



Product Data

AquaEdge® High-Efficiency Semi-Hermetic Centrifugal Liquid Chillers R-513A or R-515B

300 to 3400 Nominal Tons (1,055 to 11,957 kW)



19XR
TWO-STAGE
COMPRESSOR

19XR and 19XRV are both High-Efficiency Semi-Hermetic Centrifugal Liquid Chillers, 50/60 Hz; 19XRV features Greenspeed® Intelligence

The Carrier-designed AquaEdge® family of chillers achieves high efficiencies without compromising the environment.

Carrier's AquaEdge centrifugal chillers offer:

- Use of non-ozone depleting refrigerant R-513A or R-515B (R-515B is available for 19XR Two-Stage compressors only).
- Carrier offers a five year refrigerant warranty (Domestic & Canada only).
- The ability to store the entire charge of refrigerant inside the chiller, minimizing the chance of leaks during refrigerant transfer for maintenance
- Semi-hermetic compression
- Free-standing medium voltage VFD (variable frequency drive) (option)
- Modular construction
- Positive pressure design
- Single stage 300 to 550 tons (1,055 to 1,934 kW)
- Two stage 600 to 3400 tons (2,110 to 11,957 kW)

The AquaEdge chiller efficiency levels meet or exceed energy efficiency requirements of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 90.1-2022.

The AquaEdge chillers' high efficiency demands are obtained at true operating conditions. Therefore, the effects of potential direct or indirect global warming are greatly diminished.

High efficiency

Today's owners of chilled water plants demand high efficiency from their chillers. Per AHRI (Air-Conditioning, Heating and Refrigeration Institute) 550/590 and 551/591, chillers operate at design conditions less than one percent of the time.

As a result, superior part load efficiency is required for today's chilled water applications.

The AquaEdge 19XR centrifugal chiller is offered as a fixed-speed machine or with an optional free-standing variable speed drive to maximize part load efficiency. The 19XRV chiller is equipped with a factory-installed variable speed drive.

Environmental leadership

Carrier has long been committed to the environment and its sustainability. AquaEdge chillers provide our customers with a high-efficiency, chlorine-free solution. Carrier's decision to utilize non-ozone depleting R-513A or R-515B (R-515B is available for 19XR

Two-Stage compressors only) refrigerant provides our customers with a safer and more environmentally balanced choice without compromising efficiency.

Reliability

The AquaEdge chiller's single-stage or two-stage positive-pressure compressor, coupled with ASME (American Society of Mechanical Engineers) constructed heat exchangers, provides high reliability and sustainability. Carrier's semi-hermetic motors operate in a clean-liquid, refrigerant-cooled environment. The semi-hermetic design eliminates the potential for shaft seal leaks and refrigerant/oil loss. These are just some of the reasons why the AquaEdge® family of chillers has one of the industry's lowest leak rates.

Positive pressure design

The AquaEdge chiller's positive pressure design reduces the chiller size by up to 35% compared to low-pressure designs. The smaller size minimizes the need for valuable mechanical room floor space. In addition, positive pressure designs eliminate the need for costly low-pressure containment devices, reducing the initial cost of the system.

The AquaEdge chiller advantage

The AquaEdge chiller can be shipped fully charged, minimizing start-up and maintenance time. Purge units are not required. The tight construction of the AquaEdge centrifugal chiller ensures that contaminants stay out and efficiency is maintained throughout the life of the chiller.

Modular construction

The evaporator, condenser, economizer, and compressor assemblies are completely bolted together, making the

AquaEdge chillers ideally suited for replacement projects where ease of disassembly and reassembly at the job site are essential.

Marine container shipment (19XR, heat exchanger frame sizes 3 to 6 only)

The compact design allows for open-top container shipment to export destinations, ensuring product quality while reducing shipping cost.

Optional refrigerant isolation valves

This system allows the refrigerant to be stored inside the chiller during servicing, reducing refrigerant loss and eliminating time-consuming transfer procedures. As self-contained units, AquaEdge chillers do not require additional remote storage systems.

Optional pumpdown unit

Combined with the refrigerant isolation valves listed above, the optional pumpdown unit eliminates complex connections to portable transfer systems, thereby reducing service costs. In addition, the optional pumpdown compressor meets Environmental Protection Agency (EPA) vacuum level requirements that mandate minimizing refrigerant emissions during service. Available with R-513A only.

Optional unit-mounted starter

Available in low-voltage wye-delta and solid state, Carrier's unit-mounted starter provides a single point power connection, reducing chiller installation time and expense. (Available on heat exchanger frame sizes 3 to 7 only.)

Table of contents

	Page
Features/Benefits	2
Model Number Nomenclature	8
Chiller Components	10
Physical Data	16
Options and Accessories	47
Dimensions	50
Selection Procedure	53
Electrical Data/Ratings	53
Controls	54
Typical Piping and Wiring	57
Application Data	58
Guide Specifications	76

Optional seismic kit

A seismic isolation package is available on select models to meet International Building Code and ASCE (American Society of Civil Engineers) 7 seismic qualification requirements in concurrence with ICC ES (International Code Council Evaluation Service) AC156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Non-structural Components and Systems.

Semi-hermetic compressor features:

Hydrodynamic journal bearings

Hydrodynamic journal bearings are featured for the fully supported motor shaft, and roller element bearings are featured for the high-speed impeller shaft for improved efficiency.

Pipe diffuser

Pipe diffuser design uses jet engine technology, increasing centrifugal compressor peak efficiency (single-stage only).

Motors

Motors are hermetically sealed from the machine room; cooling is accomplished by spraying liquid refrigerant on the motor windings. This highly efficient motor cooling method results in the use of smaller, cooler-running motors than could be realized with air-cooled designs of the same type.

In addition, Carrier's semi-hermetic design eliminates:

- Compressor shaft seals that require maintenance and increase the likelihood of refrigerant leaks
- Shaft alignment problems that occur with open-drive designs during start-up and operation, when equipment temperature variations cause thermal expansion
- High noise levels that are common with air-cooled motors, which radiate noise to the machine room and adjacent areas
- Machine room cooling requirements associated with air-cooled motors, which dissipate heat to the machine room

High-efficiency copper rotor

High-efficiency copper rotor motors are available on select models.

Compressors

Compressors are 100% run-tested to ensure proper operation of all compressor systems, including oil management, vibration, electrical, power transmission, and compression.

Heat exchanger features:

The American Society of Mechanical Engineers (ASME) standard

The American Society of Mechanical Engineers (ASME) standard requires the use of an independent agency to certify the design, manufacture, and testing of all heat exchangers, ensuring the ultimate in heat exchanger safety, reliability, and long life.

Air and Refrigerant-cooled VFD (19XRV)

Air and Refrigerant-cooled VFD (19XRV) helps reduce VFD size. Using R-513A or R-515B refrigerant, or air instead of water, also eliminates costly maintenance associated with the water cooling pump, heat exchanger and rubber tubing used with water-cooled VFDs.

1 in. tubes (optional)

1 in. tubes (optional) provide optimized cost and less pressure drop than the standard 3/4 in. tubes.

Tube expansion

Tube expansion at center support sheets prevents unwanted tube movement and vibration, thereby reducing the possibility of premature tube failure.

Double-grooved tube sheet holes

Double-grooved tube sheet holes reduce the possibility of leaks between the water and refrigerant system, increasing product reliability.

Condenser baffle

Condenser baffle prevents direct impingement of high velocity compressor gas onto the condenser tubes. The baffle eliminates the related vibration and wear of the tubes and distributes the refrigerant flow evenly over the length of the vessel for improved efficiency.

Closely spaced intermediate support sheets

Closely spaced intermediate support sheets prevent tube sagging and vibration, thereby increasing heat exchanger life.

Refrigerant filter drier isolation valves

Refrigerant filter drier isolation valves allow filter replacement without pumping down the chiller, which means less service time and less expense.

FLASC (flash subcooler)

FLASC (flash subcooler), located in the bottom of the condenser, increases the refrigeration effect by cooling condensed liquid refrigerant to a lower

temperature, resulting in reduced compressor power consumption.

Ball-type or linear float valves

Ball-type or linear float valves provide precise refrigerant metering over a wide variety of operating conditions. As a result, optimal refrigerant levels can be maintained in the condenser and evaporator to achieve the greatest efficiency without unintentional hot gas bypass or flooding.

Microprocessor control features:

Direct digital Product Integrated Control (PIC6.1)

Direct digital Product Integrated Control (PIC6.1) provides unmatched flexibility and functionality. Each unit integrates directly with the Carrier Comfort Network[®] (CCN) system, providing a system solution to controls applications. The PIC6.1 control can be configured to display units in English or metric, and provides unparalleled ease of operation.

The PIC6.1 display offers an "all-in-one" view of key chiller operational data, simplifying the interaction between the chiller and user.

Features include:

- Display of over 125 operating, status, and diagnostic messages for improved user experience
- Monitoring of over 100 functions and parameters to protect the chiller from abnormal conditions
- Modular pull-out/plug-in design, reducing wiring requirements and providing easy installation
- Low-voltage (24-v) design, providing the ultimate assurance of personal safety and control integrity

The display modes include 8 standard languages:

- English
- Chinese
- Spanish
- French
- German
- Dutch
- Italian
- Portuguese

Automatic capacity override

Automatic capacity override function unloads the compressor whenever key safety limits are approached, increasing unit life.

Chilled water reset

Chilled water reset can be accomplished manually or automatically from the building management system. Reset saves energy when warmer chilled water can be used.

Demand limiting

Demand limiting feature limits the power draw of the chiller during peak loading conditions. When incorporated into the Carrier Comfort Network building automation system, a red line command holds chillers at their present capacity and prevents any other chillers from starting. If a load shed signal is received, the compressors are unloaded to avoid high demand charges whenever possible.

Ramp loading

Ramp loading ensures a smooth pull-down of water loop temperature and prevents a rapid increase in compressor power consumption during the pull-down period.

Automated controls test

Automated controls test can be executed prior to start-up to verify that the entire control system is functioning properly.

365-day real time clock

365-day real time clock feature allows the operator to program a yearly schedule for each week, weekends, and holidays.

Occupancy schedules

Occupancy schedules can be programmed into the controller to ensure that the chiller only operates when cooling is required.

Extensive service menu

Extensive service menu features include password protection to prevent unauthorized access to the service menu. Built-in diagnostic capabilities assist in troubleshooting and recommend proper corrective action for preset alarms, resulting in greater operating time.

Alarm file

Alarm file maintains the last 25 time and date-stamped alarm and alert messages in memory; this function reduces troubleshooting time and cost.

Configuration data backup

Configuration data backup in nonvolatile memory provides protection during power failures and eliminates time-consuming control reconfiguration.

19XR refrigeration cycle

The compressor continuously draws refrigerant vapor from the evaporator at a rate set by the amount of guide vane opening. As the compressor suction reduces the pressure in the evaporator, the remaining refrigerant boils at a fairly low temperature (typically 38 to 42°F [3 to 6°C]). The energy required for boiling is obtained from the water flowing through the evaporator tubes. With heat energy removed, the water becomes cold enough to use in an air-conditioning circuit or process liquid cooling.

After taking heat from the water, the refrigerant vapor is compressed. Compression adds still more heat energy and the refrigerant is quite warm (typically 98 to 102°F [37 to 40°C]) when it is discharged from the compressor into the condenser.

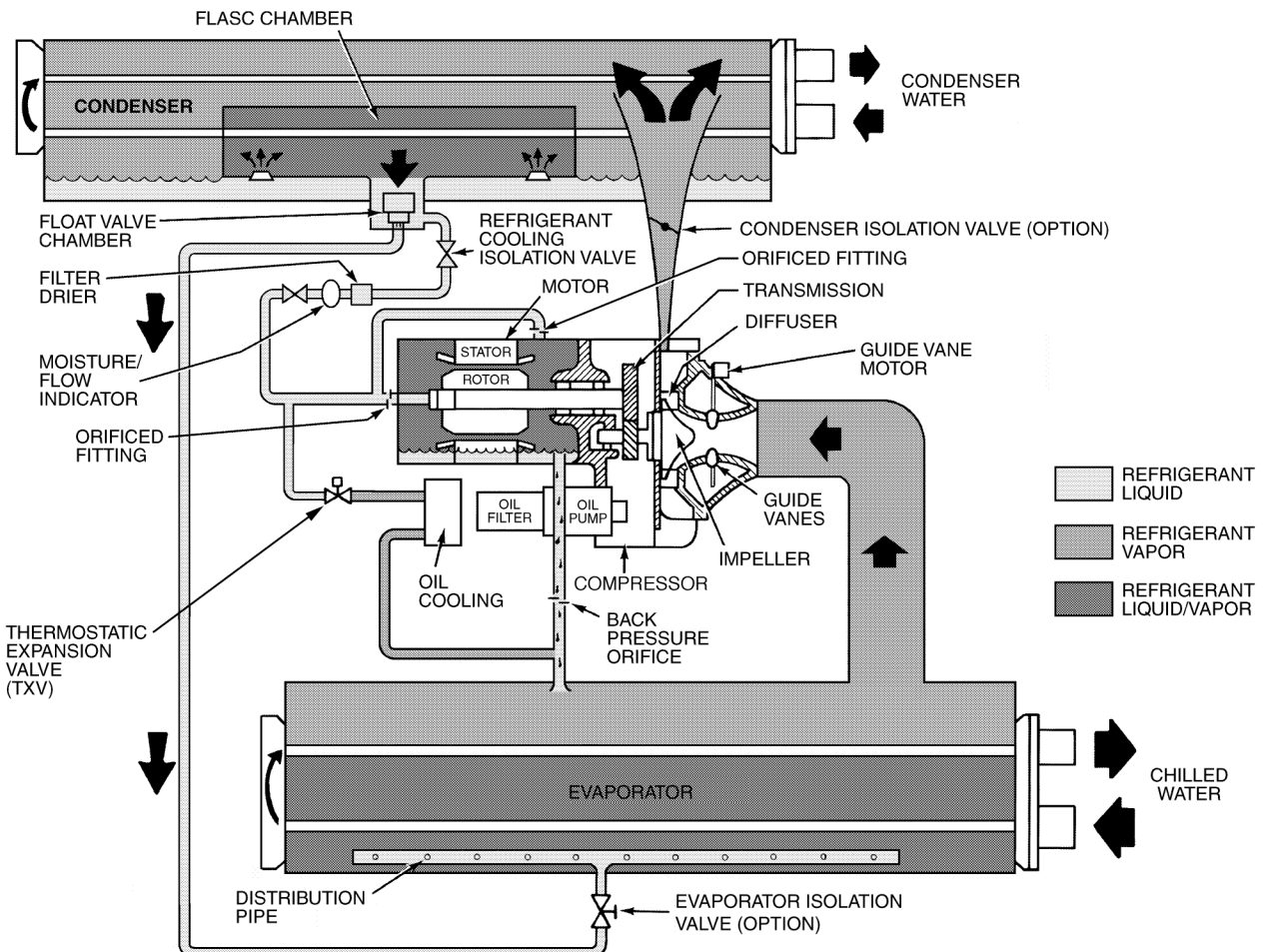
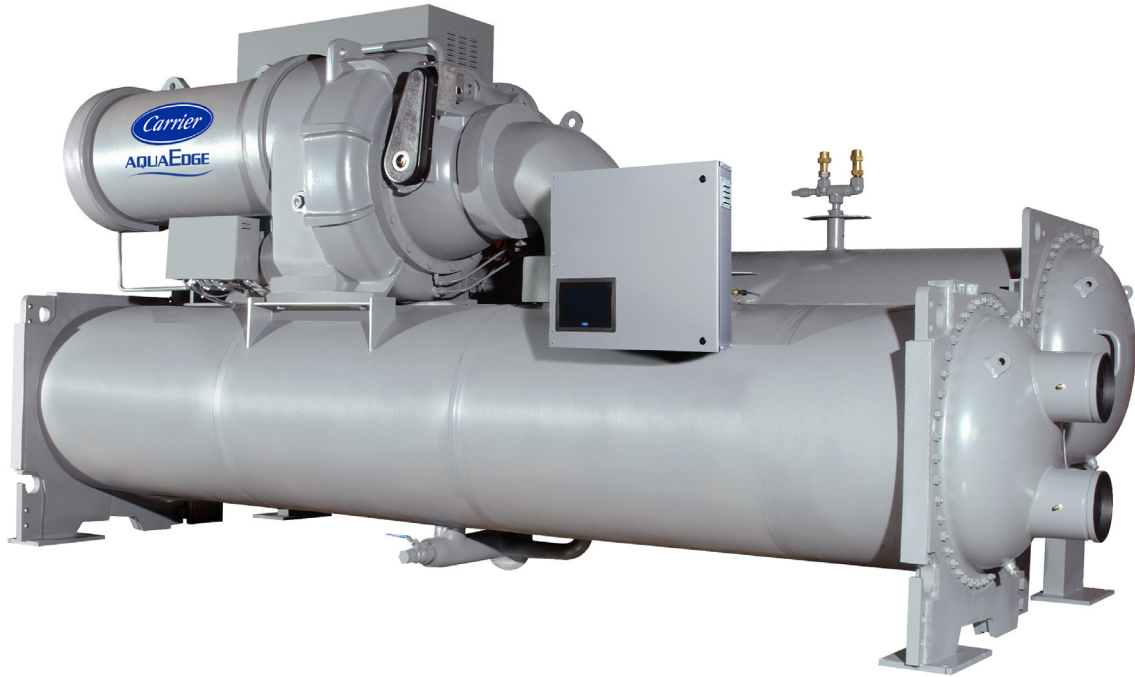
Relatively cool (typically 65 to 90°F [18 to 32°C]) water flowing into the

condenser tubes removes heat from the refrigerant, and the vapor condenses to liquid.

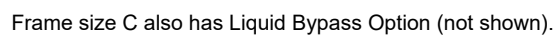
The liquid refrigerant passes through orifices into the FLASC (flash sub-cooler) chamber. Since the FLASC chamber is at a lower pressure, part of the liquid refrigerant flashes to vapor, thereby cooling the remaining liquid. The FLASC vapor is recondensed on the tubes which are cooled by entering condenser water. The liquid drains into a float valve chamber between the FLASC chamber and evaporator. Here, the AccuMeter™ float valve forms a liquid seal to keep FLASC chamber vapor from entering the evaporator. When liquid refrigerant passes through the valve, some of it flashes to vapor in the reduced pressure on the evaporator side. In flashing, it removes heat from the remaining liquid. The refrigerant is now at a temperature and pressure at which the cycle began. Refrigerant from the condenser also cools the motor, oil and optional variable speed drive.

The refrigeration cycle for a 19XR, XRV chiller with two-stage compressor is similar to the one previously described, with the following exception: Liquid refrigerant from the condenser flows into an economizer at intermediate pressure. In the economizer, vapor is separated from liquid; the separated vapor flows to the second stage of the compressor and the liquid flows into the evaporator. Since the economizer gas has to pass through only half of the compression cycle to reach condenser pressure, a saving in power is achieved. The energy removed from the vaporized refrigerant allows the liquid refrigerant in the evaporator to absorb more heat when it evaporates and thereby benefits the cooling cycle.

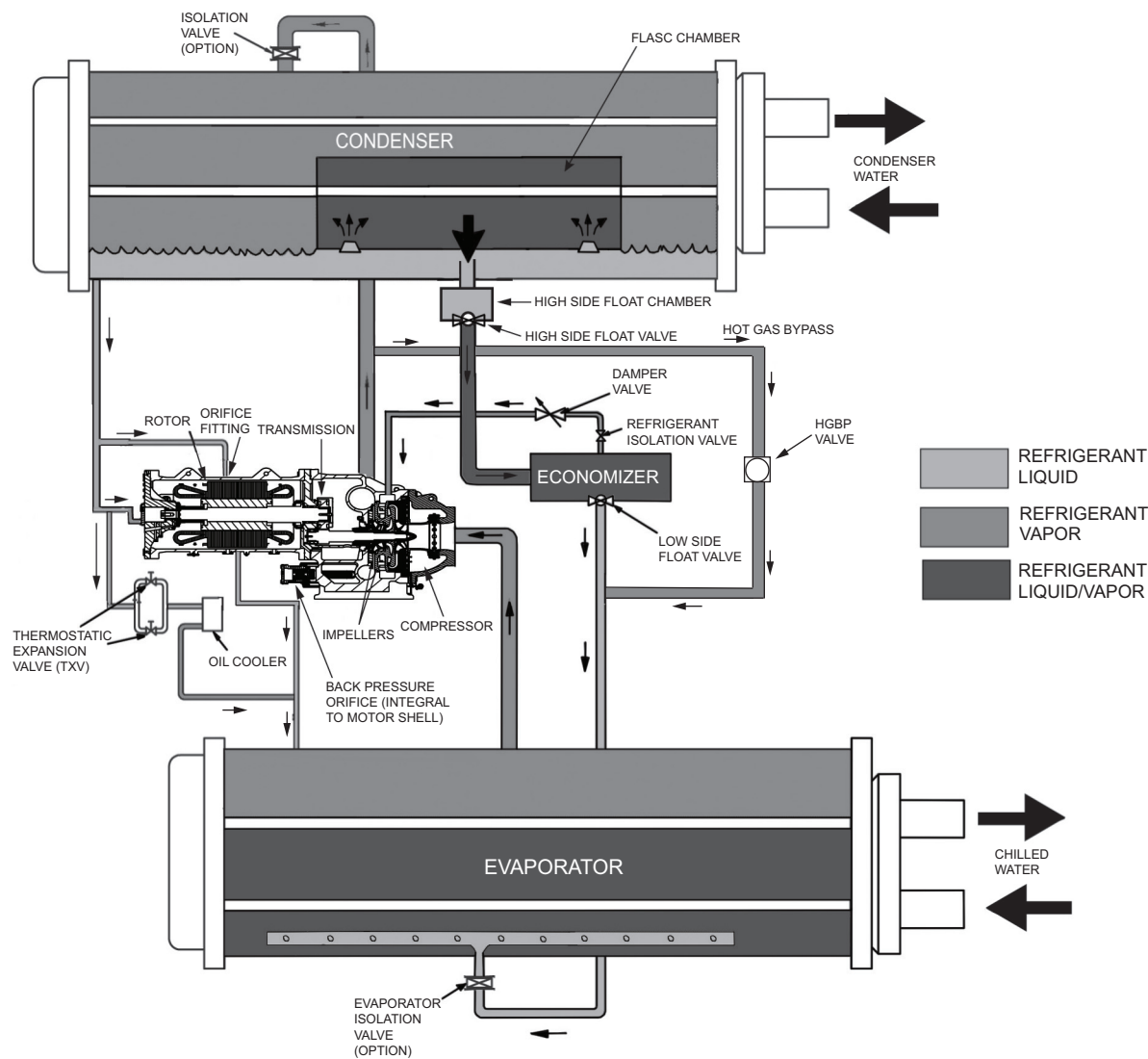
Refrigeration Cycle 19XR,XRV Single-Stage Compressor



A large, industrial-grade Carrier AquaEdge chiller unit. It features a horizontal cylindrical body with a control panel on the left side. The unit is mounted on a sturdy metal frame. On the right side, there is a large condenser coil. The Carrier logo and AquaEdge branding are visible on the top left.



Refrigeration Cycle (cont)
19XR Two-Stage Compressor Frame Sizes 6 and 7



Model number nomenclature



19XR,XRV Single-Stage Compressor and Two-Stage Compressor Frame Size C and E

	19XR-	52	51	3	8	H	UG	T ^a	64	-	
Description 19XR — High Efficiency Semi-Hermetic Centrifugal Liquid Chiller 19XRV — High Efficiency Semi-Hermetic Centrifugal Liquid Chiller with Unit-Mounted VFD											Special Order Indicator — — Standard S — Special Order
Evaporator Size^b 30-32 (Frame 3) 35-37 (Frame 3) 40-42 (Frame 4) 45-47 (Frame 4) 50-54 (Frame 5) 5A-5C (Frame 5) ^c 55-59 (Frame 5) 5F-5H (Frame 5) ^c 5K-5R (Frame 5) ^d 5T-5Z (Frame 5) ^d 60-64 (Frame 6) 6K-6R (Frame 6) ^d 65-69 (Frame 6) 6T-6Z (Frame 6) ^d 70-74 (Frame 7) 7K-7R (Frame 7) ^d 75-79 (Frame 7) 7T-7Z (Frame 7) ^d 80-84 (Frame 8) 8K-8R (Frame 8) ^d 85-89 (Frame 8) 8T-8Z (Frame 8) ^d											Motor Voltage Code Code Volts-Phase-Hertz 60 — 200-3-60 61 — 230-3-60 62 — 380-3-60 64 — 460-3-60 65 — 575-3-60 66 — 2400-3-60 67 — 3300-3-60 68 — 4160-3-60 69 — 6900-3-60 50 — 230-3-50 52 — 400-3-50 53 — 3000-3-50 54 — 3300-3-50 55 — 6300-3-50 5A — 10000-3-50 5B — 11000-3-50 6A — 11000-3-60 6B — 11000-3-60 6C — 13800-3-60
Condenser Size^b 30-32 (Frame 3) 35-37 (Frame 3) 40-42 (Frame 4) 45-47 (Frame 4) 50-54 (Frame 5) 55-59 (Frame 5) 60-64 (Frame 6) 65-69 (Frame 6) 70-74 (Frame 7) 75-79 (Frame 7) 80-84 (Frame 8) 85-89 (Frame 8)											Gear Code Compressor Frame C B,C,D,E,G,J,K,M,P — Gear Ratio Compressor Frame E A,B,C,D,E,Z — Gear Ratio Compressor Frame 3 R,S,T,U,V,W — Gear Ratio
											Motor Code^e
											Impeller Diameter
											Impeller Shroud
											Compressor Frame 3 — Single-Stage C, E — Two-Stage



Quality Assurance
ISO 9001:2015 certified processes



AHRI (Air-Conditioning, Heating,
and Refrigeration Institute)
Performance Certified

NOTE(S):

- Digit 15 will refer to the Gear Code for the following models:
Digit 10 (Compressor Frame) is C or E.
Digit 10 (Compressor Frame) is 3 and Digit 13 of the Motor Code is U.
- Frame sizes 3 through 4 available on single-stage units only.
- Refer to 19XR,XRV Computer Selection Program for details on these sizes.
- Frame sizes with K-R and T-Z are with 1-in. OD evaporator tubing.
- Refer to the 19XR,XRV Computer Selection Program for motor size details.

SEISMICOMPLIANT*

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

Seismic rating available on select models.

Model number nomenclature (cont)



19XR Two-Stage Compressor Frame Size 6 and 7

	19XR-	A45	A47	636	M	N	7	-	
Description 19XR — High Efficiency Semi-Hermetic Centrifugal Liquid Chiller									Special Order Indicator — Standard S — Special Order
Evaporator Size Code (Digits 6, 7, 8) A40-A42 A45-A47 A4A-A4C ^a A4F-A4H ^a A60-A62 A65-A67 A6A-A6C ^a A6F-A6H ^a B60-B62 ^b B65-B67 ^b B80-B82 ^b B85-B87 ^b B6A-B6C ^{a,b} B6F-B6H ^{a,b} B8A-B8C ^{a,b} B8F-B8H ^{a,b} C60-C62 ^b C65-C67 ^b C80-C82 ^b C85-C87 ^b C6A-C6C ^{a,b} C6F-C6H ^{a,b} C8A-C8C ^{a,b} C8F-C8H ^{a,b}									Motor Voltage Code Code Volts-Phase-Hertz 2 — 400-3-50 (19XR6 only) 4 — 3000-3-50 5 — 3300-3-50 6 — 6300-3-50 7 — 10000-3-50 8 — 11000-3-50 A — 380-3-60 (19XR6 only) C — 460-3-60 (19XR6 only) E — 2400-3-60 F — 3300-3-60 G — 4160-3-60 H — 6900-3-60 J — 11000-3-60 K — 13800-3-60
Condenser Size Code (Digits 9, 10, 11) A40-A42 A45-A47 A4A-A4C ^a A4F-A4H ^a A60-A62 A65-A67 A6A-A6C ^a A6F-A6H ^a B40-B42 B45-B47 B4A-B4C ^a B4F-B4H ^a B60-B62 ^a B65-B67 ^a B6A-B6C ^a B6F-B6H ^a C60-C62 ^b C65-C67 ^b C80-C82 ^b C85-C87 ^b C6A-C6C ^{a,b} C6F-C6H ^{a,b} C8A-C8C ^{a,b} C8F-C8H ^{a,b} D60-D62 ^b D65-D67 ^b D80-D82 ^b D85-D87 ^b D6A-D6C ^{a,b} D6F-D6H ^{a,b} D8A-D8C ^{a,b} D8F-D8H ^{a,b}									Motor Code^c Gear Code Compressor Frame Size 6 E,J,M,P,R Compressor Frame Size 7 O,R,T,V,X,Y
									Compressor Size Code Frame Size (12th Digit) 6 — Frame Size 6 7 — Frame Size 7 Shroud Size (13th Digit) 1 (Frame Size 7 Only) 2 3 4 5 (Frame 7 Only) Impeller Diameter (14th Digit) 2 4 6 8 0

NOTES:

- Frame sizes with A-C and F-H are with 1 in. OD tubing.
- Heat exchanger available with frame 7 compressor only.
- Refer to the 19XR,XRV Computer Selection Program for motor size details.

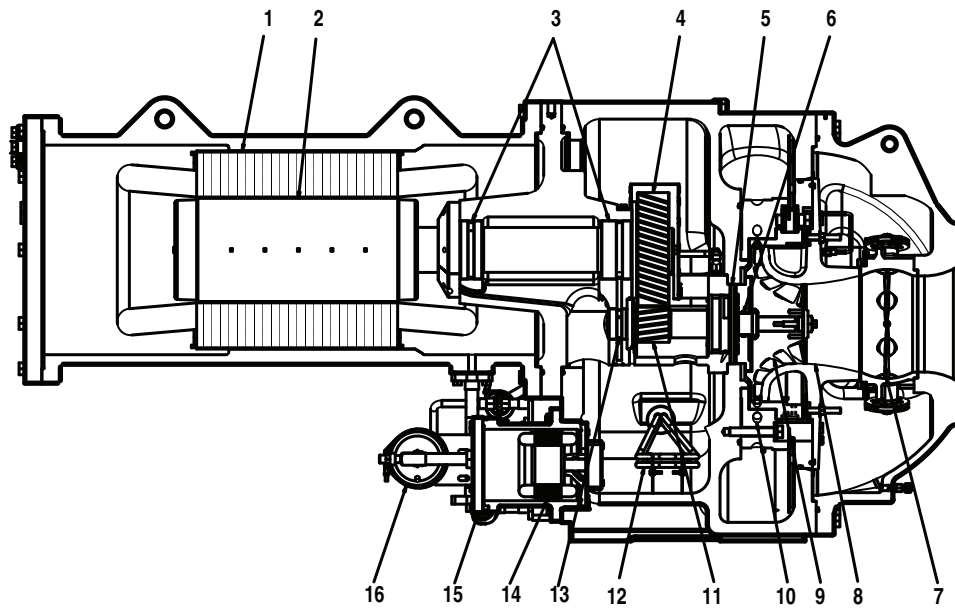


Quality Assurance
ISO 9001:2015 certified processes

AHRI (Air-Conditioning, Heating,
and Refrigeration Institute)
Performance Certified

Compliance with UL 1995
(CSA C22.2 No. 236)

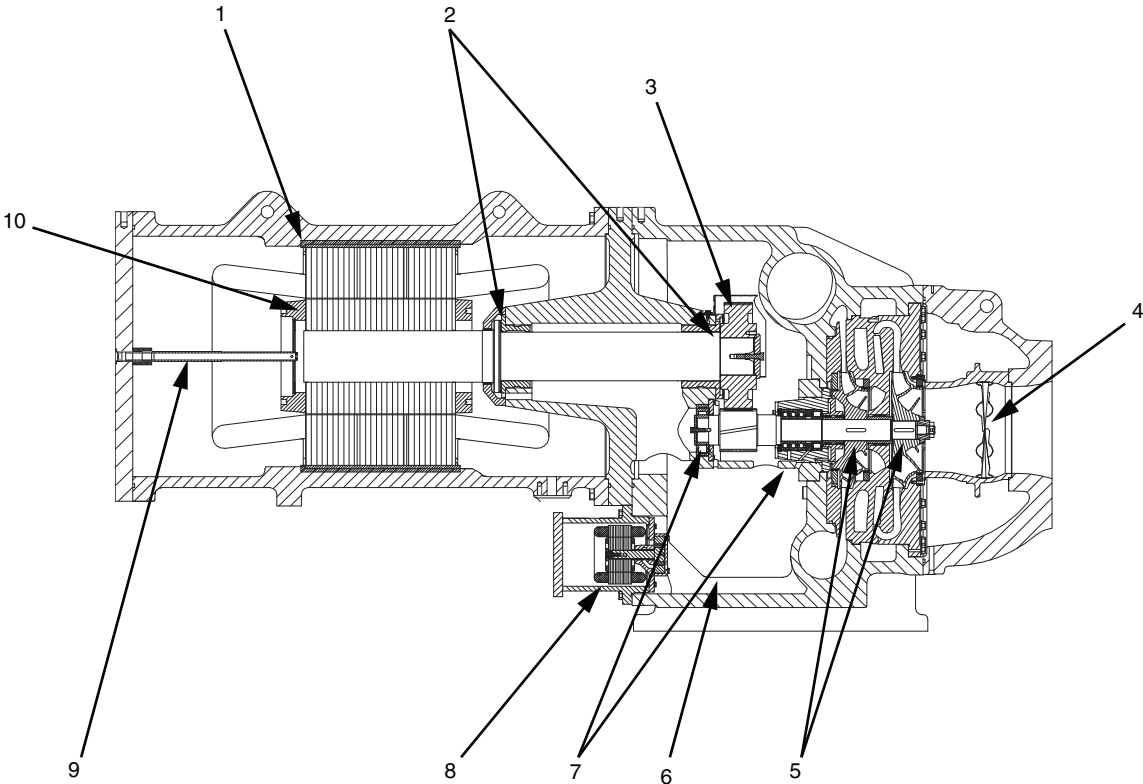
Compressor Components 19XR,XRV Single-Stage Compressor Frame Size 3



LEGEND

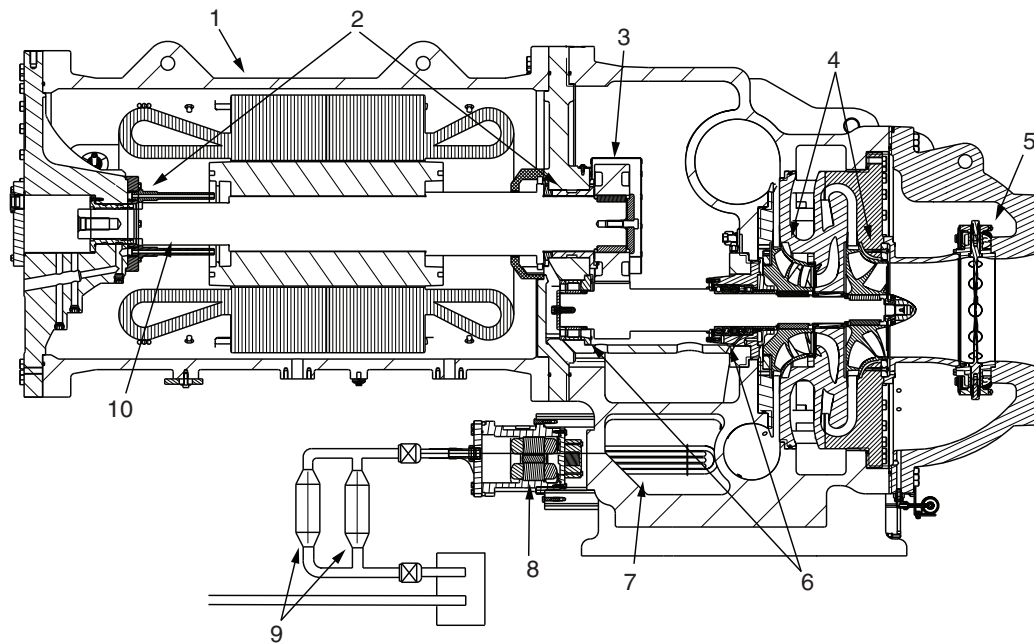
- | | |
|-------------------------------------|-------------------------------|
| 1 — Motor Stator | 9 — Impeller |
| 2 — Motor Rotor | 10 — Pipe Diffuser |
| 3 — Motor Shaft Journal Bearings | 11 — High Speed Pinion Gear |
| 4 — Low Speed Bull Gear | 12 — Oil Heater |
| 5 — High Speed Shaft Thrust Bearing | 13 — High Speed Shaft Bearing |
| 6 — High Speed Shaft Bearing | 14 — Oil Pump Motor |
| 7 — Variable Inlet Guide Vanes | 15 — Oil Pump Cover |
| 8 — Impeller Shroud | 16 — Oil Filter |

