.

## Free Cooling

When the chiller is provided with free-cooling (waterside economizer), the chiller controller will be responsible for handling the operation of the waterside economizer. Although the free cooling section does contain a control panel, its operation is dependent on the chiller controller, and it does not require any action from the end user in order to operate (turn on/shut down) the waterside economizer.

## Ice Duty

The Carrier Controller has the capability of reduced leaving fluid temperature operation for thermal storage, or ice duty. The optional energy management module includes input contacts for the "ice done" signal generated by the thermal storage control system. The ice duty feature may be configured to start on an external input command or by the Carrier Controller standard internal scheduling function. Ice duty may be used in combination with any other standard features offered by the energy management module and Carrier controls.

The production of ice, which is stored for peak cooling demands, can significantly decrease energy costs. The unit produces ice (normally at night) by supplying ice storage tanks with low temperature cooling fluid. The chiller takes advantage of reduced ambient conditions at night for this ice-making mode, so the capacity suffers a lower penalty for the low leaving fluid temperatures.

At peak cooling demand, the chiller and the stored ice may share the cooling load to reduce operating costs. The thermal storage system may potentially reduce the size of the chiller plant required to meet demand loads.

# Application data

## Chiller Location and Clearances

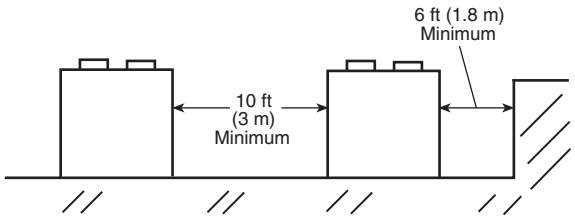
**The 30RC unit must be installed outdoors.**

Do not locate near sound sensitive areas without proper acoustic considerations. For applications that require mounting a chiller on a building rooftop, consideration should be given to using rubber-in-shear or spring isolators to minimize structure-borne transmission. Unit must be level when installed to ensure proper oil return to the compressors. Clearances must be provided around chillers for airflow, service and local code requirements. See dimensional drawings for specific unit clearance requirements. Ensure adequate clearance between adjacent chillers is maintained. A minimum of 10 ft (3048 mm) is recommended. Chiller fan is strongly recommended to be at least as high as adjacent solid walls. Installation in pits is not recommended.

## Minimum Clearances

The recommended minimum clearance to ensure proper airflow through the condenser coils and to allow fan maintenance is as shown below.

**Multiple Unit Separation**



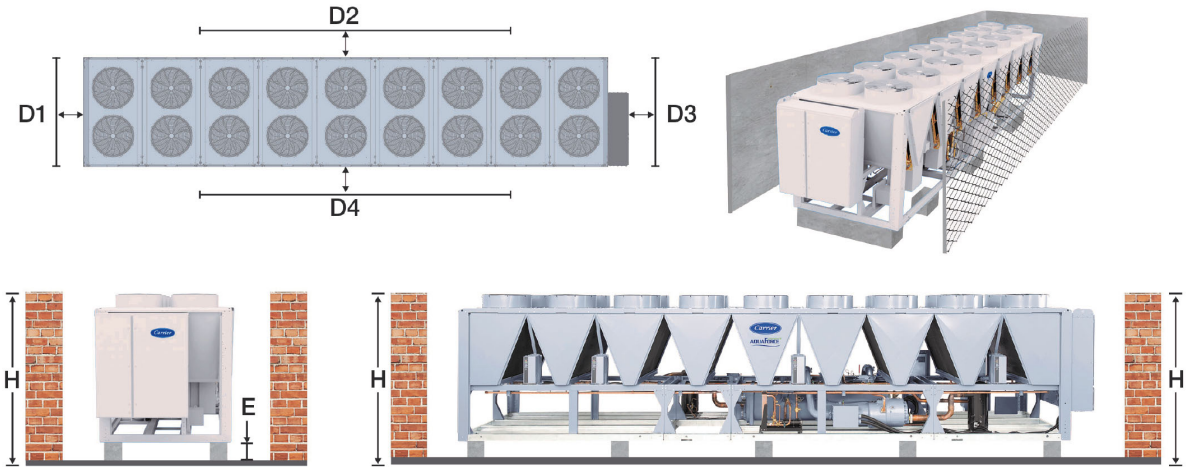

Acceptable clearance on the evaporator connection side or end opposite the control box of the unit can be reduced to 3 ft (1 m) without sacrificing performance as long as the remaining 3 sides are unrestricted. Acceptable clearance on the side with a control box can be reduced to 4 ft (1.3 m), due to NEC (National Electric Code) regulations, without sacrificing performance, as long as the remaining 3 sides are unrestricted. Clearances between chillers in dual chiller applications may be reduced to 6 ft (1.8 m) without sacrificing performance, provided the remaining sides are unrestricted.

There are applications, however, in which recommended minimum clearances are not available. In these situations, customers request a prediction of the chiller performance within the confined space. A generalized derating factor may be insufficient to fully predict performance with various real-life physical layouts and ambient conditions.

To improve performance predictions when recommended clearances cannot be met, Carrier has developed the ExpertFit™ Software Model. An interface in the computerized chiller selection program predicts air-cooled chiller performance within a confined space, taking into account various spatial constraints and conditions, thus providing actual performance reports and not just derate guidelines.

Using this tool will provide the customer with a realistic expectation for their actual installation. The illustration below is an example of a typical installation that the software can model.

**ExpertFit™ Model Example**



# Application data (cont)

## Oversizing Chillers

Oversizing chillers by more than 15% at design conditions must be avoided, as the system operating efficiency is adversely affected (resulting in greater or excessive electrical demand). When future expansion of equipment is anticipated, install a single chiller to meet present load requirements and add a second chiller to meet the additional load demand. It is also recommended that 2 smaller chillers be installed where operation at minimum load is critical. The operation of a smaller chiller loaded to a greater percentage over minimum is preferred to operating a single chiller at or near its minimum recommended value. Minimum load control should not be used as a means to allow oversizing chillers. Minimum load control should be given consideration where substantial operating time is anticipated below the minimum unloading step.

## Multiple Chillers

Where chiller capacities greater than can be supplied by a single 30RC chiller are required, or where standby capability is desired, chillers may be installed in parallel. Units may be of the same or different sizes with this piping arrangement. However, evaporator flow rates must be balanced to ensure proper flow to each chiller.

Unit software is capable of controlling 2 parallel units as a single plant by making use of the dual chiller control feature. Refer to the Controls, Start-up, Operation, Service, and Troubleshooting guide for further details.

If the dual chiller algorithm is used and the machines are installed in parallel, then an additional chilled water sensor must be installed for each module. For 30RC chillers that will be installed in a parallel piping configuration, a dual chiller accessory kit is available. Install one thermistor and well per chiller in the common leaving water header.

