# AquaEdge®
# 19DV High-Efficiency Semi-Hermetic Centrifugal Liquid Chillers with Greenspeed® Intelligence, PIC6 Controls, and HFO R-1233zd(E)
# 500 to 800 Nominal Tons (1758 to 2813 kW) 50/60 Hz

# Installation Instructions

## CONTENTS



## SAFETY CONSIDERATIONS

Centrifugal liquid chillers are designed to provide safe and reliable service when operated within design specifications. When operating this equipment, use good judgment and safety precautions to avoid damage to equipment and property or injury to personnel.

Be sure you understand and follow the procedures and safety precautions contained in the machine instructions, as well as those listed in this guide.

**⚠ DANGER**

Failure to follow these procedures will result in severe personal injury or death.

DO NOT VENT refrigerant relief devices within a building. Outlet from rupture disc, relief valve, purge unit, or fusible plugs must be vented outdoors in accordance with the latest edition of ANSI/ASHRAE 15 (American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers) (Safety Code for Mechanical Refrigeration). The accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation.

PROVIDE adequate ventilation in accordance with ANSI/ASHRAE 15, especially for enclosed and low overhead spaces. Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse can be fatal. Vapor is heavier than air and reduces the amount of oxygen available for breathing. Product causes eye and skin irritation. Decomposition products are hazardous.

DO NOT USE OXYGEN to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.

DO NOT USE air to leak test. Use only refrigerant or dry nitrogen.

NEVER EXCEED specified test pressures. VERIFY the allowable test pressure by checking the instruction literature and the design pressures on the equipment nameplate.

DO NOT VALVE OFF any safety device.

BE SURE that all pressure relief devices are properly installed and functioning before operating any machine.

RISK OF INJURY OR DEATH by electrocution. High voltage is present on motor leads even though the motor is not running. Open the power supply disconnect before touching motor leads or terminals and wait for capacitors to fully discharge.




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## ⚠ WARNING

Failure to follow these procedures may result in personal injury or death.

DO NOT USE TORCH to remove any component. System contains refrigerant which can be under pressure.

To remove a component, wear protective gloves and goggles and other necessary safety equipment, and proceed as follows.

a. Shut off electrical power to unit.
b. Recover refrigerant from system using both high-pressure and low-pressure ports.
c. Traces of vapor should be displaced with nitrogen and the work area should be well ventilated. Refrigerant in contact with an open flame produces toxic gases.
d. Cut component connection tubing with tubing cutter and remove component from unit.
e. Carefully unsweat remaining tubing stubs when necessary.

DO NOT USE eyebolts or eyebolt holes to rig machine sections or the entire assembly.

DO NOT work on high-voltage equipment unless you are a qualified electrician.

DO NOT WORK ON electrical components, including control panels, switches, variable frequency drives (VFDs), or compressors until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are de-energized before resuming work.

AVOID SPILLING liquid refrigerant on skin or getting it into the eyes. USE SAFETY GOGGLES. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, IMMEDIATELY FLUSH EYES with water and consult a physician.

NEVER APPLY an open flame or live steam to a refrigerant cylinder. Dangerous over pressure can result. When it is necessary to heat refrigerant, use only warm (110°F [43°C]) water.

DO NOT REUSE disposable (nonreturnable) cylinders or attempt to refill them. It is DANGEROUS AND ILLEGAL. When cylinder is emptied, evacuate remaining gas pressure, loosen the collar, and unscrew and discard the valve stem. DO NOT INCINERATE.

CHECK THE REFRIGERANT TYPE before adding refrigerant to the machine. The introduction of the wrong refrigerant can cause machine damage or malfunction.

Operation of this equipment with refrigerants other than those cited herein should comply with ANSI/ASHRAE 15 (latest edition). Contact Carrier for further information on use of this machine with other refrigerants.

BEFORE ADDING INHIBITOR to the unit, be sure to check the type. Using the wrong type could result in damage to the unit. Factory unit comes supplied with inhibitor.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., with refrigerant in the machine or while machine is running. Be sure pressure is at 0 psig (0 kPa) before breaking any refrigerant connection. Note that at 65°F (18°C) the machine is at near 0 psig (0 kPa) so ensure to properly check for the existence of refrigerant in the machine.

CAREFULLY INSPECT all relief valves, rupture discs, and other safety relief devices AT LEAST ONCE A YEAR. If machine operates in a corrosive atmosphere, inspect the devices at more frequent intervals.

## ⚠ WARNING

DO NOT ATTEMPT TO REPAIR OR RECONDITION any relief device when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. Replace the valve or device.

DO NOT install relief devices in series or backwards.

USE CARE when working near or in line with a compressed spring. Sudden release of the spring can cause it and objects in its path to act as projectiles.

Prior to installing or servicing this equipment ensure that personal protective equipment (PPE) is worn as required per OSHA or other local regulations.

For servicing or installing components where there is a risk of arc flash the technicians must wear personal protective equipment as identified in NFPA (National Fire Protection Association) 70E or other local country-specific requirements for arc flash protection.

## ⚠ CAUTION

Failure to follow these procedures may result in personal injury or damage to equipment.

DO NOT STEP on refrigerant lines. Broken lines can whip about and release refrigerant, causing personal injury.

DO NOT climb over a machine. Use platform, catwalk, or staging. Follow safe practices when using ladders.

USE MECHANICAL EQUIPMENT (crane, hoist, etc.) to lift or move inspection covers or other heavy components. Even if components are light, use mechanical equipment when there is a risk of slipping or losing your balance.

BE AWARE that certain automatic start arrangements CAN ENGAGE THE VFD, TOWER FAN, OR PUMPS. Open the disconnect *ahead of* the VFD, tower fan, and pumps. Shut off the machine or pump before servicing equipment.

USE only repaired or replacement parts that meet the code requirements of the original equipment.

DO NOT VENT OR DRAIN waterboxes containing industrial brines, liquid, gases, or semisolids without the permission of your process control group.

DO NOT LOOSEN waterbox cover bolts until the waterbox has been completely drained.

DOUBLE-CHECK that coupling nut wrenches, dial indicators, or other items have been removed before rotating any shafts.

DO NOT LOOSEN a packing gland nut before checking that the nut has a positive thread engagement.

PERIODICALLY INSPECT all valves, fittings, and piping for corrosion, rust, leaks, or damage.

PROVIDE A DRAIN connection in the vent line near each pressure relief device to prevent a build-up of condensate or rain water. Ensure to slope piping way from relief device.

DO NOT re-use compressor purge oil or any oil that has been exposed to the atmosphere. Dispose of oil and refrigerant per local codes and regulations.

DO NOT introduce oil to the refrigerant circuit with refrigerant recovery containers, vacuum pump, or other means.

DO NOT leave refrigerant system open to air any longer than the actual time required to service the equipment. Seal circuits being serviced and charge with dry nitrogen to prevent contamination when timely repairs cannot be completed.

## INTRODUCTION

### General

The 19DV unit is factory assembled, wired, and leak tested. Installation consists primarily of establishing water and electrical services to the machine. The rigging, installation, field wiring, field piping, and insulation of waterbox covers are the responsibility of the contractor and/or customer. Carrier has no installation responsibilities for the equipment. The refrigerant charge will be installed by the Carrier Start-up Technician during the start-up process.

### Job Data

Necessary information consists of:

- job contract or specifications
- machine location prints
- rigging information
- piping prints and details
- field wiring drawings
- starter manufacturer's installation details
- Carrier certified print

## CHILLER FAMILIARIZATION

### Chiller Information Nameplate

The information nameplate is located on the left side of the chiller control panel. Refer to Fig. 1 for model number identification.

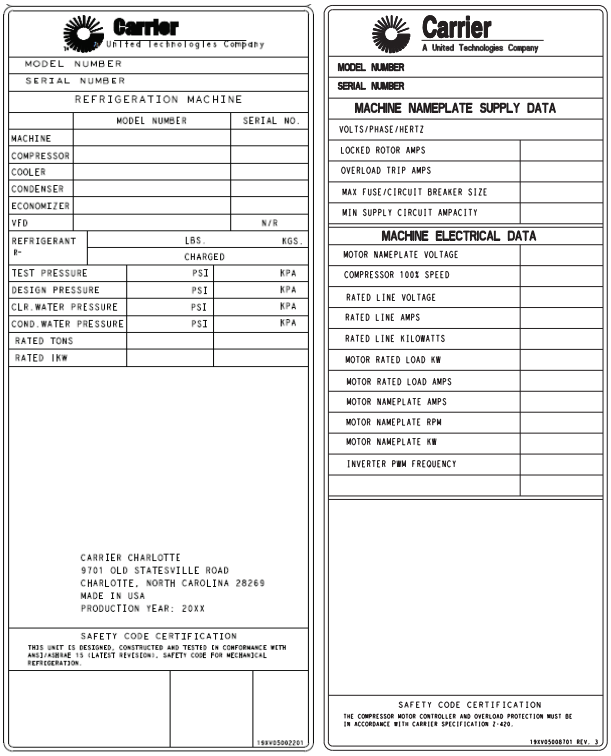



**Fig. 1 — 19DV Refrigeration Machine Nameplate**

### System Components

The main components include the evaporator and condenser heat exchangers in separate vessels, compressor, refrigerant lubrication system, control panel, economizer, VFD, and purge system.

### Evaporator

This heat exchanger (also known as the evaporator) is located underneath the compressor. The evaporator is maintained at lower refrigerant temperature/pressure so evaporating refrigerant can remove heat from water flowing through its internal tubes.

### Condenser

This heat exchanger operates at a higher refrigerant temperature/pressure than the evaporator and has water flowing through its internal tubes in order to remove heat from the refrigerant.

### Compressor

This component maintains system temperature and pressure differences and moves the heat carrying refrigerant from the evaporator to the condenser. The 19DV unit has a back to back two-stage, direct drive, and economized compressor.

### Economizer

This chamber reduces the refrigerant temperature to an intermediate level between the evaporator and condenser vessels. In the economizer, vapor is separated from the liquid, the separated vapor flows to the inlet of the second stage of the compressor, and the liquid flows into the evaporator. The energy removed from the vaporized refrigerant in the economizer allows the liquid refrigerant in the evaporator to absorb more heat when it evaporates and benefits the overall cooling efficiency cycle.

### VFD

The VFD provides a pulse width modulated signal that results in variable frequency and voltage to the compressor motor. It is controlled and monitored from the PIC6 control system.

### Purge System

The purge system is an independent assembly located under the condenser. The 19DV chiller system components normally operate in a vacuum. The purge assembly will automatically remove air and other non-condensables which may have leaked into the system to maintain chiller performance. It is controlled through the PIC6 control system.

### PIC6 Touch Screen Panel

This panel is the user interface for controlling the chiller and has the following functions:

- Chiller operation
- Chiller diagnostic
- Chiller status display
- Chiller parameter configuration
- Open protocol interface to outside building management system (BMS)

### Control Panel

This control panel includes the input and output boards (IOB), control transformer, relays, contactors, and circuit breakers. It provides the power distribution and protection to the electrical component installed on chiller, and has the following functions:

- Communication with PIC6 touch screen
- Communication with purge panel
- Communication with VFD
- Sensor input and outputs
- Actuators control
- Refrigerant pump control

### Purge Control Panel

The purge panel includes an input and output boards, control transformers, relays, and contactors. It provides the power distribution and protection to the electrical components which installed in the purge system and has the following functions:

- Communication with PIC6 touch screen
- Sensor input and outputs
- Solenoid valve control
- Control of purge compressor, vacuum pump, heater, and fan control

## Lube Assembly

The lube assembly refers to the filter, strainer and pump package with automatic valve actuator control located under the condenser. The objective of the lube assembly is to provides lubricating liquid refrigerant to the compressor bearings.

# INSTALLATION

## Step 1 — Receive the Machine

INSPECT SHIPMENT

**⚠ CAUTION**

Do not open any valves or loosen any connections. The 19DV machine may be shipped with a nitrogen holding charge. Damage to machine may result.

1. Inspect for shipping damage while machine is still on shipping conveyance. If machine appears to be damaged or has been torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. *Manufacturer is not responsible for any damage incurred in transit.*
2. Check all items against shipping list. Immediately notify the nearest Carrier representative if any item is missing.
3. To prevent loss or damage, leave all parts in original packages until installation. All openings are closed with covers or plugs to prevent dirt and debris from entering machine components during shipping. A full operating inhibitor charge is placed in the unit before shipment from the factory.

IDENTIFY MACHINE

The machine model number, serial number, and heat exchanger sizes are shown on machine identification nameplate (Fig. 1-3). Check this information against shipping papers and job data.

INSTALLATION REQUIREMENTS

Prior to starting chiller electrical installation, certain requirements should be checked. Input power wire sizes, branch circuit protection, and control wiring are all areas that need to be evaluated.

***Determine Wire Size Requirements***

Wire size should be determined based on the size of the conduit openings, and applicable local, national, and international codes (e.g., NEC [National Electric Code]/CEC regulations). General recommendations are included in the Carrier field wiring drawings. Consult drawing for termination lug sizes.

***Conduit Entry Size***

It is important to determine the size of the conduit openings in the enclosure power entry plate so that the wire planned for a specific entry point will fit through the opening. Do NOT punch holes or drill into the top surface of any panels. Knockouts are provided on the enclosure. The VFD entry plate is designed to be removed before any holes are made to prevent particulate from entering the cabinet.

***Recommended Control and Signal Wire Sizes***

The recommended minimum size wire to connect I/O signals to the control terminal blocks is 18 AWG (American Wire Gage). Recommended terminal tightening torque is 7 to 9 in.-lb (0.79 to 1.02 N-m).

***Required Airflow Clearances***

Be sure there is adequate clearance for air circulation around the enclosure. A 6-in. (152.4 mm) minimum clearance is required wherever vents are located in an enclosure.

***Service Clearances***

Verify that service clearances are adequate as identified in Fig. 4.

***Match Power Module Input and Supply Power Ratings***

It is important to verify that building power will meet the input power requirements of the Machine Electrical Data nameplate input power rating. Be sure the input power to the chiller corresponds to the chiller's nameplate voltage, current, and frequency and to the design data sheet provided by the equipment salesman. Verify all electrical inputs against design data sheets. The VFD electrical data nameplate is located on the right side of the VFD enclosure.

PROVIDE MACHINE PROTECTION

Store machine and VFD indoors, protected from construction dirt and moisture as identified in the long term storage requirements. Inspect under shipping tarps, bags, or crates to be sure that water has not collected during transit. Keep protective shipping covers in place until machine is ready for installation.

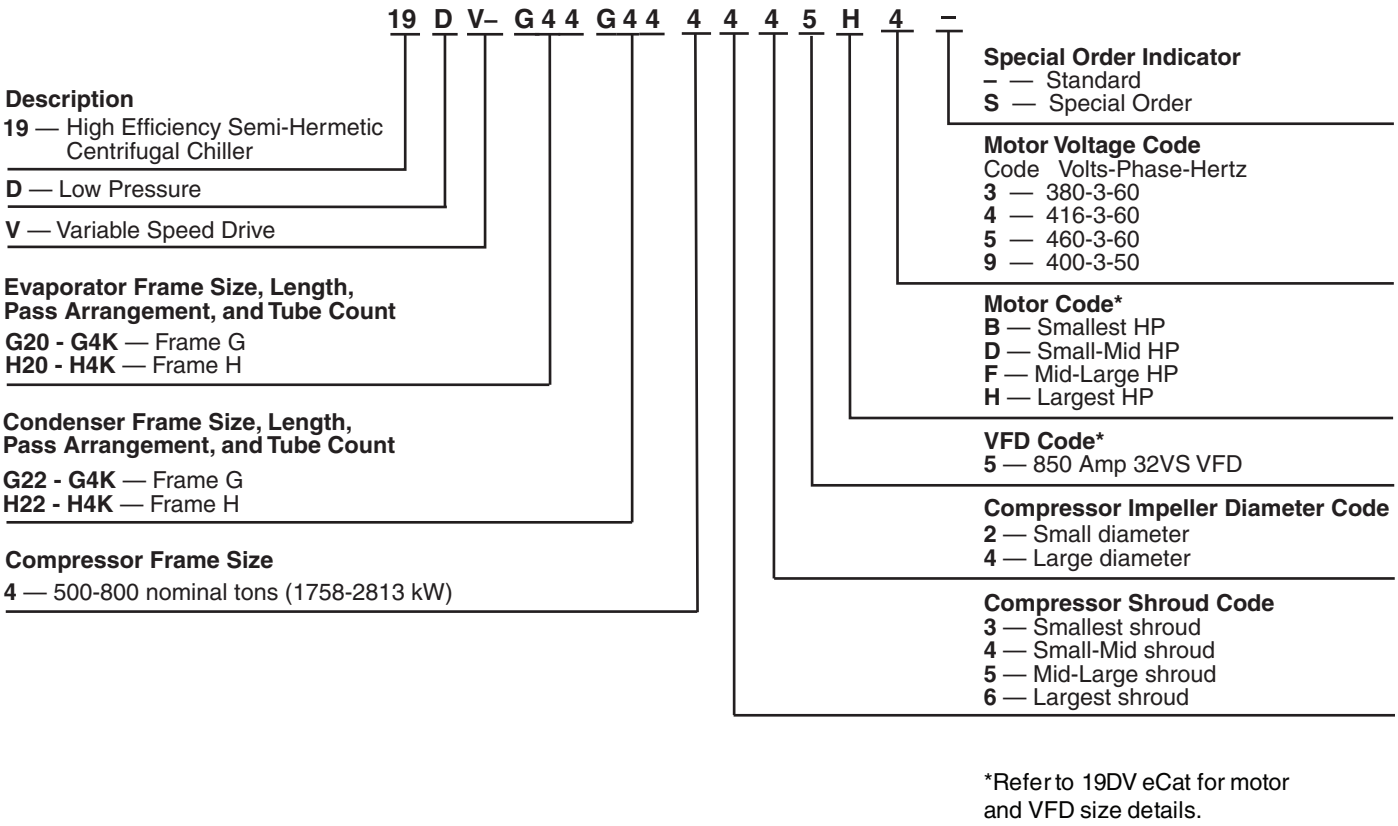
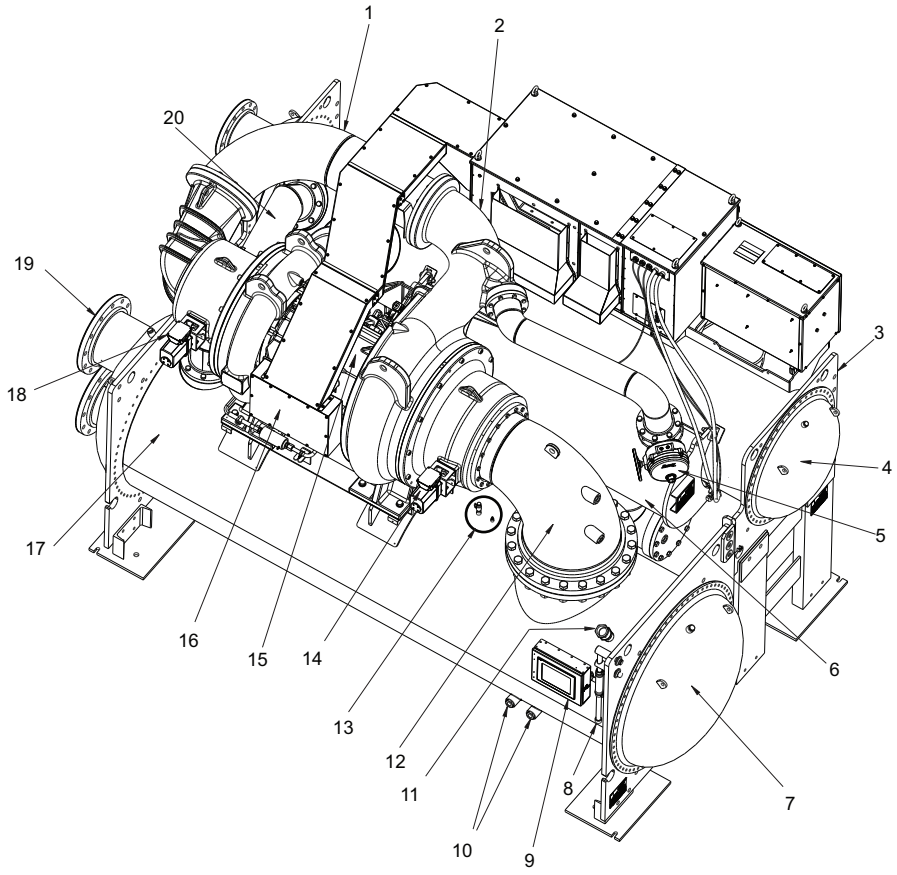
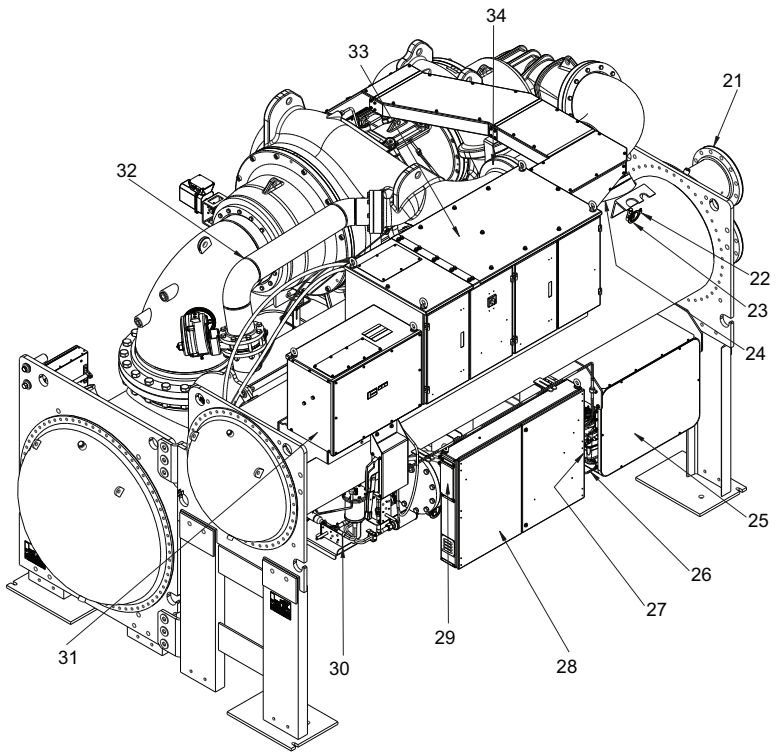