Compressor Components
19XR,XRV Two-Stage Compressor Frame Sizes C and E



- LEGEND
- | | |
|--------------------------------|-------------------------------|
| 1 — Motor Stator | 6 — Oil Heater |
| 2 — Motor Shaft Bearings | 7 — High Speed Shaft Bearings |
| 3 — Transmission | 8 — Oil Pump |
| 4 — Variable Inlet Guide Vanes | 9 — Motor Cooling |
| 5 — Impellers | 10 — Motor Rotor |

Compressor Components 19XR Two-Stage Compressor Frame Sizes 6 and 7

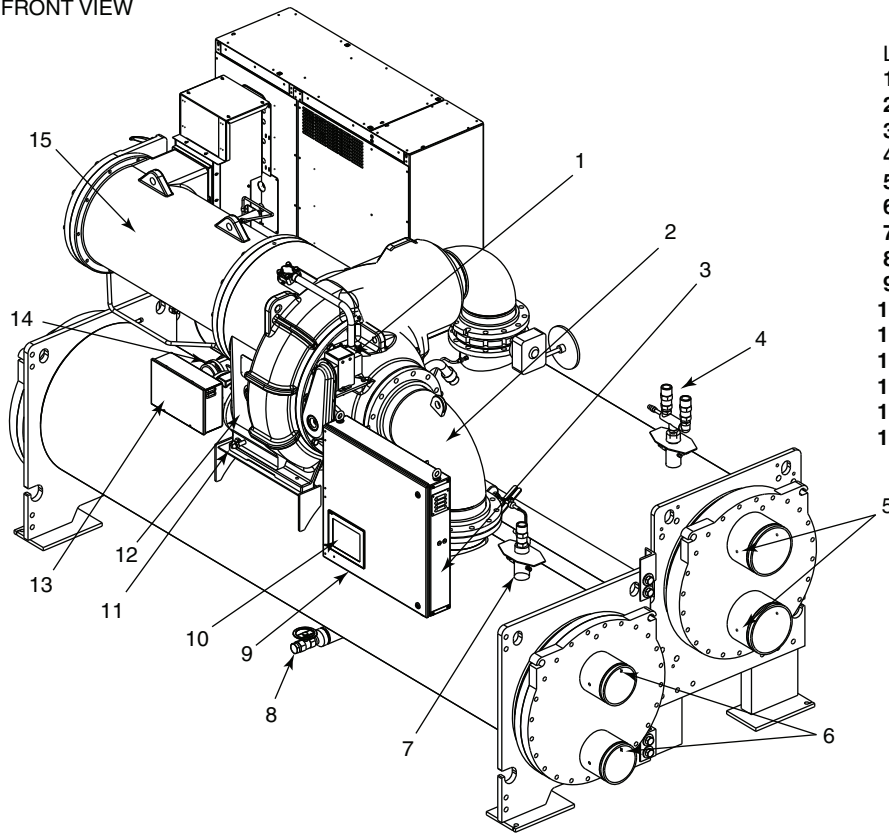


LEGEND

- | | |
|--------------------------------|-------------------------------|
| 1 — Motor Stator | 6 — High Speed Shaft Bearings |
| 2 — Motor Shaft Bearings | 7 — Oil Heater |
| 3 — Transmission | 8 — Oil Pump |
| 4 — Impellers | 9 — Oil Filters |
| 5 — Variable Inlet Guide Vanes | 10 — Motor Rotor |

19XR,XRV Single-Stage Compressor Frame Size 3

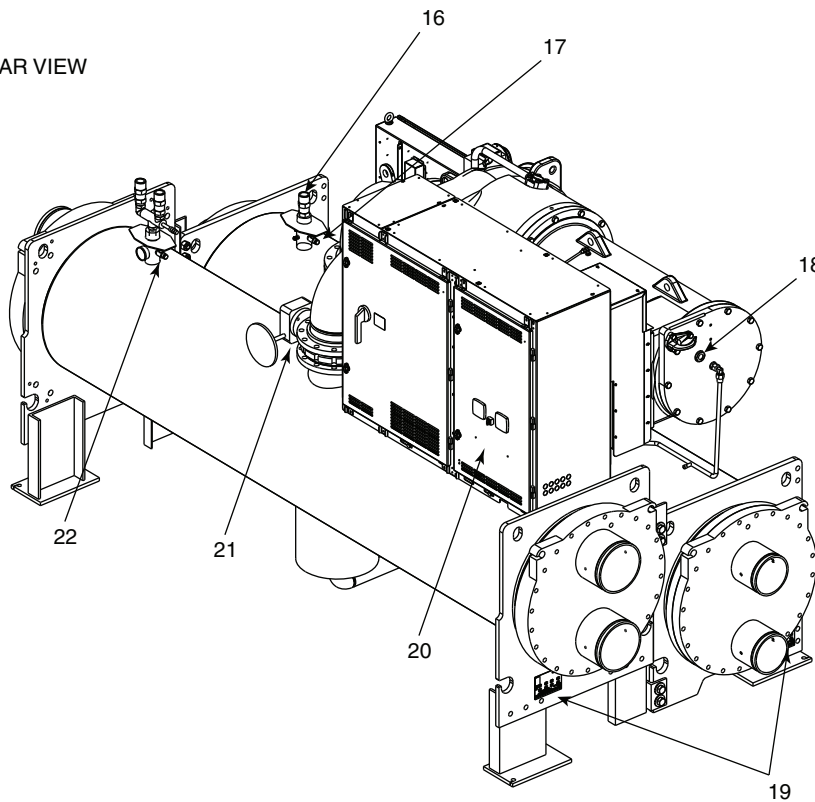
FRONT VIEW



LEGEND

- 1 — Guide Vane Actuator
- 2 — Suction Elbow
- 3 — Chiller Identification Nameplate
- 4 — Condenser Dual Relief Valves
- 5 — Condenser In/Out Temperature Thermistors
- 6 — Evaporator In/Out Temperature Thermistors
- 7 — Evaporator Pressure Transducer
- 8 — Refrigerant Storage Tank Connection
- 9 — Control Panel
- 10 — Carrier Controller HMI
- 11 — Oil Drain/Charger Valve
- 12 — Oil Level Sightglass
- 13 — Power Panel
- 14 — Refrigerant Oil Cooler (not shown)
- 15 — Compressor Motor Housing

REAR VIEW

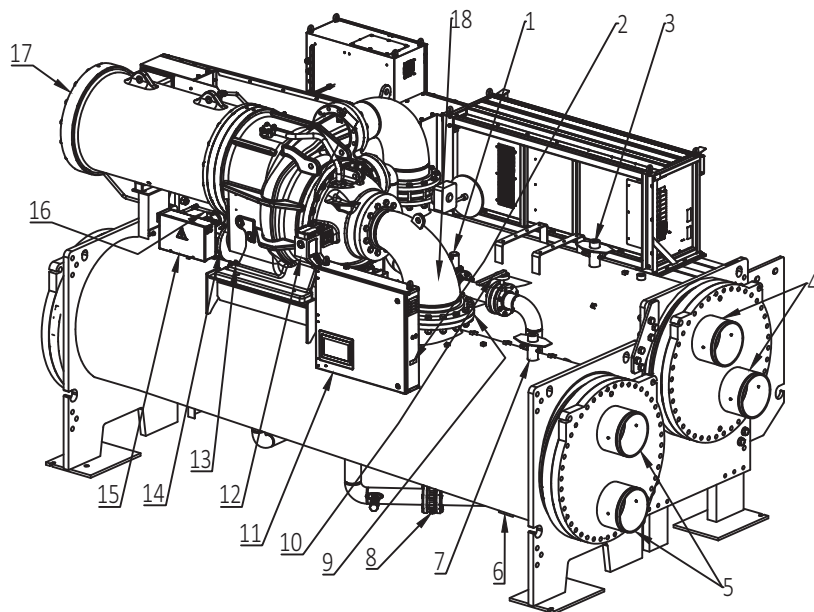


LEGEND

- 16 — Evaporator Relief Valve
- 17 — Refrigerant Charging Valve
- 18 — Motor Sightglass
- 19 — ASME Nameplates
- 20 — Starter/VFD
- 21 — Discharge Isolation Valve (Optional)
- 22 — Refrigerant Charging Valve/
Pump Out Connection

19XR,XRV Two-Stage Compressor Frame Sizes C and E

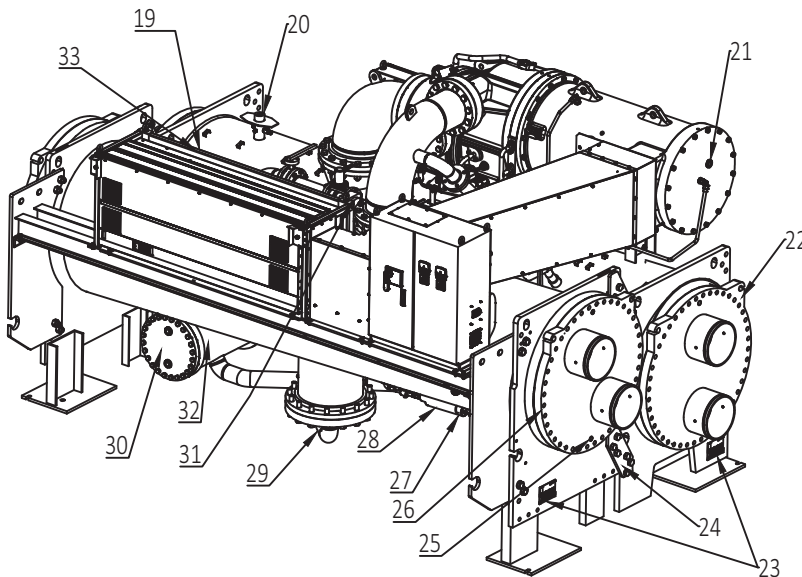
FRONT VIEW



LEGEND

- 1 — Damper Valve
- 2 — Chiller Identification Nameplate
- 3 — Condenser Auto Reset Relief Valves
- 4 — Condenser In/Out Temperature Thermistors
- 5 — Evaporator In/Out Temperature Thermistors
- 6 — Refrigerant Storage Tank Connection Valve (barely visible)
- 7 — Evaporator Pressure Transducer
- 8 — Liquid Line Isolation Valve (optional)
- 9 — Typical Flange Connection
- 10 — Refrigerant Isolation Valve
- 11 — Control Panel (PIC6.1)
- 12 — Guide Vane Actuator
- 13 — Oil Level Sight Glasses
- 14 — Oil Drain Charging Valve
- 15 — Auxiliary Power Panel
- 16 — Refrigerant Oil Evaporator (hidden)
- 17 — Compressor Motor Housing
- 18 — Suction Elbow

REAR VIEW

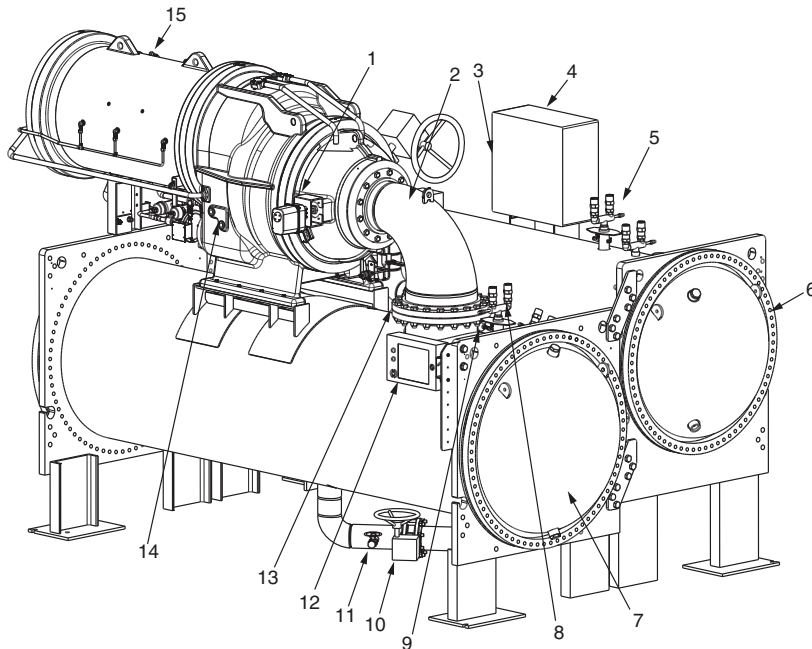


LEGEND

- 19 — Refrigerant Charging Valve/Pumpout Connection
- 20 — Evaporator Auto. Reset Relief Valves
- 21 — Motor Sight Glass
- 22 — Evaporator Waterbox Cover
- 23 — ASME Nameplate
- 24 — Vessel Take-Apart Connector
- 25 — Typical Waterbox Drain Port
- 26 — Condenser Waterbox Cover
- 27 — Refrigerant Moisture/Flow Indicator (hidden)
- 28 — Refrigerant Filter/Drier (hidden)
- 29 — Linear Float Valve Chamber Orifice
- 30 — Economizer Assembly
- 31 — Discharge Isolation Valve (optional)
- 32 — Economizer Float Ball Valve Assembly (far end of economizer assembly)
- 33 — Condenser Pressure Transducer

19XR Two-Stage Compressor Frame Sizes 6 and 7

FRONT VIEW

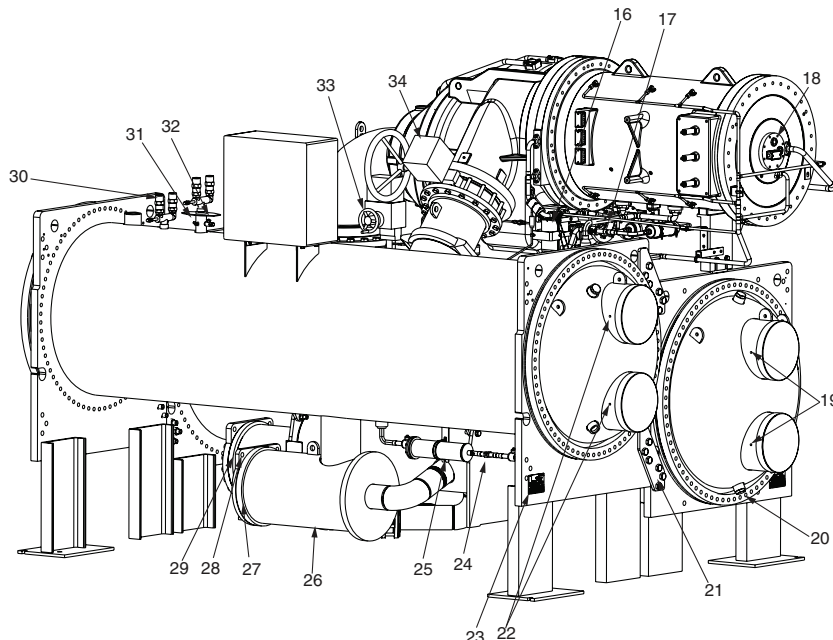


LEGEND

- 1 — Guide Vane Actuator*
- 2 — Suction Elbow
- 3 — Chiller Identification Nameplate
- 4 — Auxiliary Power Panel
- 5 — Condenser Auto. Reset Relief Valves
- 6 — Condenser Return End Waterbox Cover
- 7 — Evaporator Return End Waterbox Cover
- 8 — Evaporator Auto. Reset Relief Valves
- 9 — Evaporator Pressure Transducer
- 10 — Liquid Line Isolation Valve (optional)
- 11 — Refrigerant Storage Tank Connection Valve
- 12 — HMI (Human Machine Interface) Panel
- 13 — Typical Flange Connection
- 14 — Oil Level Sight Glasses
- 15 — Compressor Motor Housing

*See certified drawing for Frame 7 location.

REAR VIEW



LEGEND

- 16 — Oil Evaporator
- 17 — Oil Drain Changing Valve (not shown)
- 18 — Motor Sight Glass
- 19 — Evaporator In/Out Temperature Thermistors
- 20 — Typical Waterbox Drain Port
- 21 — Vessel Take-Apart Connector
- 22 — Condenser In/Out Temperature Thermistors
- 23 — ASME Nameplate
- 24 — Refrigerant Moisture/Flow Indicator
- 25 — Refrigerant Filter/Drier
- 26 — High Side Float Chamber
- 27 — High Side Float Ball Valve Assembly (inside)
- 28 — Economizer Assembly
- 29 — Economizer Float Ball Assembly (inside)
- 30 — Evaporator Auto. Reset Relief Valve
- 31 — Condenser Pressure Transducer
- 32 — Refrigerant Charging Valve/Pumpout Connection
- 33 — Damper Valve
- 34 — Discharge Isolation Valve (optional)

NOTE: Frame 6 is shown.

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C and E — Drive End Entering Evaporator Water (English)^{a,b,c,d,e,f,g}

CODE	DRY RIGGING WEIGHT (lb)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (lb)				Water Weight (lb)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
30	4,071	3,694	510	—	308	—	464	464
31	4,253	3,899	565	—	308	—	531	543
32	4,445	4,100	626	—	308	—	601	621
35	4,343	4,606	577	—	349	—	511	513
36	4,551	4,840	639	—	349	—	587	603
37	4,769	5,069	709	—	349	—	667	692
40	4,908	5,039	726	—	338	—	863	915
41	5,078	5,232	783	—	338	—	930	995
42	5,226	5,424	840	—	338	—	990	1,074
45	5,363	5,602	821	—	383	—	938	998
46	5,559	5,824	874	—	383	—	1,014	1,088
47	5,730	6,044	949	—	383	—	1,083	1,179
50	5,713	6,090	897	374	446	410	1,101	1,225
51	5,940	6,283	974	406	446	410	1,192	1,304
52	6,083	6,464	1,021	426	446	410	1,248	1,379
53	6,141	6,529	1,010	421	446	410	1,277	1,409
54	6,192	6,591	987	412	446	410	1,302	1,439
55	6,257	6,785	1,014	423	504	464	1,201	1,339
56	6,517	7,007	1,101	459	504	464	1,304	1,429
57	6,682	7,215	1,154	482	504	464	1,369	1,514
58	6,751	7,291	1,143	477	504	464	1,401	1,550
59	6,811	7,363	1,116	466	504	464	1,430	1,583
5A	5,124	—	491	205	446	410	1,023	—
5B	5,177	—	510	213	446	410	1,050	—
5C	5,243	—	532	222	446	410	1,079	—
5F	5,577	—	553	231	504	464	1,113	—
5G	5,640	—	575	240	504	464	1,143	—
5H	5,716	—	600	250	504	464	1,176	—
5K	4,993	—	673	281	446	410	1,067	—
5L	5,090	—	706	295	446	410	1,118	—
5M	5,165	—	742	310	446	410	1,162	—
5P	5,041	—	641	268	446	410	1,111	—
5Q	5,131	—	678	283	446	410	1,155	—
5R	5,214	—	709	296	446	410	1,206	—
5T	5,425	—	768	321	504	464	1,162	—
5U	5,534	—	801	334	504	464	1,220	—
5V	5,620	—	843	352	504	464	1,270	—
5X	5,484	—	730	305	504	464	1,212	—
5Y	5,584	—	769	321	504	464	1,262	—
5Z	5,678	—	805	336	504	464	1,320	—
60	6,719	6,764	1,091	455	479	441	1,400	1,521
61	6,895	6,949	1,150	480	479	441	1,470	1,597
62	7,038	7,130	1,202	502	479	441	1,527	1,671
63	7,103	7,199	1,202	502	479	441	1,559	1,704
64	7,161	7,264	1,178	492	479	441	1,587	1,735
65	7,392	6,782	1,241	518	542	441	1,530	1,667
66	7,594	7,894	1,309	546	542	499	1,610	1,753
67	7,759	8,102	1,369	571	542	499	1,674	1,838
68	7,836	8,182	1,359	567	542	499	1,711	1,875
69	7,905	8,258	1,332	556	542	499	1,743	1,911
6K	5,716	—	760	317	479	441	1,291	—
6L	5,804	—	797	332	479	441	1,341	—
6M	5,894	—	828	346	479	441	1,399	—
6P	5,768	—	725	303	479	441	1,338	—
6Q	5,852	—	764	319	479	441	1,385	—
6R	5,938	—	798	333	479	441	1,439	—
6T	6,230	—	863	360	542	499	1,405	—
6U	6,330	—	905	378	542	499	1,462	—
6V	6,433	—	941	393	542	499	1,528	—
6X	6,293	—	823	343	542	499	1,459	—
6Y	6,388	—	868	362	542	499	1,512	—

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C and E — Drive End Entering Evaporator Water (English)^{a,b,c,d,e,f,g} (cont)

CODE	DRY RIGGING WEIGHT (lb)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (lb)				Water Weight (lb)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
6Z	6,487	—	906	378	542	499	1,574	—
70	9,942	10,786	1,409	588	840	773	2,008	2,225
71	10,330	11,211	1,539	642	840	773	2,164	2,389
72	10,632	11,622	1,646	687	840	773	2,286	2,548
73	10,715	11,737	1,622	1,492	840	773	2,328	2,604
74	10,790	11,775	1,584	1,457	840	773	2,366	2,622
75	10,840	11,859	1,599	1,471	950	874	2,183	2,431
76	11,289	12,345	1,747	1,607	950	874	2,361	2,619
77	11,638	12,814	1,869	1,719	950	874	2,501	2,801
78	11,738	12,949	1,849	1,701	950	874	2,548	2,864
79	11,828	12,994	1,806	1,662	950	874	2,592	2,885
7K	8,728	—	1,047	963	840	773	1,948	—
7L	8,959	—	1,132	1,041	840	773	2,094	—
7M	9,161	—	1,214	1,117	840	773	2,229	—
7P	8,792	—	1,002	922	840	773	2,010	—
7Q	9,023	—	1,087	1,000	840	773	2,156	—
7R	9,229	—	1,167	1,074	840	773	2,295	—
7T	9,431	—	1,194	1,098	950	874	2,115	—
7U	9,698	—	1,292	1,189	950	874	2,282	—
7V	9,932	—	1,403	1,291	950	874	2,436	—
7X	9,510	—	1,142	1,051	950	874	2,185	—
7Y	9,777	—	1,240	1,141	950	874	2,352	—
7Z	10,016	—	1,347	1,239	950	874	2,511	—
80	12,664	12,753	1,700	1,564	836	769	2,726	2,977
81	12,998	13,149	1,812	1,667	836	769	2,863	3,143
82	13,347	13,545	1,928	1,774	836	769	3,005	3,309
83	13,437	13,872	1,877	1,727	836	769	3,053	3,476
84	13,523	14,217	1,840	1,693	836	769	3,099	3,651
85	13,804	14,008	1,927	1,773	945	869	2,951	3,238
86	14,191	14,465	2,054	1,890	945	869	3,108	3,428
87	14,597	14,923	2,186	2,011	945	869	3,271	3,618
88	14,705	15,311	2,142	1,970	945	869	3,325	3,608
89	14,808	15,721	2,099	1,931	945	869	3,378	4,009
8K	11,153	—	1,385	1,274	836	769	2,760	—
8L	11,400	—	1,484	1,365	836	769	2,926	—
8M	11,650	—	1,589	1,462	836	769	3,088	—
8P	11,219	—	1,334	1,227	836	769	2,830	—
8Q	11,470	—	1,430	1,316	836	769	2,999	—
8R	11,719	—	1,535	1,412	836	769	3,161	—
8T	12,069	—	1,580	1,454	945	869	2,991	—
8U	12,357	—	1,694	1,694	945	869	3,180	—
8V	12,645	—	1,814	1,669	945	869	3,365	—
8X	12,152	—	1,522	1,400	945	869	3,070	—
8Y	12,444	—	1,632	1,501	945	869	3,264	—
8Z	12,733	—	1,752	1,612	945	869	3,448	—

NOTE(S):

- Evaporator includes the control panel (PIC6.1), the suction elbow, and the distribution piping to the economizer and two-pass Victaulic dished heads (half the distribution piping weight).
- Condenser includes the high side float chamber valve and sump, discharge elbow, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads (half the distribution piping weight).
- For special tubes refer to the 19XR,XRV Computer Selection Program.
- All weights for standard 2-pass NIH (nozzle-in-head) design.
- For "E" compressor, add 1,054 lb (478 kg) steel weight and 283 lb (128 kg) refrigerant weight for economizer assembly.
- Rigging weights are for standard tubes of standard wall thickness (0.025-in. [0.635 mm] wall) and do not include refrigerant weight.
- See Model Number Nomenclature.

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C and E — Drive End Entering Evaporator Water (SI)^{a,b,c,d,e,f,g}

CODE	DRY RIGGING WEIGHT (kg)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (kg)				Water Weight (kg)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
30	1 847	1 676	231	—	140	—	210	210
31	1 929	1 769	256	—	140	—	241	246
32	2 016	1 860	284	—	140	—	273	282
35	1 970	2 089	262	—	158	—	232	233
36	2 064	2 195	290	—	158	—	266	274
37	2 163	2 299	322	—	158	—	303	314
40	2 226	2 286	329	—	153	—	391	415
41	2 303	2 373	355	—	153	—	422	451
42	2 370	2 460	381	—	153	—	449	487
45	2 433	2 541	372	—	174	—	425	453
46	2 522	2 642	396	—	174	—	460	494
47	2 599	2 742	430	—	174	—	491	535
50	2 591	2 762	407	170	202	186	499	556
51	2 694	2 850	442	184	202	186	541	591
52	2 759	2 932	463	193	202	186	566	626
53	2 786	2 962	458	191	202	186	579	639
54	2 809	2 990	448	187	202	186	591	653
55	2 838	3 078	460	192	229	210	545	607
56	2 956	3 178	499	208	229	210	591	648
57	3 031	3 273	523	219	229	210	621	687
58	3 062	3 307	518	216	229	210	635	703
59	3 089	3 340	506	211	229	210	649	718
5A	2 324	—	223	93	202	186	464	—
5B	2 348	—	231	97	202	186	476	—
5C	2 378	—	241	101	202	186	489	—
5F	2 530	—	251	105	229	210	505	—
5G	2 558	—	261	109	229	210	518	—
5H	2 593	—	272	113	229	210	533	—
5K	2 265	—	305	127	202	186	484	—
5L	2 309	—	320	134	202	186	507	—
5M	2 343	—	337	141	202	186	527	—
5P	2 287	—	291	122	202	186	504	—
5Q	2 327	—	308	128	202	186	524	—
5R	2 365	—	322	134	202	186	547	—
5T	2 461	—	348	146	229	210	527	—
5U	2 510	—	363	151	229	210	553	—
5V	2 549	—	382	160	229	210	576	—
5X	2 488	—	331	138	229	210	550	—
5Y	2 533	—	349	146	229	210	572	—
5Z	2 575	—	365	152	229	210	599	—
60	3 048	3 068	495	206	217	200	635	690
61	3 128	3 152	522	218	217	200	667	724
62	3 192	3 234	545	228	217	200	693	758
63	3 222	3 265	545	228	217	200	707	773
64	3 248	3 295	534	223	217	200	720	787
65	3 353	3 076	563	235	246	200	694	756
66	3 445	3 581	594	248	246	226	730	795
67	3 519	3 675	621	259	246	226	759	834
68	3 554	3 711	616	257	246	226	776	850
69	3 586	3 746	604	252	246	226	791	867
6K	2 593	—	345	144	217	200	586	—
6L	2 633	—	362	151	217	200	608	—
6M	2 673	—	376	157	217	200	635	—
6P	2 616	—	329	137	217	200	607	—
6Q	2 654	—	347	145	217	200	628	—
6R	2 693	—	362	151	217	200	653	—
6T	2 826	—	391	163	246	226	637	—
6U	2 871	—	411	171	246	226	663	—
6V	2 918	—	427	178	246	226	693	—
6X	2 854	—	373	156	246	226	662	—
6Y	2 898	—	394	164	246	226	686	—

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C and E — Drive End Entering Evaporator Water (SI)^{a,b,c,d,e,f,g} (cont)

CODE	DRY RIGGING WEIGHT (kg)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (kg)				Water Weight (kg)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
6Z	2 942	—	411	171	246	226	714	—
70	4 510	4 892	639	267	381	351	911	1 009
71	4 686	5 085	698	291	381	351	982	1 084
72	4 823	5 272	747	312	381	351	1 037	1 156
73	4 860	5 324	736	677	381	351	1 056	1 181
74	4 894	5 341	718	661	381	351	1 073	1 189
75	4 917	5 379	725	667	431	396	990	1 103
76	5 121	5 600	792	729	431	396	1 071	1 188
77	5 279	5 812	848	780	431	396	1 134	1 271
78	5 324	5 874	839	772	431	396	1 156	1 299
79	5 365	5 894	819	754	431	396	1 176	1 309
7K	3 959	—	475	437	381	351	884	—
7L	4 064	—	513	472	381	351	950	—
7M	4 155	—	551	507	381	351	1 011	—
7P	3 988	—	454	418	381	351	912	—
7Q	4 093	—	493	454	381	351	978	—
7R	4 186	—	529	487	381	351	1 041	—
7T	4 278	—	542	498	431	396	959	—
7U	4 399	—	586	539	431	396	1 035	—
7V	4 505	—	636	586	431	396	1 105	—
7X	4 314	—	518	477	431	396	991	—
7Y	4 435	—	562	518	431	396	1 067	—
7Z	4 543	—	611	562	431	396	1 139	—
80	5 744	5 785	771	709	379	349	1 236	1 350
81	5 896	5 964	822	756	379	349	1 299	1 426
82	6 054	6 144	875	805	379	349	1 363	1 501
83	6 095	6 292	851	783	379	349	1 385	1 577
84	6 134	6 449	835	768	379	349	1 406	1 656
85	6 261	6 354	874	804	429	394	1 339	1 469
86	6 437	6 561	932	857	429	394	1 410	1 555
87	6 621	6 769	992	912	429	394	1 484	1 641
88	6 670	6 945	972	894	429	394	1 508	1 637
89	6 717	7 131	952	876	429	394	1 532	1 818
8K	5 059	—	628	578	379	349	1 252	—
8L	5 171	—	673	619	379	349	1 327	—
8M	5 284	—	721	663	379	349	1 401	—
8P	5 089	—	605	557	379	349	1 284	—
8Q	5 203	—	649	597	379	349	1 360	—
8R	5 316	—	696	640	379	349	1 434	—
8T	5 474	—	717	660	429	394	1 357	—
8U	5 605	—	768	768	429	394	1 442	—
8V	5 736	—	823	757	429	394	1 526	—
8X	5 512	—	690	635	429	394	1 393	—
8Y	5 645	—	740	681	429	394	1 481	—
8Z	5 776	—	795	731	429	394	1 564	—

NOTE(S):

- Evaporator includes the control panel (PIC6.1), the suction elbow, and the distribution piping to the economizer and two-pass Victaulic dished heads (half the distribution piping weight).
- Condenser includes the high side float chamber valve and sump, discharge elbow, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads (half the distribution piping weight).
- For special tubes refer to the 19XR,XRV Computer Selection Program.
- All weights for standard 2-pass NIH (nozzle-in-head) design.
- For "E" compressor, add 1,054 lb (478 kg) steel weight and 283 lb (128 kg) refrigerant weight for economizer assembly.
- Rigging weights are for standard tubes of standard wall thickness (0.025-in. [0.635 mm] wall) and do not include refrigerant weight.
- See Model Number Nomenclature.