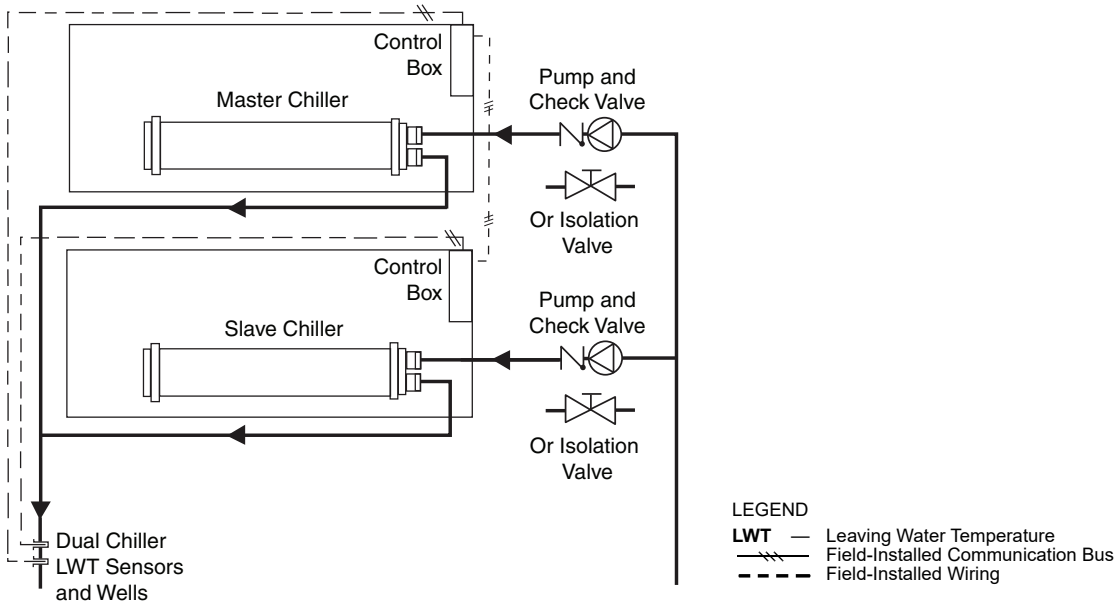
Parallel chiller control with dedicated pumps is recommended. The chiller must start and stop its own water pump, located in its own piping. Check valves are required at the discharge of each pump (*when the factory hydronic package option is chosen, and* ***dual pumps*** *are selected, the check valves are automatically supplied*). If pumps are not dedicated for each chiller, then isolation valves are required. Each chiller must open and close its own isolation valve through the unit control (the valve must be connected to the pump outputs). Refer to the chiller piping configuration shown below.

If a series application is required, the master/slave control feature cannot be used. Hydronic pump packages may not be applied in series applications.

## Series Chillers

Where a large temperature drop (greater than 20°F [11.1°C]) is desired, where chiller capacities greater than can be supplied by a single 30RC chiller are required, or where standby capability is required, 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.

**Parallel Dual Chiller Operation**



# Application data (cont)

## Evaporator Water Temperature

1. Maximum leaving chilled water temperature (LCWT) for the unit is 70°F (21.1°C). Unit can start and pull-down with up to 95°F (35°C) entering water temperature. It is recommended that entering water temperature not exceed 80°F (26.7°C).
2. Minimum LCWT for standard unit is 38°F (3.3°C). For leaving fluid temperatures below 39.9°F (–4.4°C), an inhibited antifreeze solution is required. Application of chiller to 15°F (–9.4°C) is available on R-410A chillers, and application down to 20°F (–6.7°C) is available on R-32 chillers.

NOTE: Water flowing through evaporator should not exceed 100°F (38°C).

## Water Quality

Maintaining proper water quality is important in closed-loop systems. When a brazed plate evaporator is selected, follow the guidelines presented in the table below.

**Water Quality Characteristics and Limitations**

| WATER CHARACTERISTIC | QUALITY LIMITATION |
|---|---|
| **Alkalinity ($HCO_3^-$)** | 70 – 300 ppm |
| **Sulfate ($SO_4^{2-}$)** | Less than 70 ppm |
| **$HCO_3^-/SO_4^{2-}$** | Greater than 1.0 |
| **Electrical Conductivity** | 10 – 500 µS/cm |
| **pH** | 7.5 – 9.0 |
| **Ammonium ($NH_3$)** | Less than 2 ppm |
| **Chorides ($Cl^-$)** | Less than 300 ppm |
| **Free Chlorine ($Cl_2$)** | Less than 1 ppm |
| **Hydrogen Sulfide ($H_2S$)[a]** | Less than 0.05 ppm |
| **Free (aggressive) Carbon Dioxide ($CO_2$)[b]** | Less than 5 ppm |
| **Total Hardness (dH)** | 4.0 – 8.5 |
| **Nitrate ($NO_3$)** | Less than 100 ppm |
| **Iron (Fe)** | Less than 0.2 ppm |
| **Aluminum (Al)** | Less than 0.2 ppm |
| **Manganese (Mn)** | Less than 0.1 ppm |

NOTE(S):

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. The term pH refers to the acidity, basicity, or neutrality of the water supply. Below 7.0, the water is considered to be acidic. Above 7.0, 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 $2^{[(6.3\text{-}pH)/0.3]}$ where TA = Total Alkalinity, PPM as $CaCO_3$.

## Strainers

Applications employing a brazed plate evaporator are supplied with a factory-installed strainer (20 mesh for 30RC 065-092 and 16 mesh for 30RC 100-152).

Strainers are also factory-supplied when DX evaporator chillers have factory-installed pumps. For any application with a DX evaporator that does not have a factory-installed hydronic package, and for all open-loop applications, a screen strainer with a minimum screen size of 20 mesh must be installed a maximum of 10 ft (3.0 m) from the unit to prevent debris from damaging internal tubes of the evaporator.

**Strainer Requirements**

| APPLICATION | 30RC WITH DX (SHELL-IN-TUBE) HEAT EXCHANGER | |
|---|---|---|
| | With Hydronic Package[a] | Without Hydronic Package |
| | Type of Strainer | |
| **Closed Loop** | 1/8-in. Perforated (Factory Supplied) | 20 Mesh[b] |
| **Open Loop** | 1/8-in. Perforated (Factory Supplied) and 20 Mesh[b] | 20 Mesh[b] |

NOTE(S):

a. Units with a hydronic package are shipped with a fine mesh start-up strainer that must be removed within 24 hours after start-up.

b. A 20 mesh strainer must be field supplied and installed within 10 ft (3 m) of the evaporator inlet.

## Evaporator Flow/Range

The 30RC chillers may be operated over a wide range of temperature rise, providing flow limits are not exceeded. For minimum and maximum evaporator flow rates, see the Minimum and Maximum Evaporator Flow Rates table on page 49. A high flow rate is generally limited by the maximum pressure drop that can be tolerated by the unit. The 30RC chillers are designed for a full load temperature rise of 5° to 20°F (2.8° to 11.1°C). Use the Packaged Chiller Builder Program to obtain all ratings.

### Minimum Evaporator Flow (Maximum Evaporator Temperature Rise)

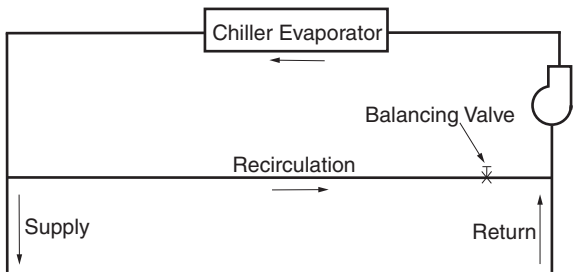
The minimum evaporator flow for standard units is shown in the Minimum and Maximum Evaporator Fluid Flow Rates table on page 49. When system design conditions require a lower flow (or higher rise) than the minimum allowable evaporator flow, follow these recommendations:

a. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature rise.

b. Evaporator fluid may be recirculated to raise the flow rate to the chiller. The mixed temperature entering the evaporator must be maintained to a minimum of at least 5°F (2.8°C) above the LCWT and to a maximum of no more than 20°F (11.1°C) above the LCWT.

NOTE: Recirculation flow is shown below.

**Recirculation Flow**



# Application data (cont)

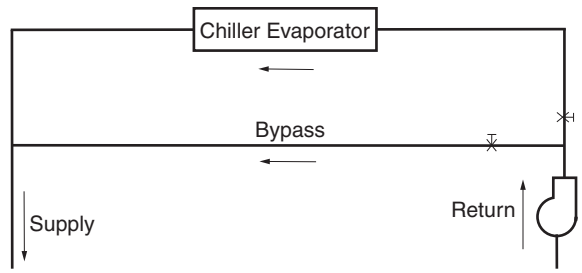
**Maximum evaporator flow**

The maximum evaporator flow (see the Minimum and Maximum Evaporator Flow Rates table on page 49) results in a practical maximum pressure drop through evaporator.

Return fluid may bypass the evaporator to keep the pressure drop through the evaporator within acceptable limits. This permits a higher delta T with lower fluid flow through evaporator and mixing after the evaporator. The mixed temperature entering the evaporator must be maintained to a minimum of at least 5°F (2.8°C) above the LCWT and to a maximum of no more than 20°F (11.1°C) above the LCWT.

NOTE: Bypass flow is shown below.