**Fig. 2 — 19DV Chiller Model Number Identification**




## FRONT VIEW

1 — Interconnecting Compressor Piping
2 — VFD Drain (Field Drain Piping Required)
3 — Condenser
4 — Condenser Waterbox Return End
5 — Economizer Isolation Valve (Option)
6 — Economizer
7 — Evaporator Waterbox Return End
8 — Vacuum/Charging Valve (Hidden)
9 — PIC6 HMI Touchscreen Panel
10 — Evaporator Bundle Sight Glasses
11 — Rupture Disc
12 — Suction Elbow
13 — Evaporator Charging Valve and Evaporator Pressure Transducer
14 — First Stage Guided Vane Actuator
15 — Compressor Motor
16 — Moisture Indicator (Hidden)
17 — Evaporator
18 — Second Stage Guided Vane Actuator
19 — Evaporator Waterbox Nozzles
20 — Free Cooling Pipe (Option)




## REAR VIEW

21 — Condenser Waterbox Nozzles
22 — Condenser Pressure Transducer
23 — Condenser Charging Valve
24 — Envelope Stability Control Pipe
25 — Purge Assembly
26 — Purge Vent (Hidden)
27 — Motor VFD Cooling Moisture Indicator (Hidden)
28 — Control Panel
29 — Chiller Name Plate Label
30 — Lubrication Assembly
31 — Pull Box (replaced by Active Harmonic Filter if selected)
32 — Economizer Pipe
33 — VFD
34 — Discharge Pipe

**Fig. 3 — Typical 19DV Compressor Chiller Components**

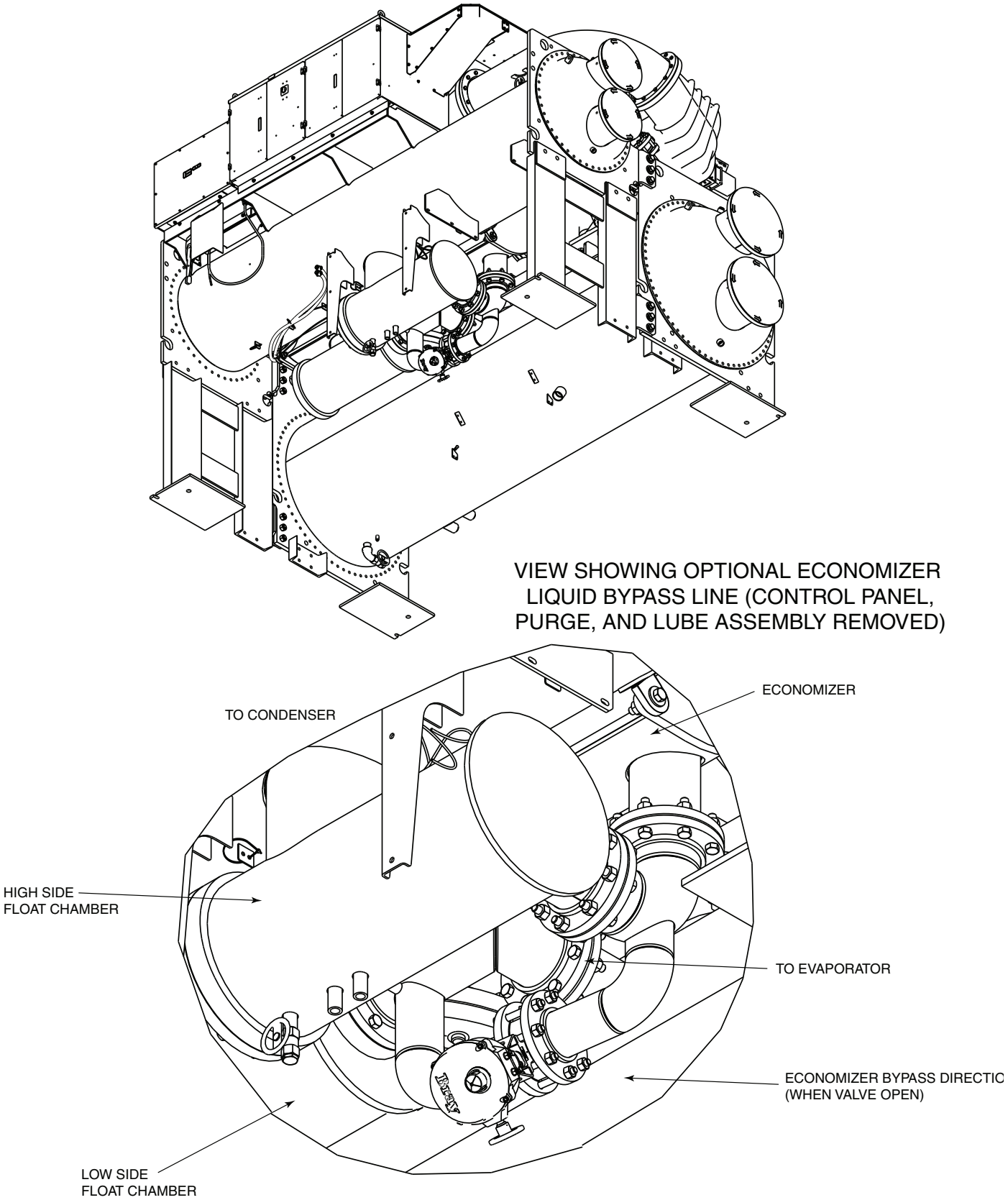
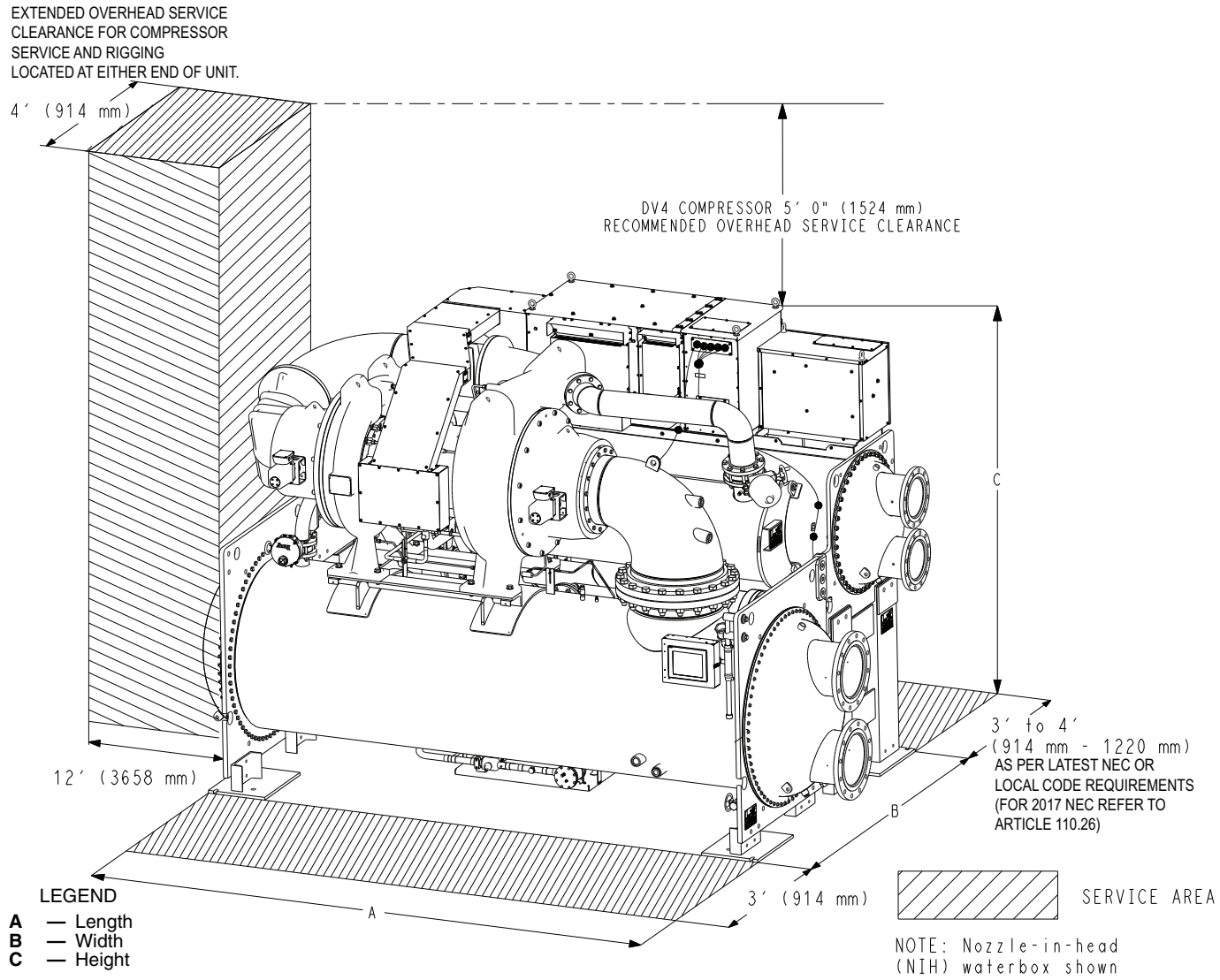



**Fig. 3 — Typical 19DV Compressor Chiller Liquid Bypass**




NOTES:
1. Dished head (NIH) waterbox shown.
2. Service areas are minimum space required. For compressor service either end allow 4 feet (1220 mm) on the evaporator side of the chiller or provide free space above the tube pull area equal to the height of the chiller plus 5 feet (1524 mm).

**Fig. 4 — 19DV 500-800 Ton Two-Stage Chiller Dimensions**

**⚠ CAUTION**

Freezing water can damage equipment. If machine can be or possibly has been exposed to freezing temperatures after water circuits have been installed, open waterbox drains and remove all water from evaporator and condenser. Leave drains open until system is ready to be filled.

It is important to properly plan before installing a 19DV unit to ensure that the environmental and operating conditions are satisfactory and the machine is protected. The installation must comply with all requirements in this document and in the certified prints.

***Operating Environment***

Chiller should be installed in an indoor environment where the ambient temperature is between 40 and 104°F (4 and 40°C) with a relative humidity of 95% or less, non-condensing. 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.

NOTE: NEMA Type 1 enclosures are constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt. This type of enclosure does not protect against water, dust, moisture or airborne contaminants.

## Step 2 — Rig the Machine

The 19DV machine can be rigged as an entire assembly. It also has connections that allow the compressor, evaporator, and condenser sections to be separated and rigged individually.

RIG MACHINE ASSEMBLY

See rigging instructions on label attached to machine. Refer to rigging guide (Fig. 5), dimensions in Fig. 4, and physical data in Tables 1-12. *Lift machine only from the points indicated in rigging guide.*

IMPORTANT: Verify with company performing the rigging that they have access to required spreader beam for 4 point lift. Carrier is not responsible for rigging damage.

Each lifting cable or chain must be capable of supporting the entire weight of the machine.

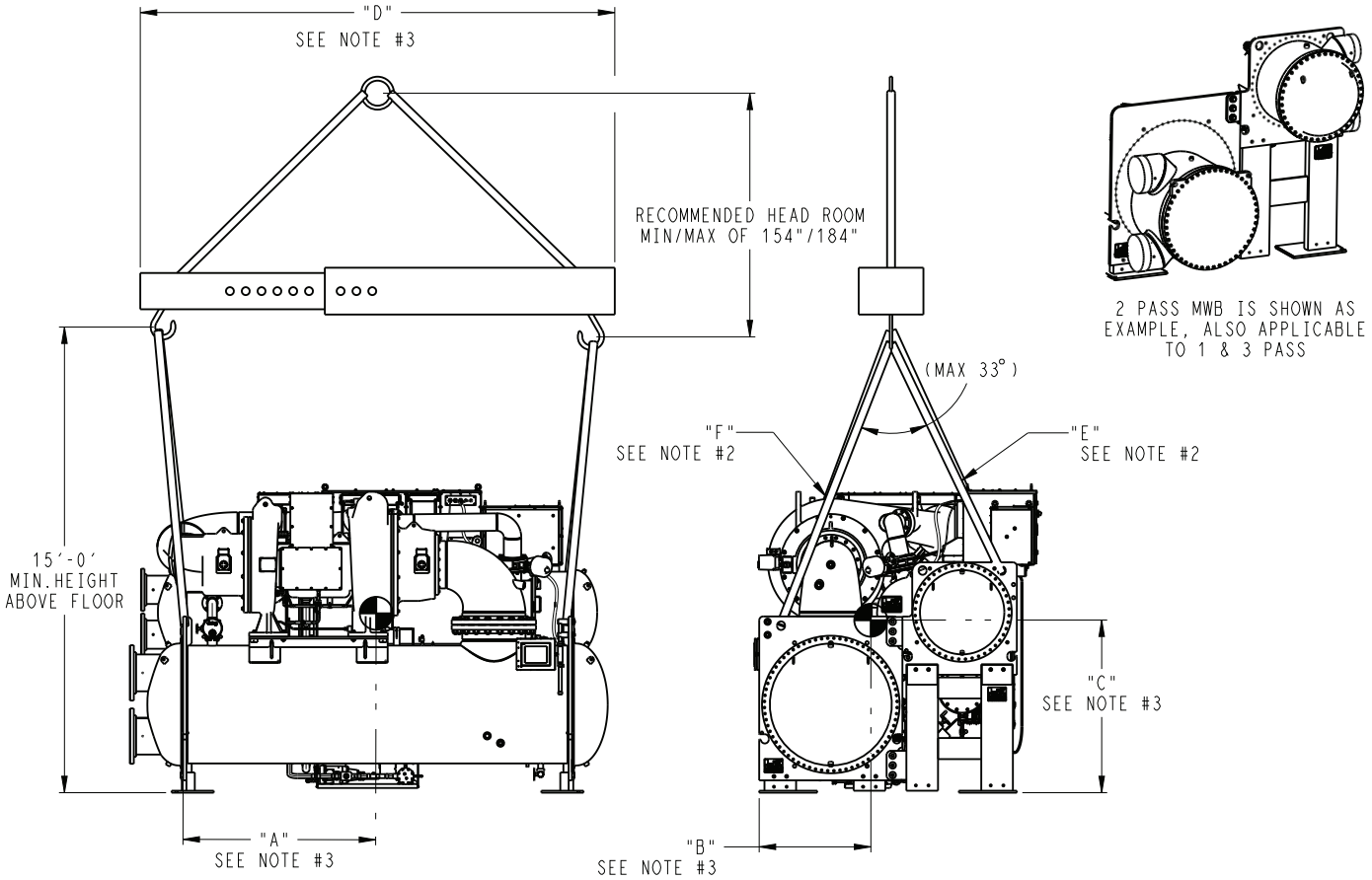
Contractors are not authorized to disassemble any part of the chiller without Carrier's supervision. Any request otherwise must be approved in writing by the Carrier Technical Service Manager. Non-conformance to this requirement may result in loss of product warranty.

NOTE: If transmission of vibrations from mechanical equipment is of concern and is not the responsibility of the manufacturer, Carrier suggests that a structural engineer be consulted.

**⚠ WARNING**

Lifting chiller or components from points other than those specified may result in serious damage to the machine or personal injury. Rigging equipment and procedures must be adequate for maximum chiller weight. See Fig. 5 for maximum chiller and component weights.

| COMPRESSOR FRAME | EVAPORATOR CODE | NIH MAX. WEIGHT LB | MWB MAX. WEIGHT LB | VESSEL LENGTH ft | DIM. "A" in. | DIM. "B" in. | DIM. "C" in. | DIM. "D" in. | CHAIN LENGTH "E" in. | CHAIN LENGTH "F" in. |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | G2A~G2K, G20~G29 | 35,900 | 38,000 | 12 | 92 | 35 | 58 | 168 | 106 | 126 |
| | G4A~G4K, G40~G49 | 38,000 | 40,100 | 14 | 100 | 34 | 57 | 188 | 106 | 126 |
| | H2A~H2K, H20~H29 | 38,700 | 41,100 | 12 | 72 | 50 | 66 | 168 | 106 | 126 |
| | H4A~H4K, H40~H49 | 41,200 | 43,500 | 14 | 75 | 55 | 64 | 188 | 106 | 126 |




LEGEND

**MWB** — Marine Waterbox
**NIH** — Nozzle in Head

**MACHINE RIGGING GUIDE**

NOTES:

1. Each chain must be capable of supporting the entire weight of the machine. See chart for maximum weights. (The maximum weights shown cover weights from steel and copper tubing, insulation, and refrigerant charge, excluding water weight.)
2. Chain lengths shown are typical for 15′ lifting height. Some minor adjustments may be required.
3. Dimensions "A" and "B" define distance from machine center of gravity to tube sheet outermost surfaces.
   Dimension "C" defines distance from machine center of gravity to floor.
   Dimension "D" defines distance measured between the chain lifting hooks.
4. Marine waterbox values are for 150 PSI rated.

**Fig. 5 — Machine Rigging Guide (Compressor Frame Size DV4)**

## Table 1 — 19DV Dimensions (Nozzle-In-Head Waterbox)

| HEAT EXCHANGER SIZE | PASSES | A (LENGTH, WITH NOZZLE-IN-HEAD WATERBOX) | | B (WIDTH) | | C (HEIGHT) | |
|---|---|---|---|---|---|---|---|
| | | in. | mm | in. | mm | in. | mm |
| G2* | 1 pass | 189.0 | 4801 | 108.4 | 2753 | 117.0 | 2972 |
| | 2 pass | 180.9 | 4595 | | | | |
| | 3 pass | 185.5 | 4712 | | | | |
| G4* | 1 pass | 209.5 | 5322 | 99.9 | 2537 | 117.0 | 2972 |
| | 2 pass | 201.4 | 5116 | | | | |
| | 3 pass | 206.0 | 5233 | | | | |
| H2* | 1 pass | 190.8 | 4847 | 114.0 | 2896 | 123.9 | 3148 |
| | 2 pass | 183.4 | 4659 | | | | |
| | 3 pass | 187.5 | 4763 | | | | |
| H4* | 1 pass | 211.3 | 5368 | 110.3 | 2802 | 123.9 | 3148 |
| | 2 pass | 203.9 | 5180 | | | | |
| | 3 pass | 208.0 | 5284 | | | | |

NOTES:
1. 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, local safety code, and Carrier drawings.
2. Overhead clearance for service rigging compressor should be at minimum 3 feet (914 mm) with 5 feet (1524 mm) recommended for easier overhead access.
3. Dimensions are approximate. Certified drawings available upon request.
4. Marine waterboxes typically add to the width of the machine. See certified drawings for details.
5. 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and flanged connections. See certified drawings.
6. 19DV unit heights can vary depending on the configuration. Check 19DV certified drawings for height information.
7. Table contains heat exchanger dimensions. For arrangements where the compressor motor housing extends past the waterbox, consult the 19DV certified drawings.
8. Consult factory for configurations not listed in the above table.

## Table 2 — 19DV 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 |
| G | 14 | 14 | 12 | 12 | 10 | 10 |
| H | 14 | 14 | 12 | 12 | 12 | 10 |

## Table 3 — 19DV Dimensions (Marine Waterbox, 150 psig)

| HEAT EXCHANGER SIZE | PASSES | A (LENGTH, WITH MARINE WATERBOX) | | B (WIDTH) | | C (HEIGHT) | |
|---|---|---|---|---|---|---|---|
| | | in. | mm | in. | mm | in. | mm |
| G2* | 1 pass | 218.5 | 5550 | 108.4 | 2753 | 117.0 | 2972 |
| | 2 pass | 192.3 | 4883 | | | | |
| | 3 pass | 210.8 | 5353 | | | | |
| G4* | 1 pass | 239.0 | 6071 | 102.2 | 2594 | 117.0 | 2972 |
| | 2 pass | 212.8 | 5404 | | | | |
| | 3 pass | 231.3 | 5871 | | | | |
| H2* | 1 pass | 220.5 | 5601 | 114.0 | 2896 | 123.9 | 3148 |
| | 2 pass | 194.2 | 4933 | | | | |
| | 3 pass | 212.5 | 5215 | | | | |
| H4* | 1 pass | 241.0 | 6122 | 112.9 | 2868 | 123.9 | 3148 |
| | 2 pass | 214.7 | 5454 | | | | |
| | 3 pass | 233.0 | 5919 | | | | |

NOTES:
1. 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, local safety code, and Carrier drawings.
2. Overhead clearance for service rigging compressor should be at minimum 3 feet (914 mm) with 5 feet (1524 mm) recommended for easier overhead access.
3. Dimensions are approximate. Certified drawings available upon request.
4. Marine waterboxes typically add to the width of the machine. See certified drawings for details.
5. 19DV unit height can vary depending on the configuration. Check 19DV certified drawings for height information.
6. The table does not take into account equipment overhang or nozzle configurations with nozzles on opposite ends of chiller or mix of waterbox types. See certified drawings for final unit dimensions.