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C, E — Compressor End Entering Evaporator Water (English)^{a,b,c,d,e}

CODE ^f	DRY RIGGING WEIGHT ^g (lb)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (lb)				Water Weight (lb)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
30	4,071	3,694	350	—	260	—	464	464
31	4,253	3,899	420	—	260	—	531	543
32	4,445	4,100	490	—	260	—	601	621
35	4,343	4,606	400	—	310	—	511	513
36	4,551	4,840	480	—	310	—	587	603
37	4,769	5,069	550	—	310	—	667	692
40	4,908	5,039	560	—	338	—	863	915
41	5,078	5,232	630	—	338	—	930	995
42	5,226	5,424	690	—	338	—	990	1,074
45	5,363	5,602	640	—	383	—	938	998
46	5,559	5,824	720	—	383	—	1,014	1,088
47	5,730	6,044	790	—	383	—	1,083	1,179
50	5,713	6,090	750	690	446	410	1,101	1,225
51	5,940	6,283	840	773	446	410	1,192	1,304
52	6,083	6,464	900	828	446	410	1,248	1,379
53	6,141	6,529	900	828	446	410	1,277	1,409
54	6,192	6,591	900	828	446	410	1,302	1,439
55	6,257	6,785	870	800	504	464	1,201	1,339
56	6,517	7,007	940	865	504	464	1,304	1,429
57	6,682	7,215	980	902	504	464	1,369	1,514
58	6,751	7,291	980	902	504	464	1,401	1,550
59	6,811	7,363	980	902	504	464	1,430	1,583
5A	5,124	—	500	460	446	410	1,023	—
5B	5,177	—	520	478	446	410	1,050	—
5C	5,243	—	550	506	446	410	1,079	—
5F	5,577	—	550	506	504	464	1,113	—
5G	5,640	—	570	524	504	464	1,143	—
5H	5,716	—	600	552	504	464	1,176	—
5K	4,993	—	673	619	446	410	1,067	—
5L	5,090	—	706	650	446	410	1,118	—
5M	5,165	—	742	683	446	410	1,162	—
5P	5,041	—	641	590	446	410	1,111	—
5Q	5,131	—	678	624	446	410	1,155	—
5R	5,214	—	709	652	446	410	1,206	—
5T	5,425	—	768	707	504	464	1,162	—
5U	5,534	—	801	737	504	464	1,220	—
5V	5,620	—	843	776	504	464	1,270	—
5X	5,484	—	730	672	504	464	1,212	—
5Y	5,584	—	769	707	504	464	1,262	—
5Z	5,678	—	805	741	504	464	1,320	—
60	6,719	6,764	940	865	479	441	1,400	1,521
61	6,895	6,949	980	902	479	441	1,470	1,597
62	7,038	7,130	1,020	938	479	441	1,527	1,671
63	7,103	7,199	1,020	938	479	441	1,559	1,704
64	7,161	7,264	1,020	938	479	441	1,587	1,735
65	7,392	7,682	1,020	938	542	499	1,530	1,667
66	7,594	7,894	1,060	975	542	499	1,610	1,753
67	7,759	8,102	1,090	1,003	542	499	1,674	1,838
68	7,836	8,182	1,090	1,003	542	499	1,711	1,875
69	7,905	8,258	1,090	1,003	542	499	1,743	1,911
6K	5,716	—	760	699	479	441	1,291	—
6L	5,804	—	797	733	479	441	1,341	—
6M	5,894	—	828	762	479	441	1,399	—
6P	5,768	—	725	667	479	441	1,338	—
6Q	5,852	—	764	703	479	441	1,385	—
6R	5,938	—	798	734	479	441	1,439	—
6T	6,230	—	863	794	542	499	1,405	—
6U	6,330	—	905	833	542	499	1,462	—
6V	6,433	—	941	866	542	499	1,528	—
6X	6,293	—	823	757	542	499	1,459	—
6Y	6,388	—	868	799	542	499	1,512	—

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C, E — Compressor End Entering Evaporator Water (English)^{a,b,c,d,e} (cont)

CODE ^f	DRY RIGGING WEIGHT ^g (lb)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (lb)				Water Weight (lb)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
6Z	6,487	—	906	834	542	499	1,574	—
70	9,942	10,786	1,220	1,122	840	773	2,008	2,225
71	10,330	11,211	1,340	1,233	840	773	2,164	2,389
72	10,632	11,622	1,440	1,325	840	773	2,286	2,548
73	10,715	11,737	1,440	1,325	840	773	2,328	2,604
74	10,790	11,775	1,440	1,325	840	773	2,366	2,622
75	10,840	11,859	1,365	1,256	950	874	2,183	2,431
76	11,289	12,345	1,505	1,385	950	874	2,361	2,619
77	11,638	12,814	1,625	1,495	950	874	2,501	2,801
78	11,738	12,949	1,625	1,495	950	874	2,548	2,864
79	11,828	12,994	1,625	1,495	950	874	2,592	2,885
7K	8,728	—	1,047	963	840	773	1,948	—
7L	8,959	—	1,132	1,041	840	773	2,094	—
7M	9,161	—	1,214	1,117	840	773	2,229	—
7P	8,792	—	1,002	922	840	773	2,010	—
7Q	9,023	—	1,087	1,000	840	773	2,156	—
7R	9,229	—	1,167	1,074	840	773	2,295	—
7T	9,431	—	1,194	1,098	950	874	2,115	—
7U	9,698	—	1,292	1,189	950	874	2,282	—
7V	9,932	—	1,403	1,291	950	874	2,436	—
7X	9,510	—	1,142	1,051	950	874	2,185	—
7Y	9,777	—	1,240	1,141	950	874	2,352	—
7Z	10,016	—	1,347	1,239	950	874	2,511	—
80	12,664	12,753	1,500	1,380	836	769	2,726	2,977
81	12,998	13,149	1,620	1,490	836	769	2,863	3,143
82	13,347	13,545	1,730	1,592	836	769	3,005	3,309
83	13,437	13,872	1,730	1,592	836	769	3,053	3,476
84	13,523	14,217	1,730	1,592	836	769	3,099	3,651
85	13,804	14,008	1,690	1,555	945	869	2,951	3,238
86	14,191	14,465	1,820	1,674	945	869	3,108	3,428
87	14,597	14,923	1,940	1,785	945	869	3,271	3,618
88	14,705	15,311	1,940	1,785	945	869	3,325	3,808
89	14,808	15,721	1,940	1,785	945	869	3,378	4,009
8K	11,153	—	1,385	1,274	836	769	2,760	—
8L	11,400	—	1,484	1,365	836	769	2,926	—
8M	11,650	—	1,589	1,462	836	769	3,088	—
8P	11,219	—	1,334	1,227	836	769	2,830	—
8Q	11,470	—	1,430	1,316	836	769	2,999	—
8R	11,719	—	1,535	1,412	836	769	3,161	—
8T	12,069	—	1,580	1,454	945	869	2,991	—
8U	12,357	—	1,694	1,558	945	869	3,180	—
8V	12,645	—	1,814	1,669	945	869	3,365	—
8X	12,152	—	1,522	1,400	945	869	3,070	—
8Y	12,444	—	1,632	1,501	945	869	3,264	—
8Z	12,733	—	1,752	1,612	945	869	3,448	—

NOTE(S):

- Evaporator includes the control panel (PIC6.1), suction elbow, and 1/2 the distribution piping weight.
- Condenser includes float valve and sump, discharge elbow, and 1/2 the distribution piping weight.
- For special tubes refer to the 19XR,XRV Computer Selection Program.
- All weights for standard 2-pass NIH (nozzle-in-head) design.
- For "E" compressor, add 1,054 lb (478 kg) steel weight and 283 lb (128 kg) refrigerant weight for economizer assembly.
- Heat exchanger frame sizes 3 through 4 available on single-stage chillers only.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C, E — Compressor End Entering Evaporator Water (SI)^{a,b,c,d,e}

CODE ^f	DRY RIGGING WEIGHT ^g (kg)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (kg)				Water Weight (kg)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
30	1 847	1 676	159	—	118	—	210	210
31	1 929	1 769	191	—	118	—	241	246
32	2 016	1 860	222	—	118	—	273	282
35	1 970	2 089	181	—	141	—	232	233
36	2 064	2 195	218	—	141	—	266	274
37	2 163	2 299	249	—	141	—	303	314
40	2 226	2 286	254	—	153	—	391	415
41	2 303	2 373	286	—	153	—	422	451
42	2 370	2 460	313	—	153	—	449	487
45	2 433	2 541	290	—	174	—	425	453
46	2 522	2 642	327	—	174	—	460	494
47	2 599	2 742	358	—	174	—	491	535
50	2 591	2 762	340	313	202	186	499	556
51	2 694	2 850	381	351	202	186	541	591
52	2 759	2 932	408	376	202	186	566	626
53	2 786	2 962	408	376	202	186	579	639
54	2 809	2 990	408	376	202	186	591	653
55	2 838	3 078	395	363	229	210	545	607
56	2 956	3 178	426	392	229	210	591	648
57	3 031	3 273	445	409	229	210	621	687
58	3 062	3 307	445	409	229	210	635	703
59	3 089	3 340	445	409	229	210	649	718
5A	2 324	—	227	209	202	186	464	—
5B	2 348	—	236	217	202	186	476	—
5C	2 378	—	249	230	202	186	489	—
5F	2 530	—	249	230	229	210	505	—
5G	2 558	—	259	238	229	210	518	—
5H	2 593	—	272	250	229	210	533	—
5K	2 265	—	305	281	202	186	484	—
5L	2 309	—	320	295	202	186	507	—
5M	2 343	—	337	310	202	186	527	—
5P	2 287	—	291	268	202	186	504	—
5Q	2 327	—	308	283	202	186	524	—
5R	2 365	—	322	296	202	186	547	—
5T	2 461	—	348	321	229	210	527	—
5U	2 510	—	363	334	229	210	553	—
5V	2 549	—	382	352	229	210	576	—
5X	2 488	—	331	305	229	210	550	—
5Y	2 533	—	349	321	229	210	572	—
5Z	2 575	—	365	336	229	210	599	—
60	3 048	3 068	426	392	217	200	635	690
61	3 128	3 152	445	409	217	200	667	724
62	3 192	3 234	463	425	217	200	693	758
63	3 222	3 265	463	425	217	200	707	773
64	3 248	3 295	463	425	217	200	720	787
65	3 353	3 484	463	425	246	226	694	756
66	3 445	3 581	481	442	246	226	730	795
67	3 519	3 675	494	455	246	226	759	834
68	3 554	3 711	494	455	246	226	776	850
69	3 586	3 746	494	455	246	226	791	867
6K	2 593	—	345	317	217	200	586	—
6L	2 633	—	362	332	217	200	608	—
6M	2 673	—	376	346	217	200	635	—
6P	2 616	—	329	303	217	200	607	—
6Q	2 654	—	347	319	217	200	628	—
6R	2 693	—	362	333	217	200	653	—
6T	2 826	—	391	360	246	226	637	—
6U	2 871	—	411	378	246	226	663	—
6V	2 918	—	427	393	246	226	693	—
6X	2 854	—	373	343	246	226	662	—
6Y	2 898	—	394	362	246	226	686	—

19XR,XRV Heat Exchanger Weights — Single-Stage Compressor and Two-Stage Compressor Frame Size C, E — Compressor End Entering Evaporator Water (SI)^{a,b,c,d,e} (cont)

CODE ^f	DRY RIGGING WEIGHT ^g (kg)		MACHINE CHARGE					
	Evaporator Only	Condenser Only	Refrigerant Weight (kg)				Water Weight (kg)	
			Evaporator		Condenser		Evaporator	Condenser
			R-513A	R-515B	R-513A	R-515B		
6Z	2 942	—	411	378	246	226	714	—
70	4 510	4 892	553	509	381	351	911	1 009
71	4 686	5 085	608	559	381	351	982	1 084
72	4 823	5 272	653	601	381	351	1 037	1 156
73	4 860	5 324	653	601	381	351	1 056	1 181
74	4 894	5 341	653	601	381	351	1 073	1 189
75	4 917	5 379	619	570	431	396	990	1 103
76	5 121	5 600	683	628	431	396	1 071	1 188
77	5 279	5 812	737	678	431	396	1 134	1 271
78	5 324	5 874	737	678	431	396	1 156	1 299
79	5 365	5 894	737	678	431	396	1 176	1 309
7K	3 959	—	475	437	381	351	884	—
7L	4 064	—	513	472	381	351	950	—
7M	4 155	—	551	507	381	351	1 011	—
7P	3 988	—	454	418	381	351	912	—
7Q	4 093	—	493	454	381	351	978	—
7R	4 186	—	529	487	381	351	1 041	—
7T	4 278	—	542	498	431	396	959	—
7U	4 399	—	586	539	431	396	1 035	—
7V	4 505	—	636	586	431	396	1 105	—
7X	4 314	—	518	477	431	396	991	—
7Y	4 435	—	562	518	431	396	1 067	—
7Z	4 543	—	611	562	431	396	1 139	—
80	5 744	5 785	680	626	379	349	1 236	1 350
81	5 896	5 964	735	676	379	349	1 299	1 426
82	6 054	6 144	785	722	379	349	1 363	1 501
83	6 095	6 292	785	722	379	349	1 385	1 577
84	6 134	6 449	785	722	379	349	1 406	1 656
85	6 261	6 354	767	705	429	394	1 339	1 469
86	6 437	6 561	826	759	429	394	1 410	1 555
87	6 621	6 769	880	810	429	394	1 484	1 641
88	6 670	6 945	880	810	429	394	1 508	1 727
89	6 717	7 131	880	810	429	394	1 532	1 818
8K	5 059	—	628	578	379	349	1 252	—
8L	5 171	—	673	619	379	349	1 327	—
8M	5 284	—	721	663	379	349	1 401	—
8P	5 089	—	605	557	379	349	1 284	—
8Q	5 203	—	649	597	379	349	1 360	—
8R	5 316	—	696	640	379	349	1 434	—
8T	5 474	—	717	660	429	394	1 357	—
8U	5 605	—	768	707	429	394	1 442	—
8V	5 736	—	823	757	429	394	1 526	—
8X	5 512	—	690	635	429	394	1 393	—
8Y	5 645	—	740	681	429	394	1 481	—
8Z	5 776	—	795	731	429	394	1 564	—

NOTE(S):

- Evaporator includes the control panel (PIC6.1), suction elbow, and 1/2 the distribution piping weight.
- Condenser includes float valve and sump, discharge elbow, and 1/2 the distribution piping weight.
- For special tubes refer to the 19XR,XRV Computer Selection Program.
- All weights for standard 2-pass NIH (nozzle-in-head) design.
- For "E" compressor, add 1,054 lb (478 kg) steel weight and 283 lb (128 kg) refrigerant weight for economizer assembly.
- Heat exchanger frame sizes 3 through 4 available on single-stage chillers only.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR Two-Stage Compressor Frame Size 6 Heat Exchanger Weights (English)^{a,b}

CODE ^c	DRY RIGGING WEIGHT (lb) ^d		REFRIGERANT WEIGHT (lb)				WATER WEIGHT (lb)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
A40	16,877	18,542	1,647	1,690	927	853	4,328	4,553
A41	17,270	19,062	1,773	1,631	927	853	4,557	4,890
A42	17,690	19,565	1,887	1,736	927	853	4,816	5,213
A45	16,968	18,493	1,599	1,471	927	853	4,453	4,582
A46	17,371	19,063	1,714	1,577	927	853	4,701	4,949
A47	17,761	19,578	1,837	1,690	927	853	4,941	5,281
A60	18,354	20,139	1,878	1,728	1,074	988	4,721	5,029
A61	18,807	20,745	2,022	1,860	1,074	988	4,984	5,415
A62	19,295	21,330	2,152	1,980	1,074	988	5,280	5,786
A65	18,469	20,095	1,823	1,677	1,074	988	4,859	5,060
A66	18,936	20,758	1,954	1,798	1,074	988	5,144	5,482
A67	19,389	21,357	2,095	1,927	1,074	988	5,419	5,862
A4A	15,540	17,089	1,681	1,547	861	792	4,183	4,524
A4B	15,794	17,472	1,792	1,649	861	792	4,392	4,859
A4C	16,063	17,812	1,897	1,745	861	792	4,615	5,137
A4F	15,592	17,076	1,626	1,496	861	792	4,322	4,588
A4G	15,845	17,405	1,736	1,597	861	792	4,531	4,867
A4H	16,249	17,821	1,890	1,739	861	792	4,865	5,219
A6A	16,465	18,359	1,917	1,764	998	918	4,555	4,996
A6B	16,758	18,806	2,044	1,880	998	918	4,794	5,368
A6C	17,070	19,202	2,164	1,991	998	918	5,050	5,698
A6F	16,535	18,356	1,854	1,706	998	918	4,709	5,068
A6G	16,829	18,739	1,979	1,821	998	918	4,948	5,387
A6H	17,296	19,225	2,156	1,984	998	918	5,331	6,156
B40	—	21,217	—	—	1,233	—	—	5,850
B41	—	21,965	—	—	1,233	—	—	6,333
B42	—	22,581	—	—	1,233	—	—	6,729
B45	—	21,173	—	—	1,233	—	—	5,904
B46	—	21,909	—	—	1,233	—	—	6,379
B47	—	22,653	—	—	1,233	—	—	6,859
B60	—	23,061	—	—	1,423	—	—	6,464
B61	—	23,932	—	—	1,423	—	—	7,018
B62	—	24,649	—	—	1,423	—	—	7,473
B65	—	23,022	—	—	1,423	—	—	6,521
B66	—	23,879	—	—	1,423	—	—	7,066
B67	—	24,745	—	—	1,423	—	—	7,617
B4A	—	19,217	—	—	1,148	—	—	5,756
B4B	—	19,793	—	—	1,148	—	—	6,243
B4C	—	20,254	—	—	1,148	—	—	6,633
B4F	—	19,217	—	—	1,148	—	—	5,852
B4G	—	19,721	—	—	1,148	—	—	6,279
B4H	—	20,318	—	—	1,148	—	—	6,785
B6A	—	20,794	—	—	1,326	—	—	6,357
B6B	—	21,465	—	—	1,326	—	—	6,915
B6C	—	22,002	—	—	1,326	—	—	7,362
B6F	—	20,806	—	—	1,326	—	—	6,462
B6G	—	21,393	—	—	1,326	—	—	6,951
B6H	—	22,088	—	—	1,326	—	—	8,379

NOTE(S):

- Evaporator weight includes the suction elbow and the distribution piping to the economizer and two-pass Victaulic dished heads.
- Condenser weight includes the high side float chamber, discharge pipe, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads.
- Heat exchanger frame sizes 3 through 4 available on single-stage chillers only.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR Two-Stage Compressor Frame Size 6 Heat Exchanger Weights (SI)^{a,b}

CODE ^c	DRY RIGGING WEIGHT (kg) ^d		REFRIGERANT WEIGHT (kg)				WATER WEIGHT (kg)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
A40	7 655	8 411	747	767	420	387	1 963	2 065
A41	7 834	8 646	804	740	420	387	2 067	2 218
A42	8 024	8 875	856	787	420	387	2 185	2 365
A45	7 697	8 388	725	667	420	387	2 020	2 078
A46	7 879	8 647	777	715	420	387	2 132	2 245
A47	8 056	8 880	833	767	420	387	2 241	2 395
A60	8 325	9 135	852	784	487	448	2 141	2 281
A61	8 531	9 410	917	844	487	448	2 261	2 456
A62	8 752	9 675	976	898	487	448	2 395	2 624
A65	8 377	9 115	827	761	487	448	2 204	2 295
A66	8 589	9 416	886	816	487	448	2 333	2 487
A67	8 795	9 687	950	874	487	448	2 458	2 659
A4A	7 049	7 751	762	702	391	359	1 897	2 052
A4B	7 164	7 925	813	748	391	359	1 992	2 204
A4C	7 286	8 079	860	792	391	359	2 093	2 330
A4F	7 072	7 746	738	679	391	359	1 960	2 081
A4G	7 187	7 895	787	724	391	359	2 055	2 208
A4H	7 370	8 083	857	789	391	359	2 207	2 367
A6A	7 468	8 328	870	800	453	416	2 066	2 266
A6B	7 601	8 530	927	853	453	416	2 175	2 435
A6C	7 743	8 710	982	903	453	416	2 291	2 585
A6F	7 500	8 326	841	774	453	416	2 136	2 299
A6G	7 634	8 500	898	826	453	416	2 244	2 444
A6H	7 845	8 720	978	900	453	416	2 418	2 792
B40	—	9 624	—	—	559	—	—	2 654
B41	—	9 963	—	—	559	—	—	2 873
B42	—	10 243	—	—	559	—	—	3 052
B45	—	9 604	—	—	559	—	—	2 678
B46	—	9 938	—	—	559	—	—	2 893
B47	—	10 275	—	—	559	—	—	3 111
B60	—	10 460	—	—	645	—	—	2 932
B61	—	10 855	—	—	645	—	—	3 183
B62	—	11 181	—	—	645	—	—	3 390
B65	—	10 443	—	—	645	—	—	2 958
B66	—	10 831	—	—	645	—	—	3 205
B67	—	11 224	—	—	645	—	—	3 455
B4A	—	8 717	—	—	521	—	—	2 611
B4B	—	8 978	—	—	521	—	—	2 832
B4C	—	9 187	—	—	521	—	—	3 009
B4F	—	8 717	—	—	521	—	—	2 654
B4G	—	8 945	—	—	521	—	—	2 848
B4H	—	9 216	—	—	521	—	—	3 078
B6A	—	9 432	—	—	601	—	—	2 883
B6B	—	9 736	—	—	601	—	—	3 137
B6C	—	9 980	—	—	601	—	—	3 339
B6F	—	9 437	—	—	601	—	—	2 931
B6G	—	9 704	—	—	601	—	—	3 153
B6H	—	10 019	—	—	601	—	—	3 801

NOTE(S):

- Evaporator weight includes the suction elbow and the distribution piping to the economizer and two-pass Victaulic dished heads.
- Condenser weight includes the high side float chamber, discharge pipe, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads.
- See Model Number Nomenclature for 19XR Two-Stage Compressor Frame Size 6 and 7.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR Two-Stage Compressor Frame Size 7 Heat Exchanger Weights (English)^{a,b}

CODE ^c	DRY RIGGING WEIGHT (lb) ^d		REFRIGERANT WEIGHT (lb)				WATER WEIGHT (lb)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
B60	24,704	—	2,273	2,091	—	—	6,340	—
B61	25,337	—	2,355	2,167	—	—	6,737	—
B62	25,964	—	2,460	2,263	—	—	7,116	—
B65	25,014	—	2,185	2,010	—	—	6,485	—
B66	25,631	—	2,275	2,093	—	—	6,873	—
B67	26,264	—	2,379	2,189	—	—	7,255	—
B6A	22,819	—	2,081	1,915	—	—	6,159	—
B6B	23,299	—	2,162	1,989	—	—	6,568	—
B6C	23,829	—	2,256	2,076	—	—	6,993	—
B6F	23,139	—	1,951	1,795	—	—	6,344	—
B6G	23,648	—	2,019	1,857	—	—	6,774	—
B6H	24,171	—	2,120	1,950	—	—	7,194	—
B80	26,184	—	2,557	2,352	—	—	6,766	—
B81	26,922	—	2,649	2,437	—	—	7,208	—
B82	27,627	—	2,768	2,547	—	—	7,629	—
B85	26,438	—	2,458	2,261	—	—	6,923	—
B86	27,157	—	2,559	2,354	—	—	7,355	—
B87	27,868	—	2,676	2,462	—	—	7,780	—
B8A	24,164	—	2,341	2,154	—	—	6,580	—
B8B	24,722	—	2,432	2,237	—	—	7,036	—
B8C	25,317	—	2,538	2,335	—	—	7,510	—
B8F	24,403	—	2,195	2,019	—	—	6,783	—
B8G	25,011	—	2,271	2,089	—	—	7,262	—
B8H	25,599	—	2,385	2,194	—	—	7,731	—
C60	30,825	29,857	2,647	2,435	1,832	1,685	8,475	8,630
C61	31,536	30,881	2,751	2,531	1,847	1,699	8,924	9,275
C62	32,467	31,871	2,875	2,645	1,861	1,712	9,474	9,916
C65	31,135	29,982	2,562	2,357	1,832	1,685	8,645	8,684
C66	31,851	31,064	2,666	2,453	1,847	1,699	9,097	9,362
C67	32,777	32,186	2,793	2,570	1,863	1,712	9,644	10,078
C6A	28,641	27,676	2,443	2,248	1,778	1,636	6,898	8,675
C6B	29,167	28,315	2,534	2,331	1,785	1,642	7,352	9,216
C6C	29,750	28,918	2,627	2,417	1,792	1,649	7,823	9,752
C6F	28,929	27,774	2,334	2,147	1,778	1,636	7,724	8,710
C6G	29,478	28,457	2,415	2,222	1,785	1,642	8,194	9,283
C6H	30,083	29,223	2,500	2,300	1,793	1,649	8,681	9,935
C80	32,698	31,810	2,978	2,740	2,003	1,843	9,084	9,312
C81	33,513	32,955	3,095	2,847	2,019	1,857	9,589	10,029
C82	34,572	34,094	3,234	2,975	2,035	1,872	10,208	10,742
C85	33,034	31,911	2,882	2,651	2,003	1,843	9,275	9,367
C86	33,855	33,113	2,999	2,759	2,020	1,857	9,784	10,120
C87	34,908	34,385	3,142	2,891	2,036	1,872	10,399	10,196
C8A	30,378	29,323	2,748	2,528	1,942	1,787	7,310	9,387
C8B	30,998	30,056	2,851	2,623	1,950	1,794	7,821	9,991
C8C	31,679	30,784	2,955	2,719	1,957	1,800	8,351	10,589
C8F	30,694	29,397	2,626	2,416	1,942	1,787	8,239	9,420
C8G	31,340	30,174	2,717	2,500	1,950	1,794	8,768	10,059
C8H	32,046	31,059	2,813	2,588	1,959	1,802	9,316	10,787
D60	—	38,296	—	—	2,301	2,117	—	11,473
D61	—	39,624	—	—	2,320	2,134	—	12,309
D62	—	41,031	—	—	2,340	2,153	—	13,210
D65	—	37,624	—	—	2,303	2,119	—	11,617
D66	—	38,837	—	—	2,320	2,134	—	12,387
D67	—	40,460	—	—	2,343	2,156	—	13,410
D80	—	41,916	—	—	2,525	2,323	—	12,447
D81	—	43,382	—	—	2,546	2,342	—	13,388
D82	—	44,963	—	—	2,569	2,363	—	14,401
D85	—	42,058	—	—	2,528	2,326	—	12,609
D86	—	43,408	—	—	2,547	2,343	—	13,475
D87	—	45,204	—	—	2,572	2,366	—	14,626
D6A	—	35,286	—	—	2,227	2,049	—	11,401
D6B	—	36,328	—	—	2,238	2,059	—	12,255

19XR Two-Stage Compressor Frame Size 7 Heat Exchanger Weights (English)^{a,b} (cont)

CODE ^c	DRY RIGGING WEIGHT (lb) ^d		REFRIGERANT WEIGHT (lb)				WATER WEIGHT (lb)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
D6C	—	37,288	—	—	2,248	2,068	—	13,078
D6F	—	34,447	—	—	2,227	2,049	—	11,448
D6G	—	35,637	—	—	2,239	2,060	—	12,408
D6H	—	36,663	—	—	2,250	2,070	—	13,278
D8A	—	38,494	—	—	2,442	2,247	—	12,366
D8B	—	39,633	—	—	2,454	2,258	—	13,327
D8C	—	40,731	—	—	2,465	2,268	—	14,253
D8F	—	38,479	—	—	2,442	2,247	—	12,419
D8G	—	39,761	—	—	2,455	2,259	—	13,499
D8H	—	40,922	—	—	2,467	2,270	—	14,478

NOTE(S):

- Evaporator weight includes the suction elbow and the distribution piping to the economizer and two-pass Victaulic dished heads.
- Condenser weight includes the high side float chamber, discharge pipe, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads.
- See Model Number Nomenclature for 19XR Two-Stage Compressor Frame Size 6 and 7.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR Two-Stage Compressor Frame Size 7 Heat Exchanger Weights (SI)^{a,b}

CODE ^c	DRY RIGGING WEIGHT (kg) ^d		REFRIGERANT WEIGHT (kg)				WATER WEIGHT (kg)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
B60	11 206	—	1 031	948	—	—	2 876	—
B61	11 493	—	1 068	983	—	—	3 056	—
B62	11 777	—	1 116	1 026	—	—	3 228	—
B65	11 346	—	991	912	—	—	2 942	—
B66	11 626	—	1 032	949	—	—	3 118	—
B67	11 913	—	1 079	993	—	—	3 291	—
B6A	10 351	—	944	869	—	—	2 794	—
B6B	10 568	—	981	902	—	—	2 979	—
B6C	10 809	—	1 023	942	—	—	3 172	—
B6F	10 496	—	885	814	—	—	2 878	—
B6G	10 727	—	916	842	—	—	3 073	—
B6H	10 964	—	962	885	—	—	3 263	—
B80	11 877	—	1 160	1 067	—	—	3 069	—
B81	12 212	—	1 202	1 105	—	—	3 269	—
B82	12 531	—	1 256	1 155	—	—	3 460	—
B85	11 992	—	1 115	1 026	—	—	3 140	—
B86	12 318	—	1 161	1 068	—	—	3 336	—
B87	12 641	—	1 214	1 117	—	—	3 529	—
B8A	10 961	—	1 062	977	—	—	2 985	—
B8B	11 214	—	1 103	1 015	—	—	3 191	—
B8C	11 484	—	1 151	1 059	—	—	3 406	—
B8F	11 069	—	996	916	—	—	3 077	—
B8G	11 345	—	1 030	948	—	—	3 294	—
B8H	11 612	—	1 082	995	—	—	3 507	—
C60	—	13 543	—	—	831	—	—	3 915
C61	—	14 007	—	—	838	—	—	4 207
C62	—	14 456	—	—	844	—	—	4 498
C65	—	13 600	—	—	831	—	—	3 939
C66	—	14 090	—	—	838	—	—	4 247
C67	—	14 599	—	—	845	—	—	4 571
C6A	—	12 554	—	—	806	—	—	3 935
C6B	—	12 843	—	—	810	—	—	4 180
C6C	—	13 117	—	—	813	—	—	4 423
C6F	—	12 598	—	—	806	—	—	3 951
C6G	—	12 908	—	—	810	—	—	4 211
C6H	—	13 255	—	—	813	—	—	4 506
C80	—	14 429	—	—	909	—	—	4 224
C81	—	14 948	—	—	916	—	—	4 549
C82	—	15 465	—	—	923	—	—	4 872
C85	—	14 475	—	—	909	—	—	4 249
C86	—	15 020	—	—	916	—	—	4 590
C87	—	15 597	—	—	924	—	—	4 625
C8A	—	13 301	—	—	881	—	—	4 258
C8B	—	13 633	—	—	885	—	—	4 532
C8C	—	13 963	—	—	888	—	—	4 803
C8F	—	13 334	—	—	881	—	—	4 273
C8G	—	13 687	—	—	885	—	—	4 563
C8H	—	14 088	—	—	889	—	—	4 893
D60	—	17 371	—	—	1 044	960	—	5 204
D61	—	17 973	—	—	1 052	968	—	5 583
D62	—	18 611	—	—	1 061	977	—	5 992
D65	—	17 066	—	—	1 045	961	—	5 269
D66	—	17 616	—	—	1 052	968	—	5 619
D67	—	18 352	—	—	1 063	978	—	6 083
D80	—	19 013	—	—	1 145	1 054	—	5 646
D81	—	19 678	—	—	1 155	1 062	—	6 073
D82	—	20 395	—	—	1 165	1 072	—	6 532
D85	—	19 077	—	—	1 147	1 055	—	5 719
D86	—	19 690	—	—	1 155	1 063	—	6 112
D87	—	20 504	—	—	1 167	1 073	—	6 634
D6A	—	16 005	—	—	1 010	929	—	5 171
D6B	—	16 478	—	—	1 015	934	—	5 559

19XR Two-Stage Compressor Frame Size 7 Heat Exchanger Weights (SI)^{a,b} (cont)

CODE ^c	DRY RIGGING WEIGHT (kg) ^d		REFRIGERANT WEIGHT (kg)				WATER WEIGHT (kg)	
	Evaporator Only	Condenser Only	Evaporator Only		Condenser Only		Evaporator Only	Condenser Only
			R-513A	R-515B	R-513A	R-515B		
D6C	—	16 914	—	—	1 020	938	—	5 932
D6F	—	15 625	—	—	1 010	929	—	5 193
D6G	—	16 165	—	—	1 016	934	—	5 628
D6H	—	16 630	—	—	1 021	939	—	6 023
D8A	—	17 461	—	—	1 108	1 019	—	5 609
D8B	—	17 977	—	—	1 113	1 024	—	6 045
D8C	—	18 475	—	—	1 118	1 029	—	6 465
D8F	—	17 454	—	—	1 108	1 019	—	5 633
D8G	—	18 035	—	—	1 114	1 025	—	6 123
D8H	—	18 562	—	—	1 119	1 030	—	6 567

NOTE(S):

- Evaporator weight includes the suction elbow and the distribution piping to the economizer and two-pass Victaulic dished heads.
- Condenser weight includes the high side float chamber, discharge pipe, and the distribution piping weight from the economizer to the float chamber and two-pass Victaulic dished heads.
- See Model Number Nomenclature for 19XR Two-Stage Compressor Frame Size 6 and 7.
- Rigging weights are for standard tubes of standard wall thickness (0.025 in. [0.635 mm] wall).

19XR Component Weights, Frame 3,C,E Compressor^{a,b,c}

COMPONENT	FRAME 3		FRAME C		FRAME E	
	lb	kg	lb	kg	lb	kg
Suction Elbow	185	84	303	137	337	171
Discharge Elbow	125	57	245	111	427	194
Control Panel ^d	92	72	92	42	92	42
Optional Evaporator Inlet Isolation Valve	13	6	24	11	24	11
Optional Discharge Isolation Valve	46	21	93	42	93	42
Std Tier VFD — 380, 400, 460-v (230, 335, 445 A)	650	295	650	295	—	—
Std Tier VFD — 380, 400, 460-v (DD588)	275	125	275	125	—	—
Std Tier VFD — 380, 400, 460-v (DE658, DE745, DE800)	650	295	650	295	—	—
Std Tier VFD — 380, 400, 460-v (DE800, DE990)	—	—	700	318	700	318
Std Tier VFD — 380, 400, 460-v (DP1120, DP1260, DP1460)	—	—	3000	1361	3000	1361
Std Tier VFD — 380, 400, 460-v (DP1670)	—	—	—	—	3400	1542
LiquiFlo 2 VFD — 380, 400, 460-v (442 A)	1600	726	—	—	—	—
LiquiFlo 2 VFD — 380, 400, 460-v (608 A)	1600	726	—	—	—	—
LiquiFlo 2 VFD — 380, 400, 460-v (900 A)	—	—	2800	1270	2800	1270
LiquiFlo 2 VFD — 380, 400, 460-v (1200 A)	—	—	2850	1293	2850	1293
LiquiFlo 2 VFD — 575-v (390 A)	2200	998	—	—	—	—
VFD Shelf (Rockwell VFD)	—	—	1049	476	1049	476
VFD Shelf (Danfoss VFD)	1395	633	1395	633	1499	680

NOTE(S):

- a. To determine compressor frame size, refer to 19XR,XRV Computer Selection Program.
- b. VFD sizes are available on select heat exchanger models; consult the 19XR,XRV Computer Selection program.
- c. VFD Power Panel (DD558, DE658, DE745, DE800, DE880, DE990) used on frames 3, C, E = 300 lb (136 kg).
- d. Included in total evaporator weight.

19XR Component Weights, Frame 6,7^a

COMPONENT	FRAME 6 COMPRESSOR		FRAME 7 COMPRESSOR	
	lb	kg	lb	kg
Suction Pipe Assembly (includes flanges)	486	220	613	278
Optional Evaporator Inlet Isolation Valve	26	12	28	13
Optional Discharge Isolation Valve	277	91	324	147
HMI Panel	25	11	25	11
Control Panel ^b	190	86	190	86
Economizer Cover	132	60	182	83
High Side Float Chamber Cover	132	60	182	83

NOTE(S):

- a. Variable frequency drive (VFD) sizes are available on select heat exchanger models; consult the 19XR,XRV Computer Selection program.
- b. Included in total evaporator weight.

Economizer Weight

FRAME SIZE	DRY WEIGHT (lb) ^a	REFRIGERANT WEIGHT (lb)	OPERATION WEIGHT (lb)	DRY WEIGHT (kg) ^a	REFRIGERANT WEIGHT (kg)	OPERATION WEIGHT (kg)
XRC (fr 5 HX)	1019	210	1229	462	95	557
XRC (fr 6,7 HX)	1252	250	1502	568	113	681
XRE	1054	283	1337	478	128	606
XR6	1589	360	1949	721	163	884
XR7	2749	646	3395	1247	293	1540

NOTE(S):

- a. Includes economizer weight and all connecting piping to compressor.

19XR Additional Data for Marine Waterboxes (19XR3, C, E)^{a,b}

HEAT EXCHANGER FRAME, PASS	ENGLISH					SI				
	psig	RIGGING WEIGHT (lb)		WATER VOLUME (gal)		kPa	RIGGING WEIGHT (kg)		WATER VOLUME (L)	
		Evaporator	Condenser	Evaporator	Condenser		Evaporator	Condenser	Evaporator	Condenser
Frame 3, 1 and 3 Pass	150	730	—	84	—	1034	331	—	318	—
Frame 3, 2 Pass		365	365	42	42		166	166	159	159
Frame 4, 1 and 3 Pass		1888	—	109	—		856	—	412	—
Frame 4, 2 Pass		944	989	54	54		428	449	205	205
Frame 5, 1 and 3 Pass		2445	—	122	—		1109	—	462	—
Frame 5, 2 Pass		1223	1195	61	60		555	542	231	226
Frame 6, 1 and 3 Pass		2860	—	139	—		1297	—	524	—
Frame 6, 2 Pass		1430	1443	69	69		649	655	262	262
Frame 7, 1 and 3 Pass		3970	—	309	—		1801	—	1170	—
Frame 7, 2 Pass		1720	1561	155	123		780	708	585	465
Frame 8, 1 and 3 Pass		5048	—	364	—		2290	—	1376	—
Frame 8, 2 Pass		2182	1751	182	141		990	794	688	532
Frame 3, 1 and 3 Pass	300	860	—	84	—	2068	390	—	318	—
Frame 3, 2 Pass		430	430	42	42		195	195	159	159
Frame 4, 1 and 3 Pass		2162	—	109	—		981	—	412	—
Frame 4, 2 Pass		1552	1641	47	47		704	744	178	178
Frame 5, 1 and 3 Pass		2655	—	122	—		1204	—	462	—
Frame 5, 2 Pass		1965	1909	53	50		891	866	199	190
Frame 6, 1 and 3 Pass		3330	—	139	—		1510	—	524	—
Frame 6, 2 Pass		2425	2451	58	58		1100	1112	218	218
Frame 7, 1 and 3 Pass		5294	—	309	—		2401	—	1170	—
Frame 7, 2 Pass		4140	4652	146	94		1878	2110	553	356
Frame 8, 1 and 3 Pass		6222	—	364	—		2822	—	1376	—
Frame 8, 2 Pass		4952	4559	161	94		2246	2068	609	355

NOTE(S):

a. Add to heat exchanger data for total weights or volumes.

b. For the total weight of a vessel with a marine waterbox, add these values to the heat exchanger weights (or volumes).