**Bypass Flow**




## Variable Evaporator Flow Rates

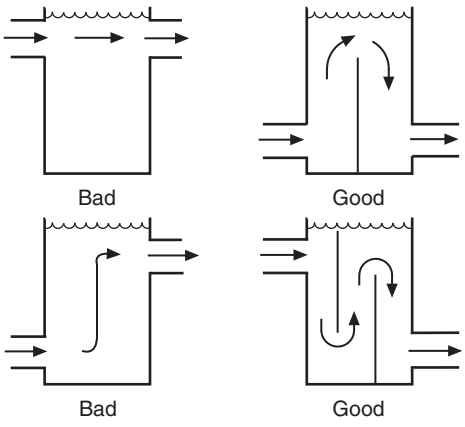
Variable flow rates may be applied to a standard chiller. The unit will, however, attempt to maintain a constant leaving chilled water temperature. In such cases, the minimum flow must be in excess of the minimum flow given in the Minimum and Maximum Evaporator Fluid Flow Rates table (page 49), adjusted for glycol in the system, and the minimum fluid volume must be in excess of 3 gallons per ton (3.2 L per kW). The flow rate must change at a rate less than 10% per minute. Apply a minimum of 6 gallons per ton (6.5 L per kW) water loop volume if the flow rate changes more rapidly.

## Fluid Loop Volume

The volume in circulation must equal or exceed 3 gal. per nominal ton (3.25 L per kW) of cooling for temperature stability and accuracy in normal air conditioning applications. In process cooling applications, or for operation at ambient temperatures below 32°F (0°C) with low loading conditions, there should be from 6 gal. per ton (6.5 L per kW). To achieve this volume, it is often necessary to install a tank in the loop.

Tanks 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.

**Tank Installation**




The piping between the chiller and the fluid loop volume tank can be done to allow the tank to be on the return side of the chiller (tank piped to chiller inlet) or the supply side of the chiller (tank piped to the chiller outlet). However, it is recommended that the tank be piped to the return side of the chiller to buffer any changes in load to allow more stable chiller operation.

## Minimum Time to Power Chiller Before Start-Up

In order to ensure that the crankcase heaters are provided sufficient time to raise the crankcase temperature to the required operating point, power must be applied to the control circuit a minimum of 24 hours prior to chiller start-up. On 30RC chillers, the control circuit obtains its power via a control transformer off the main 3-phase power supply. Therefore, the main (3-phase) power is to be supplied at least 24 hours prior to chiller start-up, unless there are special means for providing control power.

## Evaporator Fouling Factor

The standard AHRI fouling factor is 0.00010 $ft^2 \cdot hr \cdot °F/Btu$ (0.000018 $m^2 \cdot °C/W$). As fouling factor is increased, unit capacity decreases and compressor power increases. Use the Packaged Chiller Builder Program to obtain all ratings.

# Application data (cont)

**Minimum and Maximum Evaporator Flow Rates, 30RC 065-152**

| 30RC UNIT SIZE | MINIMUM EVAPORATOR FLOW RATE (gpm)[a] | MAXIMUM EVAPORATOR FLOW RATE (gpm) | MINIMUM LOOP VOLUME (gal) | MINIMUM EVAPORATOR FLOW RATE (l/s)[a] | MAXIMUM EVAPORATOR FLOW RATE (l/s) | MINIMUM LOOP VOLUME (liters) |
|---|---|---|---|---|---|---|
| **065/067** | 72 | 288 | 180 | 5 | 18 | 681 |
| **070/072** | 84 | 336 | 210 | 5 | 21 | 795 |
| **080/082** | 96 | 384 | 240 | 6 | 24 | 908 |
| **090/092** | 108 | 432 | 270 | 7 | 27 | 1022 |
| **100/102** | 120 | 480 | 300 | 8 | 30 | 1136 |
| **110/112** | 132 | 528 | 330 | 8 | 33 | 1249 |
| **120/122** | 144 | 576 | 360 | 9 | 36 | 1363 |
| **130/132** | 156 | 624 | 390 | 10 | 39 | 1476 |
| **150/152** | 180 | 720 | 450 | 11 | 45 | 1703 |

NOTE(S):

a. For minimum evaporator flow rate with brine applications, refer to E-cat software performance.

## Evaporator and Hydronic System Freeze Protection

Freeze protection for down to –20°F (–28.9°C) for the evaporator and hydronic package is provided when the Freeze Protection Evaporator Heater option is selected. Since power is sometimes lost for extended periods during winter storms, freeze protection provided by heater tapes will be effective only if a back-up power supply can be assured for the unit's control circuit, heater, and evaporator pump. If not protected with an antifreeze solution, draining the evaporator and outdoor piping is recommended if the system will not be used during freezing weather conditions.

Two conditions that must be considered when determining antifreeze concentration are leaving water set point and ambient freeze conditions. Both of these parameters can help determine the recommended concentration level. Higher concentration must be used to adequately protect the machine.

NOTE: Use only antifreeze solutions approved for heat exchanger duty.

For applications in which the leaving water temperature set point is less than 40°F (4.4°C), a suitable inhibited antifreeze solution must be used. The solution concentration must be sufficient to protect the chilled water loop to a freeze protection (first crystals) concentration of at least 15°F (8.3?C) below the leaving water temperature set point.

If the chiller refrigerant or fluid lines are in an area where ambient conditions fall below 34°F (1?C), it is required that an antifreeze solution be added to protect the unit and fluid piping to a temperature of 15?F (8.3?C) below the lowest anticipated ambient temperature.

Select concentration based on either burst or freeze protection as dictated by the application. If the chiller does not operate during the winter, nor is a start-up expected, a burst protection concentration is recommended. This concentration may not be high enough to pump the fluid through the unit. Burst protection is typically a lower concentration that will provide better performance from the machine. If the chiller does operate during winter, a freeze protection concentration is recommended. This concentration will be high enough to keep the fluid in a condition that it can be pumped at low ambient conditions.

IMPORTANT: Glycol anti-freeze solutions are highly recommended, since heater tapes provide no protection in the event of a power failure.

Consult glycol fluid manufacturers for burst protection recommendations and fluid specifications.

## High Ambient Temperature Operation

High outdoor ambient chiller start-up and operation is possible for standard 30RC chillers at ambient temperatures up to 125.6°F (52°C) at nominal voltage. Operation at high ambient temperatures reduces chiller full load capacity when compared to operation at standard conditions.

## Low Ambient Temperature Operation

Units will start and operate down to 32°F (0°C) as standard.

NOTE: Minimum load on chiller must be above the minimum step of unloading.

With the inclusion of wind baffles and variable speed condenser fans, the unit is capable of starting as low as –13°F (–25°C) and be operational to as low as –20°F (–29°C) ambient temperature. Inhibited propylene glycol or other suitable corrosion-resistant anti-freeze solution must be field supplied and installed in all units for unit operation below 34°F (1.1°C). Solution must be added to fluid loop to protect loop down to 15°F (8.3°C) below minimum operating ambient temperature. Concentration should be based on expected minimum temperature and either "Burst" or "Freeze" protection levels. At least 6 gal. per ton (6.5 L per kW) of water volume is the recommended minimum for a moderate system load.

## High-Efficiency Variable Condenser Fans

Highly efficient part load performance is available with variable speed condenser fan motors controlled by variable speed drives. In most applications, the chiller will run at part load conditions the vast majority of the time, and this is particularly the case if the application has a 24/7 duty cycle. This option will lower utility costs while producing a scroll compressor design that provides excellent part load efficiency. This is the essence of 30RC chillers with Greenspeed® Intelligence. The use of this option also enables the chiller to operate at low ambient conditions (–20°F [–29°C]).

## Altitude Performance Correction

Altitude has an effect upon air-cooled chiller performance. Thus, the altitude of all applications is considered in the Packaged Chiller Builder Program.