## Table 4 — Component Weights

| COMPONENT | DV4 COMPRESSOR | |
|---|---|---|
| | lb | kg |
| SUCTION PIPE ASSEMBLY (INCLUDES FLANGES) | 569 | 258 |
| INTERSTAGE PIPING | 1000 | 4 |
| DISCHARGE PIPING | 5 | 3 |
| HMI PANEL | 24 | 11 |
| CONTROL PANEL | 190 | 86 |
| HIGH SIDE FLOAT CHAMBER COVER | 50 | 23 |
| LOW SIDE FLOAT CHAMBER COVER | 50 | 23 |
| PURGE ASSEMBLY | 263 | 119 |
| ENVELOP CONTROL VALVE / HGBP (OPTION) | 97 | 44 |
| LIQUID BYPASS VALVE (OPTION) | 121 | 55 |
| FREE COOLING VALVE (OPTION) | 184 | 84 |
| FREE COOLING PIPE (INCLUDES EC VALVE AND FREE COOLING VALVE) | 478 | 217 |
| LIQUID BYPASS AND ISOLATION VALVE (OPTION) | 300 | 136 |
| VFD 32VSS0850 | 1450 | 658 |
| VFD ACTIVE HARMONIC FILTER | 332 | 151 |
| VFD CABLE | 200 | 91 |
| VFD TRAY | 124 | 57 |

## Table 5 — 19DV Compressor and Motor Weights* — DV4 High-Efficiency Motors

| MOTOR CODE | ENGLISH | | | SI | | |
|---|---|---|---|---|---|---|
| | COMPRESSOR WEIGHT† (lb) | STATOR AND HOUSING WEIGHT (lb) | ROTOR AND SHAFT WEIGHT (lb) | COMPRESSOR WEIGHT† (kg) | STATOR AND HOUSING WEIGHT (kg) | ROTOR AND SHAFT WEIGHT (kg) |
| **Voltage: 380/460** | | | | | | |
| B | 6195 | 1090 | 330 | 2810 | 494 | 150 |
| D | 6195 | 1150 | 340 | 2810 | 522 | 154 |
| F | 6195 | 1230 | 350 | 2810 | 558 | 159 |
| H | 6195 | 1316 | 364 | 2810 | 597 | 165 |

* Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, rotor, and end bell cover weights.

† Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only.

## Table 6 — 19DV Two-Stage Compressor Frame Size DV4 Heat Exchanger Weights (English)

| CODE† | DRY RIGGING WEIGHT (LB)* | | REFRIGERANT WEIGHT (LB) | | WATER WEIGHT (LB) | |
|---|---|---|---|---|---|---|
| | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY |
| **G20** | 8611 | — | 700 | — | 1723 | — |
| **G21** | 8772 | — | 700 | — | 1799 | — |
| **G22** | 8942 | 6713 | 700 | 413 | 1879 | 1332 |
| **G23** | 9111 | 6956 | 700 | 405 | 1959 | 1430 |
| **G24** | 9330 | 7222 | 700 | 402 | 2063 | 1539 |
| **G25** | 8677 | — | 700 | — | 1695 | — |
| **G26** | 8802 | — | 700 | — | 1754 | — |
| **G27** | 8972 | 6669 | 700 | 413 | 1834 | 1245 |
| **G28** | 9147 | 6884 | 700 | 405 | 1917 | 1333 |
| **G29** | 9339 | 7140 | 700 | 402 | 2007 | 1437 |
| **G40** | 9260 | — | 840 | — | 1808 | — |
| **G41** | 9446 | — | 840 | — | 1895 | — |
| **G42** | 9641 | 7275 | 840 | 468 | 1986 | 1453 |
| **G43** | 9836 | 7555 | 840 | 458 | 2076 | 1566 |
| **G44** | 10088 | 7860 | 840 | 455 | 2195 | 1689 |
| **G45** | 9326 | — | 840 | — | 1780 | — |
| **G46** | 9470 | — | 840 | — | 1847 | — |
| **G47** | 9665 | 7220 | 840 | 468 | 1938 | 1363 |
| **G48** | 9867 | 7467 | 840 | 458 | 2032 | 1463 |
| **G49** | 10087 | 7760 | 840 | 455 | 2135 | 1581 |
| **G2A** | 8225 | — | 700 | — | 1740 | — |
| **G2B** | 8324 | — | 700 | — | 1807 | — |
| **G2C** | 8433 | 6198 | 700 | 413 | 1881 | 1424 |
| **G2D** | 8540 | 6402 | 700 | 405 | 1952 | 1544 |
| **G2E** | 8699 | 6585 | 700 | 397 | 2059 | 1653 |
| **G2F** | 8236 | — | 700 | — | 1675 | — |
| **G2G** | 8331 | — | 700 | — | 1739 | — |
| **G2H** | 8450 | 6180 | 700 | 413 | 1819 | 1340 |
| **G2J** | 8580 | 6359 | 700 | 405 | 1907 | 1446 |
| **G2K** | 8710 | 6504 | 700 | 397 | 1994 | 1532 |
| **G4A** | 8818 | — | 840 | — | 1827 | — |
| **G4B** | 8933 | — | 840 | — | 1904 | — |
| **G4C** | 9059 | 6688 | 840 | 468 | 1988 | 1558 |
| **G4D** | 9182 | 6922 | 840 | 458 | 2068 | 1696 |
| **G4E** | 9365 | 7133 | 840 | 448 | 2191 | 1819 |
| **G4F** | 8821 | — | 840 | — | 1757 | — |
| **G4G** | 8931 | — | 840 | — | 1830 | — |
| **G4H** | 9068 | 6663 | 840 | 468 | 1922 | 1471 |
| **G4J** | 9218 | 6869 | 840 | 458 | 2021 | 1591 |
| **G4K** | 9368 | 7036 | 840 | 448 | 2121 | 1690 |
| **H20** | 9572 | — | 741 | — | 2127 | — |
| **H21** | 9755 | — | 752 | — | 2213 | — |
| **H22** | 9936 | 7933 | 763 | 484 | 2298 | 1726 |
| **H23** | 10177 | 8253 | 778 | 495 | 2412 | 1856 |
| **H24** | 10420 | 8601 | 792 | 507 | 2527 | 1996 |
| **H25** | 9518 | — | 741 | — | 2101 | — |
| **H26** | 9697 | — | 752 | — | 2185 | — |
| **H27** | 9906 | 7815 | 763 | 484 | 2284 | 1678 |
| **H28** | 10115 | 8125 | 778 | 495 | 2383 | 1803 |
| **H29** | 10356 | 8450 | 792 | 507 | 2497 | 1936 |
| **H40** | 10315 | — | 841 | — | 2235 | — |
| **H41** | 10526 | — | 853 | — | 2334 | — |
| **H42** | 10734 | 8618 | 866 | 484 | 2430 | 1882 |
| **H43** | 11011 | 8985 | 883 | 495 | 2560 | 2029 |
| **H44** | 11291 | 9384 | 900 | 507 | 2690 | 2189 |
| **H45** | 10253 | — | 841 | — | 2205 | — |
| **H46** | 10459 | — | 853 | — | 2302 | — |
| **H47** | 10700 | 8482 | 866 | 563 | 2414 | 1827 |
| **H48** | 10940 | 8837 | 883 | 576 | 2527 | 1969 |

## Table 6 — 19DV Two-Stage Compressor Frame Size DV4 Heat Exchanger Weights (English)(cont)

| CODE† | DRY RIGGING WEIGHT (LB)* | | REFRIGERANT WEIGHT (LB) | | WATER WEIGHT (LB) | |
|---|---|---|---|---|---|---|
| | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY |
| **H49** | 11218 | 9211 | 900 | 590 | 2657 | 2121 |
| **H2A** | 9025 | — | 700 | — | 2111 | — |
| **H2B** | 9149 | — | 707 | — | 2195 | — |
| **H2C** | 9294 | 7294 | 716 | 431 | 2293 | 1852 |
| **H2D** | 9453 | 7532 | 726 | 439 | 2400 | 1991 |
| **H2E** | 9623 | 7791 | 736 | 448 | 2514 | 2143 |
| **H2F** | 8990 | — | 700 | — | 2088 | — |
| **H2G** | 9115 | — | 707 | — | 2172 | — |
| **H2H** | 9253 | 7210 | 716 | 431 | 2266 | 1802 |
| **H2J** | 9402 | 7425 | 726 | 439 | 2363 | 1929 |
| **H2K** | 9568 | 7675 | 736 | 448 | 2477 | 2075 |
| **H4A** | 9692 | — | 795 | — | 2218 | — |
| **H4B** | 9835 | — | 803 | — | 2313 | — |
| **H4C** | 10002 | 7889 | 813 | 499 | 2424 | 2025 |
| **H4D** | 10185 | 8163 | 824 | 508 | 2546 | 2183 |
| **H4E** | 10381 | 8461 | 836 | 518 | 2676 | 2356 |
| **H4F** | 9652 | — | 795 | — | 2191 | — |
| **H4G** | 9795 | — | 803 | — | 2286 | — |
| **H4H** | 9956 | 7792 | 813 | 499 | 2393 | 1969 |
| **H4J** | 10126 | 8040 | 824 | 508 | 2504 | 2113 |
| **H4K** | 10318 | 8327 | 836 | 518 | 2634 | 2279 |

* Rigging weights are for standard Super B5LSL and Super C5 tubes of standard wall thickness (0.025-in. [0.635 mm] wall) and do not include refrigerant weight.

† See Model Number Nomenclature on page 5.

NOTES:
1. Evaporator weight includes two-pass Victaulic dished heads.
2. Condenser weight includes the high side float chamber, discharge pipe, and two-pass Victaulic dished heads; does not include economizer weight.

## Table 7 — 19DV Two-Stage Compressor Frame Size DV4 Heat Exchanger Weights (SI)

| CODE† | DRY RIGGING WEIGHT (kg)* | | REFRIGERANT WEIGHT (kg) | | WATER WEIGHT (kg) | |
|---|---|---|---|---|---|---|
| | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY |
| **G20** | 3906 | — | 318 | — | 782 | — |
| **G21** | 3979 | — | 318 | — | 816 | — |
| **G22** | 4056 | 3045 | 318 | 187 | 852 | 604 |
| **G23** | 4133 | 3155 | 318 | 184 | 889 | 649 |
| **G24** | 4232 | 3276 | 318 | 182 | 936 | 698 |
| **G25** | 3936 | — | 318 | — | 769 | — |
| **G26** | 3993 | — | 318 | — | 796 | — |
| **G27** | 4070 | 3025 | 318 | 187 | 832 | 565 |
| **G28** | 4149 | 3123 | 318 | 184 | 870 | 605 |
| **G29** | 4236 | 3239 | 318 | 182 | 910 | 652 |
| **G40** | 4200 | — | 381 | — | 820 | — |
| **G41** | 4285 | — | 381 | — | 860 | — |
| **G42** | 4373 | 3300 | 381 | 212 | 901 | 659 |
| **G43** | 4462 | 3427 | 381 | 208 | 942 | 710 |
| **G44** | 4576 | 3565 | 381 | 206 | 996 | 766 |
| **G45** | 4230 | — | 381 | — | 807 | — |
| **G46** | 4296 | — | 381 | — | 838 | — |
| **G47** | 4384 | 3275 | 381 | 212 | 879 | 618 |
| **G48** | 4476 | 3387 | 381 | 208 | 922 | 664 |
| **G49** | 4575 | 3520 | 381 | 206 | 968 | 717 |
| **G2A** | 3731 | — | 318 | — | 789 | — |
| **G2B** | 3776 | — | 318 | — | 820 | — |
| **G2C** | 3825 | 2811 | 318 | 187 | 853 | 646 |
| **G2D** | 3874 | 2904 | 318 | 184 | 885 | 700 |
| **G2E** | 3946 | 2987 | 318 | 180 | 934 | 750 |
| **G2F** | 3736 | — | 318 | — | 760 | — |
| **G2G** | 3779 | — | 318 | — | 789 | — |
| **G2H** | 3833 | 2803 | 318 | 187 | 825 | 608 |
| **G2J** | 3892 | 2884 | 318 | 184 | 865 | 656 |
| **G2K** | 3951 | 2950 | 318 | 180 | 904 | 695 |
| **G4A** | 4000 | — | 381 | — | 829 | — |
| **G4B** | 4052 | — | 381 | — | 864 | — |
| **G4C** | 4109 | 3034 | 381 | 212 | 902 | 707 |
| **G4D** | 4165 | 3140 | 381 | 208 | 938 | 769 |
| **G4E** | 4248 | 3235 | 381 | 203 | 994 | 825 |
| **G4F** | 4001 | — | 381 | — | 797 | — |
| **G4G** | 4051 | — | 381 | — | 830 | — |
| **G4H** | 4113 | 3022 | 381 | 212 | 872 | 667 |
| **G4J** | 4181 | 3116 | 381 | 208 | 917 | 722 |
| **G4K** | 4249 | 3191 | 381 | 203 | 962 | 767 |
| **H20** | 4342 | — | 336 | — | 965 | — |
| **H21** | 4425 | — | 341 | — | 1004 | — |
| **H22** | 4507 | 3599 | 346 | 220 | 1042 | 783 |
| **H23** | 4616 | 3744 | 353 | 225 | 1094 | 842 |
| **H24** | 4726 | 3901 | 359 | 230 | 1146 | 905 |
| **H25** | 4317 | — | 336 | — | 953 | — |
| **H26** | 4399 | — | 341 | — | 991 | — |
| **H27** | 4493 | 3545 | 346 | 220 | 1036 | 761 |
| **H28** | 4588 | 3685 | 353 | 225 | 1081 | 818 |
| **H29** | 4698 | 3833 | 359 | 230 | 1133 | 878 |
| **H40** | 4679 | — | 381 | — | 1014 | — |
| **H41** | 4774 | — | 387 | — | 1058 | — |
| **H42** | 4869 | 3909 | 393 | 220 | 1102 | 853 |
| **H43** | 4995 | 4075 | 401 | 225 | 1161 | 920 |
| **H44** | 5121 | 4256 | 408 | 230 | 1220 | 993 |
| **H45** | 4651 | — | 381 | — | 1000 | — |
| **H46** | 4744 | — | 387 | — | 1044 | — |
| **H47** | 4853 | 3847 | 393 | 255 | 1095 | 829 |
| **H48** | 4962 | 4008 | 401 | 261 | 1146 | 893 |

## Table 7 — 19DV Two-Stage Compressor Frame Size DV4 Heat Exchanger Weights (SI)(cont)

| CODE† | DRY RIGGING WEIGHT (kg)* | | REFRIGERANT WEIGHT (kg) | | WATER WEIGHT (kg) | |
|---|---|---|---|---|---|---|
| | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY | EVAPORATOR ONLY | CONDENSER ONLY |
| **H49** | 5088 | 4178 | 408 | 268 | 1205 | 962 |
| **H2A** | 4094 | — | 318 | — | 958 | — |
| **H2B** | 4150 | — | 321 | — | 996 | — |
| **H2C** | 4216 | 3308 | 325 | 195 | 1040 | 840 |
| **H2D** | 4288 | 3416 | 329 | 199 | 1089 | 903 |
| **H2E** | 4365 | 3534 | 334 | 203 | 1140 | 972 |
| **H2F** | 4078 | — | 318 | — | 947 | — |
| **H2G** | 4134 | — | 321 | — | 985 | — |
| **H2H** | 4197 | 3270 | 325 | 195 | 1028 | 818 |
| **H2J** | 4265 | 3368 | 329 | 199 | 1072 | 875 |
| **H2K** | 4340 | 3481 | 334 | 203 | 1124 | 941 |
| **H4A** | 4396 | — | 361 | — | 1006 | — |
| **H4B** | 4461 | — | 364 | — | 1049 | — |
| **H4C** | 4537 | 3578 | 369 | 226 | 1100 | 919 |
| **H4D** | 4620 | 3703 | 374 | 230 | 1155 | 990 |
| **H4E** | 4709 | 3838 | 379 | 235 | 1214 | 1069 |
| **H4F** | 4378 | — | 361 | — | 994 | — |
| **H4G** | 4443 | — | 364 | — | 1037 | — |
| **H4H** | 4516 | 3535 | 369 | 226 | 1086 | 893 |
| **H4J** | 4593 | 3647 | 374 | 230 | 1136 | 958 |
| **H4K** | 4680 | 3777 | 379 | 235 | 1195 | 1034 |

* Rigging weights are for standard Super B5LSL and Super C5 tubes of standard wall thickness (0.025-in. [0.635 mm] wall) and do not include refrigerant weight.

† See Model Number Nomenclature on page 5.

NOTES:
1. Evaporator weight includes two-pass Victaulic dished heads.
2. Condenser weight includes the high side float chamber, discharge pipe, and two-pass Victaulic dished heads; does not include economizer weight.

## Table 8 — 19DV Two-Stage Compressor Frame Size DV4 Economizer Weight

| ECONOMIZER SIZE | DRY WEIGHT (lb)* | REFRIGERANT WEIGHT (lb) | OPERATION WEIGHT (lb) | DRY WEIGHT (kg)* | REFRIGERANT WEIGHT (kg) | OPERATION WEIGHT (kg) |
|---|---|---|---|---|---|---|
| **12 in.** | 1961 | 342 | 2303 | 889 | 155 | 1044 |
| **14 in.** | 2330 | 342 | 2672 | 1057 | 155 | 1212 |

* Includes standard economizer weight and all connecting piping to compressor.

## Table 9 — Additional Weights for 19DV 150 psig (1034 kPa) Marine Waterboxes* 19DV4† — English (lb)

| FRAME | NUMBER OF PASSES | EVAPORATOR | | | CONDENSER | | |
|---|---|---|---|---|---|---|---|
| | | RIGGING WGT | | WATER WGT | RIGGING WGT | | WATER WGT |
| | | VICTAULIC | FLANGE | | VICTAULIC | FLANGE | |
| G | 1 | 1221 | 1069 | 1174 | 612 | 498 | 1398 |
| | 2 | 864 | 716 | 607 | 449 | 373 | 558 |
| | 3 | 1533 | 1419 | 1001 | 848 | 778 | 1161 |
| H | 1 | 1517 | 1369 | 1131 | 815 | 703 | 1675 |
| | 2 | 941 | 793 | 597 | 672 | 560 | 802 |
| | 3 | 1659 | 1547 | 921 | 1080 | 1010 | 1395 |

* Add to evaporator and condenser weights for total weights. Evaporator and condenser weights may be found in Table 6. The first digit of the heat exchanger code (first column) is the heat exchanger frame size.

† Values are for Victaulic nozzles, two-pass dished head design.

## Table 10 — Additional Weights for 19DV 150 psig (1034 kPa) Marine Waterboxes* 19DV4† — SI (kg)

| FRAME | NUMBER OF PASSES | EVAPORATOR | | | CONDENSER | | |
|---|---|---|---|---|---|---|---|
| | | RIGGING WGT | | WATER WGT | RIGGING WGT | | WATER WGT |
| | | VICTAULIC | FLANGE | | VICTAULIC | FLANGE | |
| G | 1 | 554 | 485 | 533 | 278 | 226 | 634 |
| | 2 | 392 | 325 | 275 | 204 | 169 | 253 |
| | 3 | 695 | 644 | 454 | 385 | 353 | 527 |
| H | 1 | 688 | 621 | 513 | 370 | 319 | 760 |
| | 2 | 427 | 360 | 271 | 305 | 254 | 364 |
| | 3 | 753 | 702 | 418 | 490 | 458 | 633 |

* Add to evaporator and condenser weights for total weights. Evaporator and condenser weights may be found in Table 7. The first digit of the heat exchanger code (first column) is the heat exchanger frame size.

† Values are for Victaulic nozzles, two-pass dished head design.

## Table 11 — 19DV Waterbox Cover Weights, DV4 — English (lb)

| WATERBOX DESCRIPTION | PASSES | EVAPORATOR | | | | CONDENSER | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | FRAME G | | FRAME H | | FRAME G | | FRAME H | |
| | | FLANGED | VICTAULIC | FLANGED | VICTAULIC | FLANGED | VICTAULIC | FLANGED | VICTAULIC |
| NIH DISHED COVER, 150 PSIG | 1 | 494 | 417 | 515 | 437 | 232 | 172 | 249 | 187 |
| | 2 | 682 | 528 | 714 | 560 | 308 | 235 | 390 | 273 |
| | 2 return | 404 | | 424 | | 154 | | 168 | |
| | 3 | 557 | 499 | 588 | 529 | 247 | 210 | 268 | 232 |
| MWB FLAT COVER, 150 PSIG | 1 | 668 | | 759 | | 138 | | 172 | |
| | 2 | | | | | 172 | | 214 | |
| | 2 return | 404 | | 422 | | 154 | | 168 | |
| | 3 | 668 | | 759 | | 172 | | 215 | |

LEGEND

**MWB** — Marine Waterbox

NOTE: Weights for dished head cover and MWB end cover 150 psig are included in the heat exchanger weights shown in Table 6.

## Table 12 — 19DV Waterbox Cover Weights, DV4 — SI (kg)

| WATERBOX DESCRIPTION | PASSES | EVAPORATOR | | | | CONDENSER | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | FRAME G | | FRAME H | | FRAME G | | FRAME H | |
| | | FLANGED | VICTAULIC | FLANGED | VICTAULIC | FLANGED | VICTAULIC | FLANGED | VICTAULIC |
| NIH DISHED COVER, 1034 kPa | 1 | 224 | 189 | 234 | 198 | 105 | 78 | 113 | 85 |
| | 2 | 309 | 239 | 324 | 254 | 140 | 107 | 177 | 124 |
| | 2 return | 183 | | 192 | | 70 | | 76 | |
| | 3 | 253 | 226 | 267 | 240 | 112 | 95 | 122 | 105 |
| MWB FLAT COVER, 1034 kPa | 1 | 303 | | 344 | | 63 | | 78 | |
| | 2 | | | | | 78 | | 97 | |
| | 2 return | 183 | | 191 | | 70 | | 76 | |
| | 3 | 303 | | 344 | | 78 | | 98 | |

LEGEND

**MWB** — Marine Waterbox

NOTE: Weights for dished head cover and MWB end cover 1034 kPa are included in the heat exchanger weights shown in Table 7.