19XRV Additional Data for Marine Waterboxes (19XR6/7)^{a,b}

HEAT EXCHANGER FRAME, PASS	COUPLING TYPE	ENGLISH (lb)				SI (kg)					
		psig	Rigging Weight		Water Weight		kPa	Rigging Weight		Water Weight	
			Evaporator	Condenser	Evaporator	Condenser		Evaporator	Condenser	Evaporator	Condenser
Size 6, Frame A, 1 Pass	Victaulic	150	2,794	2,582	6,515	5,648	1034	1 267	1 171	2 955	2 562
	Flange		3,124	2,912				1 417	1 321		
Size 6, Frame A, 2 Pass	Victaulic		2,454	2,236	2,979	2,613		1 113	1 014	2 979	1 185
	Flange		2,650	2,432				1 202	1 103		
Size 6, Frame A, 3 Pass	Victaulic		2,771	2,840	4,190	3,950		1 157	1 288	1 900	1 792
	Flange		2,899	3,020				1 315	1 370		
Size 6, Frame B, 1 Pass	Victaulic		—	2,604	—	6,975		—	1 181	—	3 162
	Flange		—	2,934				—	1 331		
Size 6, Frame B, 2 Pass	Victaulic		—	2,459	—	3,600		—	1 115	—	1 633
	Flange		—	2,719				—	1 233		
Size 6, Frame B, 3 Pass	Victaulic		—	2,770	—	4,858		—	1 256	—	2 203
	Flange		—	2,950				—	1 338		
Size 7 Frame B, 1 Pass	Victaulic		4,045	—	8,103	—		1 835	—	3 675	—
	Flange		4,375	—				1 984	—		
Size 7 Frame B, 2 Pass	Victaulic		3,648	—	4,139	—		1 655	—	1 877	—
	Flange		3,908	—				1 773	—		
Size 7 Frame B, 3 Pass	Victaulic		4,160	—	5,633	—		1 887	—	2 555	—
	Flange		4,340	—				1 969	—		
Size 7 Frame C, 1 Pass	Victaulic		4,828	4,273	10,264	9,858		2 190	1 938	4 655	4 472
	Flange		5,158	4,713				2 340	2 138		
Size 7 Frame C, 2 Pass	Victaulic		4,375	3,714	5,201	4,826		1 984	1 685	2 359	2 189
	Flange		4,635	4,044				2 102	1 834		
Size 7 Frame C, 3 Pass	Victaulic		4,957	4,434	7,144	6,819		2 248	2 011	3 240	3 093
	Flange		5,137	4,630				2 330	2 100		
Size 7 Frame D, 1 Pass	Victaulic		—	4,863	—	12,530		—	2 206	—	5 684
	Flange		—	5,303				—	2 405		
Size 7 Frame D, 2 Pass	Victaulic		—	4,243	—	6,074		—	1 925	—	2 755
	Flange		—	4,573				—	2 074		
Size 7 Frame D, 3 Pass	Victaulic		—	5,079	—	8,659		—	2 303	—	3 928
	Flange		—	5,275				—	2 393		
Size 6, Frame A, 1 Pass	Victaulic	300	6,379	5,573	5,058	4,426	2068	2 893	2 528	2 294	2 008
	Flange		6,709	5,903				3 043	2 678		
Size 6, Frame A, 2 Pass	Victaulic		5,594	4,834	2,101	1,890		2 537	2 193	953	857
	Flange		5,790	5,030				2 626	2 282		
Size 6, Frame A, 3 Pass	Victaulic		6,031	5,310	3,005	2,688		2 736	2 409	1 363	1 219
	Flange		6,159	5,490				2 794	2 490		
Size 6, Frame B, 1 Pass	Victaulic		—	7,084	—	5,509		—	3 213	—	2 499
	Flange		—	7,414				—	3 363		
Size 6, Frame B, 2 Pass	Victaulic		—	6,474	—	2,577		—	2 937	—	1 169
	Flange		—	6,734				—	3 054		
Size 6, Frame B, 3 Pass	Victaulic		—	6,816	—	3,340		—	3 092	—	1 515
	Flange		—	6,996				—	3 173		
Size 7 Frame B, 1 Pass	Victaulic		8,305	—	5,783	—		3 767	—	2 623	—
	Flange		8,635	—				3 917	—		
Size 7 Frame B, 2 Pass	Victaulic		7,426	—	2,382	—		3 368	—	1 080	—
	Flange		7,686	—				3 486	—		
Size 7 Frame B, 3 Pass	Victaulic		7,785	—	3,268	—		3 531	—	1 482	—
	Flange		7,965	—				3 612	—		
Size 7 Frame C, 1 Pass	Victaulic		11,001	9,228	7,030	7,591		4 990	4 186	3 188	3 443
	Flange		11,331	9,668				5 140	4 385		
Size 7 Frame C, 2 Pass	Victaulic		9,829	8,003	2,708	3,061		4 458	3 630	1 228	1 388
	Flange		10,089	8,333				4 576	3 682		
Size 7 Frame C, 3 Pass	Victaulic		10,343	8,647	3,866	4,468		4 692	3 922	1 753	2 027
	Flange		10,053	8,843				4 773	6 069		
Size 7 Frame D, 1 Pass	Victaulic		—	12,940	—	9,365		—	5 869	—	4 248
	Flange		—	13,380				—	5 927		
Size 7 Frame D, 2 Pass	Victaulic		—	11,170	—	3,607		—	5 067	—	1 925
	Flange		—	11,500				—	5 102		
Size 7 Frame D, 3 Pass	Victaulic		—	12,042	—	5,398		—	5 462	—	2 448
	Flange		—	12,238				—	5 551		

NOTE(S):

a. Add to heat exchanger data for total weights or volumes.

b. For the total weight of a vessel with a marine waterbox, add these values to the heat exchanger weights (or volumes).

19XR,XRV Compressor and Motor Weights^a — High-Efficiency Motors, Compressor Frame Size 3^b

MOTOR CODE	ENGLISH (lb)						SI (kg)					
	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight
		Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight			Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight	
HIGH-EFFICIENCY MOTORS / LOW VOLTAGE (200-575 v)												
KCH	2816	1353	285	1381	291	274	1277	614	129	626	132	124
KEH	2816	1417	307	1441	313	274	1277	643	139	654	142	124
KGH	2816	1470	320	1505	333	274	1277	667	145	683	151	124
KHH	2816	1505	333	—	—	274	1277	683	151	—	—	124
UC	2816	1391	330	1419	344	274	1277	631	150	644	156	124
UE	2816	1455	372	1479	386	274	1277	660	169	671	175	124
UG	2816	1508	400	1543	421	274	1277	684	181	700	191	124
UH	2816	1543	421	—	—	274	1277	700	191	—	—	124

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.
- Stator weight includes the stator and shell.

19XR,XRV Compressor and Motor Weights^a — High-Efficiency Motors, Compressor Frame Size C^b

MOTOR CODE	ENGLISH (lb)						SI (kg)					
	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight
		Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight			Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight	
HIGH EFFICIENCY MOTORS / LOW VOLTAGE (230 - 575 V)												
VC	3265	1936	474	2008	494	317	1481	878	215	911	224	144
VE	3265	2057	518	2092	534	317	1481	933	235	949	242	144
VH	3265	2200	591	2200	591	317	1481	998	268	998	268	144
HIGH EFFICIENCY MOTORS / LOW VOLTAGE (400 V)												
VC	3678	2008	494	—	—	317	1668	911	224	—	—	144
VE	3678	2092	534	—	—	317	1668	949	242	—	—	144
VH	3678	2200	591	—	—	317	1668	998	268	—	—	144
HIGH EFFICIENCY MOTORS / LOW VOLTAGE (380/3/60 or 460/3/60 or 575/3/60 V)												
VC	3678	1936	474	—	—	317	1668	878	215	—	—	144
VE	3678	2057	518	—	—	317	1668	933	235	—	—	144
VH	3678	2200	591	—	—	317	1668	998	268	—	—	144
HIGH EFFICIENCY MOTORS / MEDIUM VOLTAGE (2400-6900 V)												
DD	3265	2025	429	2025	429	338	1481	919	195	919	195	153
DH	3265	2250	480	2380	522	338	1481	1021	218	1080	237	153
HIGH EFFICIENCY MOTORS / HIGH VOLTAGE (10000 V)												
LF	3265	—	—	2665	646	413	1481	—	—	1209	293	187
LH	3265	—	—	2760	666	413	1481	—	—	1252	302	187
HIGH EFFICIENCY MOTORS / HIGH VOLTAGE (11000 V)												
LF	3265	—	—	2659	646	413	1481	—	—	1209	293	187
LH	3265	—	—	2754	666	413	1481	—	—	1249	302	187

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only.
- Stator weight includes the stator and shell.

19XR,XRV Compressor and Motor Weights^a—High-Efficiency Motors, Compressor Frame Size E^b

MOTOR CODE	ENGLISH (lb)						SI (kg)					
	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight	Compressor Weight ^c	60 Hz		50 Hz		End Bell Cover Weight
		Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight			Stator Weight ^d	Rotor Weight	Stator Weight ^d	Rotor Weight	
HIGH-EFFICIENCY MOTORS / LOW VOLTAGE (400-460 v)												
MCH	4853	2873	672	2925	693	414	2201	1303	305	1327	314	188
MEH	4853	2956	704	3071	737	414	2201	1341	319	1392	334	188
MFH	4853	3034	724	3153	791	414	2201	1376	328	1430	359	188
MGH	4853	3071	737	—	—	414	2201	1393	334	—	—	188
HIGH-EFFICIENCY MOTORS / MEDIUM VOLTAGE (2400-4160 v)												
MBH	4853	2890	670	2970	696	414	2201	1311	304	1347	316	188
MDH	4853	2970	696	3170	749	414	2201	1347	316	1438	340	188
MFH	4853	3170	749	3460	830	414	2201	1438	340	1569	376	188
MGH	4853	3270	791	—	—	414	2201	1483	359	—	—	188
HIGH-EFFICIENCY MOTORS / MEDIUM VOLTAGE (6300-6900 v)												
MBH	4853	2970	696	3120	736	414	2201	1347	316	1415	334	188
MDH	4853	3170	749	3170	749	414	2201	1438	340	1438	340	188
MFH	4853	3170	749	3460	830	414	2201	1438	340	1569	376	188
MGH	4853	3410	817	—	—	414	2201	1547	371	—	—	188
HIGH-EFFICIENCY MOTORS / HIGH VOLTAGE (10000-11000 v)												
MDH	4853	—	—	3956	678	414	2201	—	—	1794	308	188
MFH	4853	—	—	4062	719	414	2201	—	—	1842	326	188
MHH	4853	3820	657	—	—	414	2201	1733	298	—	—	188
HIGH-EFFICIENCY MOTORS / HIGH VOLTAGE (13800 v)												
MHH	4853	3779	646	—	—	414	2201	1714	293	—	—	188

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.
- Stator weight includes the stator and shell.

19XR Compressor and Motor Weights^a — High-Efficiency Motors Two-Stage Compressor Frame Size 6, 60 Hz^b

MOTOR CODE	ENGLISH (lb)				SI (kg)			
	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight
Voltage: 380-3-60								
N	10,287	1,153	5,928	1,021	4 666	2 689	523	463
P	10,287	1,153	5,928	1,021	4 666	2 689	523	463
Q	10,287	1,179	6,107	1,021	4 666	2 770	535	463
R	10,287	1,153	6,109	1,021	4 666	2 771	523	463
S	10,287	1,153	6,144	1,021	4 666	2 787	523	463
T	10,287	1,179	6,151	1,021	4 666	2 790	535	463
Voltage: 460-3-60								
N	10,287	1,153	5,946	1,021	4 666	2 697	523	463
P	10,287	1,153	5,948	1,021	4 666	2 698	523	463
Q	10,287	1,179	6,107	1,021	4 666	2 770	535	463
R	10,287	1,179	6,111	1,021	4 666	2 772	535	463
S	10,287	1,188	6,149	1,021	4 666	2 789	539	463
T	10,287	1,188	6,153	1,021	4 666	2 791	539	463
Voltage: 2400-3-60								
N	10,287	5,929	1,212	1,021	4 666	2 689	550	463
P	10,287	6,021	1,230	1,021	4 666	2 731	558	463
Q	10,287	6,112	1,248	1,021	4 666	2 772	566	463
R	10,287	6,190	1,264	1,021	4 666	2 808	573	463
S	10,287	6,268	1,280	1,021	4 666	2 843	581	463
T	10,287	6,259	1,280	1,021	4 666	2 839	581	463
Voltage: 3300-3-60								
N	10,287	5,927	1,212	1,021	4 666	2 688	550	463
P	10,287	6,019	1,230	1,021	4 666	2 730	558	463
Q	10,287	6,110	1,248	1,021	4 666	2 771	566	463
R	10,287	6,187	1,264	1,021	4 666	2 806	573	463
S	10,287	6,263	1,280	1,021	4 666	2 841	581	463
T	10,287	6,277	1,280	1,021	4 666	2 847	581	463
Voltage: 4160-3-60								
N	10,287	6,103	1,247	1,021	4 666	2 768	566	463
P	10,287	6,103	1,248	1,021	4 666	2 768	566	463
Q	10,287	6,103	1,248	1,021	4 666	2 768	566	463
R	10,287	6,185	1,264	1,021	4 666	2 805	573	463
S	10,287	6,268	1,280	1,021	4 666	2 843	581	463
T	10,287	6,268	1,280	1,021	4 666	2 843	581	463
Voltage: 6900-3-60								
N	10,287	6,558	1,316	1,021	4 666	2 975	600	463
P	10,287	6,559	1,316	1,021	4 666	2 975	600	463
Q	10,287	6,559	1,316	1,021	4 666	2 975	600	463
R	10,287	6,566	1,316	1,021	4 666	2 978	600	463
S	10,287	6,574	1,316	1,021	4 666	2 982	600	463
T	10,287	6,604	1,351	1,021	4 666	2 996	613	463

19XR Compressor and Motor Weights^a — High-Efficiency Motors Two-Stage Compressor Frame Size 6, 60 Hz^b (cont)

MOTOR CODE	ENGLISH (lb)				SI (kg)			
	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight
Voltage: 11000-3-60								
N	10,287	6,587	1,351	1,021	4 666	2 988	613	463
P	10,287	6,587	1,351	1,021	4 666	2 988	613	463
Q	10,287	6,587	1,351	1,021	4 666	2 988	613	463
R	10,287	6,716	1,385	1,021	4 666	3 036	628	463
S	10,287	6,844	1,419	1,021	4 666	3 104	644	463
T	10,287	6,844	1,419	1,021	4 666	3 104	644	463
Voltage: 13800-3-60								
N	10,287	6,554	1,351	1,021	4 666	2 973	613	463
P	10,287	6,554	1,351	1,021	4 666	2 973	613	463
Q	10,287	6,554	1,351	1,021	4 666	2 973	613	463
R	10,287	6,709	1,385	1,021	4 666	3 043	628	463
S	10,287	6,864	1,419	1,021	4 666	3 113	644	463
T	10,287	6,864	1,419	1,021	4 666	3 113	644	463

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.

19XR Compressor and Motor Weights^a — High-Efficiency Motors Two-Stage Compressor Frame Size 6, 50 Hz^b

MOTOR CODE	ENGLISH (lb)				SI (kg)			
	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight
Voltage: 400-3-50								
N	10,287	1,153	5,917	1,021	4 666	2 684	523	463
P	10,287	1,153	5,919	1,021	4 666	2 685	523	463
Q	10,287	1,179	6,105	1,021	4 666	2 769	535	463
R	10,287	1,179	6,107	1,021	4 666	2 770	535	463
S	10,287	1,188	6,149	1,021	4 666	2 789	539	463
T	10,287	1,188	6,151	1,021	4 666	2 790	539	463
Voltage: 3000-3-50								
N	10,287	5,918	1,212	1,021	4 666	2 684	550	463
P	10,287	6,006	1,230	1,021	4 666	2 724	558	463
Q	10,287	6,094	1,248	1,021	4 666	2 764	566	463
R	10,287	6,184	1,264	1,021	4 666	2 805	573	463
S	10,287	6,274	1,280	1,021	4 666	2 846	581	463
T	10,287	6,296	1,280	1,021	4 666	2 856	581	463
Voltage: 3300-3-50								
N	10,287	5,913	1,212	1,021	4 666	2 682	550	463
P	10,287	6,007	1,230	1,021	4 666	2 725	558	463
Q	10,287	6,101	1,248	1,021	4 666	2 767	566	463
R	10,287	6,192	1,264	1,021	4 666	2 809	573	463
S	10,287	6,283	1,280	1,021	4 666	2 850	581	463
T	10,287	6,266	1,280	1,021	4 666	2 842	581	463
Voltage: 6300-3-50								
N	10,287	6,277	1,280	1,021	4 666	2 847	581	463
P	10,287	6,333	1,298	1,021	4 666	2 873	589	463
Q	10,287	6,389	1,316	1,021	4 666	2 898	600	463
R	10,287	6,473	1,316	1,021	4 666	2 936	600	463
S	10,287	6,556	1,316	1,021	4 666	2 974	600	463
T	10,287	6,609	1,351	1,021	4 666	2 998	613	463
Voltage: 10000-3-50								
N	10,287	6,281	1,280	1,021	4 666	2 849	581	463
P	10,287	6,281	1,281	1,021	4 666	2 849	581	463
Q	10,287	6,281	1,281	1,021	4 666	2 849	581	463
R	10,287	6,441	1,316	1,021	4 666	2 922	600	463
S	10,287	6,600	1,351	1,021	4 666	2 994	613	463
T	10,287	6,156	1,351	1,021	4 666	2 792	613	463
Voltage: 11000-3-50								
N	10,287	6,600	1,351	1,021	4 666	2 994	613	463
P	10,287	6,600	1,351	1,021	4 666	2 994	613	463
Q	10,287	6,600	1,351	1,021	4 666	2 994	613	463
R	10,287	6,765	1,385	1,021	4 666	3 069	628	463
S	10,287	6,930	1,419	1,021	4 666	3 143	644	463
T	10,287	6,930	1,419	1,021	4 666	3 143	644	463

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.

19XR Compressor and Motor Weights^a — High-Efficiency Motors Two-Stage Compressor Frame Size 7, 60 Hz^b

MOTOR CODE	ENGLISH (lb)				SI (kg)			
	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight
Voltage: 2400-3-60								
U	16,024	6,719	1,443	983	7 268	3 048	654	446
V	16,024	6,718	1,443	983	7 268	3 047	654	446
W	16,024	6,717	1,443	983	7 268	3 047	654	446
X	16,024	6,811	1,460	983	7 268	3 089	662	446
Y	16,024	6,906	1,476	983	7 268	3 132	670	446
Z	16,024	7,073	1,509	983	7 268	3 208	684	446
Voltage: 3300-3-60								
U	16,024	6,723	1,443	983	7 268	3 049	654	446
V	16,024	6,730	1,443	983	7 268	3 053	654	446
W	16,024	6,736	1,443	983	7 268	3 055	654	446
X	16,024	6,816	1,460	983	7 268	3 092	662	446
Y	16,024	6,895	1,476	983	7 268	3 128	670	446
Z	16,024	7,055	1,509	983	7 268	3 200	684	446
Voltage: 4160-3-60								
U	16,024	6,739	1,443	983	7 268	3 057	654	446
V	16,024	6,721	1,443	983	7 268	3 049	654	446
W	16,024	6,703	1,443	983	7 268	3 040	654	446
X	16,024	6,778	1,460	983	7 268	3 074	662	446
Y	16,024	6,853	1,476	983	7 268	3 108	670	446
Z	16,024	7,069	1,509	983	7 268	3 206	684	446
Voltage: 6900-3-60								
U	16,024	6,730	1,443	983	7 268	3 053	654	446
V	16,024	6,909	1,476	983	7 268	3 134	670	446
W	16,024	7,088	1,509	983	7 268	3 215	684	446
X	16,024	7,076	1,509	983	7 268	3 210	684	446
Y	16,024	7,064	1,509	983	7 268	3 204	684	446
Z	16,024	7,141	1,542	983	7 268	3 239	699	446
Voltage: 11000-3-60								
G	16,024	7,434	1,700	983	7 268	3 372	771	486
H	16,024	7,602	1,768	983	7 268	3 448	802	486
J	16,024	7,602	1,768	983	7 268	3 448	802	486
K	16,024	7,602	1,768	983	7 268	3 448	802	446
L	16,024	7,602	1,768	983	7 268	3 448	802	486
M	16,024	7,767	1,837	983	7 268	3 523	833	486
Voltage: 13800-3-60								
U	16,024	7,073	1,509	983	7 268	3 208	684	446
V	16,024	7,109	1,526	983	7 268	3 225	692	446
W	16,024	7,146	1,542	983	7 268	3 241	699	446
X	16,024	7,146	1,542	983	7 268	3 241	699	446
Y	16,024	7,146	1,542	983	7 268	3 241	699	446
Z	16,024	7,295	1,575	983	7 268	3 309	714	446

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.

19XR Compressor and Motor Weights^a — High-Efficiency Motors Two-Stage Compressor Frame Size 7, 50 Hz^b

MOTOR CODE	ENGLISH (lb)				SI (kg)			
	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight	Compressor Weight ^c	Stator and Housing Weight	Rotor and Shaft Weight	End Bell Cover Weight
Voltage: 3000-3-50								
U	16,024	6,725	1,443	983	7 268	3 050	654	446
V	16,024	6,716	1,443	983	7 268	3 046	654	446
W	16,024	6,706	1,443	983	7 268	3 042	654	446
X	16,024	6,802	1,460	983	7 268	3 085	662	446
Y	16,024	6,899	1,476	983	7 268	3 129	670	446
Z	16,024	7,066	1,509	983	7 268	3 205	684	446
Voltage: 3300-3-50								
U	16,024	6,743	1,443	983	7 268	3 059	654	446
V	16,024	6,739	1,443	983	7 268	3 057	654	446
W	16,024	6,734	1,443	983	7 268	3 054	654	446
X	16,024	6,826	1,460	983	7 268	3 096	662	446
Y	16,024	6,917	1,476	983	7 268	3 137	670	446
Z	16,024	7,075	1,509	983	7 268	3 209	684	446
Voltage: 6300-3-50								
U	16,024	6,743	1,443	983	7 268	3 059	654	446
V	16,024	6,900	1,476	983	7 268	3 130	670	446
W	16,024	7,058	1,509	983	7 268	3 201	684	446
X	16,024	7,130	1,526	983	7 268	3 234	692	446
Y	16,024	7,203	1,542	983	7 268	3 267	699	446
Z	16,024	7,203	1,542	983	7 268	3 267	699	446
Voltage: 10000-3-50								
G	16,024	7,269	1,631	983	7 268	3 297	740	446
H	16,024	7,269	1,631	983	7 268	3 297	740	446
J	16,024	7,269	1,631	983	7 268	3 297	740	446
K	16,024	7,602	1,768	983	7 268	3 448	802	446
L	16,024	7,602	1,768	983	7 268	3 448	802	446
M	16,024	7,769	1,837	983	7 268	3 523	833	446
Voltage: 11000-3-50								
G	16,024	7,434	1,700	983	7 268	3 372	771	446
H	16,024	7,602	1,768	983	7 268	3 448	802	446
J	16,024	7,602	1,768	983	7 268	3 448	802	446
K	16,024	7,602	1,768	983	7 268	3 448	802	446
L	16,024	7,602	1,768	983	7 268	3 448	802	446
M	16,024	7,767	1,837	983	7 268	3 523	833	446

NOTE(S):

- Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.
- See Model Number Nomenclature.
- Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only. For high lift compressors, contact Carrier Chiller Marketing for weights.

19XR Waterbox Cover Weights Evaporator Frames 3^a

WATERBOX DESCRIPTION	ENGLISH (lb)		METRIC (kg)	
	EVAPORATOR		EVAPORATOR	
	FRAME 3		FRAME 3	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	287	318	130	144
NIH, 2 Pass Cover, 150 psig (1034 kPa)	287	340	130	154
NIH, 3 Pass Cover, 150 psig (1034 kPa)	294	310	133	141
MWB End Cover, 150 psig (1034 kPa)	315	315	143	143
NIH/MWB Return Cover, 150 psig (1034 kPa)	243	243	110	110
NIH, 1 Pass Cover, 300 psig (2068 kPa)	411	486	186	220
NIH, 2 Pass Cover, 300 psig (2068 kPa)	411	518	186	235
NIH, 3 Pass Cover, 300 psig (2068 kPa)	433	468	196	212
NIH Plain End Cover, 300 psig (2068 kPa)	291	291	132	132
MWB End Cover, 300 psig (2068 kPa)	619	619	281	281
MWB Return Cover, 300 psig (2068 kPa)	445	445	202	202

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Condenser Frames 3^a

WATERBOX DESCRIPTION	ENGLISH (lb)		METRIC (kg)	
	CONDENSER		CONDENSER	
	FRAME 3		FRAME 3	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	260	297	118	135
NIH, 2 Pass Cover, 150 psig (1034 kPa)	265	318	120	144
NIH, 3 Pass Cover, 150 psig (1034 kPa)	272	288	123	131
MWB End Cover, 150 psig (1034 kPa)	234	234	106	106
NIH/MWB Return Cover, 150 psig (1034 kPa)	225	225	102	102
NIH, 1 Pass Cover, 300 psig (2068 kPa)	379	454	172	206
NIH, 2 Pass Cover, 300 psig (2068 kPa)	379	486	172	220
NIH, 3 Pass Cover, 300 psig (2068 kPa)	401	436	182	198
NIH Plain End Cover, 300 psig (2068 kPa)	270	270	122	122
MWB End Cover, 300 psig (2068 kPa)	474	474	215	215
MWB Return Cover, 300 psig (2068 kPa)	359	359	163	163

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Evaporator Frames 4, 5^a

WATERBOX DESCRIPTION	ENGLISH (lb)				METRIC (kg)			
	EVAPORATOR				EVAPORATOR			
	FRAME 4		FRAME 5		FRAME 4		FRAME 5	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	148	185	168	229	67	84	76	104
NIH, 2 Pass Cover, 150 psig (1034 kPa)	202	256	224	276	92	116	102	125
NIH, 3 Pass Cover, 150 psig (1034 kPa)	473	489	617	634	215	222	280	288
MWB End Cover, 150 psig (1034 kPa)	317	317	393	393	144	144	178	178
MWB Return Cover, 150 psig (1034 kPa)	138	138	154	154	63	63	70	70
NIH, 1 Pass Cover, 300 psig (2068 kPa)	633	709	764	839	287	322	347	381
NIH, 2 Pass Cover, 300 psig (2068 kPa)	626	689	761	867	284	313	345	394
NIH, 3 Pass Cover, 300 psig (2068 kPa)	660	694	795	830	299	315	361	376
NIH/MWB End Cover, 300 psig (2068 kPa)	522	522	658	658	237	237	298	298

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Condenser Frames 4, 5^a

WATERBOX DESCRIPTION	ENGLISH (lb)				METRIC (kg)			
	CONDENSER				CONDENSER			
	FRAME 4		FRAME 5		FRAME 4		FRAME 5	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	148	185	168	229	67	84	76	104
NIH, 2 Pass Cover, 150 psig (1034 kPa)	191	245	224	298	87	111	102	135
NIH, 3 Pass Cover, 150 psig (1034 kPa)	503	519	629	655	228	235	285	297
MWB End Cover and Bolt-on End Cover, 150 psig (1034 kPa)	317	317	393	393	144	144	178	178
MWB Return Cover, 150 psig (1034 kPa)	138	138	154	154	63	63	70	70
NIH, 1 Pass Cover, 300 psig (2068 kPa)	633	709	764	839	287	322	347	381
NIH, 2 Pass Cover, 300 psig (2068 kPa)	622	729	727	878	282	331	330	393
NIH, 3 Pass Cover, 300 psig (2068 kPa)	655	689	785	838	297	313	356	376
NIH/MWB End Cover, 300 psig (2068 kPa)	522	522	658	658	237	237	298	298

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Evaporator Frames 6^a

WATERBOX DESCRIPTION	ENGLISH (lb)		METRIC (kg)	
	EVAPORATOR		EVAPORATOR	
	FRAME 6		FRAME 6	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	187	223	85	101
NIH, 2 Pass Cover, 150 psig (1034 kPa)	257	330	117	150
NIH, 3 Pass Cover, 150 psig (1034 kPa)	765	791	347	359
MWB End Cover, 150 psig (1034 kPa)	487	487	221	221
NIH/MWB Return Cover, 150 psig (1034 kPa)	172	172	78	78
NIH, 1 Pass Cover, 300 psig (2068 kPa)	978	1053	444	478
NIH, 2 Pass Cover, 300 psig (2068 kPa)	927	1078	420	489
NIH, 3 Pass Cover, 300 psig (2068 kPa)	997	1050	452	476
NIH/MWB End Cover, 300 psig (2068 kPa)	834	834	378	378

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Condenser Frames 6^a

WATERBOX DESCRIPTION	ENGLISH (lb)		METRIC (kg)	
	CONDENSER		CONDENSER	
	FRAME 6		FRAME 6	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	187	223	85	101
NIH, 2 Pass Cover, 150 psig (1034 kPa)	245	330	111	150
NIH, 3 Pass Cover, 150 psig (1034 kPa)	772	843	350	382
MWB End Cover and Bolt-on End Cover, 150 psig (1034 kPa)	487	487	221	221
NIH/MWB Return Cover, 150 psig (1034 kPa)	172	172	78	78
NIH, 1 Pass Cover, 300 psig (2068 kPa)	978	1053	444	478
NIH, 2 Pass Cover, 300 psig (2068 kPa)	923	1074	419	487
NIH, 3 Pass Cover, 300 psig (2068 kPa)	995	1049	451	476
NIH/MWB End Cover, 300 psig (2068 kPa)	834	834	378	378

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Evaporator Frame 7 and 8^a

WATERBOX DESCRIPTION	ENGLISH (lb)				METRIC (kg)			
	EVAPORATOR				EVAPORATOR			
	FRAME 7		FRAME 8		FRAME 7		FRAME 8	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	329	441	417	494	149	200	189	224
NIH, 2 Pass Cover, 150 psig (1034 kPa)	426	541	540	693	193	245	245	314
NIH, 3 Pass Cover, 150 psig (1034 kPa)	1250	1291	1629	1687	567	586	739	765
MWB End Cover, 150 psig (1034 kPa)	844	844	1125	1125	383	383	510	510
NIH/MWB Return Cover, 150 psig (1034 kPa)	315	315	404	404	143	143	183	183
NIH, 1 Pass Cover, 300 psig (2068 kPa)	1712	1883	2359	2523	777	854	1070	1144
NIH, 2 Pass Cover, 300 psig (2068 kPa)	1662	1908	2369	2599	754	865	1075	1179
NIH, 3 Pass Cover, 300 psig (2068 kPa)	1724	1807	2353	2516	782	820	1067	1141
NIH/MWB End Cover, 300 psig (2068 kPa)	1378	1378	1951	1951	625	625	885	885

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights Condenser Frame 7 and 8^a

WATERBOX DESCRIPTION	ENGLISH (lb)				METRIC (kg)			
	CONDENSER				CONDENSER			
	FRAME 7		FRAME 8		FRAME 7		FRAME 8	
	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
NIH, 1 Pass Cover, 150 psig (1034 kPa)	329	441	417	494	149	200	189	224
NIH, 2 Pass Cover, 150 psig (1034 kPa)	404	520	508	662	183	236	230	300
NIH, 3 Pass Cover, 150 psig (1034 kPa)	1222	1280	1469	1527	554	580	666	693
MWB End Cover, 150 psig (1034 kPa)	781	781	1007	1007	354	354	457	457
Bolt-on MWB End Cover, 150 psig (1034 kPa)	700	700	1307	1307	318	318	593	593
NIH/MWB Return Cover, 150 psig (1034 kPa)	315	315	404	404	143	143	183	183
NIH, 1 Pass Cover, 300 psig (2068 kPa)	1690	1851	1986	2151	767	840	901	976
NIH, 2 Pass Cover, 300 psig (2068 kPa)	1628	1862	1893	2222	738	845	859	1008
NIH, 3 Pass Cover, 300 psig (2068 kPa)	1714	1831	1993	2112	777	831	904	958
NIH/MWB End Cover, 300 psig (2068 kPa)	1276	1276	1675	1675	579	579	760	760

NOTE(S):

a. Weight for NIH 2-pass cover, 150 psig (1034 kPa), is included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights, Two-Stage Compressor Frame 6 Evaporator Frame A^{a,b}

WATERBOX DESCRIPTION	PASSES	ENGLISH (lb)		METRIC (kg)	
		EVAPORATOR		EVAPORATOR	
		FRAME A		FRAME A	
		STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED
Dished Head, 150 psig	1	1006	1171	456	531
MWB End Cover, 150 psig	1	976	976	443	443
MWB End Cover (ASME), 300 psig	1	2460	2460	1116	1116
Dished Head, 150 psig	2	1140	1336	517	606
Dished Head (Return Cover), 150 psig	2	976	976	443	443
MWB End Cover, 150 psig	2	1068	1068	484	484
MWB End Cover (Return Cover), 150 psig	2	976	976	443	443
MWB End Cover (ASME), 300 psig	2	2460	2460	1116	1116
MWB End Cover (ASME) (Return Cover), 300 psig	2	2460	2460	1116	1116
Dished Head, 150 psig	3	1048	1112	475	504
MWB End Cover, 150 psig	3	1030	1030	467	467
MWB End Cover (ASME), 300 psig	3	2460	2460	1116	1116

NOTE(S):

a. Consult factory for 1 and 3 pass data.

b. Weights for dished head cover and MWB end cover 150 psig (1034 kPa) are included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

ASME — American Society of Mechanical Engineers

MWB — Marine Waterbox

19XR Waterbox Cover Weights, Two-Stage Compressor Frame 6 Condenser Frame A and B^{a,b}

WATERBOX DESCRIPTION	PASSES	ENGLISH (lb)				METRIC (kg)			
		CONDENSER				CONDENSER			
		FRAME A		FRAME B		FRAME A		FRAME B	
		STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED
Dished Head, 150 psig	1	895	1060	1006	1171	406	481	473	547
MWB, 150 psig	1	859	859	1075	1075	390	390	488	488
MWB (ASME), 300 psig	1	2117	2117	2744	2744	960	960	1292	1292
Dished Head, 150 psig	2	981	1179	1140	1400	445	535	574	633
Dished Head (Return Cover), 150 psig	2	824	824	976	976	374	374	481	481
MWB 150 psig	2	907	907	1075	1075	411	411	630	630
MWB (Return), 150 psig	2	824	824	976	976	374	411	488	488
MWB (ASME), 300 psig	2	2117	2117	2744	2744	960	1083	1440	1440
MWB Return Cover (ASME), 300 psig	2	2117	2117	2744	2744	960	960	1245	1245
Dished Head, 150 psig	3	1067	1157	1050	1140	484	525	476	517
MWB End Cover, 150 psig	3	942	942	1020	1020	427	427	463	463
MWB End Cover (ASME), 300 psig	3	2117	2177	2744	2744	960	987	1245	1245

NOTE(S):

a. Consult factory for 1 and 3 pass data.

b. Weights for dished head cover and MWB end cover 150 psig (1034 kPa) are included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

ASME — American Society of Mechanical Engineers

MWB — Marine Waterbox

19XR Waterbox Cover Weights, Two-Stage Compressor Frame 7, Evaporator Frames B, Ca,b

WATERBOX DESCRIPTION	PASSES	ENGLISH (lb)				METRIC (kg)			
		EVAPORATOR				EVAPORATOR			
		FRAME B		FRAME C		FRAME B		FRAME C	
		STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
Dished Head, 150 psig (1034 kPa)	1	1380	1545	1849	2014	626	701	839	914
MWB End Cover, 150 psig (1034 kPa)	1	1366	1366	1835	1835	620	620	832	832
MWB End Cover (ASME), 300 psig (2068 kPa)	1	3425	3425	4805	4805	1554	1554	2180	2180
Dished Head, 150 psig (1034 kPa)	2	1589	1849	2076	2336	721	839	942	1060
Dished Head (Return Cover), 150 psig (1034 kPa)	2	1367	1367	1836	1836	620	620	833	833
MWB End Cover, 150 psig (1034 kPa)	2	1489	1489	1987	1987	675	675	901	901
MWB (Return Cover), 150 psig (1034 kPa)	2	1367	1367	1836	1836	620	620	833	833
MWB End Cover (ASME), 300 psig (2068 kPa)	2	3425	3425	4805	4805	1554	1554	2180	2180
MWB (Return Cover), 300 psig (2068 kPa)	2	3425	3425	4805	4805	1554	1554	2180	2180
Dished Head, 150 psig (1034 kPa)	3	1514	1604	2028	2118	687	728	920	961
MWB End Cover, 150 psig (1034 kPa)	3	1506	1506	1995	1995	683	683	905	905
MWB End Cover (ASME), 300 psig (2068 kPa)	3	3425	3425	4805	4805	1554	1554	2180	2180

NOTE(S):

- Consult factory for 1 and 3 pass data.
- Weights for dished head cover and MWB end cover 150 psig (1034 kPa) are included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

ASME — American Society of Mechanical Engineers
MWB — Marine Waterbox
STD — Standard

19XR Waterbox Cover Weights, Two-Stage Compressor Frame 7, Condenser Frames C, Da,b

WATERBOX DESCRIPTION	PASSES	ENGLISH (lb)				METRIC (kg)			
		CONDENSER				CONDENSER			
		FRAME C		FRAME D		FRAME C		FRAME D	
		STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED	STD NOZZLES	FLANGED
Dished Head, 150 psig (1034 kPa)	1	1380	1600	1849	2029	626	726	839	920
MWB End Cover, 150 psig (1034 kPa)	1	1367	1367	1835	1835	620	620	832	832
MWB End Cover (ASME), 300 psig (2068 kPa)	1	3639	3639	5249	5249	1651	1651	2353	2353
Dished Head, 150 psig (1034 kPa)	2	1589	1919	2076	2406	721	870	942	1091
Dished Head (Return Cover), 150 psig (1034 kPa)	2	1367	1367	1836	1836	620	620	833	833
MWB End Cover, 150 psig (1034 kPa)	2	1497	1497	1988	1988	679	679	902	902
MWB (Return Cover), 150 psig (1034 kPa)	2	1367	1367	1836	1836	620	620	833	833
MWB End Cover (ASME), 300 psig (2068 kPa)	2	3639	3639	5249	5249	1651	1651	2381	2381
MWB (Return Cover) (ASME), 300 psig (2068 kPa)	2	3639	3639	5249	5249	1651	1651	2381	2381
Dished Head, 150 psig (1034 kPa)	3	1514	1612	2028	2126	687	731	920	964
MWB End Cover, 150 psig (1034 kPa)	3	1493	1493	1993	1993	677	677	904	904
MWB End Cover (ASME), 300 psig (2068 kPa)	3	3639	3639	5249	5249	1651	1651	2381	2381

NOTE(S):

- Consult factory for 1 and 3 pass data.
- Weights for dished head cover and MWB end cover 150 psig (1034 kPa) are included in the heat exchanger weights shown in the heat exchanger weight tables.