# Application data (cont)

## Condenser Airflow

Airflow restrictions on units with standard fans will affect the unit capacity, condenser head pressure, and compressor power input. Correction factors to be applied for external static restrictions up to 0.2 in. wg (50 Pa) are as follows:

| EXTERNAL STATIC | | CAPACITY MULTIPLIER | COMPRESSOR POWER MULTIPLIER |
|---|---|---|---|
| in. wg | Pa | | |
| **0.0** | 0.0 | 1.000 | 1.00 |
| **0.1** | 25.0 | 0.986 | 1.01 |
| **0.2** | 50.0 | 0.968 | 1.03 |

## Condenser Coil Protection (*Enviro-Shield*™)

Refer to the environmental selection guides for more information. If the standard Novation® (microchannel) coil does not meet the corrosion requirements for a given application, additional coil options are available. For specific geographical recommendations, please refer to the NACO (North American Commercial Operations) Packaged Chiller Builder program.

### Aluminum Fin/Copper Tube Coils

These coils are constructed of seamless copper tubes, mechanically bonded to aluminum fins. The fins have wavy enhancements. These coils are not recommended for corrosive environments.

### E-coated Novation® Coils

These coils have an extremely flexible and durable epoxy coating uniformly applied to all coil surfaces. Unlike brittle phenolic dip and bake coatings, e-coat provides superior protection, with unmatched flexibility, edge coverage, metal adhesion, thermal performance and, most importantly, corrosion resistance. E-coated coils provide this protection because all coil surfaces are completely encapsulated from environmental contamination. This option provides the best protection for Novation coil technology. E-coated aluminum microchannel coils shall be capable of withstanding an 8000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 Standard.

### E-coated Aluminum-Fin Coils

These coils have the same flexible and durable epoxy coating as e-coated Novation coils. This option provides better protection compared to standard or pre-coated aluminum-fin coils in many environments.

## Electrical/Utility Interests

Use of energy management practices can significantly reduce operating costs, especially during off-peak modes of operation. Demand limiting (also called load shedding) and temperature reset are 2 techniques for accomplishing efficient energy management. See the Demand Limiting (Load Shedding) section below for further details.

## Demand Limiting (Load Shedding)

When a utility's demand for electricity exceeds a certain level, loads are shed to keep electricity demand below a prescribed maximum level. Typically, this happens on hot days when air conditioning is most needed. The energy management module (EMM) can be added to accomplish this reduction. Demand may be limited on a unit by resetting fluid temperature or by unloading the chiller to a given predetermined percentage of the load. Demand limit may also be driven by an external 4 to 20 mA signal. These features require a signal from an intelligent central control. Do not cycle demand limiter for less than 10 minutes on and 5 minutes off. Duty cycling cycles electrical loads at regular intervals regardless of need. This reduces the electrical operating costs of a building by "fooling" demand indicating devices. Duty cycling of compressors or fans is not recommended, since motor winding and bearing life will suffer from constant cycling.

## Remote On-Off Control

Remote on-off control may be applied by hard-wired connection (see Controls, Start-Up, Operation, Service, and Troubleshooting guide) or by connection to a Carrier Comfort Network® (CCN) system.

## Optional Hydronic System Selection

Select pump gpm from resulting chiller selection and total pressure loss in the system plus the chiller internal pressure loss.

NOTE: Maximum gpm (L/s), pressure and pump hp must not exceed maximum on pump curve.

Pump flow can be reduced by using the factory-supplied triple-duty valve up to 10%. Beyond that, impeller trimming is recommended to reduce energy consumption. Follow local codes or ASHRAE 90.1 recommendations. Contact your Carrier representative for specific amount of trim required.

The AquaSnap® 30RC chiller will require a field-supplied expansion tank when the optional pumping package is provided.

The expansion tank is based on fluid type, temperature range, fluid pressure, and loop volume.

Parallel chillers with hydronic packages require that pump inlets be equalized to prevent pump cavitation. Pump expansion tanks must be removed and located together in the common pump suction header. All materials needed for expansion tank relocation are field supplied. Appropriate measures must be taken for freeze protection.

## Air Separation

The AquaSnap 30RC chiller will require a field-supplied air separation device when the optional pump package is provided.

Air must be controlled in a hydronic system if it is to perform properly. Air can block the flow of chilled water to its destinations and can cause cavitation in the pump, which will aerate the pump and potentially cause pump failure. The air separator is sized according to the total flow through the system. The air separator should be located inside the building. There are several types of air separators to choose from. For more information and product selection, contact your local manufacturer's representative.

## Heat Reclaim (Desuperheater)

Whenever a chiller is operating, the heat removed from the evaporator fluid, as well as, the energy associated with the compression process, must be moved to another location. Under standard operation, an air-cooled chiller moves and releases this heat into the atmosphere. There are times, however, when it is beneficial to capture this heat and convert it into useful hot water.

A desuperheater, available with all coil types, may be used to serve this purpose. The desuperheater is available for most unit sizes, and variable speed condenser fans are required when the desuperheater is employed. The leaving-water temperature can reach a maximum 160°F (71.1°C) under steady state and constant hot water flow conditions.

# Application data (cont)

To operate in heat reclaim, there must be a simultaneous need for chilled water and tempered hot water. Just as the chiller operates in standard duty, the chiller always controls the leaving chilled water temperature.

The leaving hot-water temperature is a function of the entering hot water temperature, hot water flow, and chiller capacity. As a consequence, these applications are useful for make-up water or preheating of process hot water systems that have alternative means of controlling the desired hot-water temperature.

## Freeze Protection for Desuperheater

The desuperheater is located within the standard chiller envelope. Therefore, this device, as well as its associated water piping, must be located outdoors. A form of freeze protection must be provided.

The same basic guidelines that have already been discussed for evaporator freeze protection and preparation for winter shutdown must be followed. The Carrier warranty does not cover damage due to freezing. The piping, however, must either be provided with heat trace or an antifreeze solution must be added to the hot water fluid.

Adding antifreeze solution is the only certain means of protecting the unit from freeze-up if the heater fails or electrical power is interrupted or lost while temperatures are below 32°F (0°C).

## General Heat Reclaim Application Data

The desuperheater may be used on units with high efficiency variable condenser fans. The overall chiller dimensions are unchanged when the desuperheater is selected. The desuperheater water piping connections are Victaulic, and field-installed piping is connected to a header such that there is only one hot-water inlet and one hot-water outlet connection.

## Capacity Recovery™ Feature (Rapid Restart)

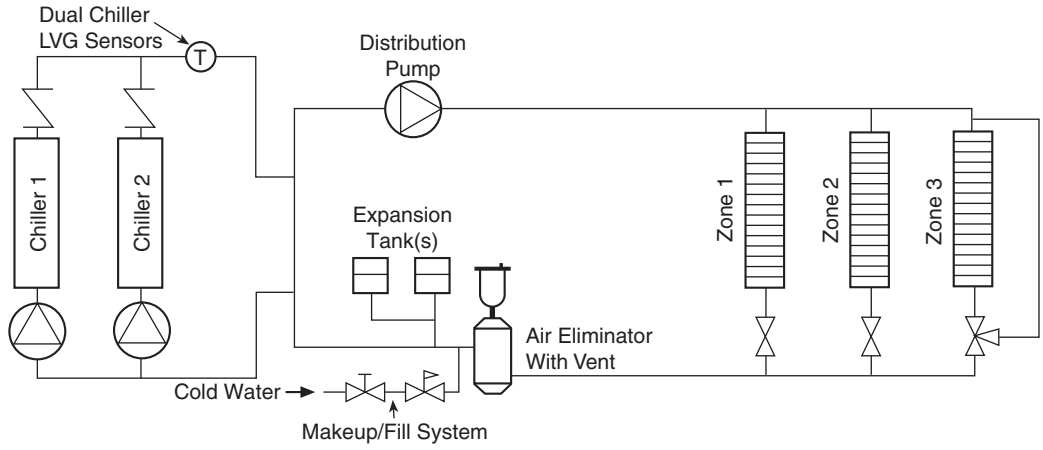
With the rise in data centers and critical cooling applications, focus has increased on capacity recovery times for chiller products. Capacity recovery is defined as the time it takes to reach 100% capacity after power is restored to the chiller, given that the full cooling load is present. Capacity recovery times are the critical factor to consider in data centers due to the consistently high loads in the space and the need to maintain the temperatures. Other manufacturers often discuss restart time without providing the details of how long it takes to reach full capacity, but the achievement of full capacity is the critical parameter to the end user.