RIG MACHINE COMPONENTS

Refer to instructions below, Fig. 6-8, and Carrier Certified Prints for machine component disassembly.

IMPORTANT: Only a qualified service technician should perform this operation.

**⚠ WARNING**

Do not attempt to disconnect flanges or tubing while the machine is under pressure or contains refrigerant. Failure to relieve pressure can result in personal injury or damage to the unit.

**⚠ CAUTION**

Before rigging the compressor, disconnect all wires connected to the control panel to avoid damage to electrical components.

NOTE: If the evaporator, economizer, and condenser vessels must be separated, the heat exchangers should be kept level by placing a support plate under the tube sheets. The support plate will also help to keep the vessels level and aligned when the vessels are bolted back together.

NOTE: Wiring must also be disconnected. Label each wire before removal (see Carrier Certified Prints). In order to disconnect the VFD from the machine, remove wiring between the VFD and the refrigerant pump, control panel, purge power, and the main motor leads at the starter lugs.

Remove all transducer and sensor wires at the sensor. Clip all wire ties necessary to pull heat exchangers apart.

NOTE: All factory units have inhibitor in the lubrication assembly. Both bearing supply and HS float chamber ball valves are shut at factory to contain the inhibitor (see Fig. 9). Should it be required to remove the lubrication assembly prior to start-up, do not cut any low piping without prior removal of inhibitor to avoid spilling on the floor.

***To Separate Evaporator and Condenser:***

1. Place a support plate under each tube sheet leg to keep each vessel level.
2. Cut tubing between high side float chamber and motor/VFD cooling.
3. Cut tubing between high side float chamber and lube assembly.
4. Disconnect the compressor discharge pipe.
5. Disconnect bolted connection between the low side float chamber and the evaporator.
6. Disconnect bolted economizer pipe between economizer and second stage compressor inlet.
7. Cut tubing between purge and compressor volute.
8. Cut tubing between purge regeneration line and motor drain.
9. Cover all openings.
10. Disconnect all wires and cables that cross from evaporator side of the machine to the condenser side.
11. Disconnect the marriage brackets connecting the evaporator and condenser tubesheets (both ends).

***To Separate the Compressor from the Evaporator:***

1. Unbolt motor drain flange.
2. Unbolt suction pipe flange.
3. Unbolt discharge pipe flange.
4. Cut tubing from purge to compressor volute.
5. Disconnect O-ring face seal from bearing drain (near motor drain).
6. Cut bearing supply tubing from lube assembly.
7. Cut motor cooling supply line tubing from high side float chamber.
8. Disconnect inhibitor reclaim line running from compressor to near bottom of evaporator.
9. Disconnect all power and control wires connected to the compressor.
10. Cover all openings.
11. Disconnect compressor motor power cables from VFD to motor.
12. Unbolt compressor mounting from the evaporator.

***Additional Notes***

1. Use silicone grease on new O-rings when refitting.
2. Use gasket sealant on new gaskets when refitting.

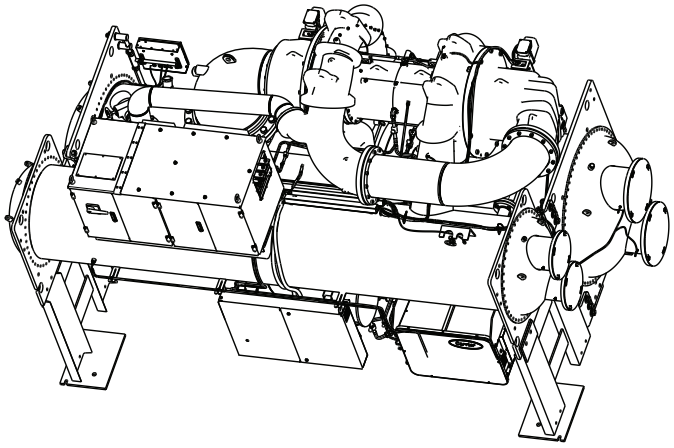


**Fig. 6 — 19DV4, Side View**

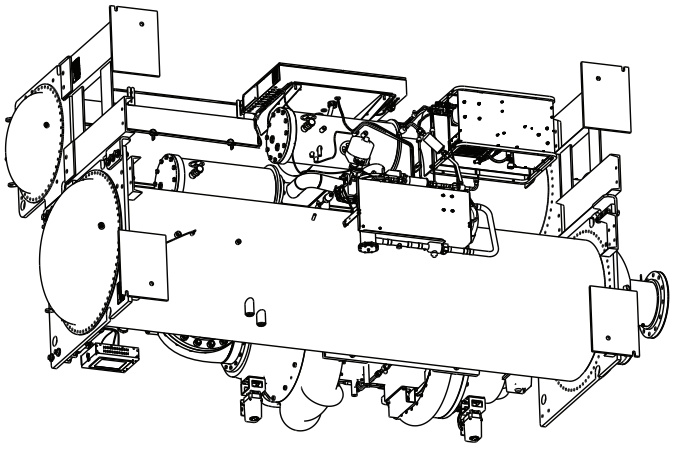
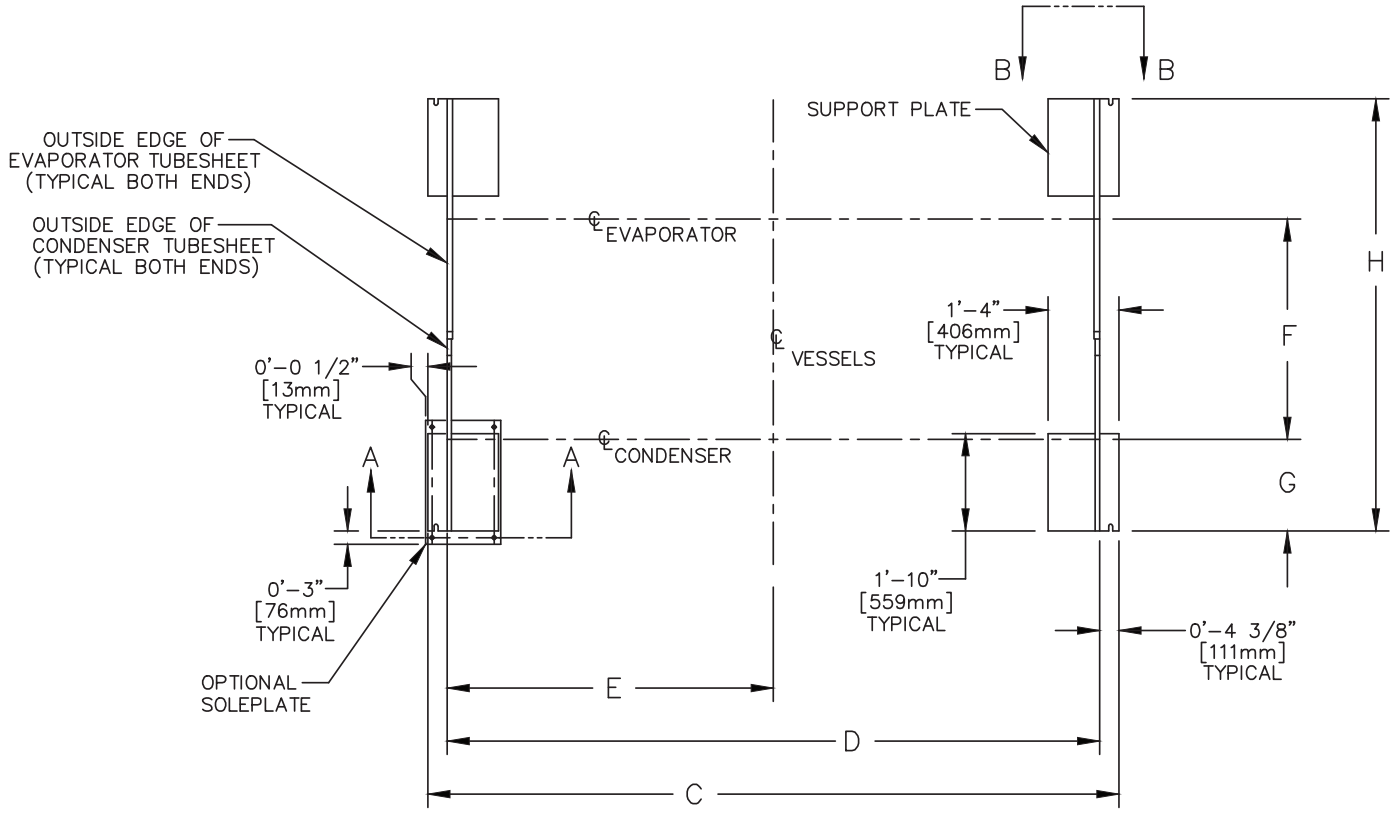


**Fig. 7 — 19DV4, Bottom View**




| | DIMENSION C | | DIMENSION D | | DIMENSION E | | DIMENSION F | | DIMENSION G | | DIMENSION H | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ft-in. | mm | ft-in. | mm | ft-in. | mm | ft-in. | mm | ft-in. | mm | ft-in. | mm |
| G2* | 13'-0 1/4" | (3969) | 12'-3 1/2" | (3747) | 6'-1 3/4" | (1873) | 4'-1 7/8" | (1267) | 1'-8 3/4" | (530) | 8'-1 3/4" | (2483) |
| G4* | 14'-8 3/4" | (4489) | 14'-0" | (4267) | 7'-0" | (2134) | 4'-1 7/8" | (1267) | 1'-8 3/4" | (530) | 8'-1 3/4" | (2483) |
| H2* | 13'-0 1/4" | (3969) | 12'-3 1/2" | (3747) | 6'-1 3/4" | (1873) | 4'-5 3/4" | (1365) | 1'-10 1/4" | (565) | 8'-9 1/4" | (2673) |
| H4* | 14'-8 3/4" | (4489) | 14'-0" | (4267) | 7'-0" | (2134) | 4'-5 3/4" | (1365) | 1'-10 1/4" | (565) | 8'-9 1/4" | (2673) |

NOTES:
1. A-A dimension refers to accessory soleplate. See page 20.
2. B-B dimension refers to standard support plate. See page 20.

**Fig. 8 — 19DV Machine Footprint**

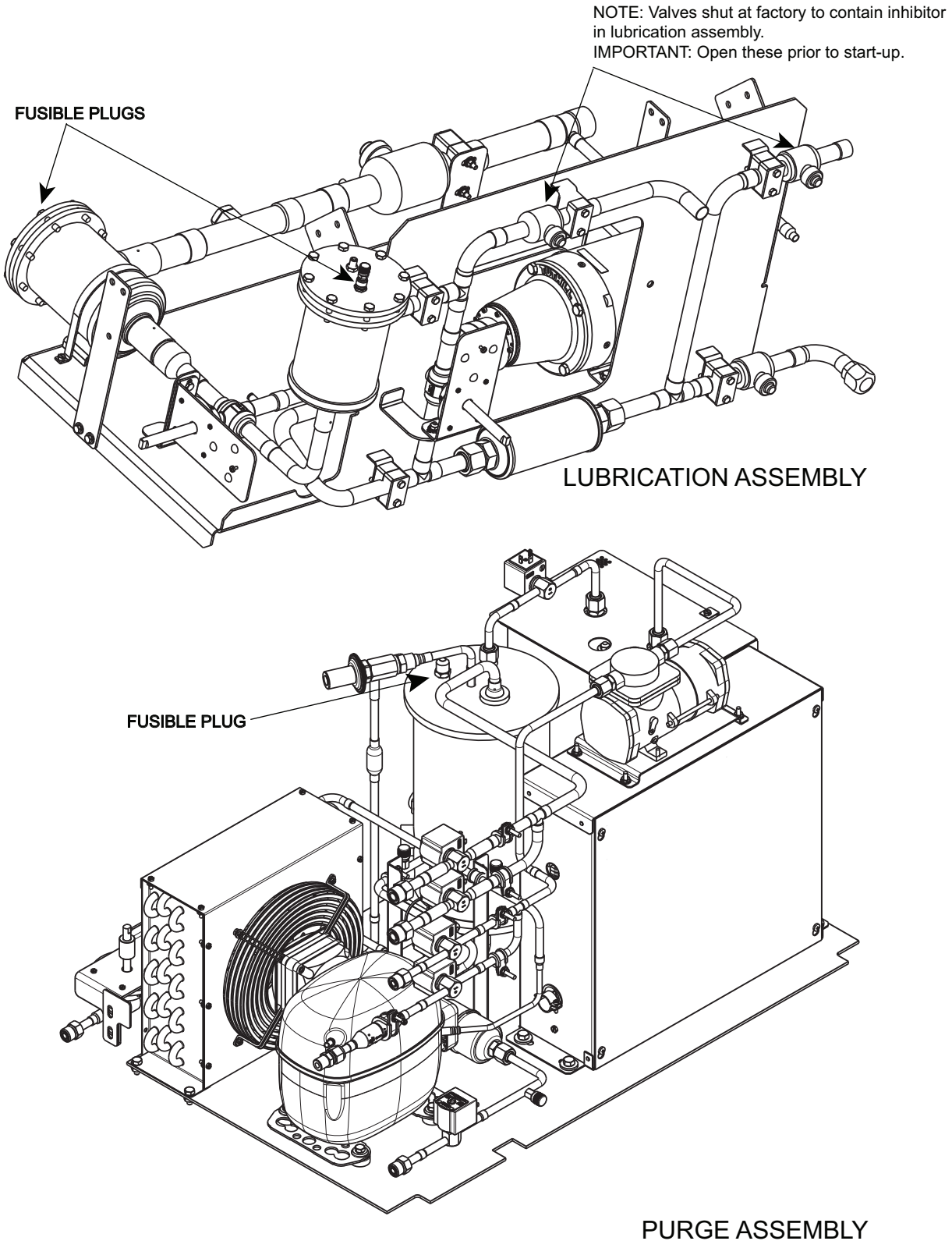



**Fig. 9 — Location of Fusible Plugs in Lubrication Assembly and Purge Assembly**

## Step 3 — Install Machine Supports

INSTALL STANDARD ISOLATION

Figure 8 shows the position of support plates and shear flex pads, which together form the standard machine support system.

IMPORTANT: Chiller housekeeping pad, anchor bolts, and attachment points that are designed by others must be in accordance with all applicable national and local codes.

INSTALL ACCESSORY ISOLATION (IF REQUIRED)

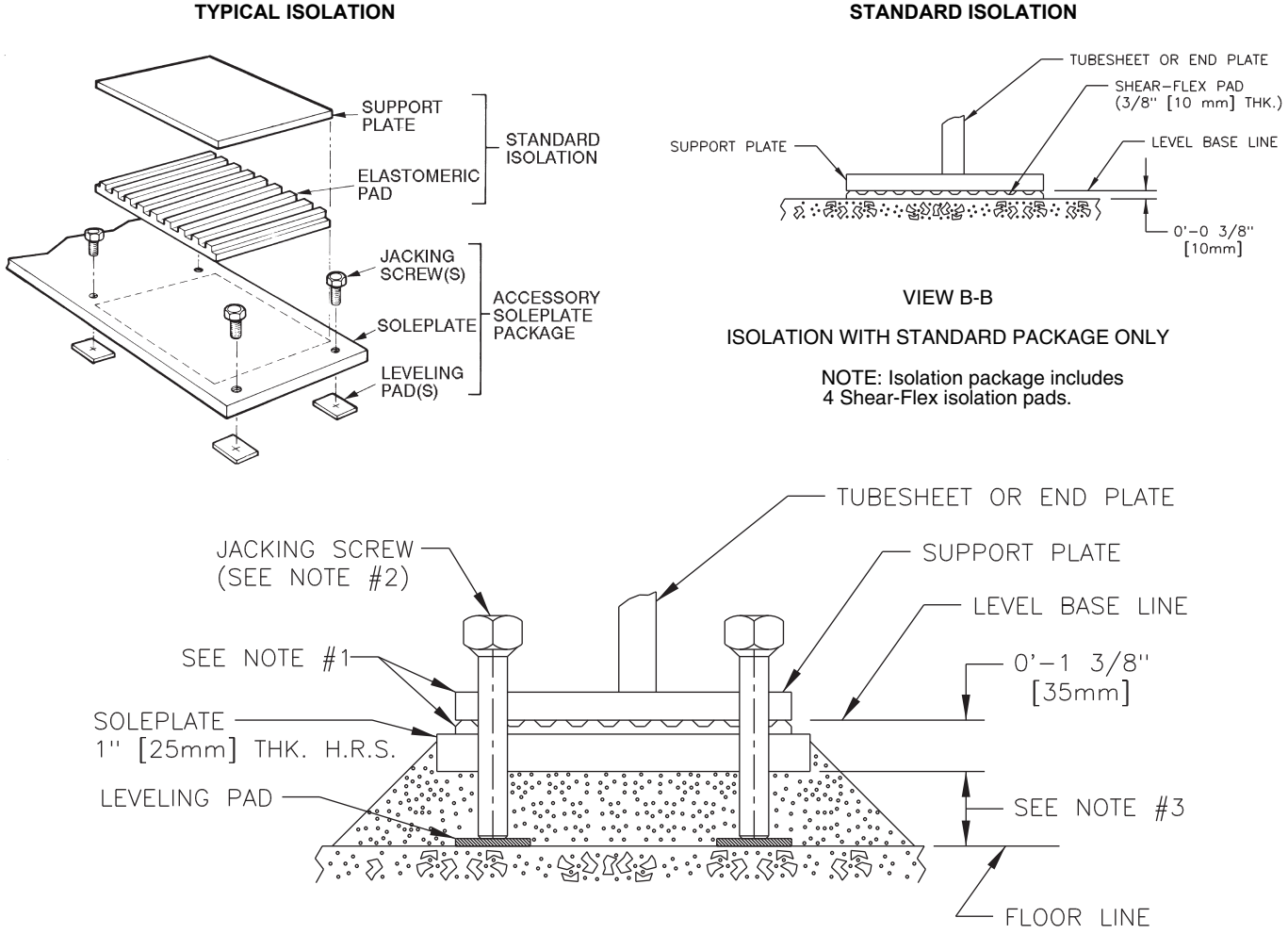
Uneven floors or other considerations may dictate the use of accessory soleplates (supplied by Carrier for field installation) and leveling pads. Refer to Fig. 10.

Chiller support plates must be level within 1/4-in. (6 mm) from one end to the other.

Level machine by using jacking screws in isolation soleplates. Use a level at least 24-in. (600 mm) long.

For adequate and long lasting machine support, proper grout selection and placement is essential. Carrier recommends that only pre-mixed, epoxy type, non-shrinking grout be used for machine installation. Follow manufacturer's instructions in applying grout.

1. Check machine location prints for required grout thickness.
2. Carefully wax jacking screws for easy removal from grout.
3. Grout must extend above the base of the soleplate and there must be no voids in grout beneath the plates.
4. Allow grout to set and harden, per manufacturer's instructions, before starting machine.
5. Remove jacking screws from leveling pads after grout has hardened.




NOTES:
1. Optional soleplate package includes 4 soleplates, 16 jacking screws and 16 leveling pads. Isolation package is also required.
2. Jacking screws to be removed after grout has set.
3. Thickness of grout will vary, depending on the amount necessary to level chiller. Use only pre-mixed non-shrinking grout, Ceilcote[1] 748 OR Embeco[2] 636 Plus, 0'-1½" (38.1 mm) to 0'-2¼" (57 mm) thick.

1. Ceilcote is a registered tradmark of Azko Nobel Coatings International.
2. Embeco is a registered trademark of Construction Research and Technology GMBH Corp.

**Fig. 10 — Accessory Isolation with Soleplate Package**

INSTALL SPRING ISOLATION

Spring isolation may be purchased as an accessory from Carrier for field installation. It may also be field supplied and installed. Spring isolators may be placed directly under machine support plates or located under machine soleplates. See Fig. 11. Consult job data for specific arrangement. Low profile spring isolation assemblies can be field supplied to keep the machine at a convenient working height.

Obtain specific details on spring mounting and machine weight distribution from job data. Also, check job data for methods to support and isolate pipes that are attached to spring isolated machines.