LEGEND

ASME — American Society of Mechanical Engineers
MWB — Marine Waterbox
STD — Standard

19XR Component Weights, Frame 3,C,E Compressor^{a,b,c}

COMPONENT	FRAME 3		FRAME C		FRAME E	
	lb	kg	lb	kg	lb	kg
Suction Elbow	185	84	303	137	337	171
Discharge Elbow	125	57	245	111	427	194
Control Panel ^d	92	72	92	42	92	42
Optional Evaporator Inlet Isolation Valve	13	6	24	11	24	11
Optional Discharge Isolation Valve	46	21	93	42	93	42
Std Tier VFD — 380, 400, 460-v (230, 335, 445 A)	650	295	650	295	—	—
Std Tier VFD — 380, 400, 460-v (DD588)	275	125	275	125	—	—
Std Tier VFD — 380, 400, 460-v (DE658, DE745, DE800)	650	295	650	295	—	—
Std Tier VFD — 380, 400, 460-v (DE800, DE990)	—	—	700	318	700	318
Std Tier VFD — 380, 400, 460-v (DP1120, DP1260, DP1460)	—	—	3000	1361	3000	1361
Std Tier VFD — 380, 400, 460-v (DP1670)	—	—	—	—	3400	1542
LiquiFlo 2 VFD — 380, 400, 460-v (442 A)	1600	726	—	—	—	—
LiquiFlo 2 VFD — 380, 400, 460-v (608 A)	1600	726	—	—	—	—
LiquiFlo 2 VFD — 380, 400, 460-v (900 A)	—	—	2800	1270	2800	1270
LiquiFlo 2 VFD — 380, 400, 460-v (1200 A)	—	—	2850	1293	2850	1293
LiquiFlo 2 VFD — 575-v (390 A)	2200	998	—	—	—	—
VFD Shelf (Rockwell VFD)	—	—	1049	476	1049	476
VFD Shelf (Danfoss VFD)	1395	633	1395	633	1499	680

NOTE(S):

- a. To determine compressor frame size, refer to 19XR,XRV Computer Selection Program.
- b. VFD sizes are available on select heat exchanger models; consult the 19XR,XRV Computer Selection program.
- c. VFD Power Panel (DD558, DE658, DE745, DE800, DE880, DE990) used on frames 3, C, E = 300 lb (136 kg).
- d. Included in total evaporator weight.

19XR Component Weights, Frame 6,7^a

COMPONENT	FRAME 6 COMPRESSOR		FRAME 7 COMPRESSOR	
	lb	kg	lb	kg
Suction Pipe Assembly (includes flanges)	486	220	613	278
Optional Evaporator Inlet Isolation Valve	26	12	28	13
Optional Discharge Isolation Valve	277	91	324	147
HMI Panel	25	11	25	11
Control Panel ^b	190	86	190	86
Economizer Cover	132	60	182	83
High Side Float Chamber Cover	132	60	182	83

NOTE(S):

- a. Variable frequency drive (VFD) sizes are available on select heat exchanger models; consult the 19XR,XRV Computer Selection program.
- b. Included in total evaporator weight.

Options and accessories



ITEM	OPTION (FACTORY INSTALLED)	ACCESSORY (FIELD INSTALLED)
Unit-Mounted Variable Frequency Drive (Available for Low Voltage Only)	X	
Free-Standing Low Voltage Variable Frequency Drive		X
Free-Standing Medium Voltage Variable Frequency Drive		X
Free-Standing Starter		X
Unit-Mounted Low-Voltage Wye-Delta or Solid-State Starters (Available on Heat Exchanger Frame Sizes 3 to 7 Only)	X	
Shipped Factory Charged with Refrigerant (can be shipped separate)	X	
1, 2, or 3 Pass Evaporator or Condenser Water-side Construction	X	
Hot Gas Bypass / Envelope Stability Control	X	
Thermal Insulation (Except Waterbox Covers)	X	
Nozzle-in Head Waterbox, 300 psig (2068 kPa)	X	
Marine Waterboxes, 150 psig (1034 kPa) ^a	X	
Marine Waterboxes, 300 psig (2068 kPa), ASME Certified ^a	X	
Marine Bolt-on Waterboxes for Condenser, 150 psig (1034 kPa) with Titanium-Clad Tubesheets (Available on Condenser Frame Sizes 4 to 8 Only)	X	
Flanged Evaporator and/or Condenser Waterbox Nozzles ^b	X	
Waterbox Hinges ^c	X	
Zinc Anodes	X	
0.028 or 0.035 in. (0.711 or 0.889 mm) Internally/Externally Enhanced Copper Tubing — Evaporator/Condenser	X	
0.028 or 0.035 in. (0.711 or 0.889 mm) Smooth Bore/Externally Enhanced Copper Tubing — Evaporator/Condenser	X	
0.028 or 0.035 in. (0.711 or 0.889 mm) Smooth Bore/Externally Enhanced Cupronickel Tubing — Evaporator/Condenser	X	
0.028 or 0.035 in. (0.711 or 0.889 mm) Internally/Externally Enhanced Cupronickel Tubing — Evaporator/Condenser	X	
0.025 or 0.028 in. (0.635 or 0.711 mm) Wall Tubes, Titanium, Internally Enhanced — Condenser	X	
Export Crating	X	
Customer Factory Performance Testing	X	
Extended Warranty (North America only)	X	
Service Contract	X	
Refrigerant Isolation Valves	X	
Unit-Mounted Pumpout Unit (Available on Heat Exchanger Frames Sizes 3 to 5, C, E Only)	X	
Seismic Kit (Select Models)	X	
Stand-Alone Pumpout Unit ^d		X
Separate Storage Tank and Pumpout Unit ^d		X
Soleplate Package		X
Multiple Chiller System Remote Temperature Sensor		X
Discharge Line Sound Reduction Kit		X
Acoustical Sound Insulation Kit		X
Spring Isolator Kit		X

NOTE(S):

- Optional marine waterboxes are NOT available with all configurations. They are available for 19XR heat exchanger frames 3-8 and 19XR; two-stage compressors frame sizes 6 and 7; and heat exchanger frame sizes A, B, C, and D. Standard waterboxes for both 19XR and 19XRV chillers are nozzle-in-head type, 150 psig (1034 kPa).
- Standard waterbox nozzles are Victaulic type. Flanged nozzles are available as an option with either nozzle-in-head type waterboxes or marine waterboxes.
- Not available with all configurations.
- Available with R-513A only.

Unit-Mounted Starter and VFD Features and Options^a

ITEM	WYE-DELTA	SOLID STATE	VFD, NO MPP ^b	UM VFD ONLY ^c
ISM	S	N/A	S	N/A
Branch Oil Pump Circuit Breaker	S	S	S	S
Controls/Oil Heater Transformer with Branch Circuit Breaker	S	S	S	N/A
Microprocessor Based Overload Trip Protection	S	S	S	S
Main Power Disconnect (Non-Fused Type)	S	N/A	N/A	N/A
Main Power Circuit Breaker	N/A	S	S	S
High Interrupt Capacity Main Circuit Breaker	O	O	O	O
Phase Loss/Reversal Imbalance Protection	S	S	S	S
Three Phase Ground Fault Protection^d	O	O	S	S
Integral SCR Bypass Contactor	N/A	S	N/A	N/A
Three-Phase Ammeter	O	O	N/A	O
Three-Phase Voltmeter	O	O	N/A	O
Three-Phase Over/Under Voltage Protection	S	S	S	S
Power Factor Digital Display	S	S	S	S ^e
Frequency Digital Display	S	S	S	S ^e
Digital Watt Display	O	O	O	S ^e
Digital Watt Hour Display	O	O	O	S ^e
Digital Power Factor Display	O	O	O	S ^e
Demand Kilowatt Display	O	O	O	S ^e
Lightning Arrestor and Surge Capacitor Package	O	O	N/A	O
Power Factor Correction Capacitors	O	O	N/A	N/A

NOTE(S):

- For free-standing starters, refer to the eCAT Free Standing Starters builder software. Refer to the eCat Chiller builder software for all VFD options, as some options may not be available for all VFD models.
- Applicable to Danfoss VFD with DP Model, Std Tier VFD.
- Applicable to Rockwell Std Tier VFD, LF2 and Danfoss VFD with DD and DE, PD Models
- Low voltage: phase to phase and phase to ground. Medium voltage: phase to phase and phase to ground.
- On PIC6.1 displacement.

LEGEND

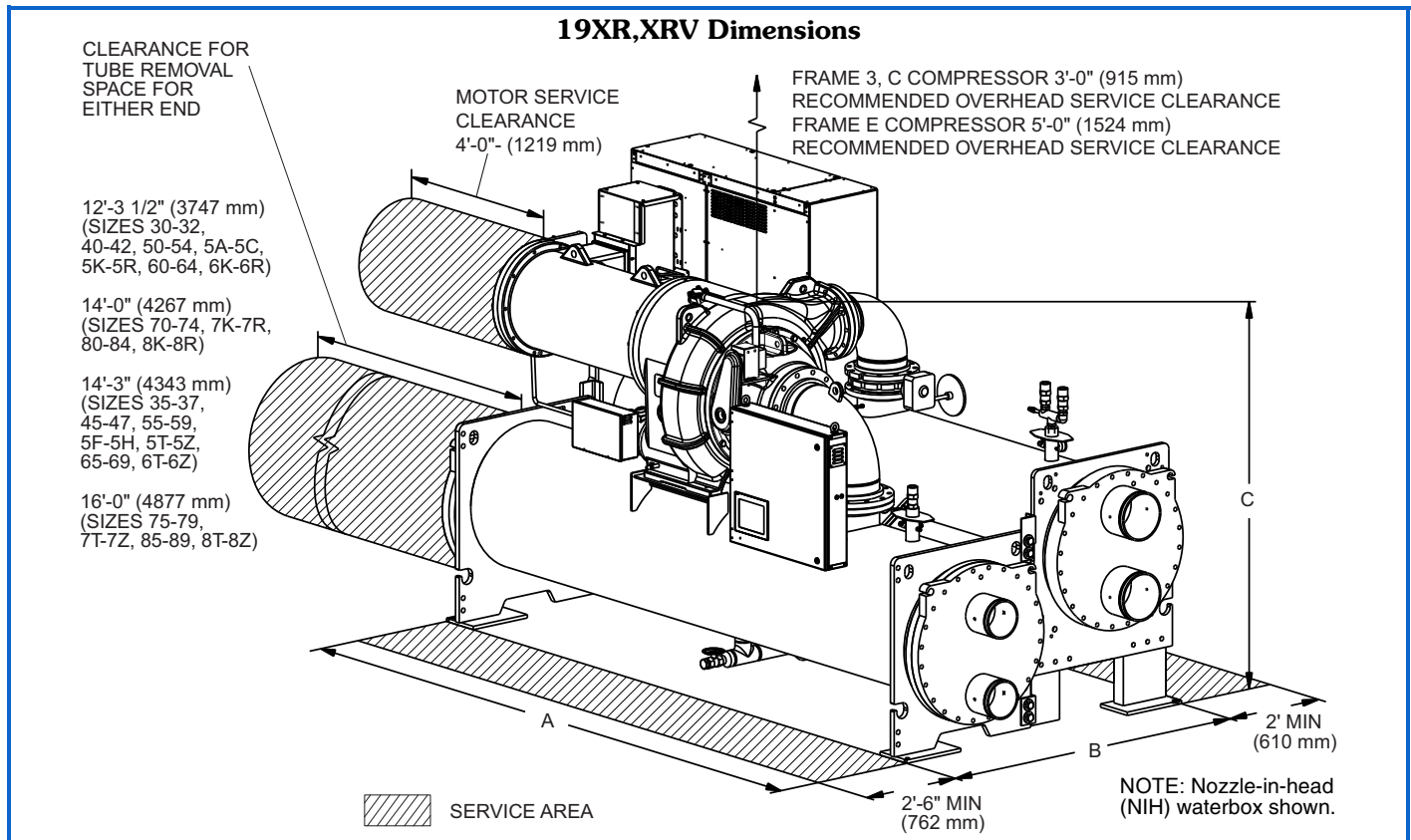
ISM — Integrated Starter Module
MPP — Main Power Panel
N/A — Not Applicable
O — Optional
S — Standard Feature
SCR — Silicon Control Rectifier
UM — Unit Mounted
VFD — Variable Frequency Drive

19XR,XRV Dimensions (Nozzle-in-Head Waterbox)^{a,b,c,d,e,f,g}

HEAT EXCHANGER SIZE	A (LENGTH, WITH NOZZLE-IN-HEAD WATERBOX)						19XR B (WIDTH)		19XR C (HEIGHT)		19XRV B (WIDTH)		19XRV C (HEIGHT)	19XR COMPRESSOR FRAME C C			
	1-Pass		2-Pass ^h		3-Pass		ft-in.	mm	ft-in.	mm	ft-in.	mm		B (WIDTH)		C (HEIGHT)	
	ft-in.	mm	ft-in.	mm	ft-in.	mm								ft-in.	mm	ft-in.	mm
30 to 32	14- 4	4369	13- 8-5/8	4182	14- 4	4369	5- 7-3/16	1707	6- 9-5/8	2073	5- 6-1/8	1680	See Note ⁹	—	—	—	—
35 to 37	16- 0-1/2	4889	15- 5-1/8	4703	16- 0-1/2	4889	5- 7-3/16	1707	6- 9-5/8	2073	5- 6-7/16	1688		—	—	—	—
40 to 42	14- 10	4521	14- 3-5/8	4360	14- 6-3/4	4439	6- 3-1/8	1908	7- 0-3/4	2153	6- 2	1880		—	—	—	—
45 to 47	16- 6-1/2	5042	16- 0-1/8	4880	16- 3-1/4	4959	6- 3-1/8	1908	7- 0-3/4	2153	6- 2	1880		—	—	—	—
50 to 52	14- 11	4546	14- 5	4395	14- 7-1/4	4451	6- 8-7/8	2054	7- 2-3/8	2194	6- 6-1/2	1994		6-10	2083	7- 11-3/8	2421
50 to 54, 5K to 5R ⁱ	14- 11	4546	14- 5	4395	14- 7-1/4	4451	6- 8-7/8	2054	7- 2-3/8	2194	6- 7-7/8	2029		6-10	2083	7- 11-3/8	2421
5A to 5C	14- 11	4546	14- 5	4395	14- 7-1/4	4451	6- 8-7/8	2054	7- 2-3/8	2194	6- 8-7/8	2054		6-10	2083	7- 11-3/8	2421
55 to 57	16- 7-1/2	5067	16- 1-1/2	4915	16- 3-3/4	4972	6- 8-7/8	2054	7- 2-3/8	2194	6- 6-1/2	1994		6-10	2083	7- 11-3/8	2421
55 to 59, 5T to 5Z ⁱ	16- 7-1/2	5067	16- 1-1/2	4915	16- 3-3/4	4972	6- 8-7/8	2054	7- 2-3/8	2194	6- 7-7/8	2029		6-10	2083	7- 11-3/8	2421
5F to 5H	16- 7-1/2	5067	16- 1-1/2	4915	16- 3-3/4	4972	6- 8-7/8	2054	7- 2-3/8	2194	6- 8-7/8	2054		6-10	2083	7- 11-3/8	2421
60 to 64, 6K to 6R	15- 0	4572	14- 5-3/4	4413	14- 7-3/4	4464	6- 0-5/8	2124	7- 4-3/8	2245	6- 10-5/8	2124		7-1	2159	8- 9-5/8	2684
65 to 69, 6T to 6Z	16- 8-1/2	5093	16- 2-1/4	4934	16- 4-1/4	4985	6- 0-5/8	2124	7- 4-3/8	2245	6- 10-5/8	2124		7-1	2159	8- 9-5/8	2684
70 to 74, 7K to 7R ⁱ	17- 1-1/2	5219	16- 11-1/2	5169	16- 10	5131	7- 11-1/2	2426	9- 6-1/4	2972	9- 1-3/8	2778		8- 1-1/2	2477	9-0	2743
70 to 74, 7K to 7R ^j	17- 1-1/2	5219	16- 11-1/2	5169	16- 10	5131	7- 11-1/2	2426	9- 6-1/4	2972	9- 3-5/8	2835		8- 1-1/2	2477	9-0	2743
75 to 79, 7T to 7Z	19- 1-1/2	5829	18- 11-1/2	5779	18- 10	5740	7- 11-1/2	2426	9- 6-1/4	2972	9- 3-5/8	2835		8- 1-1/2	2477	9-0	2743
80 to 84, 8K to 8R	17- 4-1/2	5296	17- 1	5207	16- 10-1/2	5143	8- 10-3/4	2711	9- 8-1/8	3029	10- 0-9/16	3063		—	—	—	—
85 to 89, 8T to 8Z	19- 4-1/2	5905	19- 1	5817	18- 10-1/2	5753	8- 10-3/4	2711	9- 8-1/8	3029	10- 0-9/16	3063		—	—	—	—

NOTE(S):

- Service access should be provided per American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
- Allow at least 3 ft (915 mm) overhead clearance for service rigging for frame 3 and C compressor. Overhead clearance for service rigging E compressor should be 5 ft (1524 mm).
- Dimensions are approximate. Certified drawings available upon request.
- Marine waterboxes may add 6 in. (152 mm) to the width of the machine. See certified drawings for details.
- 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and Victaulic connections. The 300 psig (2068 kPa) design and/or flanges will add length. See certified drawings.
- Not all waterbox/pass combinations are available with unit-mounted VFD. Check selection program and Drawing Manager for availability.
- 19XRV heights can vary depending on the configuration. Check 19XRV certified drawings for height information.
- Assumes both evaporator and condenser nozzles on same end of chiller.
- Compressor frame C.
- Compressor frame E.



**19XR,XRV Dimensions — Single-Stage Compressor and Two-Stage Compressor
Frame Size C and E (Marine Waterbox)^{a,b,c,d,e,f,g}**

HEAT EXCHANGER SIZE	A (LENGTH, MARINE WATERBOX)				19XR B WIDTH		19XRV B WIDTH		19XR,XRV C HEIGHT
	2-Pass ^h		1 or 3-Pass ⁱ						
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	
30 to 32	14-9	4496	16-4-3/4	4997	6-1-1/16	1856	6-1-1/16	1856	See Note ^f
35 to 37	16-5-1/2	5017	18-1-1/4	5518	6-1-1/16	1856	6-1-1/16	1856	
40 to 42	15-2-3/4	4642	16-8-1/4	5086	6-3-1/4	1911	6-3-1/4	1911	
45 to 47	16-11-1/4	5163	18-4-3/4	5607	6-3-1/4	1911	6-3-1/4	1911	
50 to 54, 5K to 5R	15-3-1/2	4661	16-8-1/2	5093	6-8-7/8	2054	6-8-7/8	2054	
5A to 5C	15-3-1/2	4661	16-8-1/2	5093	6-8-7/8	2054	6-8-7/8	2054	
55 to 59, 5T to 5Z	17-0	5182	18-5	5613	6-8-7/8	2054	6-8-7/8	2054	
5F to 5H	17-0	5182	18-5	5613	6-8-7/8	2054	6-8-7/8	2054	
60 to 64, 6K to 6R	15-4-1/8	4677	16-8-3/4	5099	6-11-3/4	2127	6-11-3/4	2127	
65 to 69, 6T to 6Z	17-0-5/8	5197	18-5-1/4	5620	6-11-3/4	2127	6-11-3/4	2127	
70 to 74, 7K to 7R	18-3-5/8	5579	19-9-3/4	6039	8-8-1/8	2645	9-6-3/8	2905	
75 to 79, 7T to 7Z	20-3-5/8	6188	21-9-3/4	6649	8-8-1/8	2645	9-6-3/8	2905	
80 to 84, 8K to 8R	18-4	5583	19-10-1/2	6058	9-5-5/8	2886	10-5	3175	
85 to 89, 8T to 8Z	20-4	6198	21-10-1/2	6668	9-5-5/8	2886	10-5	3175	

NOTE(S):

- Service access should be provided per American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
- Allow at least 3 ft (915 mm) overhead clearance for service rigging for frame frames 3 and C compressor. Overhead clearance for service rigging frame E compressor should be 5 ft (1524 mm).
- Dimensions are approximate. Certified drawings available upon request.
- Marine waterboxes may add 6 in. (152 mm) to the width of the machine. See certified drawings for details.
- 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and Victaulic connections. The 300 psig (2068 kPa) design and/or flanges will add length. See certified drawings.
- 19XR,XRV heights can vary depending on the configuration. Check 19XR,XRV certified drawings for height information.
- Not all waterbox/pass combinations are available with unit-mounted VFD (variable frequency drive). Check selection program for availability.
- Assumes both evaporator and condenser nozzles on same end of chiller.
- 1 or 3-pass length applies if evaporator is a 1 or 3-pass design.

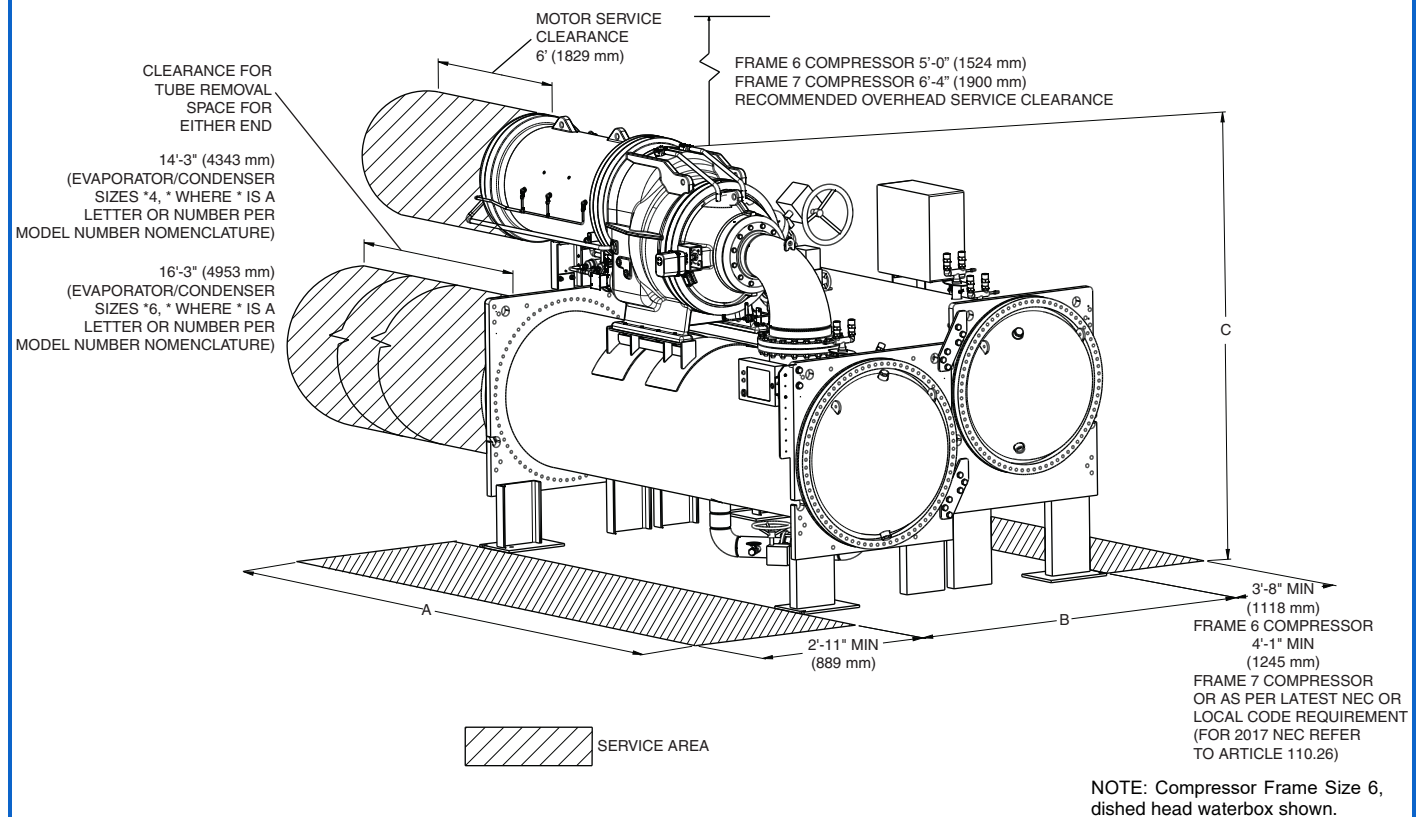
19XR Dimensions — Two-Stage Compressor Frame Sizes 6 and 7 (Dished Head Waterbox)^{a,b,c,d,e,f}

EVAPORATOR HEAT EXCHANGER SIZE ^g	CONDENSER HEAT EXCHANGER SIZE ^g	A (LENGTH, DISHED HEAD WATERBOX)						19XR B WIDTH		19XR C HEIGHT
		1-Pass		2-Pass		3-Pass				
		ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	
A4	A4	17- 8	5385	17- 6-3/4	5353	17- 6-3/4	5353	10- 3-1/8	3127	See Note ^f
A6	A6	19- 8	5994	19- 6-3/4	5962	19- 6-3/4	5962	10- 3-1/8	3127	
A4	B4	17- 8	5385	17- 7-3/8	5369	17- 7-3/8	5369	10- 8-1/2	3264	
A6	B6	19- 8	5994	19- 7-3/8	5978	19- 7-3/8	5978	10- 8-1/2	3264	
B6	C6	20- 0	6096	19- 11-1/8	6074	19- 9	6120	12- 0-5/8	3674	
B8	C8	22- 0	6096	21- 11-1/8	6684	21- 9	6629	12- 5-1/2	3797	
C6	C6	20- 4-1/4	6204	19- 11-1/8	6074	19- 11-3/4	6090	12- 5-1/2	3797	
C6	D6	20- 4-1/4	6204	20- 0	6096	20- 0-1/2	6109	13- 2	4013	
C8	D8	20- 0	6096	21- 11-1/8	6684	21- 9	6629	13- 2	4013	

NOTE(S):

- Service access should be provided per American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
- Allow at least 5 ft (1524 mm) overhead clearance for service rigging.
- Dimensions are approximate. Certified drawings available upon request.
- 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and flanged connections.
- Table contains heat exchanger dimensions for largest type shown.
- 19XR heights can vary depending on the configuration. Check 19XR certified drawings for height information.
- See page 9 for evaporator and condenser size codes.

19XR Dimensions — Two-Stage Compressor Frame Sizes 6 and 7



19XR Dimensions — Two-Stage Compressor Frame Sizes 6 and 7 (150 psig Marine Waterbox)^{a,b,c,d,e,f}

EVAPORATOR HEAT EXCHANGER SIZE ^g	CONDENSER HEAT EXCHANGER SIZE ^g	A (Length, Marine Waterbox)						19XR B WIDTH		19XR C HEIGHT
		1-Pass		2-Pass		3-Pass				
		ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	
A4	A4	23- 1-3/4	7055	21- 8-1/2	6617	20- 11	6375	10- 6-3/8	3210	See Note ^f
A6	A6	25- 1-3/4	7665	23- 8-1/2	7226	22- 11	6985	10- 6-3/8	3210	
A4	B4	23- 1-3/4	7055	22- 1-3/4	6750	21- 1-3/4	6446	11- 0-1/8	3356	
A6	B6	25- 1-3/4	7665	24- 1-3/4	7360	23- 1-3/4	7055	11- 0-1/8	3356	
B6	C6	26- 6-3/4	8097	25- 2-1/2	7680	24- 2-3/4	7385	12- 3-7/8	3756	
B8	C8	28- 6-3/4	8706	27- 2-1/2	8293	26- 2-3/4	7994	12- 10-3/8	3921	
C6	C6	26- 6-3/4	8097	25- 4-7/8	7744	24- 2-3/4	8097	12- 3-7/8	3756	
C6	D6	26- 11	8204	25- 7-1/8	7801	24- 7	7493	13- 6-5/8	4131	
C8	D8	28- 6-3/4	8706	27- 2-1/2	8293	26- 2-3/4	7994	13- 6-5/8	4131	

NOTE(S):

- Service access should be provided per American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
- Allow at least 5 ft (1524 mm) overhead clearance for service rigging.
- Dimensions are approximate. Certified drawings available upon request.
- 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and flanged connections.
- Table contains largest of all configurations of the type shown.
- 19XR heights can vary depending on the configuration. Check 19XR certified drawings for height information.
- See page 9 for evaporator and condenser size codes.

19XR Dimensions — Two-Stage Compressor Frame Sizes 6 and 7 (300 psig ASME Marine Waterbox)^{a,b,c,d,e,f}

EVAPORATOR HEAT EXCHANGER SIZE ^g	CONDENSER HEAT EXCHANGER SIZE ^g	A (LENGTH, MARINE WATERBOX)						19XR B WIDTH		19XR C HEIGHT
		1-Pass		2-Pass		3-Pass				
		ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	
A4	A4	21- 5-1/2	6541	20- 5	6223	19- 5-1/2	5931	10- 8-5/8	3267	See Note ^f
A6	A6	23- 5-1/2	7150	22- 5	6833	21- 5-1/2	6541	10- 8-5/8	3267	
A4	B4	21- 5-1/2	6541	20- 7-1/2	6287	19- 5-1/2	5931	11- 2-3/8	3413	
A6	B6	23- 5-1/2	7150	22- 7-1/2	6287	21- 5-1/2	6541	11- 2-7/8	3426	
B6	C6	24- 5-3/4	7462	23- 1-3/4	7055	22- 1-3/4	6750	12- 6-1/8	3813	
C6	C6	24- 5-3/4	7462	23- 2-1/2	7074	22- 1-3/4	6750	13- 0-7/8	3884	
B8	C8	26- 5-3/4	8071	25- 1-3/4	7664	24- 1-3/4	7360	12- 6-1/8	3813	
C6	D6	24- 7-3/4	7512	23- 3-1/2	7099	22- 3-3/4	6801	13- 9-1/2	4204	
C8	D8	26- 5-3/4	8071	25- 1-3/4	7664	24- 1-3/4	7360	13- 9-1/2	4204	

NOTE(S):

- Service access should be provided per American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
- Allow at least 5 ft (1524 mm) overhead clearance for service rigging.
- Dimensions are approximate. Certified drawings available upon request.
- 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and flanged connections.
- Table contains largest of all configurations of the type shown.
- 19XR heights can vary depending on the configuration. Check 19XR certified drawings for height information.
- See page 9 for evaporator and condenser size codes.

Nozzle Size

HEAT EXCHANGER FRAME SIZE	NOZZLE SIZE (in.) (NOMINAL PIPE SIZE)					
	Evaporator			Condenser		
	1-Pass	2-Pass	3-Pass	1-Pass	2-Pass	3-Pass
3	10	8	6	10	8	6
4	10	8	6	10	8	6
5	10	8	6	10	10	8
6	10	10	8	10	10	8
7	14	12	10	14	12	12
8	14	14	12	14	14	12
A	20	16	12	20	16	14
B	20	18	14	20	18	14
C	20	18	14	24	20	16
D	—	—	—	24	20	16

Compressor motor controllers

Compressor motors, as well as controls and accessories, require the use of starting equipment systems specifically designed for 19XR or 19XRV chillers. Consult your local Carrier representative regarding design information for the selection of starters.

Capacitors/power factors

Power factor considerations may indicate use of capacitors. Properly sized capacitors improve power factors, especially at part load. The 19XR,XRV Computer Selection program can select the proper capacitor size required for the application.

Electrical data / ratings

Auxiliary Ratings — Oil Pump 3 Phase, 50/60 Hz^a

ITEM	AVERAGE kW	MIN/MAX MOTOR VOLTAGE/FREQUENCY V-Ph-Hz	FLA	LRA	SEALED kva	INRUSH kva
OIL PUMP	1.35	200/240-3-60	4.34	24.5	1.96	9.34
	1.30	380/460-3-60	2.15	13.1	1.86	9.53
	1.37	507/619-3-60	2.14	25.0	2.48	24.38
	1.50	220/240-3-50	4.84	28.0	2.29	11.15
	1.50	346/440-3-50	2.59	12.2	2.09	8.30

NOTE(S):

a. FLA = Sealed kva • 1000/√3 · volts; LRA = Inrush kva • 1000/√3 · volts

LEGEND

FLA — Full Load Amps
LRA — Locked Rotor Amps

Auxiliary Ratings — Controls, Oil Sump Heater^{a,b}

ITEM	POWER SUPPLY	SEALED kva	AVERAGE WATTS
CONTROLS	24-vac	0.2	200
OIL SUMP HEATER V-Ph-Hz	115 V or 230 V, Single Phase, 50 or 60 Hz	—	1800 (Frame 3, C Compressor)
			2200 (Frame E Compressor)
	380 V, 50 or 60 Hz; 460 V, 50 or 60 Hz	—	3000 (Frame 6 Compressor)
			3500 (Frame 7 Compressor)

NOTE(S):

a. Oil sump heater only operates when the compressor is off.

b. Power to oil heater/controls must be on circuits that can provide continuous service when the compressor is disconnected.

Low Voltage Power — Control Panel 3 Phase, 50/60 Hz

FRAME SIZE	MCA	MOCP
XR6 380V	16	20
XR6 460V	13.2	15
XR7 380V	17.7	20
XR7 460V	14.6	20

LEGEND

MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection

Microprocessor controls

The microprocessor control system matches the capacity of the chiller to the cooling load while providing state-of-the-art chiller protection. The microprocessor-based control center protects the chiller by monitoring the digital and analog inputs and executing capacity overrides or safety shutdowns as necessary. The system controls cooling load within the set point (plus or minus the dead band) by sensing the water or brine temperature and regulating the inlet guide vanes (IGVs) via a mechanically linked actuator motor, and regulating VFD (variable frequency drive) speed.

Features

Control system

The control system on each 19XR centrifugal chiller is factory mounted, wired, and tested to ensure machine protection and efficient capacity control. In addition, the program logic ensures proper starting, stopping, and recycling of the chiller and provides a communication link to the Carrier Comfort Network® (CCN) system. The PIC6.1 control system consists of one main control board and up to four IOBs (input/output board modules). All boards communicate via an internal LEN bus. The main control board is supplied from a 24 VAC supply reference to earth ground. In the event of a power supply interrupt, the unit can restart automatically without the need for an external command. However, any faults active when the supply is interrupted are saved, and may in certain cases prevent a circuit or unit from restarting. IOBs are supplied from a 24 VAC supply reference to earth ground. Always separate communication cables from other cables and always run wiring as directly as possible.

Sensors

Pressure transducers

Pressure transducers measure and control the pressures in the unit. These electronic sensors deliver 0 to 5 VDC. The transducers can be calibrated through the controller. The pressure transducers are connected to the IOBs.

Temperature sensors

The system uses electronic sensors to measure and control the temperatures in the unit. There are three types of temperature sensors: 5K thermistor, 10K thermistor, and RTD (resistance temperature detector), 100 ohm, 3-wire based on IOB channel configurations. The temperature sensor range is -40°F (-40°C) to 245°F (118°C).

Controls Outputs

Evaporator/condenser water pump

The controller can stop and start an evaporator/condenser water pump.

Inlet guide vanes

The inlet guide vanes adjust the refrigerant vapor flow into the compressors to adapt to change in the operating conditions of the machine. To adjust the refrigerant flow, the guide vanes open or close to vary the cross-section of the refrigerant path. The high degree of accuracy with which the guide vanes are positioned ensures that the flow of refrigerant is precisely controlled.

Envelope stability control valve

The envelope stability control valve is a modulating valve that positions as part of the chillers control algorithm to

ensure smooth, proper operation as the chiller unloads across its operating profile.