With Carrier's Capacity Recovery™ feature, when power is restored immediately following a power outage and a restart is commanded, the AquaSnap 30RC065-152 air-cooled chiller with Greenspeed® intelligence (thus employing variable-speed condenser fans) is able to produce 100% of the cooling capacity in under 4 minutes.

This recovery capability is under normal conditions with no safety/control manual reset items or alarms, and with the provision that required chilled water flow is available. Recovery may take longer or be prevented when condenser air inlet temperature is >110°F (43.3°C) and leaving chilled water temperature is >55°F (12.7°C), or under similar extreme conditions.

The Capacity Recovery/rapid restart feature is available with the chiller when both the upgraded control panel and Greenspeed® intelligence with variable-speed condenser fans are selected.

**Typical Multiple Chiller Configuration with Air Eliminator and Expansion Tank Location**



# Application data (cont)

## Free Cooling

Due to the internal loads driven by people, computers, machinery and lighting, many HVAC applications require cooling even in colder months. While running a chiller in the colder months is one way to satisfy the cooling requirement, it can be costly to do so. Another way to meet the cooling load requirement is to operate a waterside economizer, sometimes known as a free cooling system.

There are 2 reasons a free cooling system might be a wise choice in cooler-climate applications. The first is to meet ASHRAE 90.1-2016 requirements. The other reason is to simply take advantage of the colder weather to meet the building's set point, thus saving energy. Facilities such as data centers are particularly interested in these types of systems.

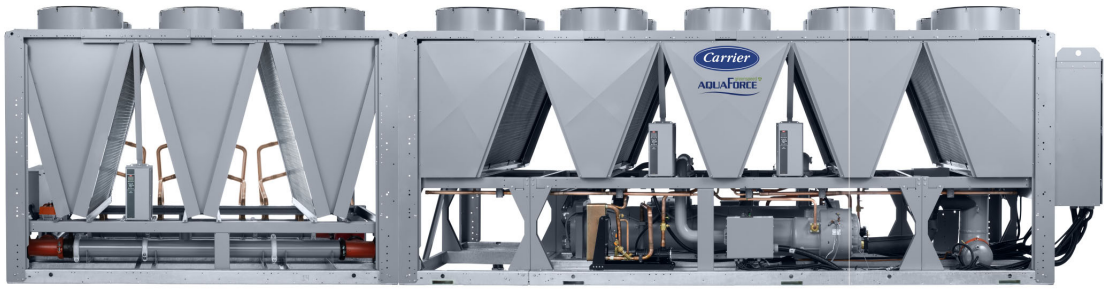
When using an air cooled chiller for mechanical cooling, most methods of obtaining free cooling with a waterside economizer utilize some type of "dry cooler." The main differences in the different dry cooler designs are where the dry coolers are located and how the dry coolers are controlled. One economizer style is called a "Remote Dry Cooler." It sits remotely from the air-cooled chiller, and chilled-fluid piping is required between the dry cooler and the chiller. In this case, the chiller and the dry cooler are controlled separately. The second style is a "Stacked Coil Dry Cooler." In this case, the dry cooling coils are mounted, or "stacked," right next to the existing refrigerant condenser coils on the chiller. The third style is a purpose-made "Modular" design, in which the mechanical cooling coils and the free cooling coils are located in separate sections of the overall chiller design. This style is designed to integrate directly to specific air-cooled chillers, and this is the style incorporated by the 30RC chiller. For both the stacked and modular designs, the control of the dry cooler section is supervised by the chiller controller.

The 30RC free cooling offering consists of sizes 020 (2V design) to 080 (8V design). All free cooling offerings, regardless of size, have one control panel, and this control panel is located at the free cooling inlet end (the end in which system return fluid enters). The free cooling control panel does not require user interaction because this panel directly interacts with the main chiller control panel.

Piping in the free cooling section can be a series arrangement or a parallel arrangement.

The term "parallel," as used here, indicates that system return fluid (at the system return fluid temperature) will enter each coil. The term "series," as used here, indicates that one or more of the free cooling coils will be supplied with fluid that has already passed through a coil or a bank of free-cooling coils. See the Free Cooling Schematic Piping Configurations on pages 16 for further clarification on this point. Please note that there are many ways a customer may accomplish field piping and that all field piping details, covering all piping arrangements and all free cooling unit sizes, are available in the 30RC Installation Instructions (not in this overview).

**Free Cooling System***




* The free cooling system is flexible enough so that it may be used with other Carrier air-cooled chillers. This is an example of a free cooling system applied to a 30XV chiller.

# Application data (cont)

An advantage associated with the series arrangement is optimization of free cooling capacity. An advantage of the parallel arrangement is lower fluid-side pressure drop. The Carrier Electronic Catalog Program will present free cooling performance associated with all free cooling sizes and piping arrangements.

A free cooling system has 3 modes of operation. The modes are free cooling only, mechanical cooling only, or hybrid mode. Hybrid mode is the case in which mechanical cooling and free cooling run at the same time. It is worthwhile to discuss how a unit with a free cooling system operates.

When the ambient temperature is too warm to provide free cooling, the chiller operates as normal in mechanical cooling mode, and the 3-way valve(s) at the inlet(s) do not allow chilled fluid to enter the free cooling coils. In the stacked design arrangement, the fans need to simultaneously force air through both the chiller condenser coils and also the unused free cooling coils, thus wasting energy. With the 30RC modular arrangement, the air only flows over the mechanical cooling coils that are in use, while the fans for the free cooling portion will simply be turned off, thereby saving energy. See the diagram below.

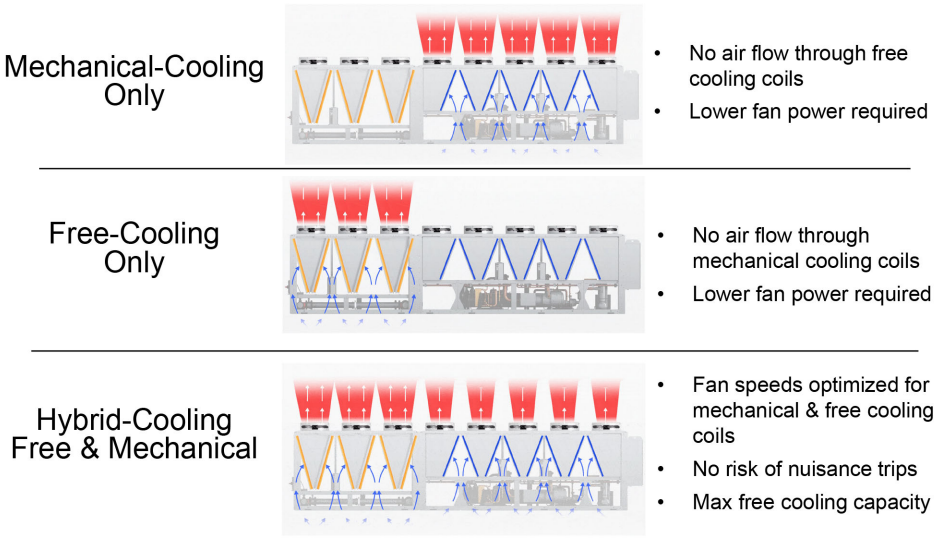
As the ambient temperature drops, a temperature will be reached where some free cooling is feasible (this temperature is customizable and the signal to initiate free cooling is based upon a factory-installed outside air temperature sensor). At this point, the 3-way valve diverts flow to the free cooling coils. After the chilled fluid passes through the free cooling coils, that fluid enters the chiller evaporator inlet. If the system set point is not met by the free cooling coils alone, the chiller will perform the remaining mechanical cooling.

With the stacked design operating in the hybrid mode, air needs to flow over both sets of coils, but the fan control system faces two conflicting issues. The free cooling coils want the most air flow possible in order to accomplish the greatest amount of free cooling. The mechanical cooling coils will want to lower the fan speed to ensure the refrigerant temperature doesn't get too cold, missing the set point and potentially damaging systems. Therefore, the control system will protect the chiller at the expense of free cooling tons, wasting the opportunity to obtain the most out of the free cooling system.