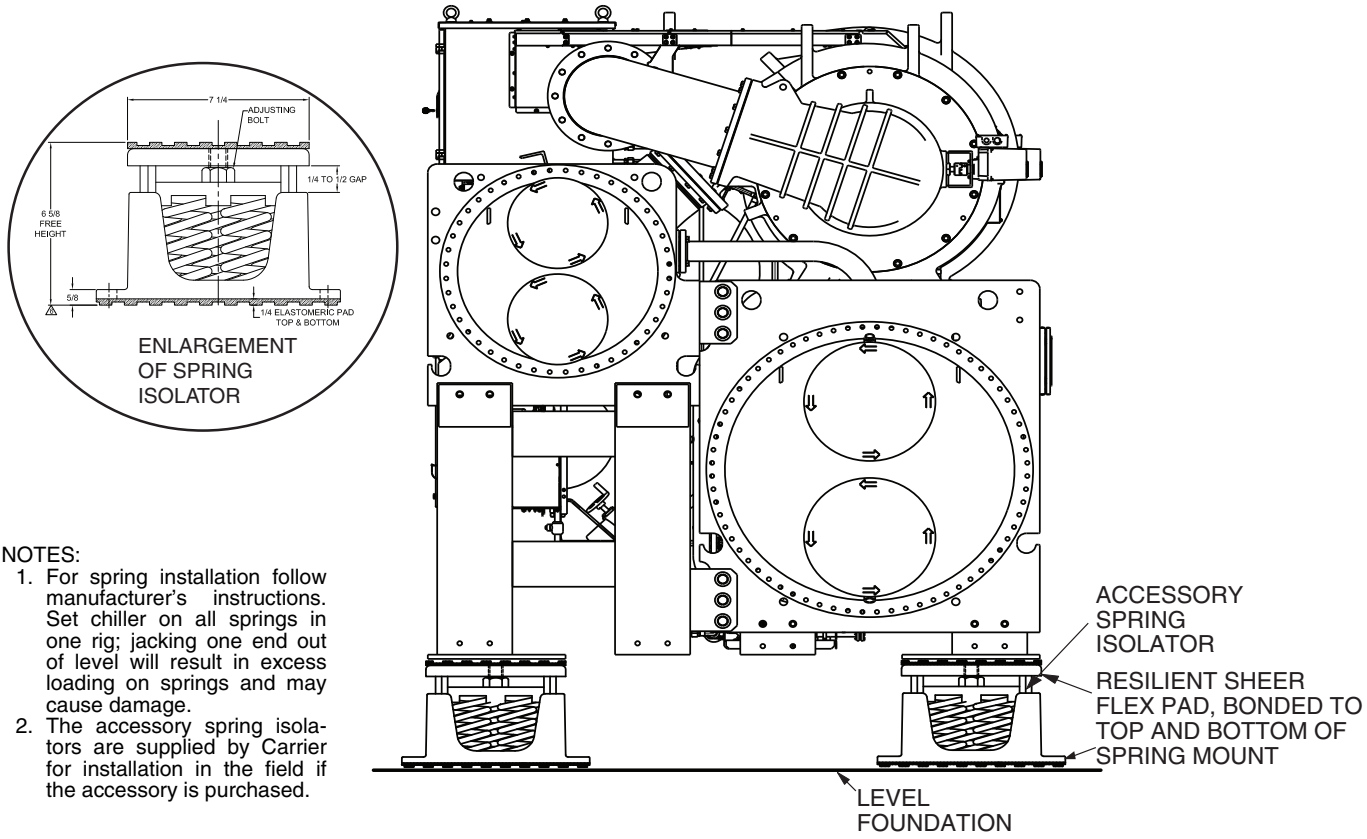
NOTE: The springs are designed to support the weight of the chiller only. Connected piping must be supported independently of the chiller.

NOTE: It is recommended that any installation other than the ground floor should have spring isolation for the chiller and piping vibration isolation.

NOTE: These isolators are not intended for seismic duty, but are intended to reduce the vibration and noise levels transmitted from the chiller to the surrounding environment. For installations adjacent to areas that are sensitive to noise and/or vibration, use the services of a qualified consulting engineer or acoustics expert to determine whether these springs will provide adequate noise/vibration suppression.

INSTALL TOP HAT (FOR 32VSH VFD - AHF OPTION).

The top hat for 32VSH is shipped separately. To install, remove existing cover on top of the AHF and install top hat with removable access cover facing outwards. The top hat dimensions are 10.2 inches high by 12.1 inches wide by 7.2 inches deep. Cut holes in top cover as appropriate for the selected conduit size and run the individual wires to the appropriate termination points. See Fig. 12.




NOTES:
1. For spring installation follow manufacturer's instructions. Set chiller on all springs in one rig; jacking one end out of level will result in excess loading on springs and may cause damage.
2. The accessory spring isolators are supplied by Carrier for installation in the field if the accessory is purchased.

**Fig. 11 — 19DV Accessory Spring Isolation (Shown with Accessory Soleplates)**

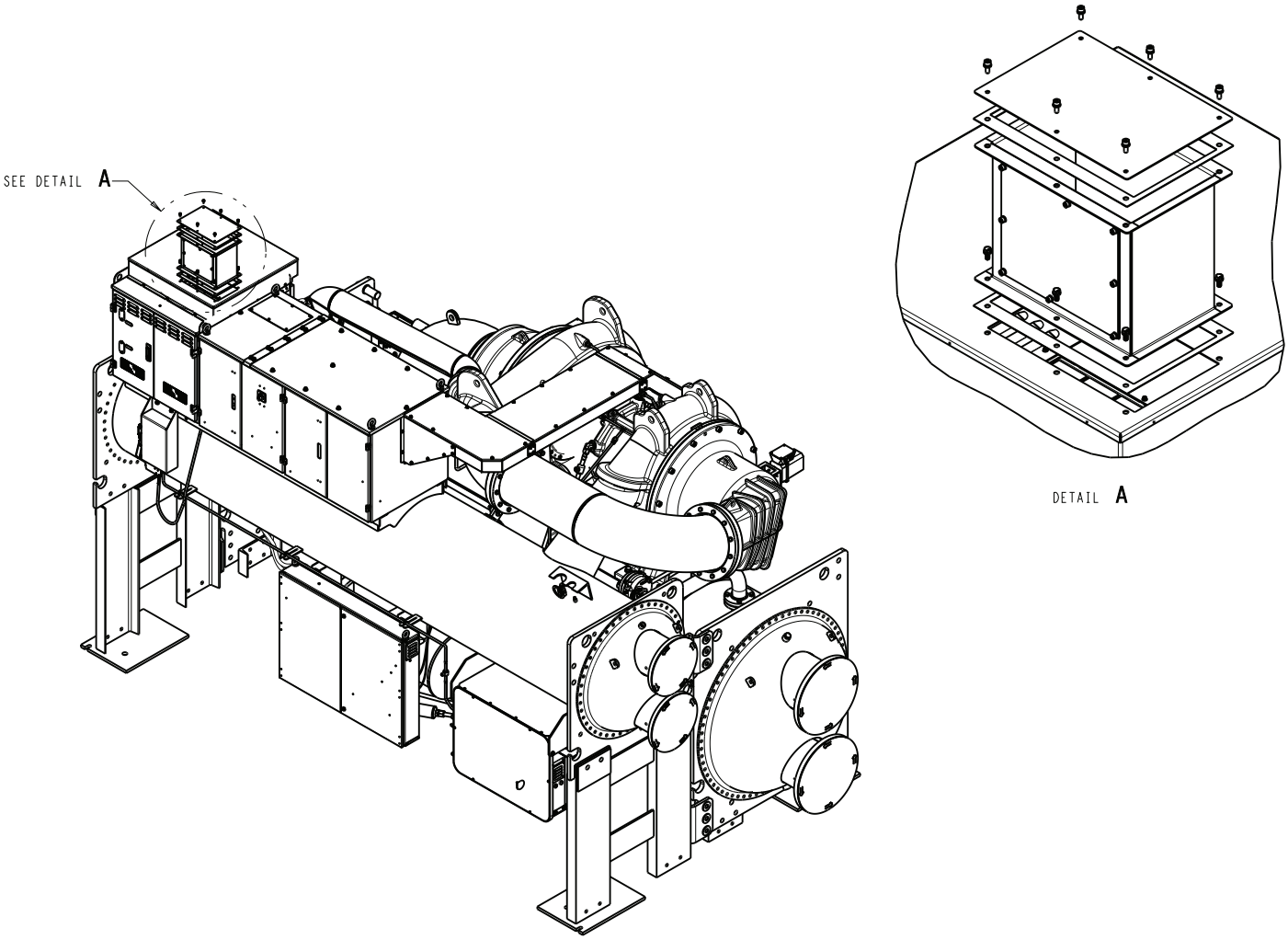



**Fig. 12 — Top Hat for 32VSH VFD AHF Option**

## Step 4 — Connect Piping

INSTALL WATER PIPING TO HEAT EXCHANGERS

Install piping using job data, piping drawings, and procedures outlined below. A typical piping installation is shown in Fig. 13.

**⚠ CAUTION**

Factory-supplied insulation is not flammable but can be damaged by welding sparks and open flame. Protect insulation with a wet canvas cover.

**⚠ CAUTION**

To prevent damage to sensors, remove evaporator and condenser water temperature sensors before welding connecting piping to water nozzles. Replace sensors after welding is complete.

**⚠ CAUTION**

When flushing the water systems, isolate the chiller from the water circuits to prevent damage to the heat exchanger tubes.

1. Offset pipe flanges to permit removal of waterbox cover for maintenance and to provide clearance for pipe cleaning. No flanges are necessary with marine waterbox option; however, water piping should not cross in front of the waterbox or compressor because service access will be blocked.
2. Provide openings in water piping for required pressure gages and thermometers. For thorough mixing and temperature stabilization, wells in the leaving water pipe should extend inside pipe at least 2 in. (50 mm).
3. Install air vents at all high points in piping to remove air and prevent water hammer.
4. Field-installed piping must be arranged and supported to avoid stress on the equipment and transmission of vibration from the equipment. Piping must be installed to prevent interference with routine access for the reading, adjusting, and servicing of the equipment. Provisions should be made for adjusting the piping in each plane for periodic and major servicing of the equipment.
5. Water flow direction must be as specified in Fig. 14 and 15.

NOTE: Entering water is always the lower of the 2 nozzles. Leaving water is always the upper nozzle for evaporator or condenser for two and three pass arrangements.

6. Install waterbox vent and drain piping in accordance with individual job data. Consult certified drawings for connection size.
7. Isolation valves are recommended on the evaporator and condenser piping to each chiller for service.
8. Apply appropriate torque on the retaining bolts in a crisscross pattern for the water box covers before insulating the water box cover. The gasket can relax during transportation and storage and the water box cover requires retightening of the bolts during installation.

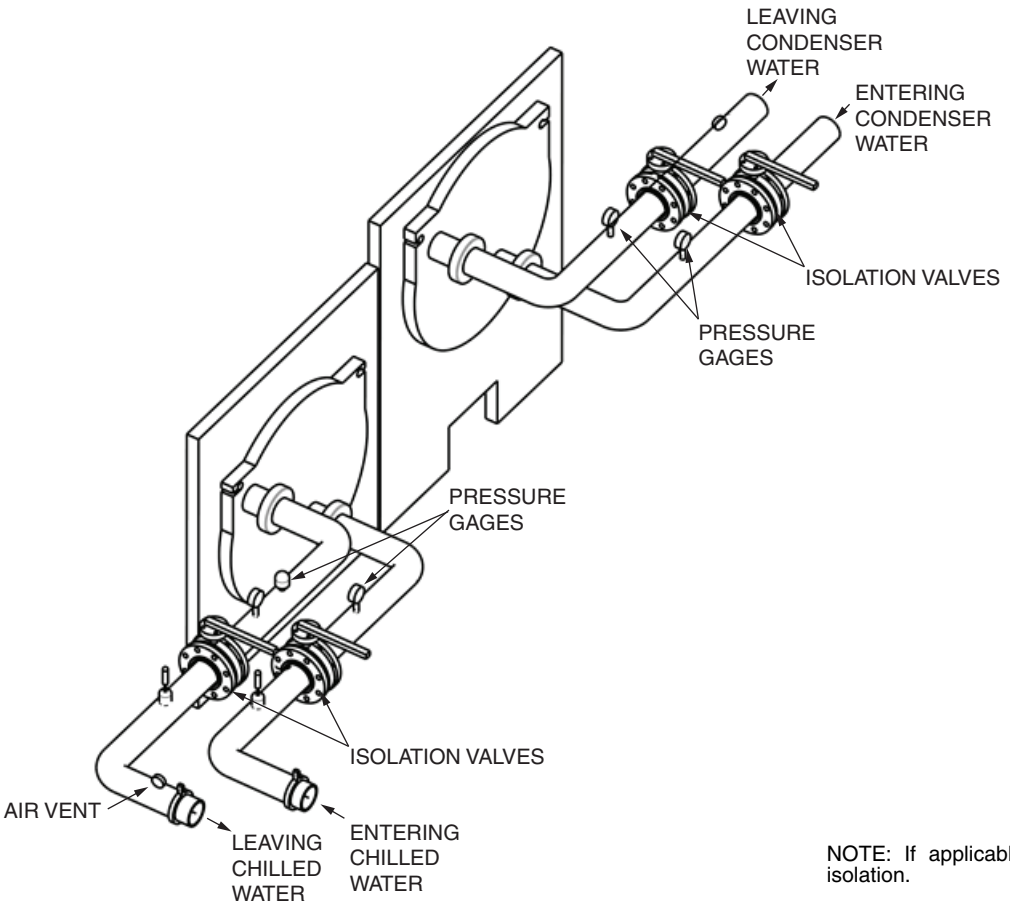
INSTALL VENT PIPING TO RELIEF DEVICES

The 19DV chiller is factory equipped with a rupture disc on the evaporator shell. Additionally for fire protection there are fusible plugs on the refrigerant lube assembly and purge assembly; see Fig. 9. Outlet size for these plugs is $^1/_4$-in. SAE Flare (male) for lubrication assembly and $^3/_8$-in. SAE flare on the purge tank. Refer to Table 13 and Fig. 16 for size and location of relief devices. Vent relief devices to the outdoors in accordance with ANSI/ASHRAE 15 (latest edition) Safety Code for Mechanical Refrigeration and all other applicable codes.

**⚠ DANGER**

Refrigerant discharged into confined spaces can displace oxygen and cause asphyxiation.

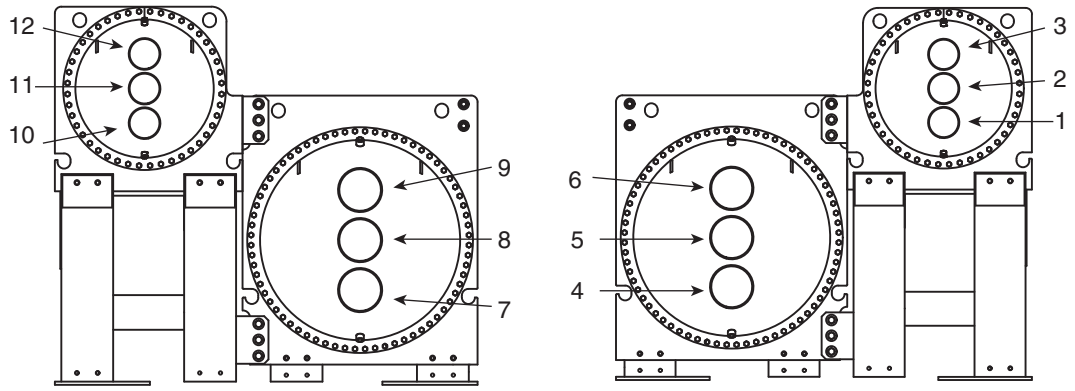
1. If relief devices are manifolded, the cross-sectional area of the relief pipe must at least equal the sum of the areas required for individual relief pipes.
2. Provide a pipe plug near outlet side of each relief device for leak testing. Provide pipe fittings that allow vent piping to be disconnected periodically for inspection of valve mechanism.
3. Piping to relief devices must not apply stress to the device. Adequately support piping. A length of flexible tubing or piping near the device is essential on spring-isolated machines.
4. Cover the outdoor vent with a rain cap and place a condensation drain at the low point in the vent piping to prevent water build-up on the atmospheric side of the relief device.
5. If the vent tubing from the purge unit is connected to the rupture disk vent piping, the piping should be sloped away from the rupture disk to prevent liquid refrigerant from condensing and accumulating on the atmospheric side of the rupture disk causing potential damage to the relief device.
6. If modulating valves are installed on the evaporator or condenser, they should be installed on the outlet piping.




NOTE: If applicable, add vibration isolation.

**Fig. 13 — Typical Nozzle Piping**

**NOZZLE-IN HEAD (NIH) WATERBOXES**



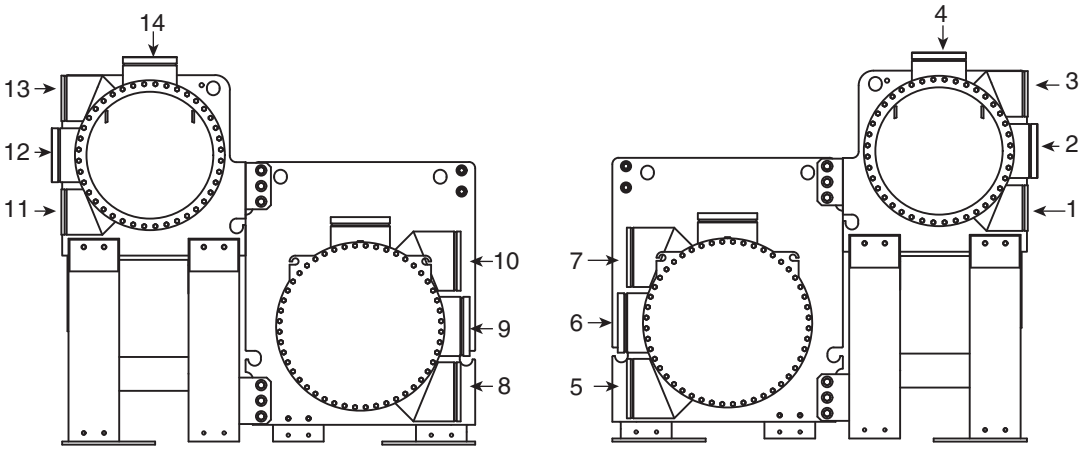

**NOZZLE ARRANGEMENT CODES FOR 19DV NOZZLE-IN-HEAD WATERBOXES**

| PASS | EVAPORATOR WATERBOXES | | | CONDENSER WATERBOXES | | |
|---|---|---|---|---|---|---|
| | IN | OUT | ARRANGEMENT CODE* | IN | OUT | ARRANGEMENT CODE* |
| 1 | 8 | 5 | A | 11 | 2 | P |
| | 5 | 8 | B | 2 | 11 | Q |
| 2 | 7 | 9 | C | 10 | 12 | R |
| | 4 | 6 | D | 1 | 3 | S |
| 3 | 7 | 6 | E | 10 | 3 | T |
| | 4 | 9 | F | 1 | 12 | U |

*Refer to certified drawings.

**Fig. 14 — Nozzle Arrangement Codes for 19DV Nozzle-in-Head Waterboxes**

**MARINE WATERBOXES (MWB)**




**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 |

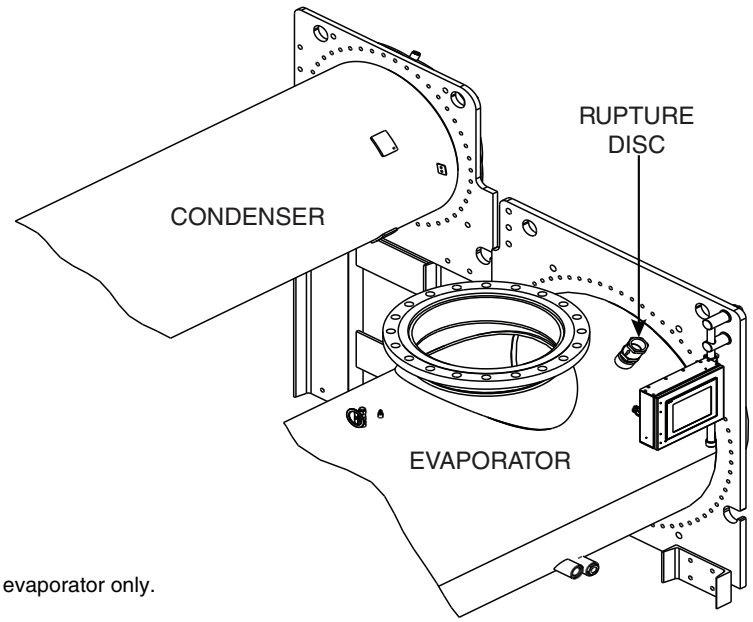
| CONDENSER MARINE WATERBOXES | | | |
|---|---|---|---|
| PASS | In | Out | Arrangement Code* |
| 1 | 12 | 2 | P |
| | 2 | 12 | Q |
| 2 | 11 | 13 | R |
| | 1 | 3 | S |
| | 11 | 14 | V |
| | 1 | 4 | W |
| 3 | 11 | 3 | T |
| | 1 | 13 | U |

*Refer to certified drawings.

**Fig. 15 — Nozzle Arrangement Codes for 19DV Marine Waterboxes**

**Table 13 — Relief Device Locations**

| LOCATION | FRAME SIZE | PRESSURE RELIEF DEVICE OUTLET SIZE |
|---|---|---|
| EVAPORATOR | G, H | 2-in. NPT FEMALE CONNECTOR |
| OPTIONAL STORAGE TANK | N/A | $1^{1}/_{4}$-in. NPT FEMALE CONNECTOR |




NOTE: Relief valve device on evaporator only.

**Fig. 16 — Relief Device Arrangements**

## Step 5 — Make Electrical Connections

Field wiring must be installed in accordance with job wiring diagrams and all applicable electrical codes.

**⚠ CAUTION**

Do not run any hazardous voltage wiring in the control panel sections associated with extra-low voltage wiring. Damage to machine could occur as a result.

Wiring diagrams in this publication are for reference only and are not intended for use during actual installation; follow job specific wiring diagrams.

**⚠ CAUTION**

Do not attempt to start compressor or any motor (even for a rotation check) or apply test voltage of any kind to the VFD or motor while the chiller is under a dehydration vacuum. Motor insulation breakdown and serious damage may result.

NOTE: The dry contacts for the field inputs should be located as close to the unit as possible. The field wiring should be capable of preventing electrical noise or induced voltage and should not be routed with any wires with voltage over 50 v.

CONNECT CONTROL INPUTS

Wiring may be specified for a spare safety switch, and a remote start/stop contact can be wired to the terminal strip. Additional spare sensors and control modules may be specified as well. Carrier Comfort Network® (CCN) communication is wired to the machine HMI panel as indicated in Fig. 17. The control panel optional wiring and HMI component layout are shown in Fig. 18.