VFD

The VFD modifies motor voltage input and frequency, allowing the chiller to react to changing lift conditions. Along with IGVs, it allows compressor start-up and provides capacity control.

Safety cutouts

- Low bearing pressure differential
- Guide vane calibration not completed
- Guide vane fault
- High bearing temperature

Pressure transducer purpose

- Evaporator pressure transducer — measures evaporator pressure
- Condenser pressure transducer — measures condenser pressure
- Refrigerant Pump Inlet pressure transducer — measures the pressure of the pump inlet
- Refrigerant Pump Outlet pressure transducer — measures the pressure of the pump outlet
- Bearing Inlet pressure transducer — measures the pressure of the bearing inlet
- Bearing Outlet pressure transducer — measures the pressure of the bearing outlet

Temperature sensor purpose

- Entering Chilled Water temperature sensor — measures entering evaporator water temperature
- Leaving Chilled Water temperature sensor — measures leaving evaporator water temperature
- Entering Condenser Water temperature sensor — measures entering condenser water temperature
- Leaving Condenser Water temperature sensor — measures leaving condenser water temperature
- Evaporator Refrigerant Liquid temperature sensor — measures evaporator refrigerant liquid temperature
- Compressor Discharge temperature sensor — measures compressor discharge temperature
- First Stage Bearing temperature sensor — measures the first stage bearing temperature
- Second Stage Bearing temperature sensor — measures the second stage bearing temperature
- Bearing Refrigerant Supply temperature sensor — measures the bearing refrigerant supply temperature
- Motor Winding temperature sensor — measures the temperature of compressor motor windings

Controls

- High motor temperature
- High discharge temperature
- Low refrigerant temperature
- High evaporator pressure
- Under voltage
- Over voltage
- Intermittent power loss
- VFD configuration conflict
- High pressure switch

- Low liquid level in high-side float valve chamber
- Low bearing refrigerant supply sub cooling
- Compressor starter faults
- Compressor surge protection
- Evaporator freeze protection
- Ground fault

User interface

The PIC6.1 Human Machine Interface (HMI) is a color 10.4 in. TFT touch screen. Navigation is either direct from the touch screen interface or by connecting to a web interface at the Ethernet IP port of the controller. The navigation menus are the same for both connection methods.

Web connection — Two web connections may be authorized at the same time. When two users are connected simultaneously, there is no priority between users; that is, the last modification is in effect regardless of the user. Connection is from a personal computer using a Java-enabled web browser. The minimum browser configuration includes:

- Microsoft Internet Explorer (version 8 or higher) or Mozilla Firefox (version 3.5.2 or higher). In the advanced connection options, add the unit address to the address list. Do not use a proxy server.
- Java platform (version 6 or higher). In the control panel, deselect (uncheck) the option that allows storing temporary Internet files and use a direct connection.
- Enabling/disabling HTTP service requires manual access to controller. Power cycle of controller is not needed.
- The HTTP service will automatically disable after a Time-out time (configurable, default to 10 minutes, for example). This is to make sure the HTTP service is fully disabled after it has been re-enabled in the job site.

To access the PIC6.1 user interface, enter the IP address of the unit in the address bar of the web browser. The IP address can be viewed or changed from the PIC6.1 interface.

Capacity control

- Leaving chilled water control
- Entering chilled water control
- Ice build control
- Soft loading control by temperature or load ramping
- Guide vane actuator module
- Hot Gas Bypass / Envelope Stability Control
- Power (demand) limiter
- Auto. chilled water reset
- Compressor surge prevention control

Interlocks

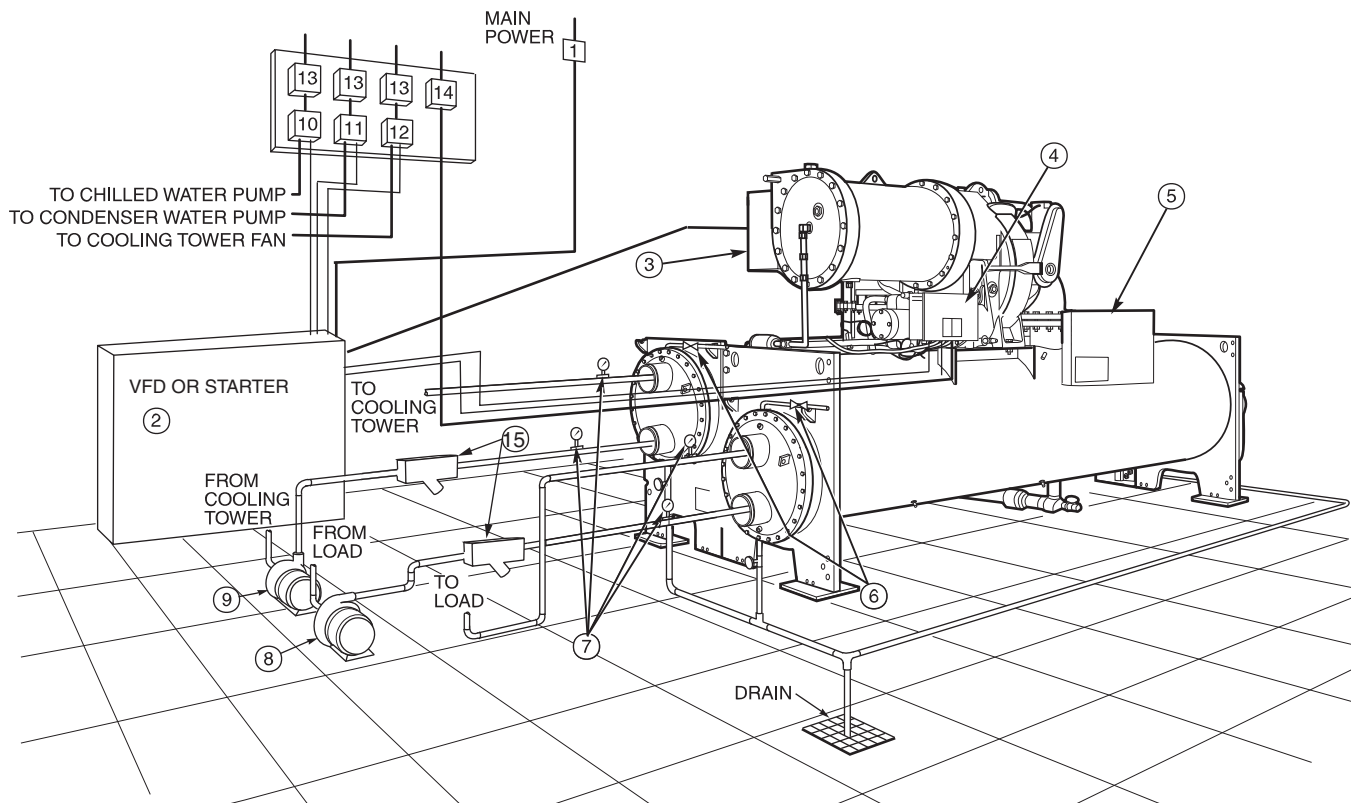
- Manual/automatic remote start
- Starting/stopping sequence:
 - Pre-lube/post-lube
 - Pre-flow/post-flow
- Compressor starter run interlock
- Pre-start check of safeties and alerts
- Low chilled water (load) recycle
- Monitor/number compressor starts and run hours
- Manual reset of safeties

Indications

- Chiller operating status message
- Power-on
- Pre-start diagnostic check
- Compressor motor amps
- Pre-alarm alert¹
- Alarm
- Contact for remote alarm
- Safety shutdown messages
- Elapsed time (hours of operation)
- Chiller input kW

1. By display code only.

19XR Chiller with Free-standing Starter or VFD



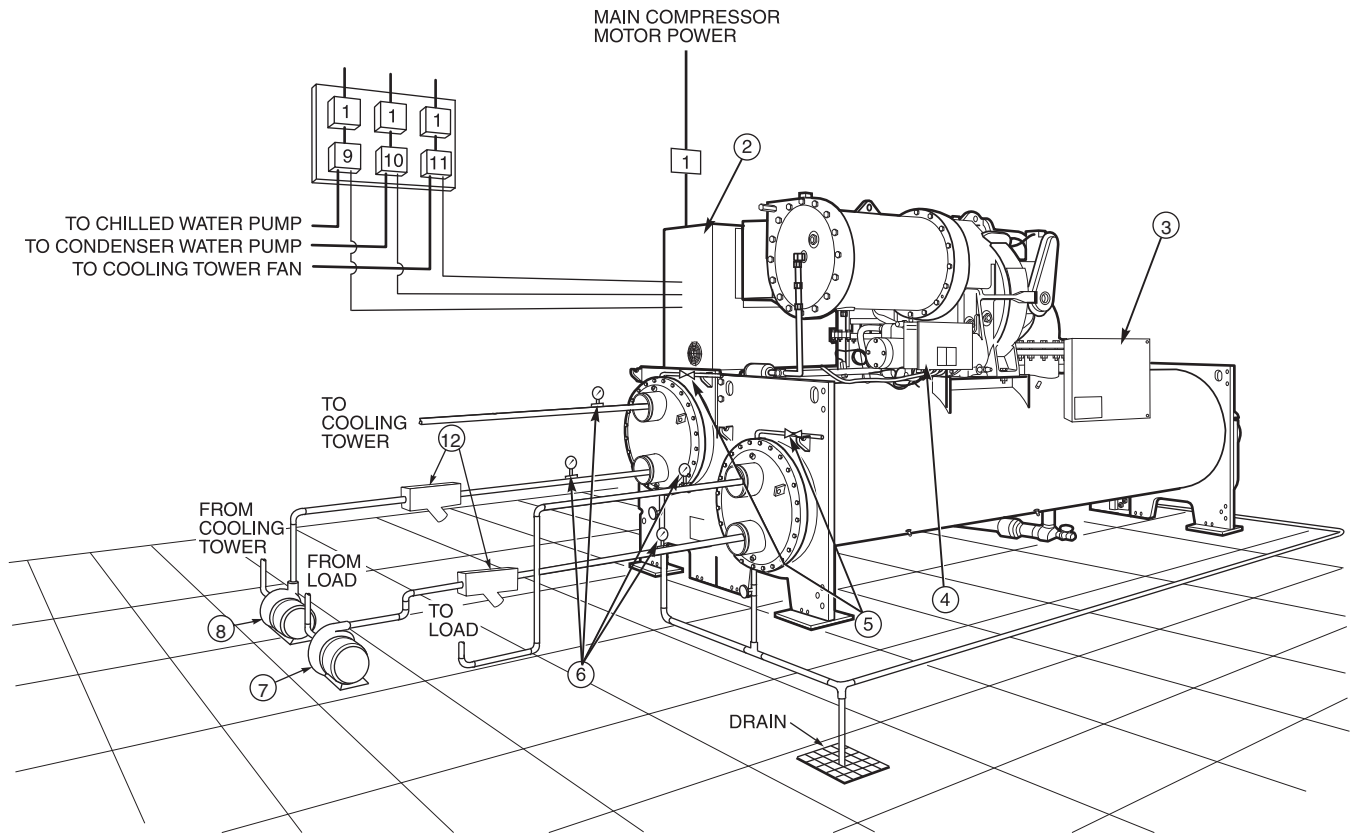
LEGEND

- 1 — Disconnect
 - 2 — Free-standing Compressor Motor Starter or VFD
 - 3 — Compressor Motor Terminal Box
 - 4 — Power Panel
 - 5 — Control Panel
 - 6 — Vents
 - 7 — Pressure Gauges
 - 8 — Chilled Water Pump
 - 9 — Condenser Water Pump
 - 10 — Chilled Water Pump Starter
 - 11 — Condensing Water Pump Starter
 - 12 — Cooling Tower Fan Starter (Low Fan, High Fan)
 - 13 — Disconnect
 - 14 — Oil Pump Disconnect (See Note 4)
 - 15 — Strainers
- Piping
 Control Wiring
 Power Wiring

NOTES:

1. Wiring and piping shown are for general point-of-connection only and are not intended to show details for a specific installation. Certified field wiring and dimensional diagrams are available on request.
2. All wiring must comply with applicable codes.
3. Wiring not shown for optional devices such as:
 - Remote Start/Stop
 - Remote Alarms
 - Optional Safety Device
 - 4 to 20 mA Resets
 - Optional Remote Sensors
4. Oil pump disconnect may be located within the enclosure of Item 2 — Free-standing Compressor Motor Starter or VFD.
5. **IMPORTANT:** Carrier suggests that a structural engineer be consulted if transmission of vibrations from mechanical equipment is of concern.
6. Isolation valves are recommended on the evaporator and condenser piping to each chiller for service.
7. Operating environment — Chiller should be installed in an indoor environment where the ambient temperature is 40 to 104°F (4 to 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.

19XR Chiller with Optional Unit-Mounted Starter or VFD



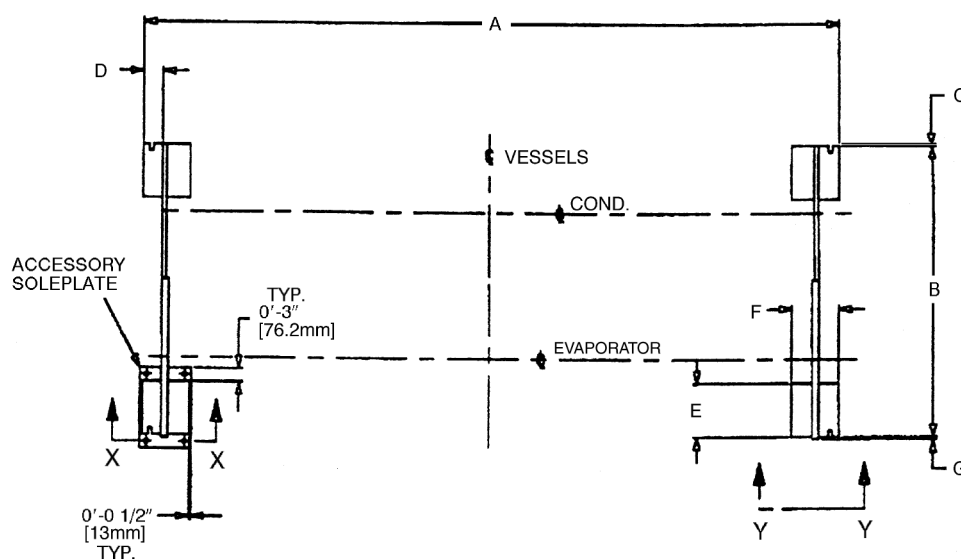
LEGEND

- 1 — Disconnect
 - 2 — Unit-Mounted Starter or VFD
 - 3 — Control Panel
 - 4 — Power Panel
 - 5 — Vents
 - 6 — Pressure Gauges
 - 7 — Chilled Water Pump
 - 8 — Condenser Water Pump
 - 9 — Chilled Water Pump Starter
 - 10 — Condensing Water Pump Starter
 - 11 — Cooling Tower Fan Starter (Low Fan, High Fan)
 - 12 — Strainers
-  Piping
 Control Wiring
 Power Wiring

NOTES:

1. Wiring and piping shown are for general point-of-connection only and are not intended to show details for a specific installation. Certified field wiring and dimensional diagrams are available on request.
2. All wiring must comply with applicable codes.
3. Wiring not shown for optional devices such as:
 - Remote Start/Stop
 - Remote Alarms
 - Optional Safety Device
 - 4 to 20 mA Resets
 - Optional Remote Sensors
4. IMPORTANT: Carrier suggests that a structural engineer be consulted if transmission of vibrations from mechanical equipment is of concern.
5. Isolation valves are recommended on the evaporator and condenser piping to each chiller for service.
6. Operating environment — Chiller should be installed in an indoor environment where the ambient temperature is 40 to 104°F (4 to 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not locate the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.

19XR,XRV Single-Stage and Two-stage Frames C and E Compressor Machine Footprint

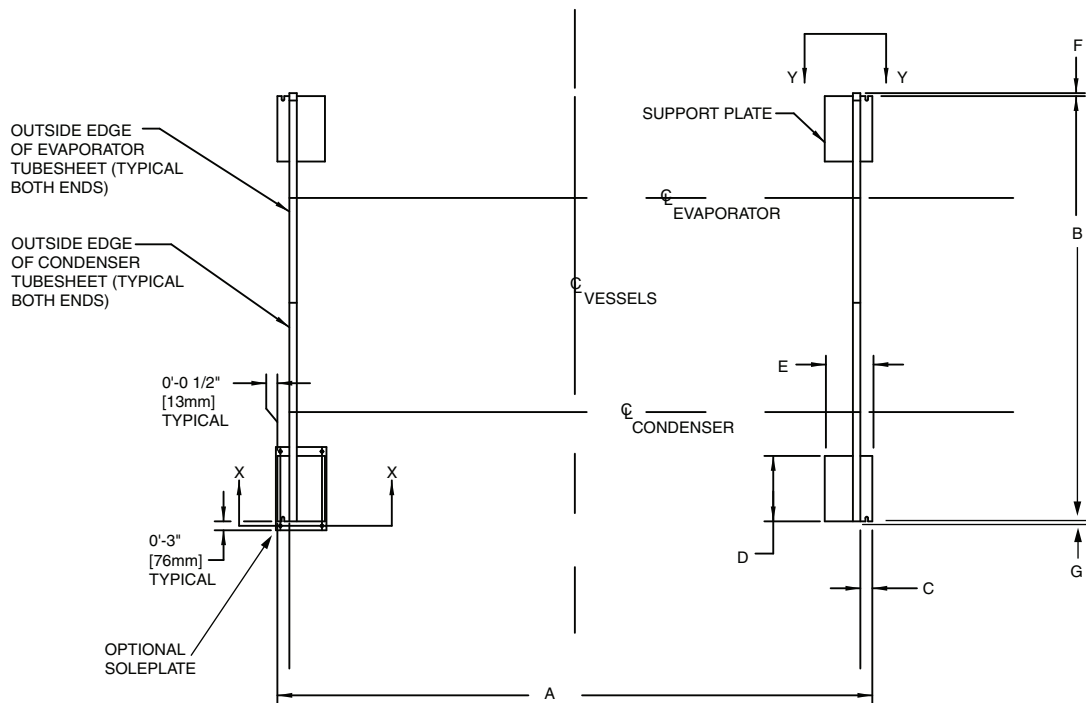


19XR,XRV HEAT EXCHANGER SIZE	DIMENSIONS													
	A		B		C		D		E		F		G	
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
30-32	12' 10-3/4"	3931	5' 4-1/4"	1632	0'	0	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
35-37	14' 7-1/4"	4451	5' 4-1/4"	1632	0'	0	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
40-42	12'10-3/4"	3931	6' 0"	1829	0' 1-1/2"	38	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
45-47	14' 7-1/4"	4451	6' 0"	1829	0' 1-1/2"	38	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
50-54, 5A-5C, 5K-5R	12' 10-3/4"	3931	6' 5-1/2"	1968	0' 1/2"	13	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
55-59, 5F-5H, 5T-5Z	14' 7-1/4"	4451	6' 5-1/2"	1968	0' 1/2"	13	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
60-64, 6K-6R	12' 10-3/4"	3931	6' 9-1/2"	2070	0' 1/2"	13	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
65-69, 6T-6Z	14' 7-1/4"	4451	6' 9-1/2"	2070	0' 1/2"	13	0' 3-5/8"	92	1' 3-1/4"	382	0' 9"	229	0' 1/2"	13
70-74, 7K-7R	15' 1-7/8"	4620	7' 10-1/2"	2400	0' 1/4"	6	0' 6-15/16"	176	1' 10"	559	1' 4"	406	0' 3/4"	19
75-79, 7T-7Z	17' 1-7/8"	5229	7' 10-1/2"	2400	0' 1/4"	6	0' 6-15/16"	176	1' 10"	559	1' 4"	406	0' 3/4"	19
80-84, 8K-8R	15' 1-7/8"	4620	8' 9-3/4"	2686	0' 15/16"	24	0' 6-15/16"	176	1' 10"	559	1' 4"	406	0' 1/16"	2
85-89, 8T-8Z	17' 1-7/8"	5229	8' 9-3/4"	2686	0' 15/16"	24	0' 6-15/16"	176	1' 10"	559	1' 4"	406	0' 1/16"	2

NOTES:

1. X-X dimension refers to accessory soleplate. See page 60.
2. Y-Y dimension refers to standard support plate. See page 60.

19XR Two-Stage Compressors Frame Sizes 6 and 7 Machine Footprint



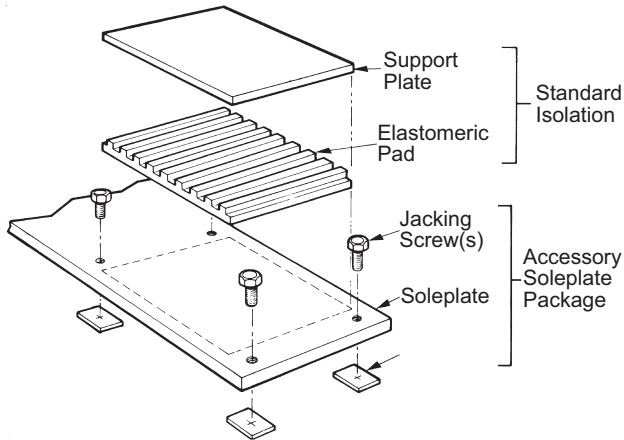
19XR HEAT EXCHANGER SIZE		DIMENSIONS											
EVAPORATOR	CONDENSER	A		B		C		D		E		G	
		ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
A4	A4	14' 8-7/8"	4492	10' 0-1/8"	3051	0' 4-7/16"	113	1' 10"	559	1' 4"	406	—	—
	B4	14' 8-7/8"	4492	10' 5-3/8"	3177	0' 4-7/16"	113	1' 10"	559	1' 4"	406	—	—
A6	A6	16' 8-7/8"	5102	10' 0-1/8"	3051	0' 4-7/16"	113	1' 10"	559	1' 4"	406	—	—
	B6	16' 8-7/8"	5102	10' 5-3/8"	3177	0' 4-7/16"	113	1' 10"	559	1' 4"	406	—	—
B6	C6	16' 8"	5080	11' 11"	3632	0' 4"	102	1' 10"	559	1' 4"	406	0' 1"	25
B8	C8	18' 8"	5690	11' 11"	3632	0' 4"	102	1' 10"	559	1' 4"	406	0' 1"	25
C6	C6	16' 8"	5080	12' 4-1/2"	3662	0' 4"	102	1' 10"	559	1' 4"	406	0' 1"	25
	D6	16' 8"	5080	13' 2"	4013	0' 4"	102	1' 10"	559	1' 4"	406	—	—
C8	D8	18' 8"	5690	13' 2"	4013	0' 4"	102	1' 10"	559	1' 4"	406	—	—

NOTES:

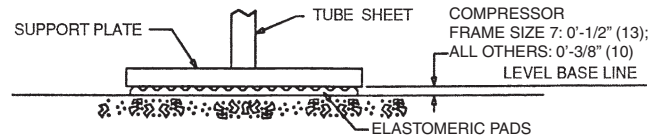
1. X-X dimension refers to accessory soleplate. See page 60.
2. Y-Y dimension refers to standard support plate. See page 60.

19XR,XRV Isolation with Accessory Soleplate Package

Typical Isolation

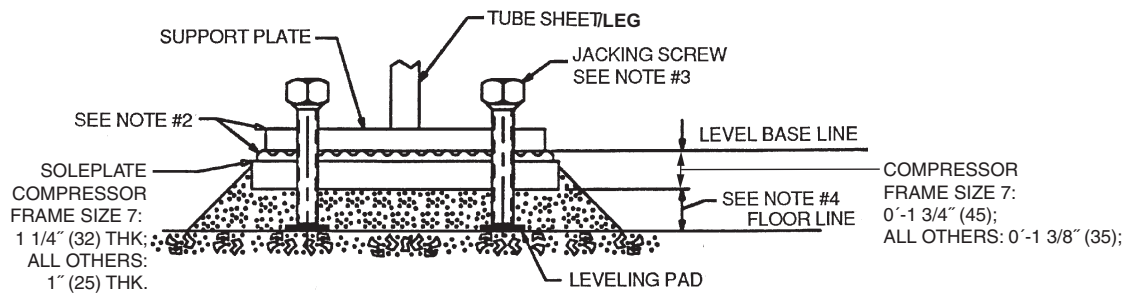


Standard Isolation



VIEW Y-Y
ISOLATION WITH STANDARD PACKAGE ONLY
NOTE: Isolation package includes 4 elastomeric pads.

Accessory Soleplate Detail

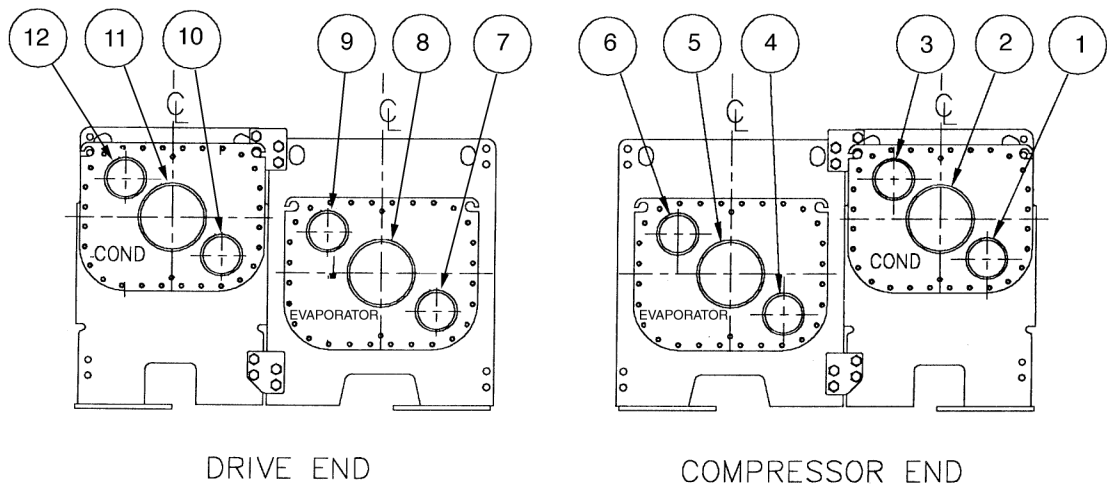


VIEW X-X

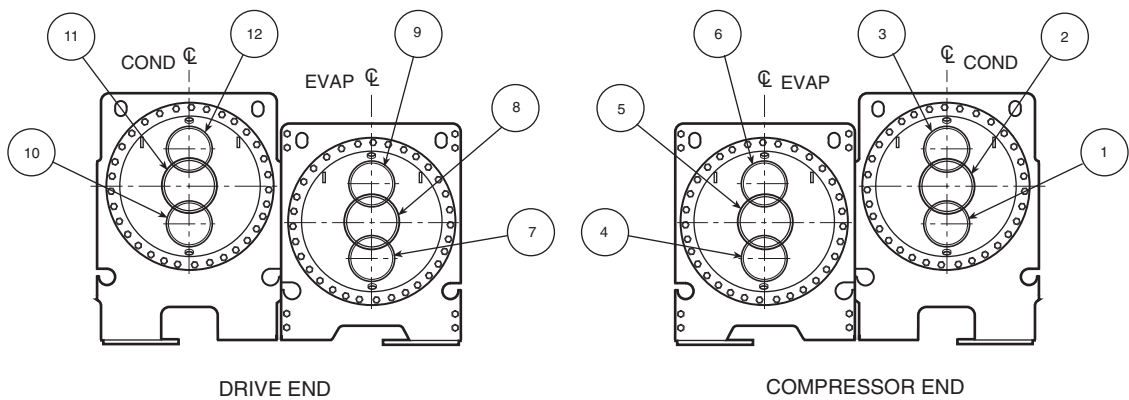
NOTES:

1. Dimensions in () are in millimeters.
2. Accessory (Carrier-supplied, field-installed) soleplate package includes 4 soleplates, 16 jacking screws and leveling pads. Isolation package is also required.
3. Jacking screws to be removed after grout has set.
4. Thickness of grout will vary, depending on the amount necessary to level chiller. Use only pre-mixed non-shrinking grout, Ceilcote 748 OR Embeco 636 Plus Grout, 1-1/2" (38.1) to 2-1/4" (57) thick.

19XR,XRV Nozzle Arrangements
Nozzle-in-Head Waterboxes

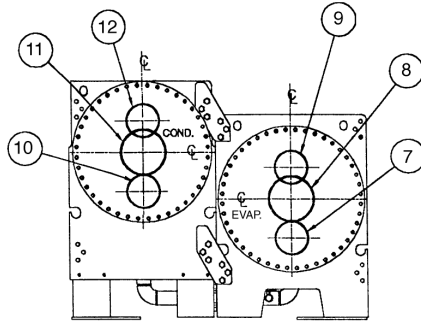


Frame 3

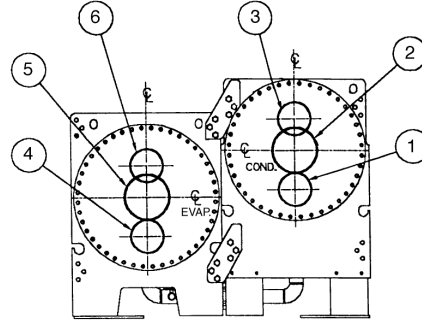


Frames 4, 5, and 6

19XR,XRV Nozzle Arrangements (cont) Nozzle-in-Head Waterboxes (cont)



DRIVE END



COMPRESSOR END

Frames 7 and 8 Nozzle Arrangement Codes for 19XR Nozzle-in-Head Waterboxes Frames 3-8

EVAPORATOR WATERBOXES			
Pass	In	Out	Arrangement Code ^a
1	8	5	A
	5	8	B
2	7	9	C
	4	6	D
3	7	6	E
	4	9	F

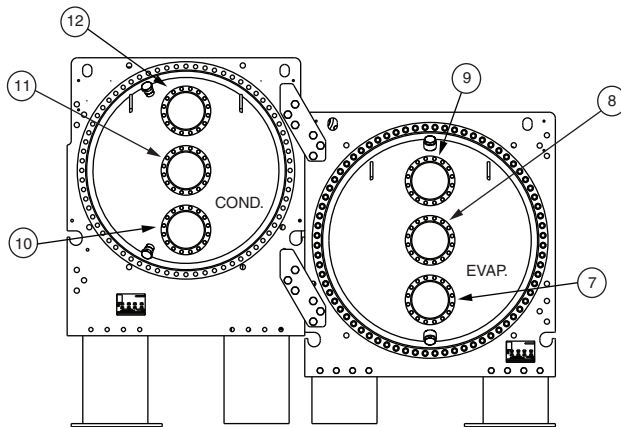
NOTE(S):

a. Refer to certified drawings.

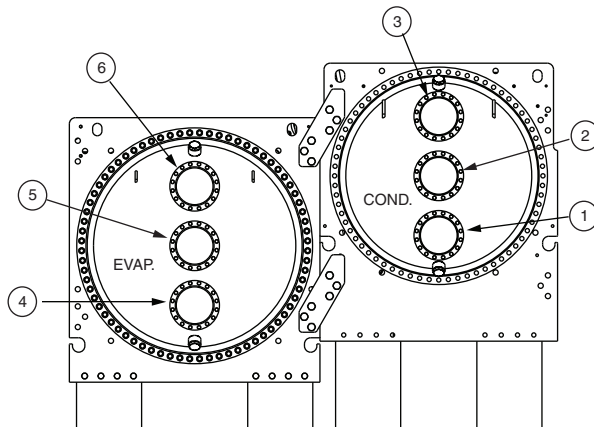
CONDENSER WATERBOXES			
Pass	In	Out	Arrangement Code ^a
1	11	2	P
	2	11	Q
2	10	12	R
	1	3	S
3	10	3	T
	1	12	U

NOTE(S):

a. Refer to certified drawings.



MOTOR END



COMPRESSOR END

19XR Two-Stage Compressors Frame Sizes 6 and 7 (Heat Exchanger Frames A, B, C, and D) Nozzle Arrangement Codes for 19XR Two-Stage Compressors Frame Sizes 6 and 7

EVAPORATOR WATERBOXES			
Pass	In	Out	Arrangement Code ^a
1 ^b	8	5	A
	5	8	B
2	7	9	C
	4	6	D
3 ^b	7	6	E
	4	9	F

NOTE(S):

a. Refer to certified drawings.

b. One and 3-pass arrangements are available via special order only.

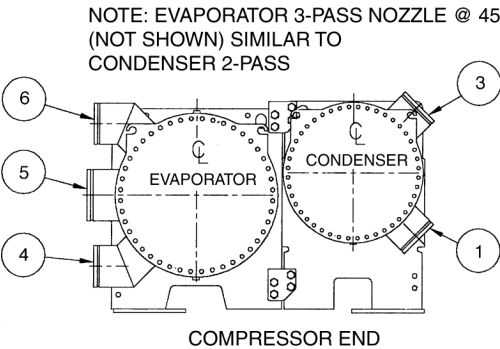
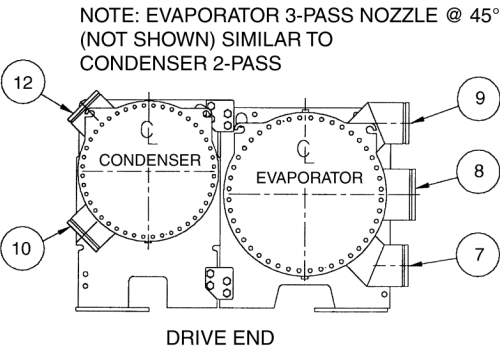
CONDENSER WATERBOXES			
Pass	In	Out	Arrangement Code ^a
1 ^b	11	2	P
	2	11	Q
2	10	12	R
	1	3	S
3 ^b	10	3	T
	1	12	U

NOTE(S):

a. Refer to certified drawings.

b. One and 3-pass arrangements are available via special order only.

19XR,XRV Nozzle Arrangements (cont)
Marine Waterboxes

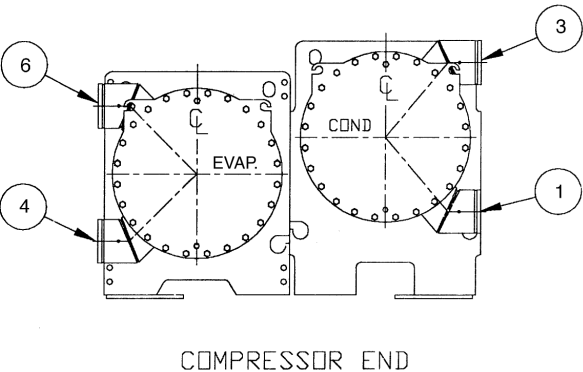
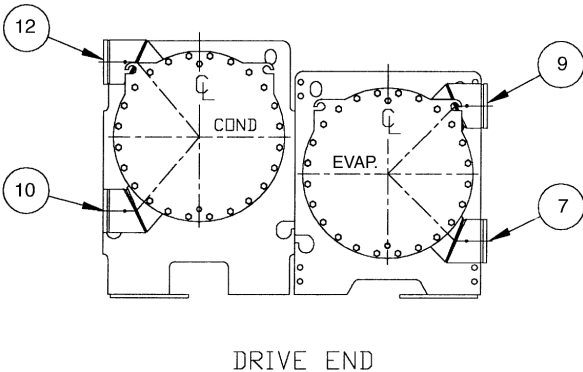


Frame 3

NOTE: There is no Frame 1 marine waterbox.