When the 30RC operates in hybrid mode, the air flows over the mechanical and free cooling coils separately. In this way, the free cooling fans can ramp up, extracting every bit of free cooling possible. At the same time, the mechanical cooling fans can slow down, ensuring set point and equipment protection are maintained. See the diagram below.

The ambient temperature may eventually drop to a point where mechanical cooling can shut off completely and set point can be met by free cooling operation alone. With the stacked design, air needs to flow over both sets of coils, including the unused mechanical cooling coils. This is similar to the mechanical-cooling-only situation where air is flowing across both coils when only one is active. With the 30RC arrangement, only the free cooling portion of the unit will be active, with the controls maximizing the free cooling tons while the fans for the mechanical cooling section will simply turn off.

**Bolt-On Dry Cooler: Modular Design**



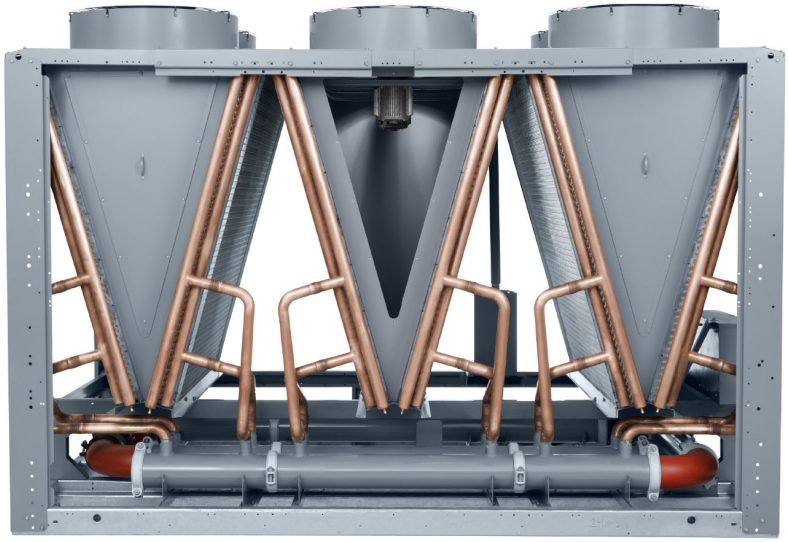
# Application data (cont)

In addition to performance benefits associated with the 30RC style free cooling design, the service benefits, compared to a stacked design, are substantial. Stacked designs have air flowing over 2 close coupled coils, and one of them essentially becomes a filter, trapping dirt and debris between the 2. In many cases, this can be nearly impossible to clean, and coil replacement can be very difficult.

With the 30RC design, because there's only one coil, most dirt is expelled by the existing fans. If needed, a normal coil wash will eliminate any remaining dirt. Changing coils is simple, since they slide out with nothing in the way. In addition, service can be done on either the mechanical or free cooling side of the system, without taking the other side offline. And, to improve the serviceability of the free-cooling coils, Carrier has developed a patent-pending removable coil trim cover, as shown below. This removable cover allows the coils to be cleaned from inside out as well, which is probably the most effective way to clean the coils, since the debris comes from the outside while the unit is operating.

Possibly the most desirable feature of a 30RC free cooling arrangement is the customizable nature of the design. Instead of requiring the customer to install an “all or nothing” type of arrangement, the customer can determine how much free cooling they would like for each particular job. While some jobs may only desire a limited amount of free cooling, others may want substantially more. With the 30RC design, the amount is completely customizable.

**Free Cooling Module Removable Coil Trim Cover for Cleaning**



# Guide specifications

**Outdoor Air-Cooled Liquid Chiller**

**HVAC Guide Specifications**

Size Range: **60 to 150 Tons**
**(212 to 528 kW) Nominal**

Carrier Model Number: **30RC**

## Part 1 — General

1.01 SYSTEM DESCRIPTION

Microprocessor-controlled, air-cooled liquid chiller for outdoor installation, utilizing scroll compressors, low sound fans and optional hydronic pump system.

For units that incorporate Greenspeed intelligence, all fans are controlled with variable speed fan drive motors. Chiller software shall be specifically developed to coordinate optimal fan speed for application conditions and provide refrigerant circuit optimization, resulting in higher part-load efficiency and reduced acoustic levels.

1.02 QUALITY ASSURANCE

A. Unit shall be rated in accordance with AHRI (Air-Conditioning, Heating and Refrigeration Institute) Standard 550/590, latest edition (U.S.A.) and all units shall be in compliance with ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) 90.1.2019.

B. Unit construction shall comply with ASHRAE 15 Safety Code, UL (Underwriters Laboratories) latest edition, and ASME (American Society of Mechanical Engineers) applicable codes (U.S.A. codes).

C. The management system governing the manufacture of this product is ISO 9001:2015 certified.

D. An operational test, in which the chiller is run under load, is performed at the factory. This test checks for proper operation of fans, as well as various controls and safeties, and a Certificate of Unit Testing, indicating successful end-of-line testing is provided with the unit.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Unit controls shall be capable of withstanding 150°F (66°C) storage temperatures in the control compartment.

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

## Part 2 — Products

2.01 EQUIPMENT

A. General:

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

B. Materials of Construction:

1. The base rail is 11 ga structural quality (Grade 50, Class 2), hot-dipped, zinc-coated, minimized spangle sheet steel (wtih Magni-coated screws).
2. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
3. Painted parts shall withstand 1000 hours in constant neutral salt spray under ASTM B117 conditions with a 1 mm scribe per ASTM D1654. After test, painted parts shall show no signs of wrinkling or cracking, no loss of adhesion, and no evidence of blistering, and the mean creepage shall not exceed 1/4 in. (Rating ≥ 4 per ASTM D1654) on either side of the scribe line.

C. Fans:

1. Condenser fans shall be direct-driven, 9-blade airfoil cross-section, reinforced polymer construction, shrouded-axial type, and shall be statically and dynamically balanced with inherent corrosion resistance.
2. Air shall be discharged vertically upward.
3. Fans shall be protected by coated steel wire safety guards.
4. Fan blades shall have serrated edges to minimize the sound that is produced.

D. Compressor/Compressor Assembly:

1. Fully hermetic scroll type compressors.
2. Direct drive, 3500 rpm (60 Hz), protected by motor temperature sensors, suction gas cooled motor.
3. External vibration isolation rubber-in-shear.
4. Each compressor shall be equipped with crankcase heaters to minimize oil dilution.

E. Brazed Plate Evaporator:

1. Evaporator shall be rated for a refrigerant working-side pressure of 445 psig (3068 kPa) and shall be tested for a maximum water-side pressure of 300 psig (2068 kPa) or 150 psig (1034 kPa) when optional hydronic package is installed.
2. Shall be single-pass, ANSI (American National Standards Institute) type 316 stainless steel, brazed plate construction.
3. Shell shall be insulated with 3/4 in. (19 mm) closed-cell, polyvinyl-chloride foam with a maximum K factor of 0.28.
4. Shall incorporate 2 independent refrigerant circuits.
5. Unit shall be provided with a factory-installed flow switch.
6. All connections shall use standard Victaulic-type fittings.
7. Brazed plate evaporator shall be supplied with a factory-installed strainer (20 mesh for 30RC 065-092 and 16 mesh for 30RC 100-152).

F. Condenser:

1. Coil shall be air-cooled Novation® heat exchanger technology with microchannel (MCHX) coils and shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Coils shall consist of a 2-pass arrangement. Coil construction shall consist of aluminum alloys for fins, tubes,

and manifolds, in combination with a corrosion-resistant coating.

2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 656 psig (4522 kPa).
4. To plan the chiller installation and for ease of maintenance/coil removal, all refrigerant piping entering and leaving the condenser coils shall be located on only one side of the chiller so the coils can be removed (when needed) from the side free of piping. This is important to consider because removing the coils from the header side, although possible, involves extra labor due to extra bending and brazing of the coil headers.