CONNECT CONTROL OUTPUTS

Connect auxiliary equipment, chilled and condenser water pumps, and spare alarms as required and indicated on job wiring drawings. Terminal blocks 5TB and 6TB are factory wired for low voltage field connections. With fourth IOB configured, the hydraulic control function will be available; with this function, the water pump control and tower fan will be controlled through the Carrier controller. It also will support three types of water flow measurement: water flow switch, water flow meter, and water pressure differential sensor. See Fig. 19-24.

CONNECT VFD

The 19DV chiller has a unit-mounted, factory-installed VFD starter. Attach power leads by connecting them from inside the VFD cabinet to the line side terminals (Fig. 25). See Table 14 for VFD conductor usage.

NOTE: For 32VSH (AHF option) a top hat is required to be installed to the top of the AHF for adequate wire installation space (Fig. 12).

IMPORTANT: Be sure to ground the power circuit in accordance with the National Electrical Code (NEC), applicable local codes, and job wiring diagrams. Also, make sure correct phasing is observed for proper rotation. The only acceptable power supply to this chiller is a transformer with a wye secondary with solidly grounded neutral configuration. If there is a different type of power supply, the chiller may require an isolation transformer to be installed to prevent damage to the VFD.

**⚠ CAUTION**

Use the knockouts provided in the control panels for wiring connections. Do not punch holes or drill into the top surface of any control enclosure. Damage to machine could result and could require component replacement.

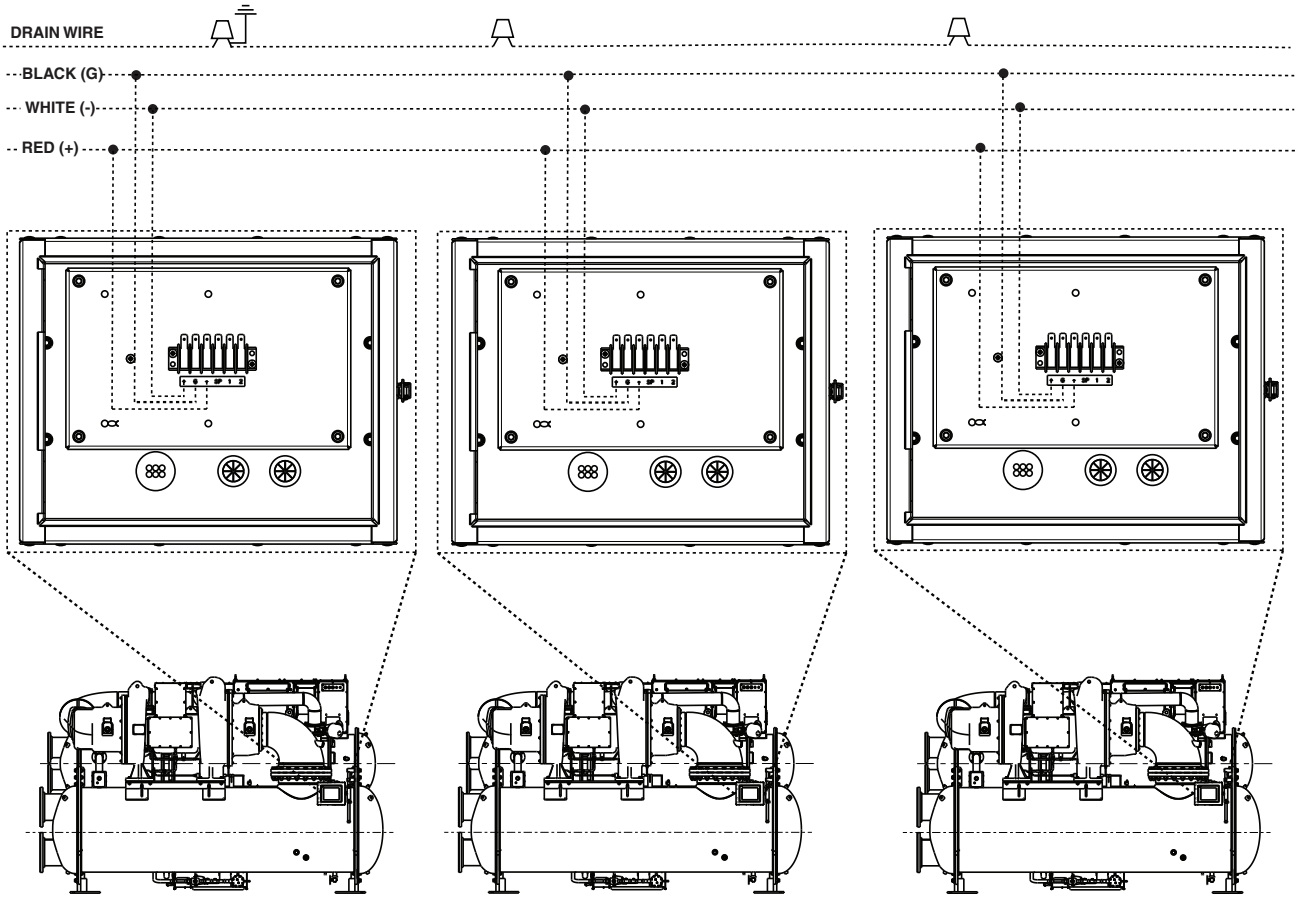
NOTE: A suitable 24 VAC relay is Carrier part number 19XV05005503. Carrier recommends using a pilot relay with a contact rating of 10 amp sealed RMS or greater for each digital output. IOB is rated for 1 amp AC RMS steady-state and 4 amps surge. Coil voltage of relay is 24 VAC.

**⚠ CAUTION**

Do not punch holes or drill into the top surface of power panel. Damage to machine could result. Use knockouts provided in the bottom of the power panels for wiring connections.

**⚠ WARNING**

For a control transformer built to Carrier specifications, do not connect an outside source of control power. An outside power source will produce dangerous voltage at the line side of the starter, because supplying voltage at the transformer secondary terminals produces input level voltage at the transformer primary terminals. Severe injury could result.




NOTE : Field-supplied terminal strip must be located in control panel.

**Fig. 17 — CCN Communication Wiring for Multiple Chillers (Typical)**

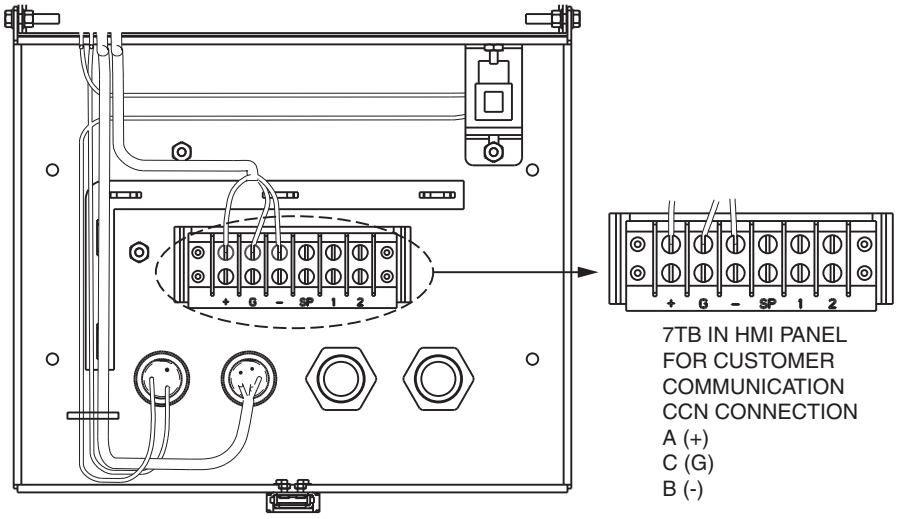



**Fig. 18 — HMI Panel**

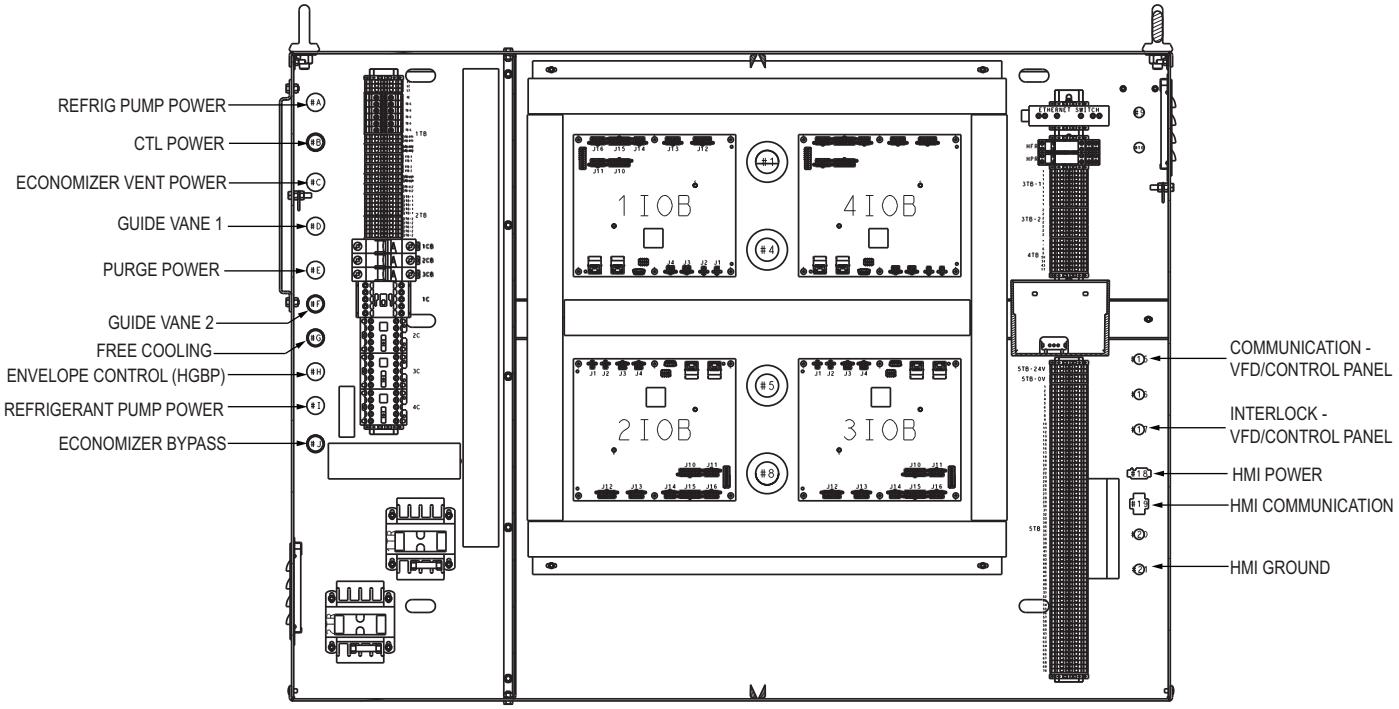



**Fig. 19 — Control Panel, IOB Layer**

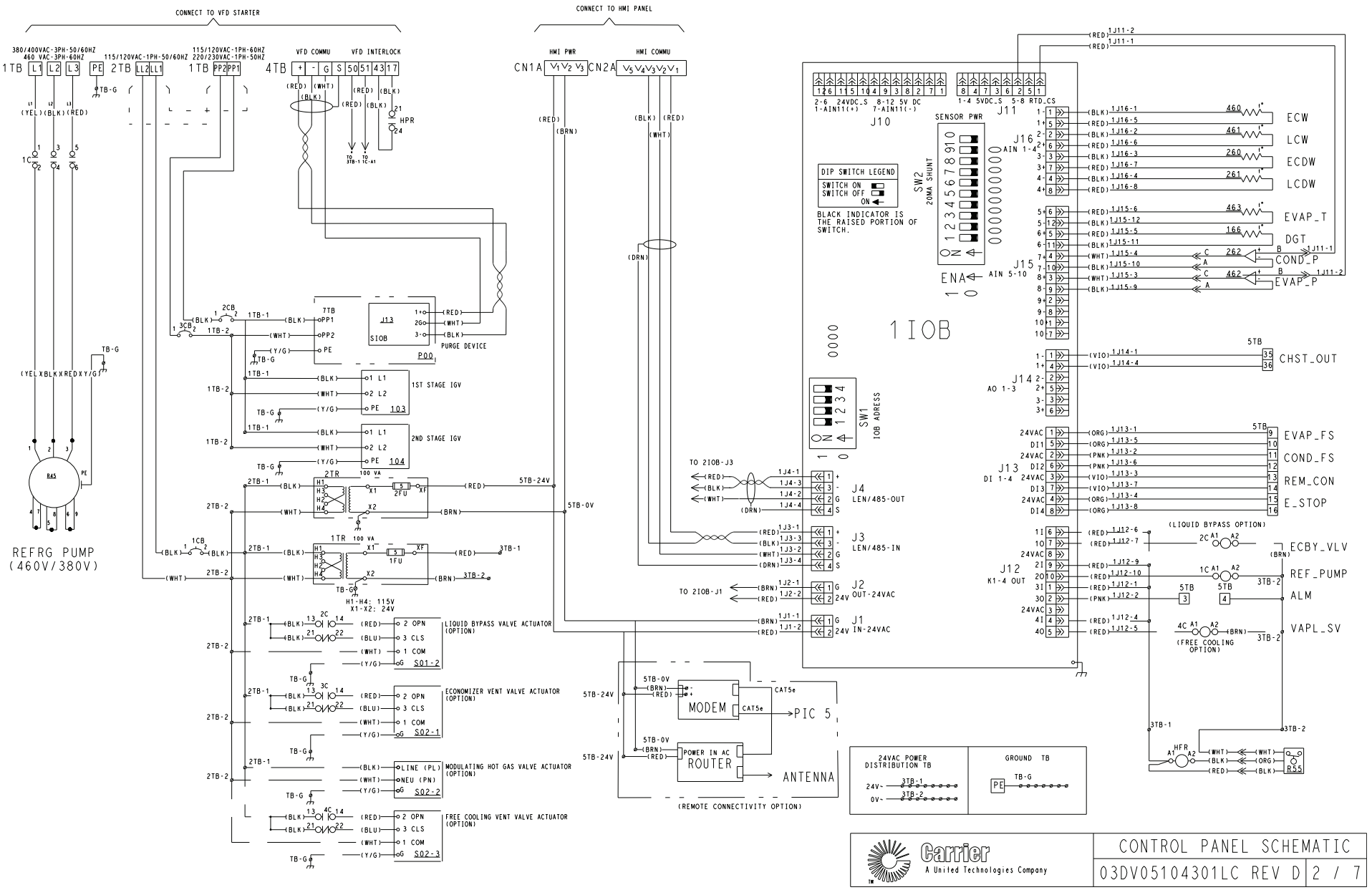
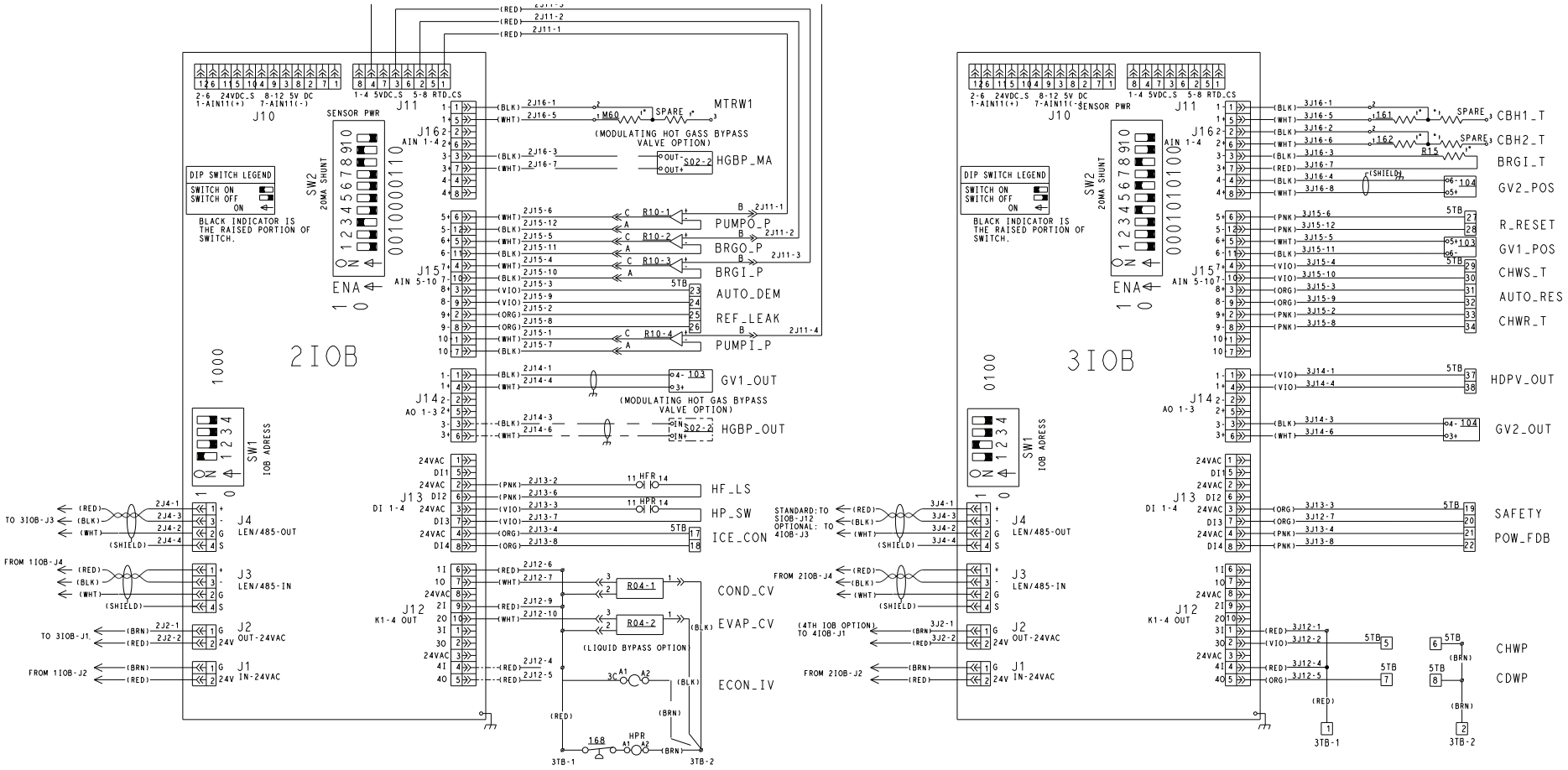

CONNECT TO VFD STARTER
CONNECT TO HMI PANEL
380/400VAC-3PH-50/60HZ
460 VAC-3PH-60HZ
115/120VAC-1PH-50/60HZ
115/120VAC-1PH-60HZ
220/230VAC-1PH-50HZ
VFD COMMU
VFD INTERLOCK
HMI PWR
HMI COMMU
1TB
2TB
4TB
CN1A
CN2A
HPR
REFRG PUMP
(460V/380V)
SIOB
PURGE DEVICE
1ST STAGE IGV
2ND STAGE IGV
LIQUID BYPASS VALVE ACTUATOR (OPTION)
ECONOMIZER VENT VALVE ACTUATOR (OPTION)
MODULATING HOT GAS VALVE ACTUATOR (OPTION)
FREE COOLING VENT VALVE ACTUATOR (OPTION)
MODEM
ROUTER
PIC 5
ANTENNA
(REMOTE CONNECTIVITY OPTION)
1IOB
J10
J11
J16
J15
J14
J13
J12
J1
J2
J3
J4
SW1
IOB ADRESS
SW2
20MA SHUNT
SENSOR PWR
DIP SWITCH LEGEND
SWITCH ON
SWITCH OFF
BLACK INDICATOR IS THE RAISED PORTION OF SWITCH.
ECW
LCW
ECDW
LCDW
EVAP_T
DGT
COND_P
EVAP_P
CHST_OUT
EVAP_FS
COND_FS
REM_CON
E_STOP
ECBY_VLV
REF_PUMP
ALM
VAPL_SV
HFR
RS5
LEN/485-OUT
LEN/485-IN
OUT-24VAC
IN-24VAC
24VAC POWER DISTRIBUTION TB
GROUND TB
Carrier
A United Technologies Company
CONTROL PANEL SCHEMATIC
03DV05104301LC REV D
2 / 7