Nozzle Arrangement Codes

Pass	EVAPORATOR WATERBOXES			CONDENSER WATERBOXES		
	In	Out	Arrangement Code	In	Out	Arrangement Code
1	8	5	A	—	—	—
	5	8	B	—	—	—
2	7	9	C	10	12	R
	4	6	D	1	3	S
3	7	6	E	—	—	—
	4	9	F	—	—	—

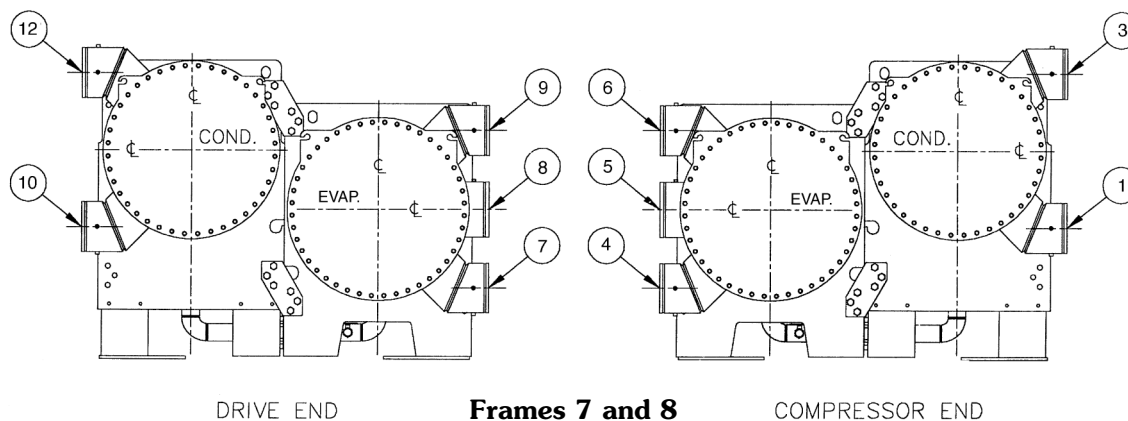


Frames 4, 5, and 6

Nozzle Arrangement Codes

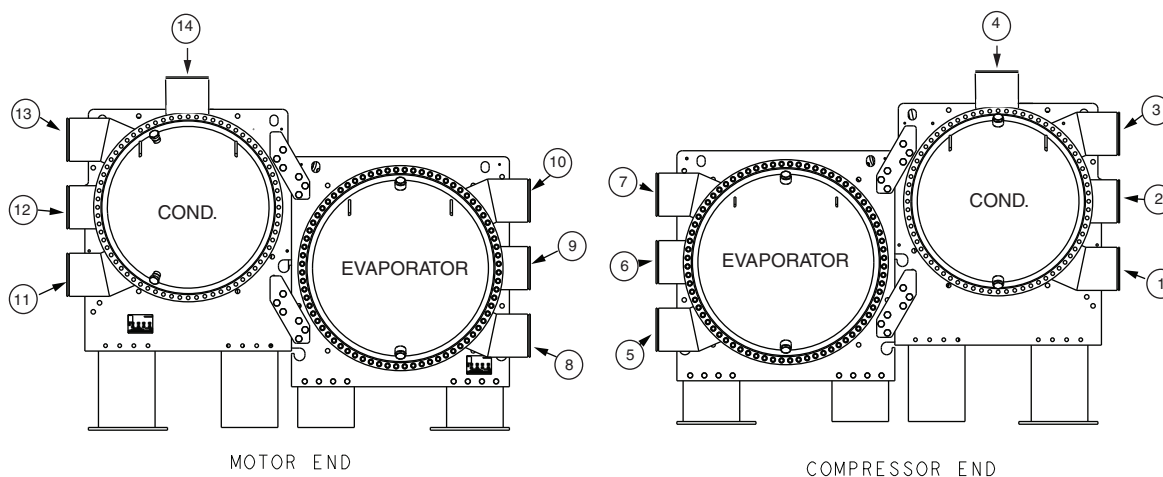
Pass	EVAPORATOR WATERBOXES			CONDENSER WATERBOXES		
	In	Out	Arrangement Code	In	Out	Arrangement Code
1	9	6	A	—	—	—
	6	9	B	—	—	—
2	7	9	C	10	12	R
	4	6	D	1	3	S
3	7	6	E	—	—	—
	4	9	F	—	—	—

19XR,XRV Nozzle Arrangements (cont) Marine Waterboxes (cont)



Nozzle Arrangement Codes

Pass	EVAPORATOR WATERBOXES			CONDENSER WATERBOXES		
	In	Out	Arrangement Code	In	Out	Arrangement Code
1	8	5	A	—	—	—
	5	8	B	—	—	—
2	7	9	C	10	12	R
	4	6	D	1	3	S
3	7	6	E	—	—	—
	4	9	F	—	—	—



Nozzle Arrangement Codes

EVAPORATOR MARINE WATERBOXES			
Pass	In	Out	Arrangement Code
1	9	6	A
	6	9	B
2	8	10	C
	5	7	D
3	8	7	E
	5	10	F

CONDENSER MARINE WATERBOXES			
Pass	In	Out	Arrangement Code
1	12	2	P
	2	12	Q
2	11	13	R
	1	3	S
	11	14	V
	1	4	W
3	11	3	T
	1	13	U

Relief Valve Locations^a

LOCATION	FRAME SIZE	RELIEF VALVE OUTLET SIZE
EVAPORATOR	3-8	1-1/4 in. NPT Female Connector
	Two-Stage 6—A	1-1/4 in. NPT Female Connector
	Two-Stage 7—B	1-1/4 in. NPT Female Connector
	Two-Stage 7—C	1-1/4 in. NPT Female Connector
CONDENSER	3-8	1-1/4 in. NPT Female Connector
	Two-Stage 6—A	1-1/4 in. NPT Female Connector
	Two-Stage 6—B	1-1/4 in. NPT Female Connector
	Two-Stage 7—C	1-1/4 in. NPT Female Connector
	Two-Stage 7—D	1-1/4 in. NPT Female Connector
OPTIONAL STORAGE TANK	N/A	1 in. NPT Female Connector

NOTE(S):

a. All valves relieve at 185 psig (1275 kPa).

Relief Valve Arrangement, Single-Stage Compressors and Two-Stage Compressor Frame Size C and E^a

HEAT EXCHANGER FRAME SIZE	COMPRESSOR FRAME SIZE	WITH/WITHOUT DISCHARGE ISOLATION VALVE	EVAPORATOR VIEW	CONDENSER VIEW	EVAPORATOR NO. VALVES	CONDENSER NO. VALVES
3	3	With Optional Isolation Valve	A	E	1	2
		Without Optional Isolation Valve	C	E	2	2
4	3	With Optional Isolation Valve	A	E	1	2
		Without Optional Isolation Valve	C	E	2	2
5	3	With Optional Isolation Valve	A	E	1	2
		Without Optional Isolation Valve	C	E	2	2
	C	With Optional Isolation Valve	A	E	1	2
		Without Optional Isolation Valve	C	E	2	2
6	C	With Optional Isolation Valve	A	E	1	2
		Without Optional Isolation Valve	C	E	2	2
7, 8	C, E	With Optional Isolation Valve	B	F	2	4
		Without Optional Isolation Valve	D	F	4	4

NOTE(S):

a. Refer to page 67.

Relief Valve Arrangement, Two-Stage Compressor Frame Size 6^{a,b}

EVAPORATOR HEAT EXCHANGER FRAME SIZE	CONDENSER HEAT EXCHANGER FRAME SIZE	WITH/WITHOUT DISCHARGE ISOLATION VALVE	VIEW CODE	EVAPORATOR NO. VALVES	CONDENSER NO. VALVES
A4	A4	With Optional Isolation Valve	G	2	4
		Without Optional Isolation Valve	H	4	4
	B4	With Optional Isolation Valve	G	2	4
		Without Optional Isolation Valve	H	4	4
A6	A6	With Optional Isolation Valve	G	2	4
		Without Optional Isolation Valve	H	4	4
	B6	With Optional Isolation Valve	G	2	4
		Without Optional Isolation Valve	H	4	4

NOTE(S):

a. See page 9 for evaporator and condenser size codes.

b. Refer to page 68.

Relief Valve Arrangement, Two-Stage Compressor Frame Size 7^{a,b}

EVAPORATOR HEAT EXCHANGER FRAME SIZE	CONDENSER HEAT EXCHANGER FRAME SIZE	WITH/WITHOUT DISCHARGE ISOLATION VALVE	VIEW CODE	EVAPORATOR NO. VALVES	CONDENSER NO. VALVES
B6	C6	With Optional Isolation Valve	I	2	6
		Without Optional Isolation Valve	J	4	6
B8	C8	With Optional Isolation Valve	I	2	6
		Without Optional Isolation Valve	J	4	6
C6	C6	With Optional Isolation Valve	I	2	6
		Without Optional Isolation Valve	J	4	6
	D6	With Optional Isolation Valve	I	2	6
		Without Optional Isolation Valve	J	4	6
C8	D8	With Optional Isolation Valve	I	3	6
		Without Optional Isolation Valve	J	6	6

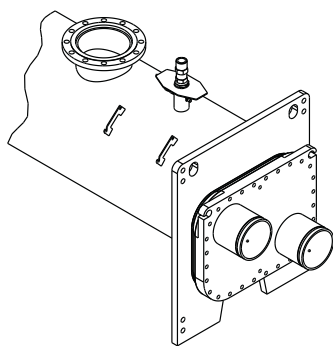
NOTE(S):

a. See page 9 for evaporator and condenser size codes.

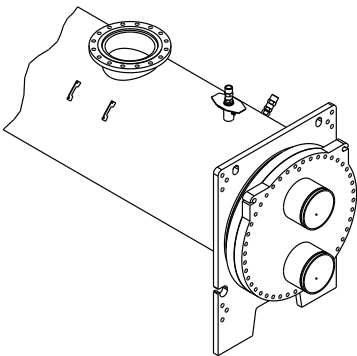
b. Refer to page 68.

Relief Valve Arrangements

With Optional Isolation of Discharge and Evaporator

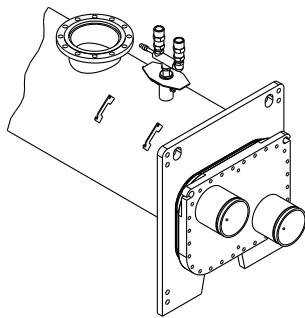


A
Frame 3-6

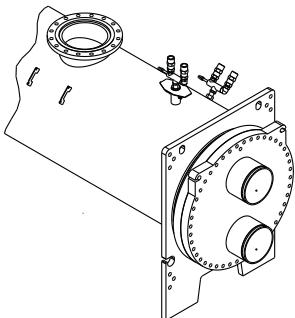


B
Frame 7, 8

Without Optional Isolation of Discharge and Evaporator



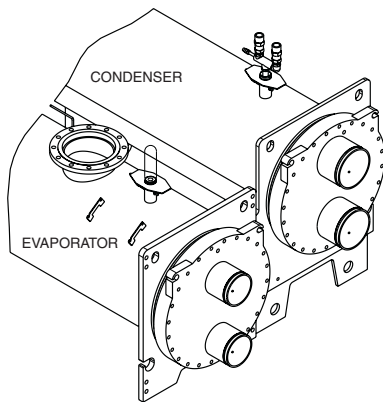
C
Frame 3-6



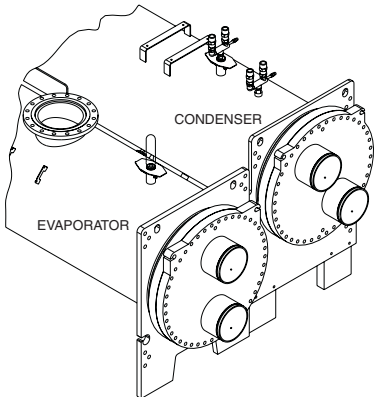
D
Frame 7, 8

NOTE: On compressor frame C, the heat exchanger frame 7, 8 relief tree is used on frames 5 and 6.

Condenser Relief Valve Arrangement — With or without Optional Isolation



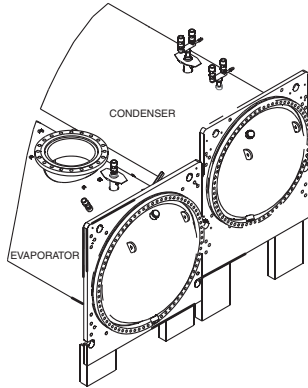
E
Frame 3-6



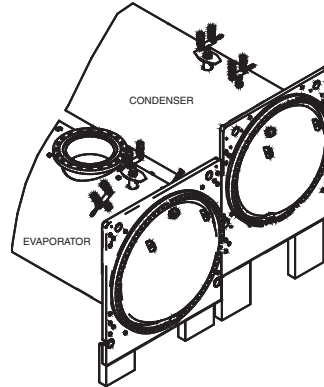
F
Frame 7, 8

Relief Valve Arrangements (cont)

Relief Valve Arrangement, Two-Stage Compressor Frame Size 6 With or without Optional Isolation

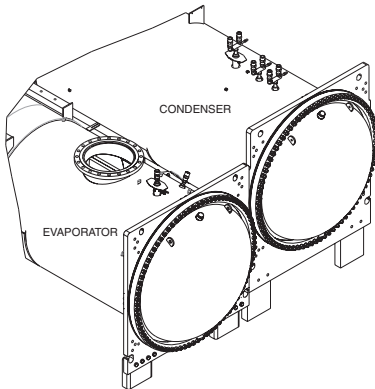


G — With Isolation Valve

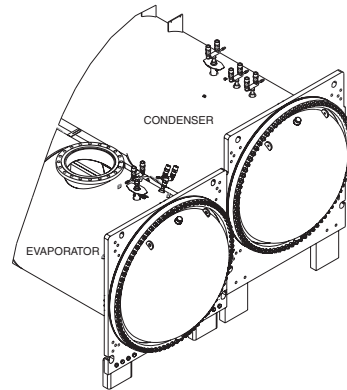


H — Without Isolation Valve

Relief Valve Arrangement, Two-Stage Compressor Frame Size 7 With or without Optional Isolation



I — With Isolation Valve



J — Without Isolation Valve

Vent and drain connections

Nozzle-in-head waterboxes have vent and drain connections on covers. Marine waterboxes have vent and drain connections on waterbox shells.

Provide high points of the chiller piping system with vents and the low points with drains. If shutoff valves are provided in the main water pipes near the unit, a minimal amount of system water is lost when the heat exchangers are drained. This reduces the time required for drainage and saves on the cost of re-treating the system water.

It is recommended that pressure gauges be provided at points of entering and leaving water to measure pressure drop through the heat exchanger. Gauges may be installed as shown in Pressure Gauge Location table. Pressure gauges installed at the vent and drain connections do not include nozzle pressure losses.

Use a reliable differential pressure gauge to measure pressure differential when determining water flow. Regular gauges of the required pressure range do not have the accuracy to provide accurate measurement of flow conditions.

Pressure Gauge Location

NUMBER OF PASSES	GAUGE LOCATION (Evaporator or Condenser)
1 or 3	One gauge in each waterbox
2	Two gauges in waterbox with nozzles

ASME stamping

All 19XR,XRV heat exchangers are constructed in accordance with ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) 15 Safety Code for Mechanical Refrigeration (latest edition). This code, in turn, requires conformance with ASME (American Society of Mechanical Engineers) Code for Unfired Pressure Vessels wherever applicable.

Each vessel is constructed and certified in accordance with ASME Section 8, Division 1.

Relief valve discharge pipe sizing

See pages 65 and 66 for number of relief valves and locations.

Relief-valve discharge piping size should be calculated per ASHRAE 15, latest edition, using the tabulated C factors for each vessel shown in the tables on pages 70 and 71.

Carrier further recommends that an oxygen sensor be installed to protect personnel. Sensor should be able to sense the depletion or displacement of oxygen in the machine room below 19.5% volume oxygen per ASHRAE 15, latest edition.

19XR,XRV Relief Valve Discharge Pipe Sizing, Single-Stage Compressors and Two-Stage Compressors Frame Size C and E

HEAT EXCHANGER	FRAME SIZE	VESSEL REQUIRED C FACTOR (lb air/Min)	RELIEF VALVE RATED C FACTOR (lb air/Min)	FIELD CONNECTION SIZE (FPT) (in.)
EVAPORATOR	30 to 32	43.8	72.1	1-1/4
	35 to 37	49.9	72.1	1-1/4
	40 to 42	50.4	72.1	1-1/4
	45 to 47	57.4	72.1	1-1/4
	50 to 54, 5A-5C, 5K-5R	53.7	72.1	1-1/4
	55 to 59, 5F-5H, 5T-5Z	61.1	72.1	1-1/4
	60 to 64, 6K to 6R	57.0	72.1	1-1/4
	65 to 69, 6T to 6Z	64.9	72.1	1-1/4
	70 to 74, 7K to 7R	77.0	144.2	1-1/4
	75 to 79, 7T to 7Z	88.0	144.2	1-1/4
	80 to 84, 8K to 8R	87.7	144.2	1-1/4
	85 to 89, 8T to 8Z	100.3	144.2	1-1/4
CONDENSER	30 to 32	41.8	72.1	1-1/4
	35 to 37	47.6	72.1	1-1/4
	40 to 42	47.1	72.1	1-1/4
	45 to 47	53.7	72.1	1-1/4
	50 to 54 Compressor Frame C	70.2	72.1	1-1/4
	55 to 59 Compressor Frame C	77.3	144.2	1-1/4
	60 to 64 Compressor Frame C	70.3	72.1	1-1/4
	65 to 69 Compressor Frame C	78.0	144.2	1-1/4
	70 to 74 Compressor Frame C	87.3	144.2	1-1/4
	75 to 79 Compressor Frame C	97.7	144.2	1-1/4
	70 to 74 Compressor Frame E	88.3	144.2	1-1/4
	75 to 79 Compressor Frame E	98.7	144.2	1-1/4
	80 to 84 Compressor Frame E	96.7	144.2	1-1/4
	85 to 89 Compressor Frame E	108.3	144.2	1-1/4

19XR Relief Valve Discharge Pipe Sizing, Two-Stage Compressors Frame Size 6 and 7

HEAT EXCHANGER	FRAME SIZE	VESSEL REQUIRED C FACTOR (lb air/Min)	COMBINED RELIEF VALVES RATED C FACTOR (lb air/Min)	FIELD CONNECTION SIZE (FPT) (in.)
EVAPORATOR	A40 to A47	95.2	144.2	1-1/4
	A60 to A67	108.8	144.2	1-1/4
	A4A to A4H	95.2	144.2	1-1/4
	A6A to A6H	108.8	144.2	1-1/4
	B60 to B67	123.7	144.2	1-1/4
	B6A to B6H	123.7	144.2	1-1/4
	B80 to B87	139.2	144.2	1-1/4
	B8A to B8H	139.2	144.2	1-1/4
	C60 to C67	138.7	144.2	1-1/4
	C6A to C6H	138.7	144.2	1-1/4
	C80 to C87	156.0	216.3	1-1/4
	C8A to C8H	156.0	216.3	1-1/4
CONDENSER AND ECONOMIZER	A40 to A47	110.1 ^a	144.2	1-1/4
	A60 to A67	122.7 ^a	144.2	1-1/4
	A4A to A4H	110.1 ^a	144.2	1-1/4
	A6A to A6H	122.7 ^a	144.2	1-1/4
	B40 to B47	120.9 ^a	144.2	1-1/4
	B60 to B67	134.9 ^a	144.2	1-1/4
	B4A to B4H	120.9 ^a	144.2	1-1/4
	B6A to B6H	134.9 ^a	144.2	1-1/4
	C60 to C67	164.7 ^a	216.3	1-1/4
	C6A to C6H	164.7 ^a	216.3	1-1/4
	C80 to C87	186.2 ^a	216.3	1-1/4
	C8A to C8H	186.2 ^a	216.2	1-1/4
	D60 to D67	164.7 ^a	216.3	1-1/4
	D6A to D6H	164.7 ^a	216.3	1-1/4
	D80 to D87	206.0	216.3	1-1/4
	D8A to D8H	206.0	216.3	1-1/4

NOTE(S):

a. The condenser discharge required C factor is the combined values of the condenser, high-side float, and economizer.

Design pressures

Design and test pressures for heat exchangers are listed below.

Design and Minimum Test Pressures

VESSEL	PRESSURES	SHELL SIDE (REFRIGERANT)		STANDARD TUBE SIDE (WATER)		OPTIONAL TUBE SIDE (WATER)	
		psig	kPa	psig	kPa	psig	kPa
Evaporator	Design	185	1276	150	1034	300	2068
	Leak Test (min)	185	1276	150	1034	300	2068
	Hydrostatic Test	—	—	195	1344	390	2690
	Proof Test (min Pneumatic)	204	1407	—	—	—	—
Condenser	Design	185	1276	150	1034	300	2068
	Leak Test (min)	185	1276	150	1034	300	2068
	Hydrostatic Test	—	—	195	1344	390	2690
	Proof Test (min Pneumatic)	204	1407	—	—	—	—
Economizer, Frame Size C and E	Design	185	1276	—	—	—	—
	Leak Test (min)	185	1276	—	—	—	—
	Hydrostatic Test	—	—	—	—	—	—
	Proof Test (min Pneumatic)	204	1407	—	—	—	—
Economizer, Frame Sizes 6 and 7	Design	185	1276	—	—	—	—
	Leak Test (min)	185	1276	—	—	—	—
	Hydrostatic Test	—	—	—	—	—	—
	Proof Test (min Pneumatic)	204	1407	—	—	—	—

Heat Exchanger Material Specifications

ITEM	MATERIAL	SPECIFICATION
Shell	HR Steel	ASME SA516 GR.70
Tube Sheet	HR Steel	ASME SA516 GR.70
Flat Covers	HR Steel	ASME/ASTM A516 GR.70
Pipe	Steel	ASME SA106 GRB/SA53 E/B
Flanges	Steel	ASME B16.5
Condenser Float Box Shell	Steel	ASME SA53 E/B
Tubes	Per Job Requirement	ASME SB359
Dished Cover	HR Steel	ASTM A516 GR.70/GB713 Q345R
Marine Water Box Shell	HR Steel	ASME/ASTM A516 GR.70

Economizer Material Specifications

ITEM	MATERIAL	SPECIFICATION
Shell	Steel	ASME SA53 E/B
Cover	HR Steel	ASME SA516 GR.70
Pipe	Steel	ASME SA106 GR.70

LEGEND

ASME — American Society of Mechanical Engineers
ASTM — American Society for Testing and Materials
HR — Hot Rolled

Insulation

Factory insulation (optional)¹

The factory insulation option for the 19XR,XRV chillers include the following areas: evaporator (not including water-box); suction line up to the compressor suction housing; compressor motor and motor cooling return lines; several small oil cooling and oil return system lines; the liquid line; the float chamber; and VFD refrigerant drain lines (19XRV units only). For two-stage chillers, factory insulation also includes economizer and economizer piping. Insulation applied at the factory is 3/4 in. (19 mm) thick and has a thermal conductivity K value of 0.28 (Btu in.)/hr ft² °F [(0.0404 • W)/(m • °C)]. Insulation conforms with Underwriters Laboratories (UL) Standard 94, Classification 5VA.

Insulation at job site

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

If the machine is to be field insulated, obtain the approximate areas from the Minimum Field-Installed Insulation Requirements table.

Insulation of waterbox is made only in the field and this area is not included in Minimum Field-Installed Insulation Requirements table. When insulating the covers, allow for service access and removal of covers. To estimate water-box cover areas refer to certified drawings.

High humidity job site locations may require field supplied and installed insulation on the float chamber, suction housing, and the lower half of the condenser.

1. On compressor frame sizes 6 and 7 the condenser is insulated as standard.

Minimum Field-installed Insulation Requirements^{a,b}

CHILLER	HEAT EXCHANGER SIZE	INSULATION ^c	
		ft ²	m ²
19XR,XRV FRAME SIZE 3, C AND E	30-32	125	11.7
	35-37	135	12.6
	40-42	155	14.4
	45-47	170	15.8
	50-54, 5A-5C, 5K-5R	170	15.8
	55-59, 5F-5H, 5T-5Z	185	17.2
	60-64, 6K-6R	185	17.2
	65-69, 6T-6Z	205	19.1
	70-74, 7K-7R	260	24.2
	75-79, 7T-7Z	295	27.4
	80-84, 8K-8R	310	28.8
	85-89, 8T-8Z	355	32.9
CHILLER	EVAPORATOR FRAME SIZE	INSULATION ^c	
		ft ²	m ²
19XR TWO-STAGE FRAME SIZE 6	A40-A47 and A4A-A4H	434	40.3
	A60-A67 and A6A-A6H	462	42.9
19XR TWO-STAGE FRAME SIZE 7	B60-B67 and B6A-B6H	666	61.9
	B80-B87 and B8A to B8H	699	64.9
	C60-C67 and C6A-C6H	694	64.9
	C80-C87 and C8A-C8H	732	68.0

NOTE(S):

- Insulation amount includes only the amount of insulation required to insulate sections of the chiller that would be included in the factory-installed insulation option.
- Add 50 sq ft additional insulation for economizer on two-stage chiller.
- Factory installed as shown on page 75.

Condensation vs. Relative Humidity^a

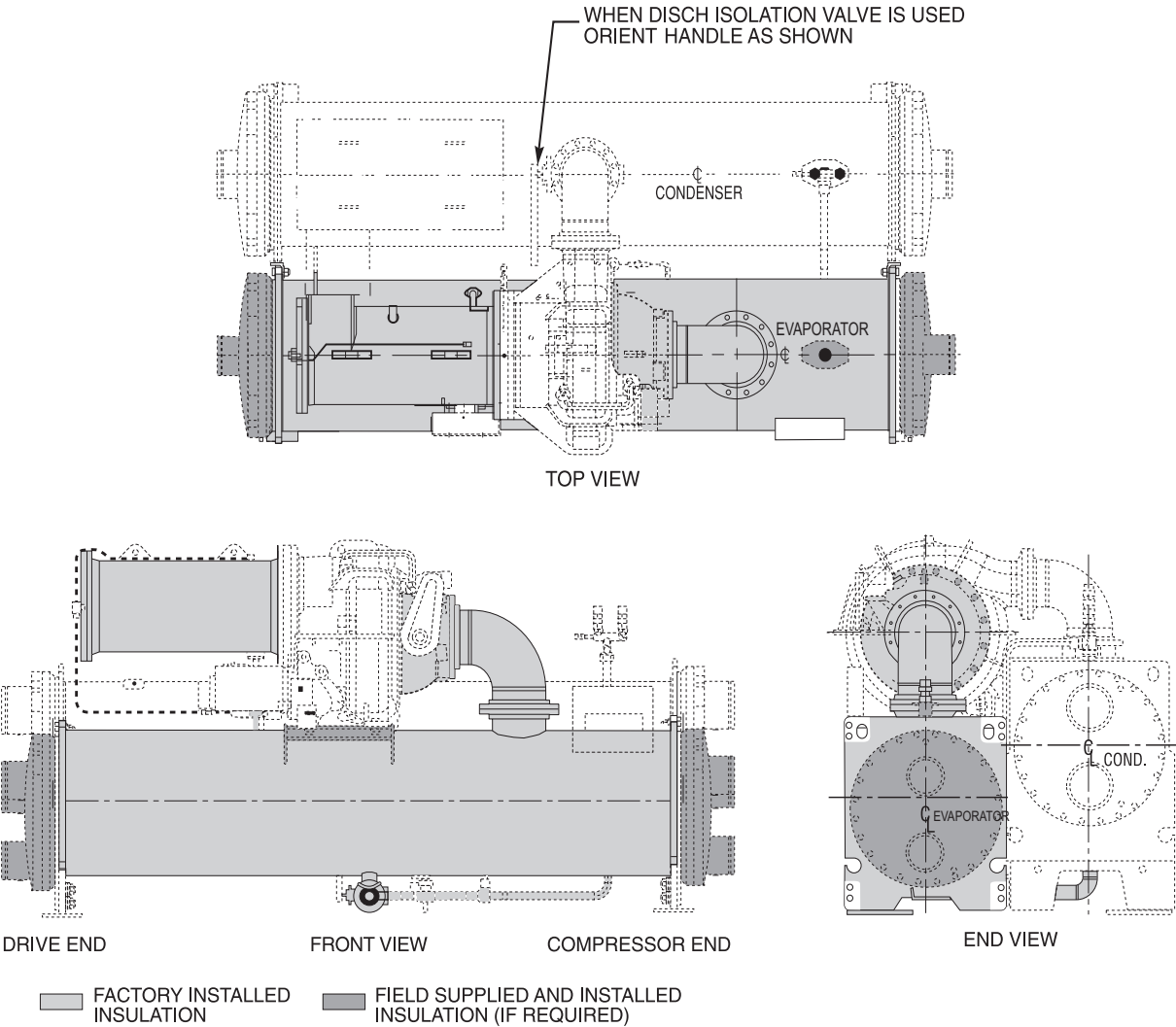
AMOUNT OF CONDENSATION	ROOM DRY-BULB TEMPERATURE				
	80°F (26.7°C)	85°F (29.4°C)	90°F (32.2°C)	95° (35°C)	100°F 37.8°C
	% Relative Humidity				
None	77	75	75	72	72
Slight	83	81	79	78	77
Extensive	88	85	83	82	81

NOTE(S):
a. These approximate values are based on a fixed 40°F (4.4°C) refrigerant temperature. Slight and Extensive amounts of condensation are defined as wet bulb temperature being more than 1°F and 2°F degree greater than insulation surface temperature.

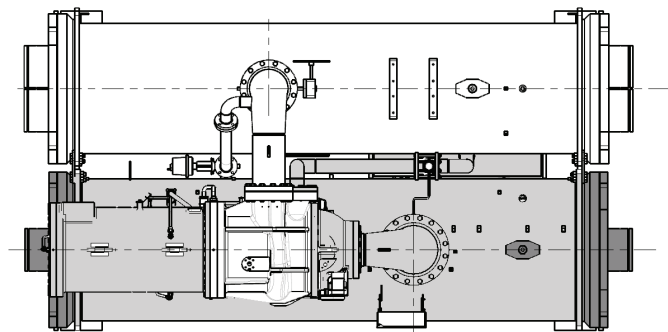
Unit location

Chiller should be installed in an indoor environment where the ambient temperature is 40 to 104°F (4 to 40°C) with a relative humidity (non-condensing) of 95% or less. To ensure that electrical components operate properly, do not install the chiller in an area exposed to dust, dirt, corrosive fumes, or excessive heat and humidity.

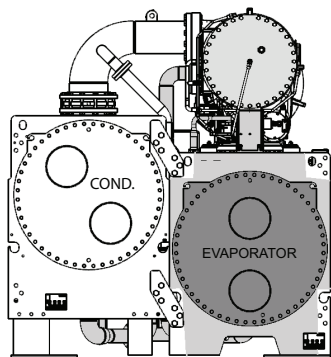
19XR,XRV Factory-Installed Insulation Area Single-Stage Chiller



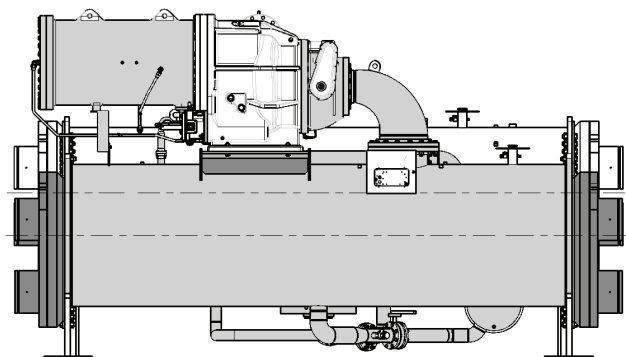
19XR,XRV Factory-Installed Insulation Area (cont)
Two-Stage Chiller Frame C and E



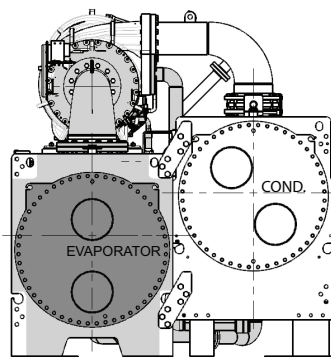
TOP VIEW



DRIVE END VIEW



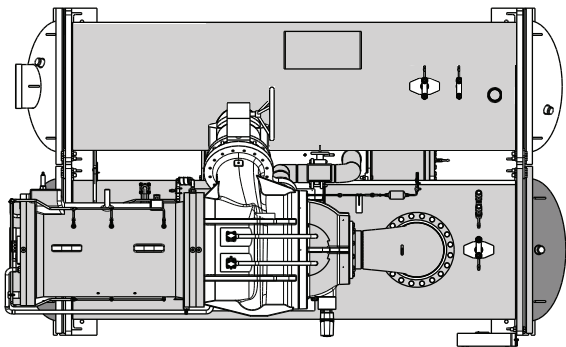
FRONT VIEW



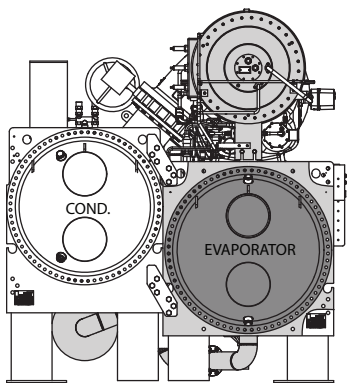
COMPRESSOR END VIEW

- FACTORY INSTALLED INSULATION
- FIELD SUPPLIED AND INSTALLED INSULATION (IF REQUIRED)

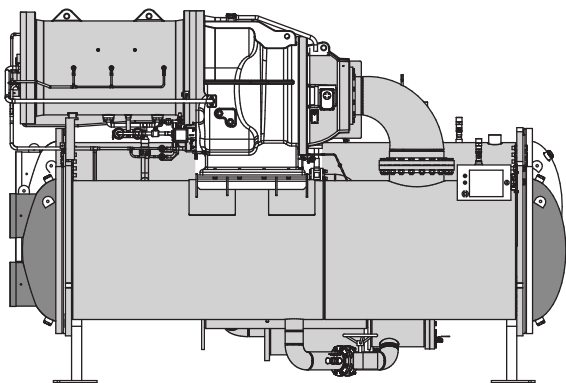
19XR Factory-Installed Insulation Area
Two-Stage Chiller Frame Sizes 6 and 7



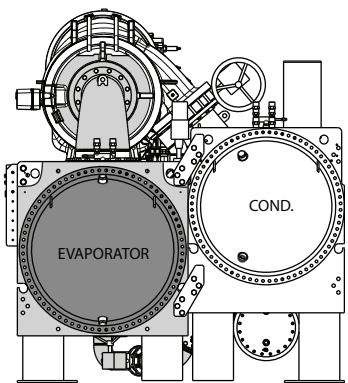
TOP VIEW



DRIVE END VIEW



FRONT VIEW



COMPRESSOR END VIEW

- FACTORY INSTALLED INSULATION
- FIELD SUPPLIED AND INSTALLED INSULATION (IF REQUIRED)

NOTE: Compressor frame size 6 is shown.

Packaged Semi-Hermetic Centrifugal Liquid Chiller

HVAC Guide Specifications — 19XR, XRV

Size Range:

**19XR,XRV — 300 to 3400 Tons
(1,055 to 11,957 kW) Nominal**

Carrier Model Number:

19XR,XRV

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Microprocessor-controlled liquid chiller shall use a semi-hermetic centrifugal compressor using refrigerant R-513A or R-515B.
- B. If a manufacturer proposes a liquid chiller using R-514A refrigerant, then the manufacturer shall include in the chiller price:
 - 1. A vapor activated alarm system shall be capable of responding to R-514A levels of 10 ppm Allowable Exposure Limit (AEL).
 - 2. External refrigerant storage tank and pumpout unit.
 - 3. Zero emission purge unit capable of operating even when the chiller is not operating.
 - 4. Back-up relief valve to rupture disk.
 - 5. Chiller pressurizing system to prevent leakage of noncondensables into chiller during shut-down periods.
 - 6. Plant room ventilation.

1.02 QUALITY ASSURANCE

- A. Chiller performance shall be rated in accordance with AHRI (Air-Conditioning, Heating and Refrigeration Institute) Standard 550/590, latest edition.
- B. Equipment and installation shall be in compliance with ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers) 15 (latest edition).
- C. Evaporator and condenser refrigerant side shall include ASME “U” stamp and nameplate certifying compliance with ASME Section VIII, Division 1 code for unfired pressure vessels.
- D. Chiller shall be designed and constructed to meet UL (Underwriters Laboratories) and UL, Canada requirements and have labels appropriately affixed.
- E. Centrifugal compressor impellers shall be dynamically balanced and over-speed tested by the manufacturer at a minimum of 120% design operating speed. Each compressor assembly shall undergo a mechanical run-in test to verify vibration levels, oil pressures, and temperatures are within acceptable limits.