G. Refrigeration Components:

Refrigerant circuit components shall include replaceable core filter drier, moisture-indicating sight glass, electronic expansion device, discharge service valve and liquid line service valves, and complete operating charge of both refrigerant and compressor oil.

H. Controls, Safeties, and Diagnostics:

1. Unit controls shall include the following minimum components:
   a. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
   b. Separate terminal block for power and controls.
   c. Control transformer to serve all controllers, relays, and control components.
   d. ON/OFF control switch.
   e. Replaceable solid-state controllers.
   f. Pressure sensors installed to measure suction and discharge pressures. Thermistors installed to measure cooler entering and leaving fluid temperatures.
2. Unit controls shall include the following functions:
   a. Automatic circuit lead/lag.
   b. Hermetic scroll compressors are maintenance-free and protected by an auto-adaptive control that minimizes compressor wear.
   c. Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return fluid temperature with temperature set point accuracy to 0.1°F (0.05°C).
   d. Limiting the chilled fluid temperature pull-down rate at start-up to an adjustable range of 0.2°F to 2°F (0.1 to 1.1°C) per minute to prevent excessive demand spikes at start-up.
   e. Seven-day time schedule.
   f. Leaving chilled fluid temperature reset from return fluid and outside air temperature.
   g. Chilled water pump start/stop control and primary standby sequencing to ensure equal pump run time.
   h. Chiller control for parallel chiller applications without addition of hardware modules and control panels (requires thermistors).
   i. Timed maintenance scheduling to signal maintenance activities for strainer maintenance and user-defined maintenance activities.
   j. Low ambient protection to energize evaporator heaters (if installed).
   k. Periodic pump start to ensure pump seals are properly maintained during off-season periods.
   l. Single step demand limit control activated by remote contact closure.
   m. Nighttime sound mode to reduce the sound of the machine per a user-defined schedule.
3. Diagnostics:
   a. The control panel shall include, as standard, a display:
      1) Color touch screen display with stylus.
      2) Display shall allow a user to navigate through menus, select desired options, and modify data.
   b. Features of the display shall include:
      1) Multiple connection ports for USB, Ethernet, or BACnet[1] IP, Modbus[2]-RTU (Remote Terminal Unit), LEN (local equipment network), and Carrier Comfort Network® (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.
      7) Full compatibility with the Carrier Comfort Network® (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.

1. BACnet is a trademark of ASHRAE.
2. Modbus is a registered trademark of Schneider Electric.

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 hardware modules.

4. Safeties:
   a. Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:
      1) Reverse rotation.
      2) Low chilled fluid temperature.
      3) Motor overtemperature.
      4) High pressure.
      5) Electrical overload.
      6) Thermal overload.
      7) Loss of refrigerant charge.
   b. Condenser fan motors shall have internal overcurrent protection.

I. Operating Characteristics:
1. Standard tier units, without modification, shall be capable of starting and running at outdoor ambient temperatures from 0°F (–17.8°C) to 125.6°F (52°C) for units employing variable speed condenser fans and from 32°F (0°C) to 120°F (48.9°C) for units that do not employ variable speed condenser fans.
2. Compact tier units shall be capable of starting and running at outdoor ambient temperatures from 32°F (0°C) to 115°F (46.1°C).
3. Unit shall be capable of starting up with 95°F (35°C) entering fluid temperature to the evaporator.
4. After power restoration, and with the Capacity Recovery™ feature enabled, unit shall be capable of full capacity recovery in less than 4 minutes provided the required chilled water flow is available and no safety/control manual reset items or alarms are in effect.

J. Motors:

Condenser fan motors shall be totally enclosed, air over, 3-phase type with permanently lubricated bearings and Class F insulation. Fans shall be 8-pole for fixed speed units and 6-pole for variable speed units.

K. Electrical Requirements:
1. Unit primary electrical power supply shall enter the unit at a single location (all chiller voltage/ size combinations shall have the ability to accommodate 2 power supplies to meet job specific requirements).
2. Primary electrical power supply shall be rated to operate up to 125.6°F (52°C) ambient temperature for all models
3. Unit shall operate on 3-phase power at the voltage shown in the equipment schedule.
4. Control points shall be accessed through terminal block.
5. Unit shall be shipped with factory control and power wiring installed.
6. Unit shall have a standard SCCR (short circuit current rating) value of 25 kA for all voltages other than 575-v, and 10 kA for 575-v units.

L. Chilled Water Circuit:
1. Chilled water circuit shall be rated for 300 psig (2068 kPa). Units with optional pump package are rated for 150 psig (1034 kPa) working pressure.
2. Thermal dispersion proof of flow switch shall be factory installed and wired.
3. Optional hydronic package (applies to all unit sizes except compact tier units, with or without the use of a VFD [variable frequency drive]):
   a. Field pipe connections shall be carbon steel Victaulic type.
   b. Optional single or primary/stand-by operation pump systems. Dual pump systems shall have a pump discharge check valve.
   c. For dual-pump packages, the equipment shall have one pump operating, and a simple transition to the back-up pump shall be accomplished by means of a valve which shall be supplied with this configuration.
   d. Pumps shall be vertical in-line, single stage design, capable of being serviced without disturbing piping connections.
      1) Pump casing shall be of class 30 cast iron.
      2) The impeller shall be of cast bronze, closed type, dynamically balanced, keyed to the shaft, and secured by locking cap screw.
      3) The hydronic kit will be provided with a flush line connection to ensure lubrication at the seal face and allow for positive venting of the seal chamber.
      4) Each port shall be fitted with an isolation valve that allows the units to operate in parallel or standby, yet may be used to isolate one pumping unit for servicing or removal with the other pump still running.
      5) Pump shall be rated for 150 psig (1034 kPa) working pressure.
      6) The pump case shall have gauge tappings at the suction and discharge nozzles and include drain ports.
      7) Dual pumps shall allow for the servicing of one pump without draining the chilled water loop.
      8) Motors shall be TEFC 3-phase type with grease-lubricated ball bearings.

9) Each pump shall be factory tested per Hydraulic Institute Standards.

10) Pump motors shall be VFD compatible.

e. A permanent factory-installed strainer shall be provided upstream of the pump inlet for all units regardless of evaporator type.

1) Units equipped with brazed-plate heat exchanger type evaporators shall be provided with a stainless-steel mesh strainer at inlet water connection to the unit.

2) Units equipped with a shell-and-tube direct expansion type evaporator shall be provided with a 1/8 in. corrosion-resistant perforated steel strainer, housed in the suction guide. In addition, a factory-installed, removable fine mesh start-up strainer for initial run period shall be included. The start-up strainer must be removed within 24 hours after chiller start-up.

f. Pressure/temperature taps (2) shall be factory installed to measure the pressure differential across the pump. For units equipped with the optional shell-and-tube direct expansion evaporator, an additional pressure/temperature tap (1) shall be factory installed at the suction guide to measure pressure differential across the strainer.

g. Combination valve (which includes check, isolation, and modulation) shall be factory installed. Pressure/temperature taps (2) shall be factory installed to measure the pressure differential across the combination valve.

h. Hydronic assembly shall have factory-supplied electric freeze protection to –20°F (–29°C) when optional heaters are used.

i. Piping shall be Schedule 40 black steel.