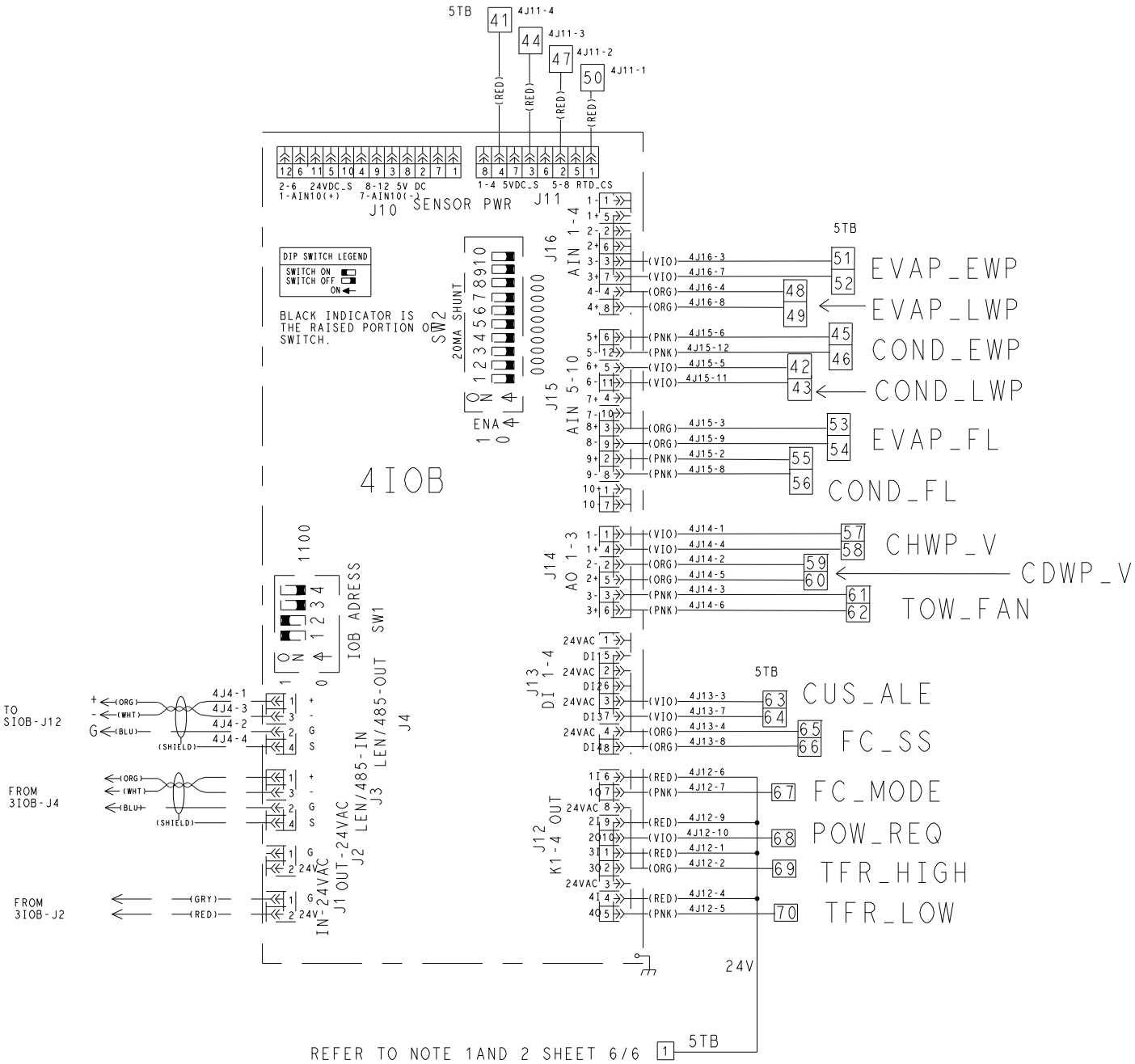
**Fig. 20 — IOB1**






| Carrier A United Technologies Company | CHILLER CONTROL SCHEMATIC | |
|---|---|---|
| | 03DV05104301LC REV D | 3 / 7 |

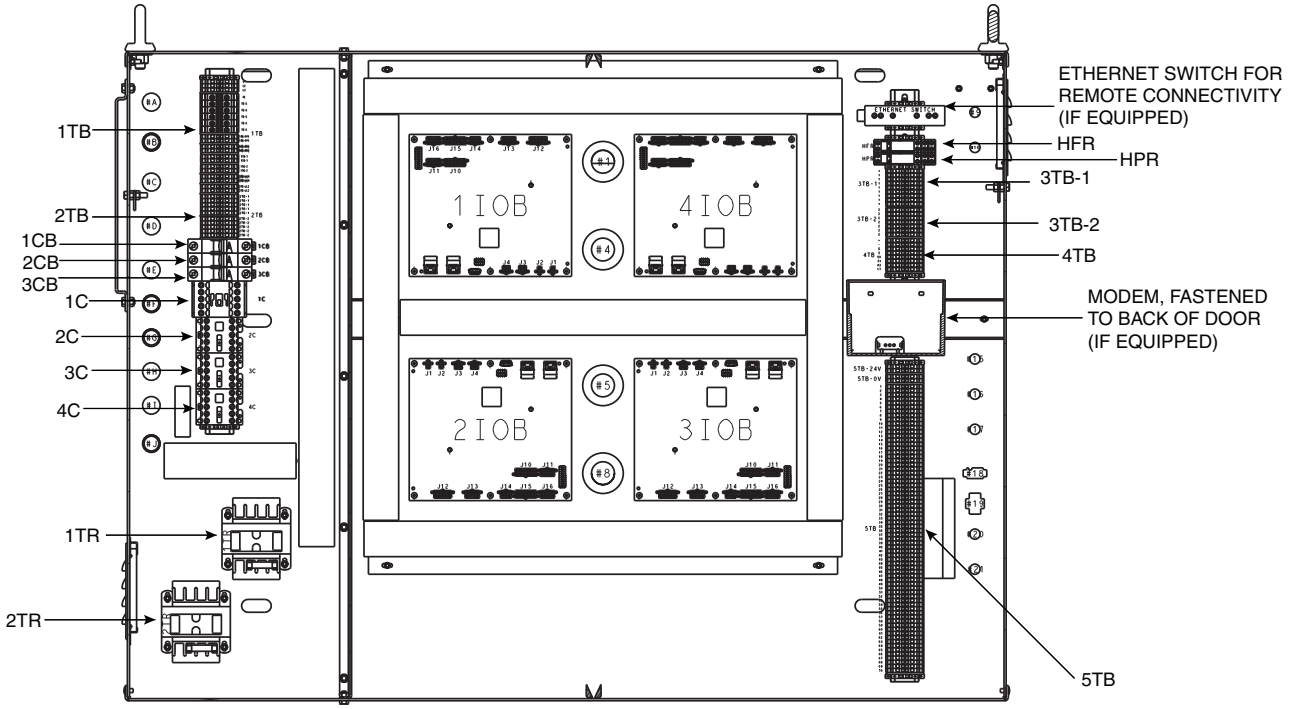
**Fig. 21 — IOB2 and IOB3**




THIS TYPICAL DRAWING SHOWS THE CARRIER STANDARD PRESSURE TRANSDUCER WHICH IS 5VDC POWER SUPPLY.

| Carrier A United Technologies Company | CONTROL PANEL SCHEMATIC | |
|---|---|---|
| | 03DV05104301LC REV D | 4 / 7 |

**Fig. 22 — IOB 4**



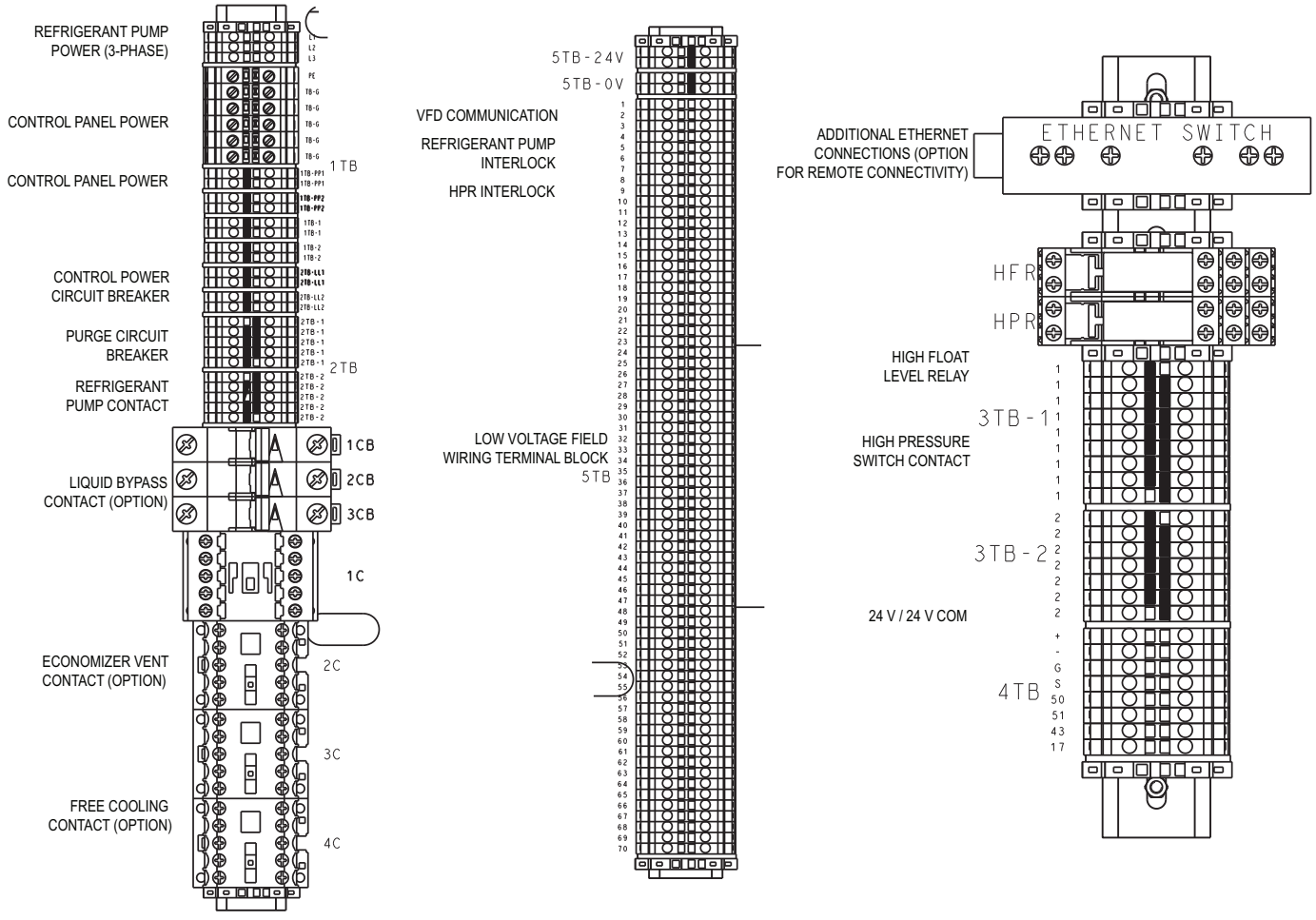




**Fig. 23 — Control Panel Layout**

## LEGEND FOR Fig. 19-23

### *Control Abbreviations*

| | | |
|---|---|---|
| **ALM** | — | Chiller Alarm |
| **AUTO_DEM** | — | Demand Limit Input |
| **AUTO_RES** | — | Auto Water Temp Reset |
| **BRGI_P** | — | Bearing Inlet Pressure |
| **BRGI_T** | — | Bearing Ref Supply Temp |
| **BRGO_P** | — | Bearing Outlet Pressure |
| **CBH1_T** | — | 1st Stage Bearing Temp |
| **CBH2_T** | — | 2st Stage Bearing Temp |
| **CDWP** | — | Condenser Water Pump |
| **CDWP_V** | — | Condenser Water Pump (Variable Speed) |
| **CHST_OUT** | — | Chiller Running (On/Off/Ready) |
| **CHWP** | — | Chilled Water Pump |
| **CHWP_V** | — | Chilled Water Pump (Variable Speed) |
| **COND_CV** | — | Condenser Control Valve |
| **COND_DCV** | — | Condenser Drain Valve |
| **COND_EWP** | — | Entering Condenser Water Pressure |
| **COND_FL** | — | Condenser Water Flow Measurement |
| **COND_FS** | — | Condenser Water Flow Switch |
| **COND_LWP** | — | Leaving Condenser Water Pressure |
| **COND_P** | — | Condenser Pressure |
| **CUS_ALE** | — | Customer Alert |
| **DGT** | — | Compressor Discharge Temperature |
| **ECBY_VLV** | — | Economizer Bypass Valve |
| **ECDW** | — | Entering Condenser Water Temperature |
| **ECON_IV** | — | Economizer Vent Valve Actuator |
| **ECW** | — | Entering Chilled Water Temperature |
| **EVAP_CV** | — | Evaporator Control Valve |
| **EVAP_EWP** | — | Entering Evaporator Water Pressure |
| **EVAP_FL** | — | Evaporator Water Flow Measurement |
| **EVAP_FS** | — | Evaporator Water Flow Switch |
| **EVAP_LWP** | — | Leaving Evaporator Water Pressure |
| **EVAP_P** | — | Evaporator Pressure |
| **EVAP_T** | — | Evaporator Refrigerant Temperature |
| **FC_MODE** | — | Free Cooling Mode |
| **FC_SS** | — | Free Cooling Start Switch |
| **FS_LOCK** | — | Fire Alarm Interlock |
| **GV1/2_OUT** | — | IGV 1/2 Output |
| **GV1/2_POS** | — | IGV 1/2 Actual Position |
| **HDPV_OUT** | — | Head Pressure Output |
| **HGBP_MA** | — | Modulating Hot Gas Valve Feedback |
| **HGBP_OUT** | — | Modulating Hot Gas Valve Output mA |
| **HF_LS** | — | High Float Liquid Level Switch |
| **HP_SW** | — | High Pressure Switch |
| **ICE_CON** | — | Ice Build Contact |
| **IGV** | — | Integrated Guide Vane |
| **LCDW** | — | Leaving Condenser Water Temperature |
| **LCW** | — | Leaving Chilled Water Temperature |
| **MTRW1** | — | Motor Winding Temperature 1 |
| **PUMPI_P** | — | Pump Inlet Pressure |
| **PUMPO_P** | — | Pump Outlet Pressure |
| **REF_LEAK** | — | Refrigerant Leak Sensor |
| **REF_PUMP** | — | Refrigerant Pump |
| **REM_CON** | — | Remote Contact Input |
| **TFR_HIGH** | — | Tower Fan High |
| **TFR_LOW** | — | Tower Fan Low |
| **TOW_FAN** | — | Tower Fan (Variable Speed) |
| **VAPL_SV** | — | Vapor Venting Line SV |

### *Instrument Code (Within Control Panel)*

| | | |
|---|---|---|
| **1C** | — | Refrigerant Pump Contactor |
| **2C** | — | Liquid Bypass Valve Relay |
| **3C** | — | Economizer Vent Valve Relay |
| **4C** | — | Free Cooling Vent Valve Relay |
| **1-3CB** | — | Micro Circuit Breaker |
| **1FU** | — | Fuse, 5A, Time-Delay, 13/32” x 1-1/2” |
| **2FU** | — | Fuse, 5A, Time-Delay, 13/32” x 1-1/2” |
| **1-4 IOB** | — | 1-4 Input Output Board 1-4 |
| **1TB** | — | Terminal Block for Power Connection |
| **2TB** | — | Internal 115/120-v Terminal Block |
| **3TB** | — | Internal 24-v Terminal Block |
| **4TB** | — | Terminal Block for VFD Connection |
| **5TB** | — | Terminal Block for Customer Optional Connection |
| **7TB** | — | 230/115-v Terminal Block (Purge Panel) |
| **1TR** | — | Transformer 1 230/115-24-v 100 va |
| **2TR** | — | Transformer 2 230/115-24-v 100 va |
| **CN1A/B** | — | Connector for HMI Power |
| **CN2A/B** | — | Connector for HMI Communication |
| **HFR** | — | High Float Level Switch |
| **HPR** | — | High Pressure Switch Relay |
| **HMI** | — | HMI Touch Screen and Main Board SAIA |
| **SIOB** | — | Standard Input Output Board (Purge Panel) |
| **TB-G** | — | Copper Terminal Block for Ground |

### *Instrument Code (Outside Control Panel)*

| | | |
|---|---|---|
| **103** | — | 1st Stage IGV |
| **104** | — | 2nd Stage IGV |
| **161** | — | 1st Bearing Temp Thermistor |
| **162** | — | 2nd Bearing Temp Thermistor |
| **166** | — | 2nd Stage Compressor Discharge Temp Thermistor |
| **168** | — | High Pressure Switch |
| **260** | — | Entering Condenser Water Temperature Thermistor |
| **261** | — | Leaving Condenser Water Temperature Thermistor |
| **262** | — | Condenser Pressure Transducer |
| **460** | — | Entering Chilled Water Temperature Thermistor |
| **461** | — | Leaving Chilled Water Temperature Thermistor |
| **462** | — | Evaporator Pressure Transducer |
| **463** | — | Evaporator Refrigerant Liquid Temp Thermistor |
| **M60** | — | Motor Winding Temperature 1 (Thermistor/PT100) |
| **P00** | — | Purge Device |
| **R04-1** | — | Condenser Control Valve |
| **R04-2** | — | Evaporator Control Valve |
| **R10-1** | — | Refrigerant Pump Outlet Pressure Transducer |
| **R10-2** | — | Bearing Outlet Pressure Transducer |
| **R10-3** | — | Bearing Inlet Pressure Transducer |
| **R10-4** | — | Refrigerant Pump Inlet Pressure Transducer |
| **R15** | — | Bearing Ref Supply Temp Thermistor |
| **R45** | — | Refrigerant Pump |
| **R55** | — | High Float Liquid Level Switch |
| **S01-2** | — | High Float Liquid Level Switch |
| **S02-1** | — | Economizer Vent Valve Actuator |
| **S02-2** | — | Modulating Hot Gas Control Valve Actuator |
| **S02-3** | — | Free Cooling Vent Valve Actuator |

### *Symbols*


Component Terminal


Conductor Male/Female Connector


Field Wiring


Optional Wiring


Component/Panel Enclosure


Shield Wire


Twisted Wire


Terminal Block Connection


Wire Splice or Junction


Internal Terminal Block/Terminal

| | |
|---|---|
| **BLK** | Black |
| **BLU** | Blue |
| **BRN** | Brown |
| **GRN** | Green |
| **GRY** | Gray |
| **RED** | Red |
| **ORG** | Orange |
| **WHT** | White |
| **YEL** | Yellow |
| **G/Y** | Green/yellow |

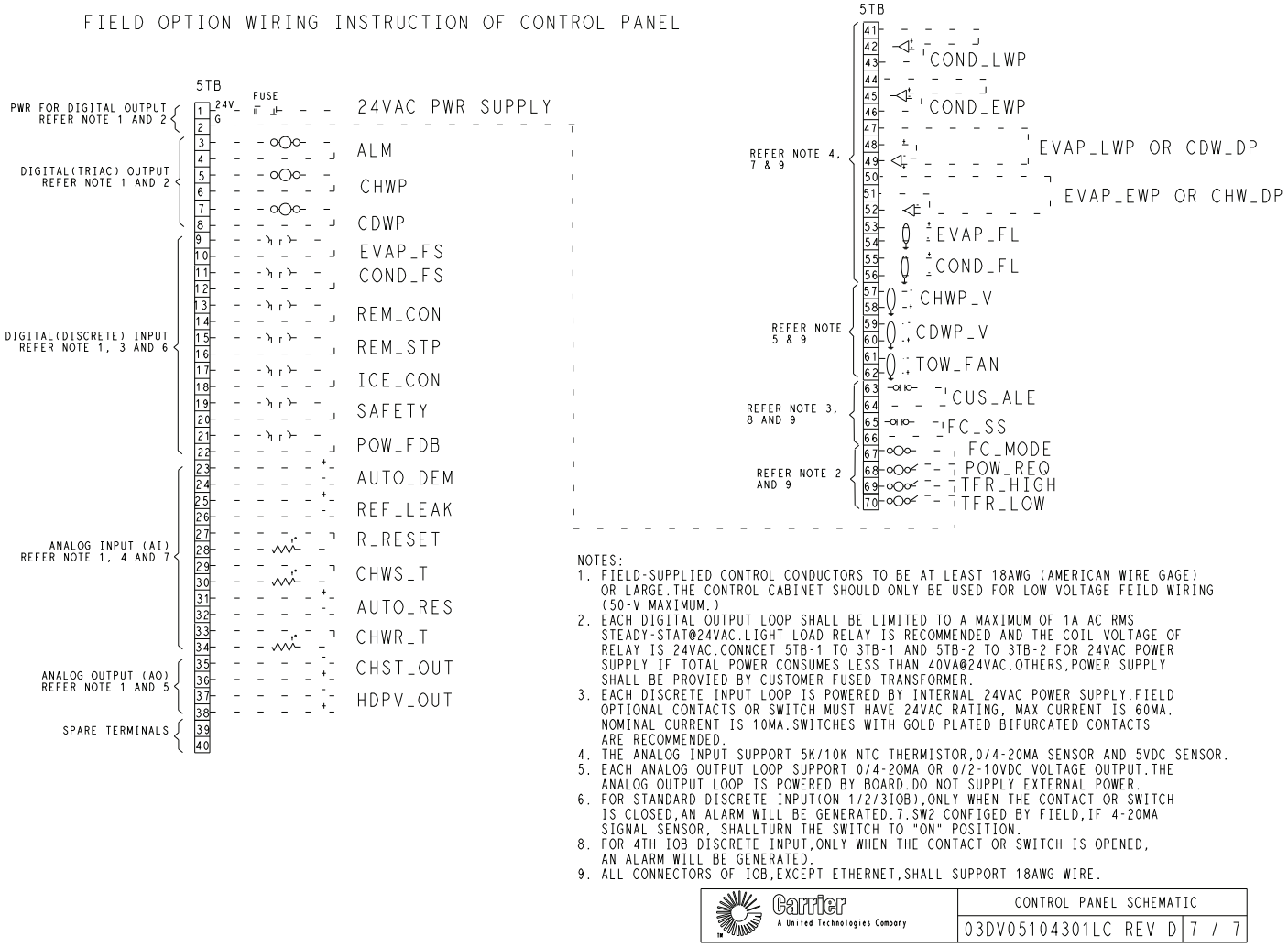



**Fig. 24 — Optional Field Wiring**

## NOTES FOR FIG. 20-24
## 19DV WITH 32VS VFD

I. General

1.0 Variable Frequency Drive (VFD) shall be designed and manufactured in accordance with Carrier engineering requirement.

1.1 All field-supplied conductors and devices must be compliant, and be installed in compliance with all applicable codes and job specifications.