- F. Each compressor assembly shall be proof tested at a minimum 204 psig (1406 kPa) and leak tested at 185 psig (1276 kPa) with a tracer gas mixture.
- G. Entire chiller assembly shall be proof tested at 204 psig (1406 kPa) and leak tested at 185 psig (1276 kPa) with a tracer gas mixture on the refrigerant side. The water side of each heat exchanger shall be hydrostatically tested at 1.3 times rated working pressure.
- H. Prior to shipment, the chiller automated controls test shall be executed to check for proper wiring and ensure correct controls operation.
- I. On chillers with unit-mounted compressor motor starter or VFD (variable frequency drive), the chiller and starter/VFD shall be factory wired and tested together to verify proper operation prior to shipment.
- J. The management system governing the manufacture of this chiller shall be ISO 9001:2015 certified.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled in accordance with manufacturer's instructions.
- B. Unit shall be shipped with all refrigerant piping and control wiring factory installed.
- C. Unit shall be shipped charged with oil and full charge of refrigerant R-513A or R-515B or a nitrogen holding charge as specified on the equipment schedule.
- D. Unit shall be shipped with firmly attached labels that indicate name of manufacturer, chiller model number, chiller serial number, and refrigerant used.
- E. If the chiller is to be exported, the unit shall be sufficiently protected from the factory against sea water corrosion to be suitable for shipment in a standard open top, ocean shipping container (19XR,XRV heat exchanger frames 1 through 6 only).

1.04 WARRANTY

Warranty shall include parts and labor for one year after start-up or 18 months from shipment, whichever occurs first.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory assembled, single piece, liquid chiller shall consist of compressor, motor, starter or variable frequency drive, lubrication system, evaporator, condenser, initial oil and refrigerant operating charges, microprocessor control system, and documentation required prior to start-up. An optional compressor motor starter or VFD can be mounted on the chiller, wired, and tested by the chiller manufacturer (select models). Or, an optional free-standing medium voltage starter or VFD can be wired and tested by the chiller manufacturer.

B. Compressor:

1. One high performance centrifugal compressor.
2. Compressor, motor, and transmission shall be semi-hermetically sealed into a common assembly and arranged for easy field servicing.
3. Internal compressor parts must be accessible for servicing without removing the compressor base from the chiller. Connections to the compressor casing shall use O-rings instead of gaskets to reduce the occurrence of refrigerant leakage. Connections to the compressor shall be flanged or bolted for easy disassembly.
4. All pressure transducers shall have quick disconnects to allow replacement of the sensor without replacement of the entire sensor wire. Pressure transducers shall be capable of field calibration to ensure accurate readings and to avoid unnecessary transducer replacement. Pressure transducers and temperature sensors shall be serviceable without the need for refrigerant charge removal or isolation.
5. Transmission shall be helical, parallel shaft speed increaser. Gears shall conform to AGMA 2001-B88, Class 11.
6. Journal bearings shall be of the steel backed babbitt lined type. Aluminum journal bearings are not acceptable. The thrust bearing shall be tilting pad or rolling element type.
7. Centrifugal compressors shall use variable inlet guide vanes to provide capacity modulation while also providing pre-whirl of the refrigerant vapor entering the impeller for more efficient compression at all loads.
8. Centrifugal compressors shall be provided with a factory-installed lubrication system to deliver oil under pressure to bearings and transmission. Included in the system shall be:
 - a. Hermetic driven oil pump with factory-installed motor contactor with overload protection.
 - b. Refrigerant-cooled oil cooler. Water-cooled oil coolers are not acceptable.
 - c. Oil pressure regulator.
 - d. Oil filter with isolation valves to allow filter change without removal of refrigerant charge.
 - e. Oil sump heater controlled from unit microprocessor.
 - f. Oil reservoir temperature sensor with main control center digital readout.
 - g. When factory-mounted compressor motor starter or VFD is provided, all wiring to oil pump, oil heater, and controls shall be pre-wired in the factory.
 - h. Compressor shall be fully field serviceable. Compressors which must be removed and returned to the factory for service shall be unacceptable.

C. Motor:

1. Compressor motor shall be of the semi-hermetic, liquid refrigerant cooled, squirrel cage, induction type suitable for voltage shown on equipment schedule.
2. If an open drive motor is provided, a compressor shaft seal leakage containment system shall be provided.
 - a. An oil reservoir shall collect oil and refrigerant that leaks past the seal.
 - b. A float device shall be provided to open when the reservoir is full, directing the refrigerant/oil mixture back into the compressor housing.
 - c. A refrigerant sensor shall be located next to the open drive seal to detect leaks.
3. Motors shall be suitable for operation in a refrigerant atmosphere and shall be cooled by atomized refrigerant in contact with the motor windings.
4. Motor stator shall be arranged for service or removal with only minor compressor disassembly and without removing main refrigerant piping connections.
5. Full load operation of the motor shall not exceed nameplate rating.
6. At least one motor winding temperature sensor (and one spare) shall be provided.
7. Should the mechanical contractor choose to provide a chiller with an open motor instead of the specified semi-hermetic motor, the contractor shall install additional cooling equipment to dissipate the motor heat as per the following formula:

$$\text{Btuh} = (\text{FLkW motor}) (0.05) (3413)$$

$$\text{Btuh} = (\text{FLkW motor}) (171)$$

and, alternately

$$\text{Tons} = \text{Btuh} / 12,000$$

The additional piping, valves, air-handling equipment, insulation, wiring, switchgear changes, ductwork, and coordination with other trades shall be the responsibility of the mechanical contractor. Shop drawings reflecting any changes to the design shall be included in the submittal, and incorporated into the final as-built drawings for the project.

8. If an open motor is provided, a mechanical room thermostat shall be provided and set at 104°F (40°C). If this temperature is exceeded, the chillers shall shut down and an alarm signal shall be generated to the central Energy Management System (EMS) display module prompting the service personnel to diagnose and repair the cause of the over-temperature condition. The mechanical contractor shall be responsible for all changes to the design, including coordination with temperature control, electrical and other trades. In addition,

the electrical power consumption of any auxiliary ventilation and/or mechanical cooling required to maintain the mechanical room conditions stated above shall be considered in the determination of conformance to the scheduled chiller energy efficiency requirement.

D. Evaporator and Condenser:

1. Evaporator shall be of shell and tube type construction, each in separate shells. Units shall be fabricated with high-performance tubing, minimum 1½ in. (6 mm) steel shell and tube sheets with fabricated steel waterboxes.
 - a. Waterbox shall be nozzle-in-head waterbox (150 psig [1034 kPa]).
 - b. Waterbox shall have standard Victaulic grooves. For 19XR with Frame 6 or Frame 7 compressor, the Victaulic AGS grooves shall be provided for nominal 14 in. pipe and larger.
2. Condenser shall be of shell and tube type construction, each in separate shells. Units shall be fabricated with high-performance tubing, minimum 1½ in. (6 mm) steel shell and tube sheets with fabricated steel waterboxes.
 - a. Waterbox shall be nozzle-in-head (150 psig [1034 kPa]).
 - b. Waterbox shall have standard Victaulic grooves. For 19XR with Frame 6 or Frame 7 compressor, the Victaulic AGS grooves shall be provided for nominal 14 in. pipe and larger.
3. Waterboxes shall have vents, drains, and covers to permit tube cleaning within the space shown on the drawings. A thermistor type temperature sensor with quick connects shall be factory installed in each water nozzle.
4. Tubes shall be individually replaceable from either end of the heat exchanger without affecting the strength and durability of the tube sheet and without causing leakage in adjacent tubes.
5. Tubing shall be copper, high-efficiency type, with integral internal and external enhancement unless otherwise noted. Tubes shall be nominal ¾ in. or 1 in. OD with nominal wall thickness of 0.025 in. measured at the root of the fin at the enhanced areas and nominal wall thickness of 0.040 in. where the tubes are in contact with the end tube sheets unless otherwise noted. Tubes shall be rolled into tube sheets and shall be individually replaceable. Tube sheet holes shall be double grooved for joint structural integrity.
6. Evaporator shall be designed to prevent liquid refrigerant from entering the compressor.
7. The condenser shell shall include a FLASC (flash subcooler) which cools the condensed liquid refrigerant to a reduced temperature, thereby increasing the refrigeration cycle efficiency.

8. A reseating type pressure relief valve shall be installed on each heat exchanger. If a non-reseating type is used, a backup reseating type shall be installed in series.

E. Refrigerant Flow Control:

1. To maintain optimal part load efficiency, the refrigerant expansion device to the evaporator and as applicable to the economizer, shall use a variable metering valve, such as a float or actuated valve. To ensure good operating performance, the valve design will prevent refrigerant gas from the condenser from passing to the evaporator or economizer at full or part load.
2. By maintaining a liquid seal at the flow valve, bypassed hot gas from the condenser to the evaporator is eliminated. The float valve chamber shall have a bolted access cover to allow field inspection and the float valve shall be field serviceable.

F. Controls, Safeties, and Diagnostics:

1. Controls:
 - a. The chiller shall be provided with a factory installed and wired microprocessor control center. The microprocessor can be configured for either English or SI units.
 - b. All chiller and starter monitoring shall be displayed at the chiller control panel.
 - c. The controls shall make use of non-volatile memory.
 - d. The chiller control system shall have the ability to interface and communicate directly to the building control system.
 - e. The default standard display screen shall simultaneously indicate the following minimum information:
 - 1) date and time of day
 - 2) 24-character primary system status message
 - 3) 24-character secondary status message
 - 4) chiller operating hours
 - 5) entering chilled water temperature
 - 6) leaving chilled water temperature
 - 7) evaporator refrigerant temperature
 - 8) entering condenser water temperature
 - 9) leaving condenser water temperature
 - 10) condenser refrigerant temperature
 - 11) oil supply pressure
 - 12) oil sump temperature
 - 13) percent motor rated load amps (RLA)
 - f. In addition to the default screen, status screens shall be accessible to view the status of every point monitored by the control center including:
 - 1) evaporator pressure
 - 2) condenser pressure

- 3) bearing oil supply temperature
 - 4) compressor discharge temperature
 - 5) motor winding temperature
 - 6) number of compressor starts
 - 7) control point settings
 - 8) discrete output status of various devices
 - 9) compressor motor starter status
 - 10) optional spare input channels
 - 11) current and voltage for each phase
 - 12) frequency
- g. Schedule Function:
- The chiller controls shall be configurable for manual or automatic start-up and shutdown. In automatic operation mode, the controls shall be capable of automatically starting and stopping the chiller according to a stored user programmable occupancy schedule. The controls shall include built-in provisions for accepting:
- 1) A minimum of two 365-day occupancy schedules.
 - 2) Minimum of 8 separate occupied/unoccupied periods per day.
 - 3) Daylight savings start/end.
 - 4) Minimum of 18 user-defined holidays.
 - 5) Means of configuring an occupancy timed override.
 - 6) Chiller start-up and shutdown via remote contact closure.
- h. Service Function:
- The controls shall provide a password protected service function which allows authorized individuals to view an alarm history file which shall contain the last 25 alarm/alert messages with time and date stamp. These messages shall be displayed in text form, not codes.
- i. Network Window Function:
- Each chiller control panel shall be capable of viewing multiple point values and statuses from other like controllers connected on a common network, including controller maintenance data. The operator shall be able to alter the remote controller's set points or time schedule and to force point values or statuses for those points that are operator forcible. The control panel shall also have access to the alarm history file of all like controllers connected on the network.
- j. Pump Control:
- Upon request to start the compressor, the control system shall start the chilled water pump, condenser water pumps and verify that flows have been established.
- k. Ramp Loading:
- A user-configurable ramp loading rate, effective during the chilled water temperature pulldown period, shall control the rate of guide vane opening to prevent a rapid increase in compressor power consumption. The controls shall allow configuration of the ramp loading rate in either degrees/minute of chilled water temperature pulldown or percent motor amps/minute. During the ramp loading period, a message shall be displayed informing the operator that the chiller is operating in ramp loading mode.
- l. Chilled Water Reset:
- The control center shall allow reset of the chilled water temperature set point based on any one of the following criteria:
- 1) Chilled water reset based on an external 4 to 20 mA signal.
 - 2) Chilled water reset based on a remote temperature sensor (such as outdoor air).
 - 3) Chilled water reset based on water temperature rise across the evaporator.
- m. Demand Limit:
- The control center shall limit amp draw of the compressor to the rated load amps or to a lower value based on one of the following criteria:
- 1) Demand limit based on a user input ranging from 40% to 100% of compressor rated load amps.
 - 2) Demand limit based on external 4 to 20 mA signal.
- n. Controlled Compressor Shutdown:
- The controls shall be capable of being configured to soft stop the compressor. When the stop button is pressed or remote contacts open with this feature active, the guide vanes shall close to a configured amperage level and the machine shall then shut down. The display shall indicate "shutdown in progress."
2. Safeties:
- a. Unit shall automatically shut down when any of the following conditions occur: (Each of these protective limits shall require manual reset and cause an alarm message to be displayed on the control panel screen, informing the operator of the shutdown cause.)
- 1) motor overcurrent
 - 2) over voltage*
 - 3) under voltage*
 - 4) single cycle dropout*
 - 5) bearing oil high temperature
 - 6) low evaporator refrigerant temperature
 - 7) high condenser pressure
 - 8) high motor temperature

- 9) high compressor discharge temperature
- 10) low oil pressure
- 11) prolonged surge
- 12) loss of evaporator water flow
- 13) loss of condenser water flow
- 14) starter fault

*Shall not require manual reset or cause an alarm if auto-restart after power failure is enabled.

- b. The control system shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:
 - 1) high condenser pressure
 - 2) high motor temperature
 - 3) low evaporator refrigerant temperature
 - 4) surge prevention control
 - 5) high motor amps.
 - c. During the capacity override period, a pre-alarm (alert) message shall be displayed informing the operator which condition is causing the capacity override. Once the condition is again within acceptable limits, the override condition shall be terminated and the chiller shall revert to normal chilled water control. If during either condition the protective limit is reached, the chiller shall shut down and a message shall be displayed informing the operator which condition caused the shutdown and alarm.
 - d. Internal built-in safeties shall protect the chiller from loss of water flow. Differential pressure switches shall not be allowed to be the only form of freeze protection.
3. Diagnostics and Service:
- a. A self diagnostic controls test shall be an integral part of the control system to allow quick identification of malfunctioning components.
 - b. Once the controls test has been initiated, all pressure and temperature sensors shall be checked to ensure they are within normal operating range. A pump test shall automatically energize the chilled water pump, condenser water pump, and oil pump. The control system shall confirm that water flow and oil pressure have been established and require operator confirmation before proceeding to the next test. A guide vane actuator test shall open and close the guide vanes to check for proper operation. The operator manually acknowledges proper guide vane operation prior to proceeding to the next test.

- c. In addition to the automated controls test, the controls shall provide a manual test which permits selection and testing of individual control components and inputs. A thermistor test and transducer test shall display and an actual reading shall be performed for each transducer and each thermistor installed on the chiller. All out-of-range sensors shall be identified.

4. Multiple Chiller Control:

The chiller controls shall be supplied as standard with a two-chiller lead/lag and a third chiller standby system. The control system shall automatically start and stop a lag or second chiller on a two-chiller system. If one of the two chillers on line goes into a fault mode, the third standby chiller shall be automatically started. The two-chiller lead/lag system shall allow manual rotation of the lead chiller, include load balancing if configured, and a staggered restart of the chillers after a power failure.

G. Electrical Requirements:

1. Electrical contractor shall supply and install main electrical power line, disconnect switches, circuit breakers, and electrical protection devices per local code requirements and as indicated necessary by the chiller manufacturer.
2. Electrical contractor shall wire the chilled water pump, condenser water pump, and tower fan control circuit to the chiller control circuit.
3. Electrical contractor shall supply and install electrical wiring and devices required to interface the chiller controls with the building control system if applicable.
4. Electrical power shall be supplied to the unit at the voltage, phase, and frequency listed in the equipment schedule.

H. Piping Requirements — Instrumentation and Safeties:

1. Mechanical contractor shall supply and install pressure gauges in readily accessible locations in piping adjacent to the chiller such that they can be easily read from a standing position on the floor. Scale range shall be such that design values shall be indicated at approximately mid-scale.
2. Gauges shall be installed in the entering and leaving water lines of the evaporator and condenser.

I. Isolator Pads:

Chiller manufacturer shall furnish neoprene isolator pads for mounting equipment on a level concrete surface.

J. Start-up:

1. The chiller manufacturer shall provide a factory-trained representative, employed by the chiller manufacturer, to perform the start-up procedures as outlined in the Start-up, Operation and Maintenance manual provided by the chiller manufacturer.

2. Manufacturer shall supply the following literature:
 - a. Start-up, operation and maintenance instructions.
 - b. Installation instructions.
 - c. Field wiring diagrams.
 - d. One complete set of certified drawings.

K. Special Features:

1. Soleplate Package Accessory:
Unit manufacturer shall furnish a soleplate package consisting of soleplates, jacking screws, leveling pads, and neoprene pads.
2. Spring Isolators Accessory:
Field furnished and selected for the desired degree of isolation.
3. Spare Sensors with Leads Accessory:
Unit manufacturer shall furnish additional temperature sensors and leads.
4. Sound Insulation Kit Accessory:
Unit manufacturer shall furnish a sound insulation kit that covers (select):
 - a. The compressor discharge pipe.
 - b. The compressor housing and motor housing.
 - c. The condenser shell and suction line.
 Blanket construction shall allow for installation and removal without the use of tape or caulk. Insulation material shall be 11 lb/cu ft fiberglass. Insulation design shall accommodate temperature and pressure probes, gauges, tubing, piping, and brackets. An extended 2 in. wide vinyl flap shall cover all exposed seams, thereby minimizing any potential noise leaks. An aluminum nameplate shall be riveted to each blanket piece. Each tag shall be embossed or etched with lettering indicating piece location, description, size, and tag number sequence.
5. Stand-Alone Pumpout Unit Accessory:
A free-standing pumpout shall be provided. The pumpout unit shall use a hermetic reciprocating compressor with water-cooled condenser. Condenser water piping, 3-phase motor power shall be installed at the job site by the installing contractor. Pumpout assembly is available for R-513A only.
6. Separate Storage Tank and Pumpout Unit Accessory:
A free-standing refrigerant storage tank and pumpout unit shall be provided. The storage vessels shall be designed per ASME Section VIII Division 1 code with 185 psig (1276 kPa) design pressure. Double relief valves per ANSI/ASHRAE 15, latest edition, shall be provided. The tank shall include a liquid level gauge and pressure gauge. The pumpout unit shall use a hermetic reciprocating compressor with water cooled condenser. Condenser water piping and

3-phase motor power shall be installed at the job site by the installing contractor (19XR compressor frame sizes 3, C, E only.) Pumpout assembly is available for R-513A only.

7. Refrigerant Charge:

The chiller shall ship from the factory fully charged with R-513A or R-515B refrigerant and oil.

8. Thermal Insulation:

Unit manufacturer shall insulate the evaporator shell, economizer low side compressor suction elbow, motor shell, and motor cooling lines. Insulation shall be 3/4 in. (19 mm) thick with a thermal conductivity not exceeding 0.28 (Btu in.)/hr ft² F [(0.0404 • W)/(m • °C)] and shall conform to UL standard 94, classification 94 HBF.

9. Automatic Hot Gas Bypass:

Hot gas bypass valve and piping shall be factory furnished to permit chiller operation for extended periods of time.

10. Evaporator and Condenser Tubes:

Contact local Carrier representative for other tube offerings.

11. Evaporator and Condenser Passes:

Unit manufacturer shall provide the evaporator and/or condenser with 1, 2 or 3 pass configuration on the water side.

12. Nozzle-In-Head, 300 psig (2068 kPa):

Unit manufacturer shall furnish nozzle-in-head style waterboxes on the evaporator and/or condenser rated at 300 psig (2068 kPa).

13. Marine Waterboxes, 150 psig (1034 kPa):

Unit manufacturer shall furnish marine style waterboxes on evaporator and/or condenser rated at 150 psig (1034 kPa).

14. Marine Waterboxes, 300 psig (2068 kPa):

Unit manufacturer shall furnish marine style waterboxes on evaporator and/or condenser rated at 300 psig (2068 kPa).

15. Flanged Waterbox Nozzles:

Unit manufacturer shall furnish standard flanged piping connections on the evaporator and/or condenser.

16. Hinges:

Unit manufacturer shall furnish hinges on waterboxes to facilitate tube cleaning.

17. Pumpout Unit:

A refrigerant pumpout system shall be installed on the chiller. The pumpout system shall include a hermetic compressor and drive, piping, wiring, and motor. (19XR heat exchanger frames 3 to 5 only). Pumpout assembly is available for R-513A only.

18. Optional Compressor Discharge Isolation Valve and Liquid Line Ball Valve:

These items shall be factory installed to allow isolation of the refrigerant charge in the condenser for servicing the compressor.

19. Optional Seismic Isolation Package (Select Models Only):

Package shall meet International Building Code and ASCE 7 seismic qualification requirements in concurrence with ICC ES AC156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems. Manufacturer shall provide seismic certificate from OSHPD (California only).

20. Optional Low-Voltage Unit-Mounted Starter (not available on chiller heat exchanger sizes 8, A, B, C, or D):

An optional reduced voltage wye-delta or solid-state starter shall be supplied. The compressor motor starter shall be factory mounted, wired and tested prior to shipment by the chiller manufacturer. Customer electrical connection for compressor motor power shall be limited to main power leads to the starter, and wiring water pumps and tower fans to the chiller control circuit.

- a. NEMA 1 enclosure with integral fan cooling and lockable hinged doors.
- b. Main power disconnect (non-fused type).
- c. Capability to start and stop chiller, pumps and tower fans.
- d. 3 kva control/oil heater transformer.
- e. Branch circuit breaker to provide power for oil pump.
- f. Branch circuit breaker to provide power for control power and oil heater.
- g. The following are standard features:
 - 1) Phase loss
 - 2) Phase reversal
 - 3) Phase imbalance
 - 4) 3-phase ground fault
 - 5) Low voltage — phase to phase and phase to ground
 - 6) Medium voltage — phase to ground
 - 7) Current overload
 - 8) Current flow while stopped
 - 9) 3-phase under/over voltage
 - 10) 3-phase digital ammeter/voltmeter
 - 11) Microprocessor based overload trip protection
 - 12) Frequency digital display

- h. Optional unit-mounted solid-state starter shall provide stepless compressor motor acceleration. The starter shall include 6 silicon controlled rectifiers (SCRs) with integrally mounted bypass once the motor has achieved full voltage and speed.

The starter shall also display the following:

- 1) Starter On
- 2) Run (up to voltage)
- 3) Phase Correct
- 4) Overtemperature Fault
- 5) SCR Gates Energized
- 6) Ground Fault
- 7) Current Imbalance Fault
- 8) Shorted SCR

21. Unit-Mounted Variable Frequency Drive (VFD) with Built-in Harmonic Filter (LiquiFlo® 1 2, available for low voltage only):

a. Design:

- 1) VFD shall be refrigerant cooled, micro-processor based, pulse width modulated (PWM) design. Water-cooled designs are not acceptable.
- 2) Input and output power devices shall be insulated gate bipolar transistors (IGBTs).
- 3) Active rectifier shall convert incoming voltage / frequency to DC voltage. Input current and voltage shall be regulated.
- 4) Transistorized inverter and control regulator shall convert DC voltage to a sinusoidal PWM waveform.
- 5) Integrated chiller controls shall coordinate motor speed and guide vane position to optimize chiller performance over all chiller operating conditions.
- 6) Surge prevention and surge protection algorithms shall take action to prevent surge and move chiller operation away from surge.

b. Enclosure:

- 1) Pre-painted unit mounted, NEMA 1 cabinet shall include hinged, lockable doors and removable lifting lugs.
- 2) VFD shall have a short circuit interrupt and withstand rating of at least 65,000 amps (35,000 amps for 575-v units).
- 3) Provisions to padlock main disconnect handle in the "Off" positions shall be provided. Mechanical interlock to prevent opening cabinet door with disconnect in the "On" position or moving

1. Third-party trademarks and logos are the property of their respective owners.

- disconnect to the "On" position while the door is open shall be provided.
- 4) Provisions shall be made for top entry of incoming line power cables.
- c. Heat Sink:
 - 1) The heat sink shall be refrigerant cooled. Heat sink and mating flange shall be suitable for ASME design working pressure of 185 psig (1276 kPa).
 - 2) Refrigerant cooling shall be controlled by a fixed orifice to maintain heat sink temperature within acceptable limits for ambient temperature.
 - 3) Water-cooled heat exchangers requiring cleaning shall not be acceptable.
- d. VFD Rating:
 - 1) Drive shall be suitable for continuous operation at nameplate voltage $\pm 10\%$.
 - 2) Drive shall be suitable for continuous operation at 100% of nameplate amps and 150% of nameplate amps for 5 seconds.
 - 3) Drive shall comply with applicable ANSI, NEMA, UL and NEC standards.
 - 4) Drive shall be suitable for operation in ambient temperatures between 40 and 104°F (4.4 and 40°C), 95% humidity (non-condensing) for altitudes up to 6000 ft (1829 m) above sea level. Specific drive performance at job site ambient temperature and elevation shall be provided by the manufacturer in the bid.
- e. User Interface:

A single display shall provide interface for programming and display of VFD and chiller parameters. Viewable parameters include:

 - 1) Operating, configuration and fault messages
 - 2) Frequency in Hz
 - 3) Load and line side voltage and current (at the VFD)
 - 4) kW (line and load side)
 - 5) IGBT temperatures
- f. VFD Performance:
 - 1) VFD voltage total harmonic distortion (THD) and harmonic current total demand distortion (TDD) shall not exceed IEEE-519 requirements using the VFD circuit breaker input terminals as the point of common coupling (PCC).
 - 2) VFD full load efficiency shall meet or exceed 97% at 100% VFD rated ampacity.
 - 3) Active rectifier shall regulate unity displacement power factor to 0.99 or higher at full load.
 - 4) Voltage boost capability to provide full motor voltage at reduced line voltage conditions.
 - 5) Soft start, linear acceleration, coast to stop.
 - 6) Base motor frequency shall be either 50 or 60 Hz. Adjustable frequency range from 39 to 60 Hz or 32.5 to 50 Hz.
- g. VFD Electrical Service (single point power):
 - 1) VFD shall have input circuit breaker with minimum 65,000 amp interrupt capacity.
 - 2) VFD shall have standard 15 amp branch circuit breaker to provide power for chiller oil pump.
 - 3) VFD shall have standard 3 kva control power transformer with circuit breaker provides power for oil heater, VFD controls and chiller controls.
 - 4) The branch oil pump circuit breaker and control power transformer shall be factory wired.
 - 5) Nameplate voltage shall range between 380 and 460 $\pm 10\%$, 3 phase, 50/60 Hz $\pm 2\%$ Hz.
- h. Discrete Outputs:

115 v discrete contact outputs shall be provided for field wired:

 - 1) Chilled water pump
 - 2) Condenser water pump
 - 3) Alarm status
 - 4) Tower fan low
 - 5) Tower fan high
- i. Analog Output:

An analog (4 to 20 mA) output for head pressure reference shall be provided. This signal shall be suitable to control a 2-way or 3-way water regulating valve in the condenser piping.
- j. Protection (the following shall be supplied):
 - 1) Under-voltage
 - 2) Over voltage
 - 3) Phase loss
 - 4) Phase reversal
 - 5) Ground fault
 - 6) Phase unbalance protection
 - 7) Single cycle voltage loss protection
 - 8) Programmable auto re-start after loss of power
 - 9) Motor overload protection (NEMA Class 10)
- k. VFD Testing:

VFD shall be factory mounted, wired and tested on the chiller prior to shipment.

22. Unit-Mounted Variable Frequency Drive (VFD) without Built-In Harmonic Filter (available for low voltage only):

a. Design:

- 1) VFD shall be refrigerant or air cooled, microprocessor based, pulse width modulated (PWM) design. Water cooled designs are not acceptable.
- 2) Output power devices shall be insulated gate bipolar transistors (IGBTs).
- 3) Converter section with full-wave fixed diode bridge rectifier shall convert incoming fixed voltage/frequency to fixed DC voltage.
- 4) DC link shall filter and smooth the converted DC voltage.
- 5) Transistorized inverter and control regulator shall convert fixed DC voltage to a sinusoidal PWM waveform.
- 6) Integrated controls shall coordinate motor speed and guide vane position to optimize chiller performance over a wide variety of operating conditions.
- 7) Surge prevention and surge protection algorithms shall take action to prevent surge and move chiller operation away from surge.

b. Enclosure:

- 1) Pre-painted, unit mounted NEMA 1 or IP54 cabinet shall include hinged doors and removable lifting lugs.
- 2) Electrical system shall have a short circuit interrupt and withstand rating of at least 100,000 amps.
- 3) Provisions to padlock main disconnect handle in the "Off" positions shall be provided. Mechanical interlock to prevent opening cabinet door with disconnect in the "On" position or moving disconnect to the "ON" position while the door is open shall be provided.
- 4) Provisions shall be made for top entry of incoming line power cables.

c. Heat Sink:

- 1) The heat sink shall be refrigerant or air cooled. Refrigerant cooled heat sink (when applicable) and mating flanges shall be suitable for ASME design working pressure of 185 psig (1276 kPa).
- 2) Refrigerant cooling (when applicable) shall be metered by integrated standard controls to maintain heat sink temperature within acceptable limits for ambient temperature.

d. VFD Rating:

- 1) Drive shall be suitable for nameplate voltage $\pm 10\%$.

- 2) Drive shall be suitable for continuous operation at 100% of nameplate amps and 150% of nameplate amps for 3 seconds.

- 3) Drive shall comply with applicable UL, CE, and NEMA standards.

- 4) Drive shall be suitable for operation in ambient temperatures between 40 and 104°F (4.4 and 40°C), 95% humidity (non-condensing) for altitudes up to 3300 ft (1006 m) above sea level. Specific drive performance at job site ambient temperature and elevation shall be provided by manufacturer in the bid.

e. User Interface:

Displays shall provide interface for programming and display of VFD and chiller parameters. Viewable parameters include:

- 1) Operating, configuration and fault messages
- 2) Frequency in hertz

f. VFD Performance:

- 1) VFD full load efficiency shall meet or exceed 97% at 100% VFD Rated ampacity.
- 2) Displacement Input Power Factor shall meet or exceed 95% soft start, linear acceleration, coast to stop.
- 3) Base motor frequency shall be either 50 or 60 Hz. Adjustable frequency range from 38 to 60 Hz or 32.5 to 50 Hz.

g. Chiller Electrical Service (single point power):

- 1) Chiller shall have input circuit breaker with minimum 100,000 amp interrupt capacity.
- 2) Chiller shall have standard 15 amp branch oil pump circuit breaker to provide power for chiller oil pump.
- 3) Chiller shall have standard 3 kva control power transformer with circuit breaker provides power for oil heater, VFD controls and chiller controls.
- 4) The branch oil pump circuit breaker and control power transformer shall be factory wired.
- 5) Input power shall be 380/480 vac, ± 10 percent, 3 phase, 50/60 Hz, ± 3 Hz.

h. Discrete Outputs:

115-v discrete contact outputs shall be provided for:

- 1) Circuit breaker shunt trip
- 2) Chilled water pump
- 3) Condenser water pump
- 4) Alarm status.

- i. Analog Output:
An analog (4 to 20 mA) output for head pressure reference shall be provided. This signal shall be suitable to control a 2-way or 3-way water regulating valve in the condenser piping.
 - j. Protection (the following shall be supplied):
 - 1) Under-voltage
 - 2) Over voltage
 - 3) Phase loss
 - 4) Phase reversal
 - 5) Ground fault
 - 6) Phase unbalance protection
 - 7) Single cycle voltage loss protection
 - 8) Programmable auto re-start after loss of power
 - 9) Motor overload protection (NEMA Class 10)
 - 10) Motor overtemperature protection
 - k. VFD Testing:
VFD shall be factory mounted, wired and tested on the chiller prior to shipment.
23. Free-Standing Medium Voltage Variable Frequency Drive:
- a. VFD Design:
 - 1) Technology shall allow connection of the drive to utility power without the requirement of an isolation transformer.
 - 2) Direct-to-drive technology shall have active front end to track and regulate input current to maintain sine wave current draw.
 - 3) VFD shall be microprocessor-based, pulse width modulated (PWM) design.
 - 4) Input and output power devices shall be 6500 volt rated symmetrical gate commutated thyristor (SGCT) to achieve superior PWM switching pattern and significantly reduce line current harmonics.
 - 5) Low voltage and medium voltage compartments shall be totally isolated and separated.
 - 6) Power shall be isolated by means of a vacuum starter that can be locked out/tagged out. This starter can be integral to drive for "A" frames, part of line up or located outside of line up for "B" frames.
 - 7) Integrated controls shall coordinate motor speed and guide vane position to optimize chiller performance over a wide variety of operating conditions.
 - 8) Surge prevention and surge protection algorithms shall take action to prevent surge and move chiller operation away from surge.
 - b. Enclosure:
 - 1) Rear access shall not be required and VFD shall be fully accessible from front.
 - 2) Pre-painted cabinet (NEMA 1) includes hinged, lockable doors and removable lifting lugs.
 - 3) Enclosure shall have short circuit interrupt and withstand rating of at least 25,000 amps.
 - c. Heat Sink:
 - 1) The heat sink shall be air-cooled from 200 hp to 5500 hp.
 - 2) Advanced overtemperature compensation algorithm shall provide standard heat sink temperature and flow monitoring.
 - d. VFD Rating:
 - 1) Drives less than 6600 vac shall be suitable for nameplate voltage plus or minus 10%; 6600-vac drives shall have voltage rating of plus 5% and minus 10%.
 - 2) Drive shall be suitable for continuous operation at 100% of nameplate amps and 110% of nameplate amps for 60 seconds every ten minutes; voltage sag of -30%; and control power loss ride through of 5 cycles standard and >5 cycles with optional UPS (uninterruptible power supply).
 - 3) Drive complies with applicable sections of NEMA, UL, and NEC standards and is UL, Canada listed.
 - 4) Drive shall be suitable for operation in ambient temperatures between 40 and 104°F (4.4 and 40°C), 95% humidity (non-condensing) for altitudes up to 3300 ft (1006 m) above sea level. Specific drive performance at job site ambient temperature and elevation shall be provided by the manufacturer in the bid.
 - e. VFD Performance:
 - 1) VFD voltage total harmonic distortion (THD) shall not exceed 3% and harmonic current total demand distortion (TDD) shall not exceed IEEE-519 requirements using the VFD circuit breaker input terminals as the point of common coupling (PCC).
 - 2) VFD full load efficiency shall meet or exceed 97% at 100% VFD rated ampacity.
 - 3) Displacement input power factor shall meet or exceed 99% to unity gain at full load.
 - 4) Soft start, linear acceleration, coast to stop.
 - 5) Base motor frequency shall be either 50 or 60 Hz, adjustable frequency range from 39 to 60 Hz or 32.5 to 50 Hz.

- f. VFD Electrical Service (Single Point Power):
VFD shall have input circuit breaker with minimum 25,000 amp interrupt capacity.
 - g. Protection (the following shall be supplied):
 - 1) Under voltage
 - 2) Over voltage
 - 3) Phase loss
 - 4) Phase reversal
 - 5) Ground fault
 - 6) Phase unbalance protection
 - 7) Single cycle voltage loss protection
 - 8) Programmable auto restart after loss of power
 - 9) Motor overload protection (NEMA Class 10)
 - 10) Motor overtemperature protection
 - h. Testing:
Drive shall be 100% load tested from VFD manufacturer's factory and shipped without any unwiring or electrical components disassembled inside main VFD cabinet.
24. Free-Standing Low Voltage Variable Frequency Drive:
- a. Design:
 - 1) Output power devices shall be insulated gate bipolar transistors (IGBTs).
 - 2) Converter section with full wave fixed diode bridge rectifier shall convert incoming fixed voltage/frequency to fixed DC voltage.
 - 3) Transistorized inverter and control regulator shall convert fixed DC voltage to a sinusoidal PWM waveform.
 - 4) VFD shall have 1.5% AC line reactor.
 - b. Enclosure:
Main section and control section shall be housed in connected NEMA 1 cabinets.
 - c. User Interface:
Door-mounted digital keypad with non-volatile memory shall have 6 line, 30 character back-lit LCD display for programming and display of VFD parameters. Viewable parameters include:
 - 1) Operating, configuration, and fault messages
 - 2) Frequency in Hz
 - 3) Manual or automatic control mode
 - 4) Output frequency
 - 5) Percent output voltage, or voltage
 - 6) Percent output current, or current
 - 7) kW and kWh
 - d. VFD Electrical Service:
 - 1) VFD shall have main standard interrupting capacity circuit breaker with shunt trip (65 kAIC interrupt capacity).
 - 2) VFD shall have oil pump circuit breaker (65 kAIC interrupt capacity).
 - 3) VFD shall have pumpout unit circuit breaker (65 kAIC interrupt capacity).
 - 4) 110-v power shall be provided for ISM (integrated starter module) board.
 - e. Analog Output:
An analog (4 to 20 mA) output for head pressure reference shall be provided.