4. Optional hydronic package with VFD (these comments are applicable in addition to the comments in the previous section when the VFD hydronic package is employed):

a. The drive shall be of the VVC-PWM (voltage vector control — pulse with modulation) type, providing near unity displacement power factor without the need for external power factor correction capacitors at all loads and speeds.

b. The drive and motor protection shall include: motor phase to ground fault, loss of supply phase, over voltage, under voltage, motor overtemperature, inverter overload, and overcurrent. Overcurrent is not allowed, ensuring hydronic units will not overload the motor at any point in the operating range of the unit.

c. Sensorless control software shall be available in the hydronic unit to provide automatic speed control without the need for pump mounted (internal/external) or remotely mounted differential pressure system feedback sensors. Control mode setting and minimum/maximum head set points shall be set at the factory and be user adjustable via the programming interface.

d. The integrated control shall incorporate an integrated graphical user interface that shall provide running and diagnostic information and identify faults and status in clear English language. Faults shall be logged and/or recorded for review at a later date. It shall be possible to upload parameters from one drive into the non-volatile memory of a computer and download the parameters into other drives requiring the same settings. The keypad shall incorporate Hand-Off-Auto push buttons to enable switching between BMS (Building Management System) and manual control. The drive shall incorporate a USB port for direct connection to a PC and an RS485 connection with Modbus RTU protocol. Optional protocols available should include BACnet and LonWorks[1].

e. The control shall have the following additional features: sensorless override for BMS, manual pump control or closed loop PID (proportional/integral/derivative) control, programmable skip frequencies and adjust- able switching frequency for noise/vibration control, auto alarm reset, motor pre-heat function, 6 programmable digital inputs, 2 analog inputs, one programmable analog/digital output, 2 volt-free contacts.

f. The hydronic unit shall be capable of operating in any of the following control modes:

1) Duty pump and standby pumps with sensorless control.

2) Duty pump and standby pumps with remote sensor or building automation system (BAS) control.

M. 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. *High-Efficiency Variable Condenser Fans:

All fans on the unit shall have variable speed fan motors to provide higher part load efficiency and reduced acoustic levels. Each fan circuit shall have a factory-installed, independent, variable speed drive with display. Variable speed drives are UL Listed. The use of this option, with the addition of antifreeze in the evaporator circuit and wind baffles, shall allow running with outdoor ambient temperatures down to –20°F (–29°C) (may be different for compact units). Variable speed condenser fans also allow the chiller to operate at

1. LonWorks is a registered trademark of Echelon Corporation.

ambient temperatures as high as 125.6°F (52°C) and starting as low as –13°F (–25°C).

2. Unit-Mounted Non-Fused Disconnect:

   Unit shall be supplied with factory-installed, non-fused electrical disconnect for main power supply. This option is included with the high SCCR option.

3. *Optional Condenser Coil Materials:

   a. E-coated microchannel coils:

      E-coated aluminum microchannel coil shall have flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat shall have a thickness of 0.8 to 1.2 mil, with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and crosshatch adhesion of 4B-5B per ASTM D3359-02. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). E-coated coil shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. E-coated aluminum microchannel coils shall be capable of withstanding an 8000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B-117 Standard.

   b. Aluminum fin/copper tube coils:

      Coil shall be constructed of seamless copper tubes mechanically bonded to aluminum fins. Fins shall have wavy enhancements. These coils are not recommended for corrosive environments.

   c. E-coated aluminum-fin coils:

      Coil shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss 60° of 65 to 90% per ASTM ID523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and crosshatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to no less than 3000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes.

4. *Partial Heat Recovery (Desuperheater):

   Unit shall be equipped with a desuperheater to obtain beneficial use of some of the system heat rejection.

   a. Desuperheater shall be of brazed-plate design and be rated for a maximum refrigerant pressure of 653 psig (4506 kPa).

   b. Desuperheater plates shall be of stainless steel construction.

   c. Water connections shall be Victaulic.

   d. One desuperheater per refrigerant circuit shall be provided, but the system water piping shall be of header construction so that only one inlet and one outlet water connection is required.

   e. Chillers employing desuperheaters must also employ variable speed condenser fans.

   f. For all climates which experience temperatures below 32°F (0°C), a form of freeze protection must be field-supplied (some type of glycol is recommended).

   g. A strainer with a minimum of 40 mesh must be installed within 10 ft (3 m) of the desuperheater fluid inlet to prevent debris from clogging the heat exchanger.

5. Minimum Load Control:

   Unit shall be equipped with factory-installed, microprocessor-controlled, minimum load control that shall permit unit operation down to a minimum of 10% capacity (varies with unit size). This option is not available on applications with leaving fluid temperature less than 38°F (3.3°C) or on compact tier units (except size 080).

6. Energy Management Control Module:

   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 reset, or demand limit control; 2-step demand limit control (from 0% to 100%) activated by a remote contact closure; and discrete input for "Ice Done" indication for ice storage system interface.

7. Condenser Coil Trim Panels:

   Unit shall be equipped with factory or field-installed coil covers, which provide protection for the coil headers.

8. Security Grilles:

   Unit shall be equipped with factory-installed wire grilles to provide additional protection from damage. Factory-installed security grilles automatically include factory-installed coil trim panels.

9. Security Grilles (Sides) and Hail Guard (Ends):

   Unit shall be equipped with a factory-installed option consisting of louvered panels on the ends of the machine and security grilles on the sides of the machine. These coverings shall firmly fasten to the machine frame and provide coverage from the top to the bottom of the

# Guide specifications (cont)

unit. This factory-installed option also provides the functionality of a wind baffle.

10. Full Hail Guard:

    Unit shall be equipped with factory-installed louvered panels on the sides and ends of the machine which firmly fasten to the machine frame. These panels shall cover the unit from top to bottom, thus negating any need for coil trim panels. The full hail guard also provides the functionality of a wind baffle.

11. LON Translator Control:

    Unit shall be supplied with factory or field-installed interface between the chiller and a Local Operating Network (LON, i.e., LonWorks FT-10A ANSI/EIA-709.1). Field programming is required.

12. Compressor Suction Service Valve:

    Standard refrigerant discharge isolation and liquid valves shall enable service personnel to store the refrigerant charge in the evaporator or condenser during servicing. This factory-installed option (one valve per refrigerant circuit) shall allow for further isolation of the compressor from the evaporator vessel.

13. Suction Line Insulation:

    Insulation shall be tubular closed-cell insulation. This option shall be required on applications with leaving fluid temperatures below 30°F (–1.1°C) and recommended for areas with high dewpoints, where condensation may be a concern.

14. Freeze Protection — Evaporator Heaters:

    Evaporator heaters shall be supplied to provide protection from evaporator freeze-up down to –20°F (–29°C) ambient temperature.

15. *Direct Expansion Shell-and-Tube Evaporator:

    Shall provide the chiller with a shell-and-tube evaporator in lieu of the standard brazed plate evaporator. CRN certified direct expansion shell-and-tube evaporators are also available, in which case, shall provide minor evaporator modifications to meet Canadian code.

16. Chicago Relief Valve:

    Shall be supplied with chillers that must comply with Chicago Code Requirements.

17. *Desuperheater:

    Shall provide tempered hot water while chilled water is being produced. This device is not available with the dual-pump option (single pump only) and is not available with compact tier units (except size 080).

18. Low Sound:

    Unit shall be equipped with factory-installed option low sound compressor sound reduction blanket, which reduces unit sound levels by providing an acoustic blanket on each compressor.

19. High SCCR (Short Circuit Current Rating):

    The optional high SCCR (short circuit current rating) device shall allow the chiller to tolerate a 65 kA short circuit current for all voltages except 575-v (35 kA for 575-v) for a brief period of time while protecting downstream components. The high SCCR option shall provide a higher level of protection than the standard unit. This option includes the unit-mounted non-fused disconnect option.

20. Dual Chiller Accessory Kit:

    For dual chiller applications (with units piped in parallel), unit shall be provided with the additional hardware (thermistors, wells, connectors) required for proper system operation.

21. GFI Convenience Outlet:

    Shall be factory-installed and mounted with easily accessible 115-v female receptacle and shall include a 4-amp GFI receptacle. Not available on 380-v units.

22. Low LWT Fluid:

    This option, in conjunction with suction line insulation, shall be employed in all applications with a leaving fluid temperature below 38°F (3.3°C).

23. Wind Baffles:

    Units supplied with variable speed fans and operating in locations where wind velocities are expected to be greater than 5 mph shall require field-installed wind baffles consisting of louvered panels. The wind baffles will protect external facing condensing coils during partial load operation and allow operation in ambient temperatures down to –20°F (–29°C).

24. Upgraded Control Panel:

    Shall provide the chiller with a larger (7 in.) control panel and also provide the chiller with the ability to enable the Capacity Recovery™/rapid restart capability (when variable speed condenser fans are provided).

25. Dual Point Power:

    Unit shall be provided with 2 sources of 3-phase power in lieu of the standard single power source.





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