1.2 The routing of field-installed conduit and conductors and the location of field-installed devices must not interfere with equipment access or the reading, adjusting or servicing of any component.

1.3 Equipment installation and all starting and control devices must comply with details in equipment submittal drawings and literature.

1.4 Contacts and switches are shown in the position they would assume with the circuit deenergized and the chiller shutdown.

1.5 Warning — Do not use aluminum conductors.

1.6 Warning — Remove panel above VFD bus bar before drilling. Do not drill into any other VFD cabinet panels.

II. Power Wiring To VFD

2.0 Provide a means of disconnecting branch feeder power to VFD. Provide short circuit protection and interrupt capacity for branch feeder in compliance with all applicable codes.

2.1 Metal conduit must be used for the power wires, from VFD to branch feeder.

2.2 Line side power conductor rating must meet VFD nameplate voltage and chiller full load amps (minimum circuit ampacity).

2.3 Lug adapters may be required if installation conditions dictate that conductors be sized beyond the minimum ampacity required. Lugs will accommodate the quantity (#) and size cables (per phase) as follows. If larger lugs are required, they may be purchased from the manufacturer of the circuit breaker. See Table 14 for lug sizes.

2.4 Compressor motor and controls must be grounded by using equipment grounding lug provided inside unit-mounted VFD enclosure.

III. Control Wiring

3.0 Field-supplied control conductors to be at least 18 AWG (American Wire Gage) or larger.

3.1 Ice build start/terminate device contacts, remote start/stop device contacts and spare safety device contacts (devices not supplied by Carrier) must have 24 vac rating. Max current is 60 mA, nominal current is 10 mA. Switches with gold-plated bifurcated contacts are recommended.

3.2 Each integrated contact output can control loads (VA) for evaporator pump, condenser pump, tower fan low, tower fan high and alarm annunciator devices rated 5 amps at 115 vac and up to 3 amps at 250 vac.

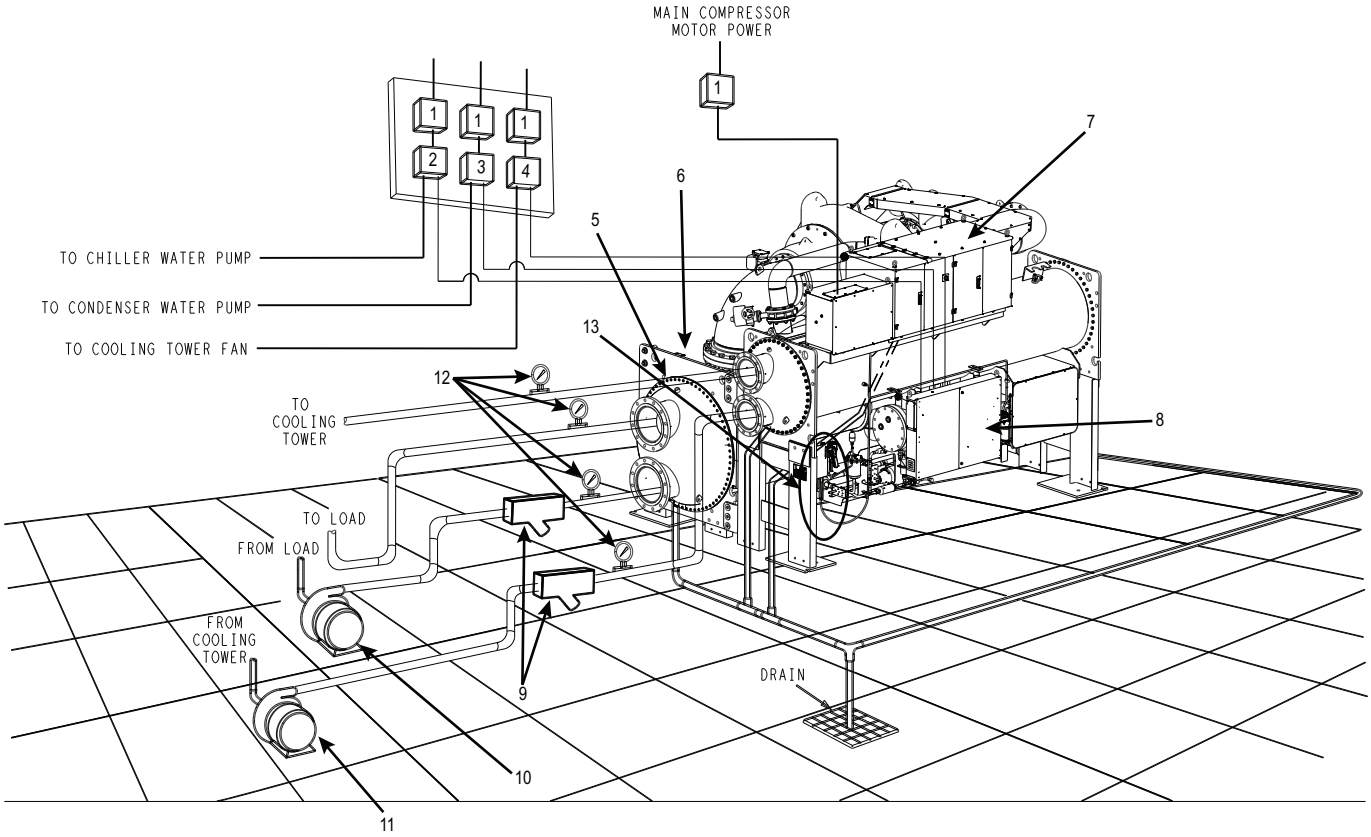
**⚠ WARNING**

Control wiring required for Carrier to start pumps and tower fan motors, and established flows must be provided to assure machine protection. If primary pump, tower fan and flow control is by other means, also provide a parallel means for control by Carrier. Failure to do so could result in machine freeze-up or overpressure.

3.3 Do not use control transformers in the VFD enclosure or control panel as the power source for external or field-supplied contactor coils, actuator motors or any other loads.

3.4 Do not route control wiring carrying 30 v or less within a conduit which has wires carrying 50 v or higher or along side wires carrying 50 v or higher.

3.5 Spare 4 to 20 mA output signal is designed for controllers with a non-grounded 4 to 20 mA input signal and a maximum input impedance of 500 ohms.




LEGEND

**1** — Disconnect
**2** — Chilled Water Pump Starter
**3** — Condenser Water Pump Starter
**4** — Cooling Tower Fan Starter (Low Fan, High Fan)
**5** — Vents
**6** — HMI (hidden)
**7** — Unit-Mounted VFD
**8** — Control Panel
**9** — Strainers
**10** — Chilled Water Pump
**11** — Condenser Water Pump
**12** — Pressure Gages
**13** — Local Disconnect
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 water 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.
7. Be sure to pipe $^{3}/_{8}$-in. VFD condensate pipe to drain.

**Fig. 25 — 19DV Chiller with VFD**

**Table 14 — VFD Conductor Usage**

| VFD MAX INPUT AMPS | STANDARD 100 KAIC LUG CAPACITY (PER PHASE) | | |
|---|---|---|---|
| | NO. OF CONDUCTORS | CONDUCTOR RANGE | GROUND CONNECTOR |
| CARRIER 32VSS0850 | 4 | 4/0 to 500 kcmil. | 2/0* |
| CARRIER 32VSH0850 | 4 | 4/0 to 500 kcmil. | 2/0* |

* Two ground lugs each capable of 2x #2-600 kcmil per lug.

CARRIER COMFORT NETWORK INTERFACE

The Carrier Comfort Network® (CCN) communication bus wiring is supplied and installed by the electrical contractor. It consists of shielded, 3-conductor cable with drain wire.

The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system element on either side of it. The negative pins must be wired to the negative pins. The signal ground pins must be wired to the signal ground pins. See Fig. 17 for location of the CCN network connections on the terminal strip labeled CCN.

NOTE: Conductors and drain wire must be 20 AWG (American Wire Gage) minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon[1], or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –4°F to 140°F (–20°C to 60°C) is required. See table below for cables that meet the requirements.

| MANUFACTURER | CABLE NO. |
|---|---|
| ALPHA | 2413 or 5463 |
| AMERICAN | A22503 |
| BELDEN | 8772 |
| COLUMBIA | 02525 |

When connecting the CCN communication bus to a system element, a color code system for the entire network is recommended to simplify installation and checkout. The following color code is recommended:

| SIGNAL TYPE | CCN BUS CONDUCTOR INSULATION COLOR | CCN NETWORK INTERFACE (CONTROL PANEL) |
|---|---|---|
| + | Red | + |
| GROUND | White | G |
| – | Black | – |

If a cable with a different color scheme is selected, a similar color code should be adopted for the entire network.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. See Fig. 17. If the communication bus cable exits from one building and enters another, the shields must be connected to ground at the lightning suppressor in each building where the cable enters or exits the building (one point only).

To connect the 19DV chiller to the network, proceed as follows (see Fig. 17):

1. Route wire through knockout in back of control panel.
2. Strip back leads.
3. Crimp one no. 8 size spring spade terminal on each conductor.
4. Attach red to "+" terminal and white to "G" terminal and black to "–" terminal of CCN Network interface located in the control panel.

## Step 6 — Install Field Insulation

**⚠ CAUTION**

Protect insulation from weld heat damage and weld splatter. Cover with wet canvas cover during water piping installation.

When installing insulation at the jobsite, insulate the following components:

- compressor motor
- economizer
- evaporator shell
- evaporator tube sheets
- suction piping
- motor cooling drain
- inhibitor reclaim piping
- purge tank and connecting tubing
- low side of purge system independent refrigerant circuit
- refrigerant liquid line to evaporator

NOTE: Insulation of the waterbox covers is applied only at the jobsite by the contractor. When insulating the covers, make sure there is access for removal of waterbox covers for servicing. See Fig. 26.

1. Teflon is a registered trademark of DuPont.

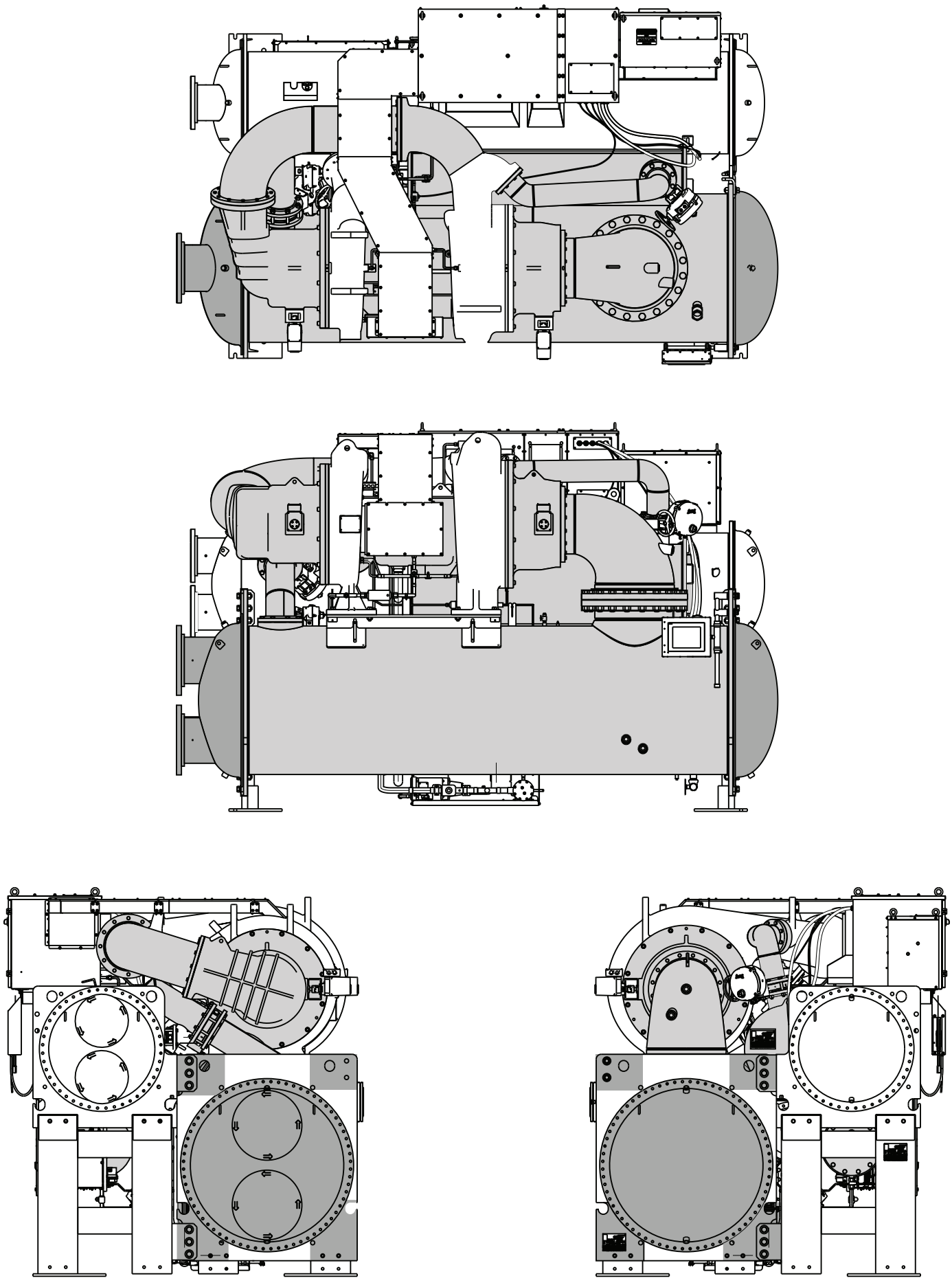
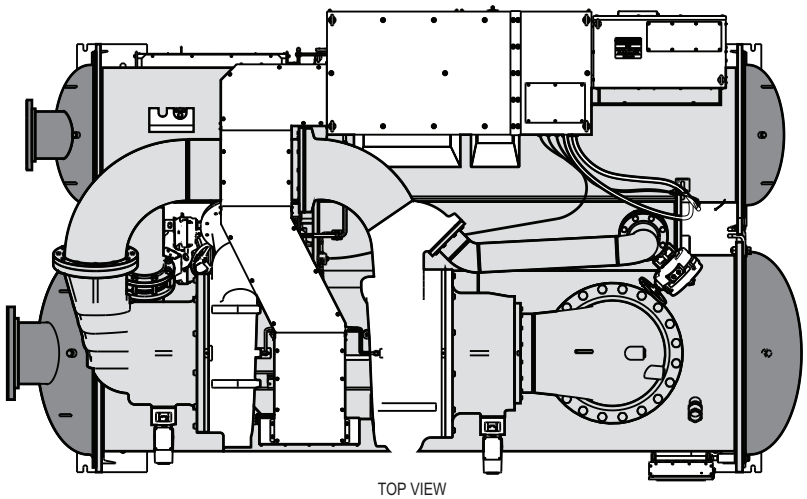
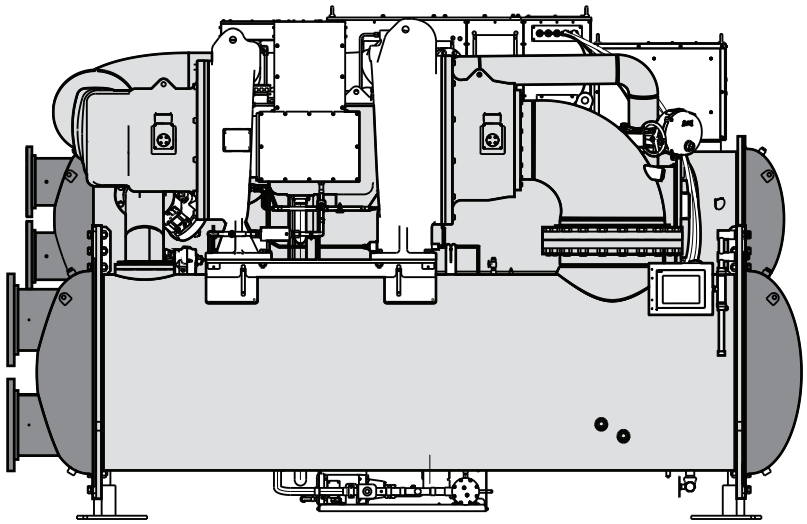
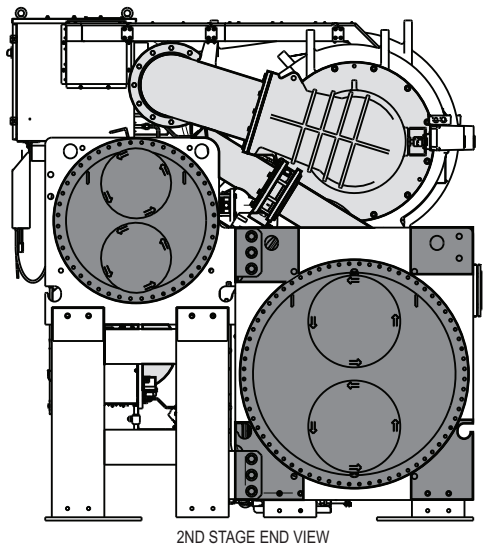
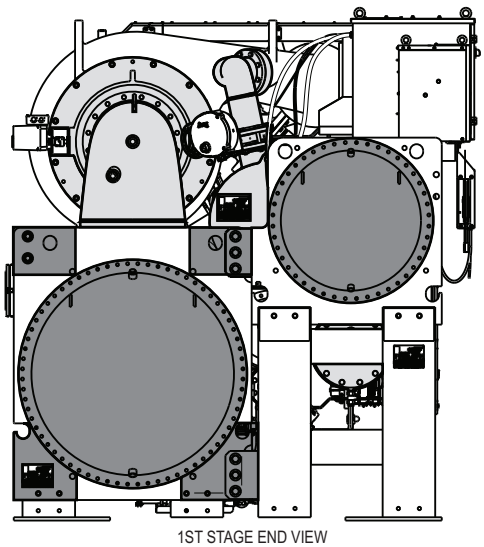


**Fig. 26 — 19DV Standard Insulation Area**




FACTORY INSTALLED INSULATION

FIELD SUPPLIED AND INSTALLED INSULATION (IF REQUIRED)

**Fig. 27 — 19DV Free-Cooling Insulation Area**

# INSTALLATION START-UP REQUEST CHECKLIST

**NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices and adhere to the safety considerations/information as outlined in preceding sections of this Installation Instructions document.**

Machine Model Number: 19DV Serial Number: _____

To: _____ Date _____

_____

_____ _____
Project Name

Attn: _____ _____
Carrier Sales Order Number

The following information provides the status of the chiller installation.

| | YES/NO (N/A) | DATE TO BE COMPLETED |
|---|---|---|
| 1. The machine is level. | | |
| 2. The machine components are installed and connected in accordance with the installation instructions. | | |
| 3. The isolation package and grouting (if necessary) are installed. | | |
| 4. The relief devices are piped to the atmosphere. | | |
| 5. All piping is installed and supported. Direction of flow is indicated in accordance with the installation instructions and job prints. | | |
| a. Chilled water piping | | |
| b. Condenser water piping | | |
| c. Waterbox drain piping | | |
| d. Pumpout unit piping (if installed) | | |
| e. VFD drain piping | | |
| f. Other _____ | | |
| 6. Gages are installed as called for on the job prints required to establish design flow for the evaporator and condenser. | | |
| a. Water pressure gages IN and OUT | | |
| b. Water temperature gages IN and OUT | | |
| 7. The machine's wiring is complete. The wiring is installed per installation instructions and certified prints. | | |
| a. Power wiring to VFD line side completed. (If chiller was disassembled during installation, motor leads must not be taped until the Carrier technician megger tests the motor.) | | |
| b. Carrier controls can independently energize water pumps and tower fan | | |
| a. The transformer feeding the VFD is confirmed to have a Wye secondary with a solidly grounded Neutral. Immediately contact Carrier Service if this is not the case. | | |
| b. Line side voltage is within ±10% of chiller nameplate voltage | | |
| c. Other _____ | | |
| 8. Was the chiller disassembled/reassembled during the installation? | | |
| Was this work supervised by a Carrier Service Representative? | | |

COMMENTS:

_____

_____

| TESTING | YES/NO | DATE TO BE COMPLETED |
|---|---|---|
| 1. The cooling tower fan has been checked for blade pitch and proper operation. | | |
| 2. The chilled water and condenser water lines have been: | | |
| a. Filled | | |
| b. Tested | | |
| c. Flushed | | |
| d. Vented | | |
| e. Strainers cleaned | | |
| f. Chemically treated | | |
| 3. The chilled water and condenser water pumps have been checked for proper rotation and flow. | | |
| 4. The following cooling load will be available for start-up: | | |
| a. 25% | | |
| b. 50% | | |
| c. 75% | | |
| d. 100% | | |
| 5. The refrigerant charge identified and will be available near machine for commissioning. Rigging is available to lift refrigerant drums. | | |
| 6. Services such as electrical power and control air will be available at start-up up over evaporator for gravity feed. | | |
| 7. The building automation system is operational. | | |
| 8. The electrical, building automation and mechanical representatives will be available to assist in commissioning the machine. | | |
| 9. The customer's operators will be available to receive instructions for proper operation of the chiller after start-up. | | |

Concerns about the installation/request for additional assistance:

_____

_____

_____

_____

_____

I am aware that the start-up time for a Carrier chiller can take between 2 and 6 days depending on the model of the machine and the options and accessories used with it.

Your contact at the jobsite will be _____

Phone number _____

Pager/Cell number _____

Fax number _____

In accordance with our contract, we hereby request the services of your technician to render start-up services per contract terms for this job on _____ (Date). I understand that the technician's time will be charged as extra services due to correcting items in this checklist that are incomplete.

Signature of Purchaser _____

Signature of Jobsite Supervisor _____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE