AquaEdge®
19DV High-Efficiency Semi-Hermetic Centrifugal Liquid Chillers with Greenspeed® Intelligence, PIC6 Controls, and HFO R-1233zd(E)
350 to 1,150 Nominal Tons (1,231 to 4,044 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.

⚠ 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.

Shut off electrical power to unit.

Recover refrigerant from system using both high-pressure and low-pressure ports.

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.

Cut component connection tubing with tubing cutter and remove component from unit.

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. See Fig. 1 for model number identification.

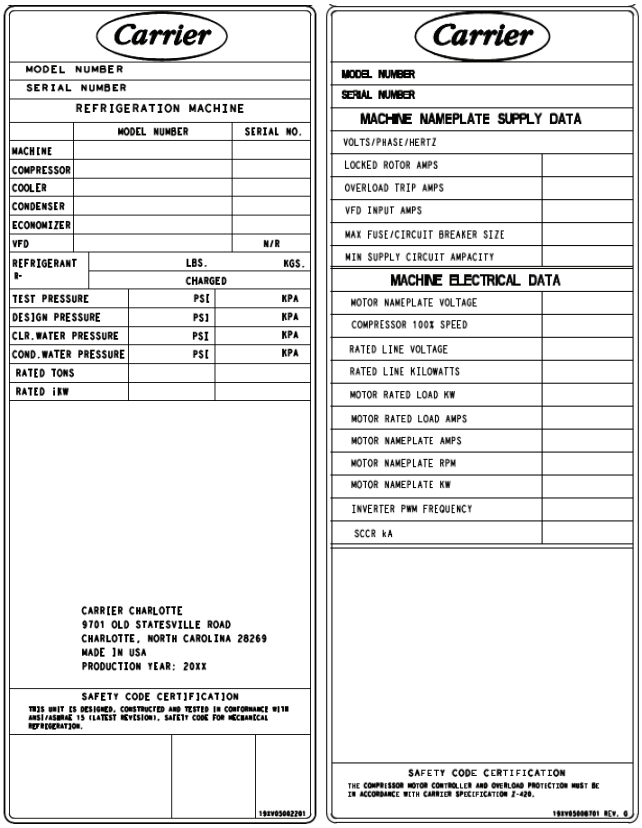


Fig. 1 — 19DV Refrigeration Machine Nameplate

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 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.
4. Confirm the drain plugs are not installed on the bottom of the heat exchanger water boxes. If they are installed contact Carrier Service to inspect the units so they can confirm there is no damage to the tubes from ambient temperature freeze.

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. See Fig. 3 for typical compressor chiller components and Fig. 4 for typical compressor chiller liquid bypass details.

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 Gauge). 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. 5.

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.

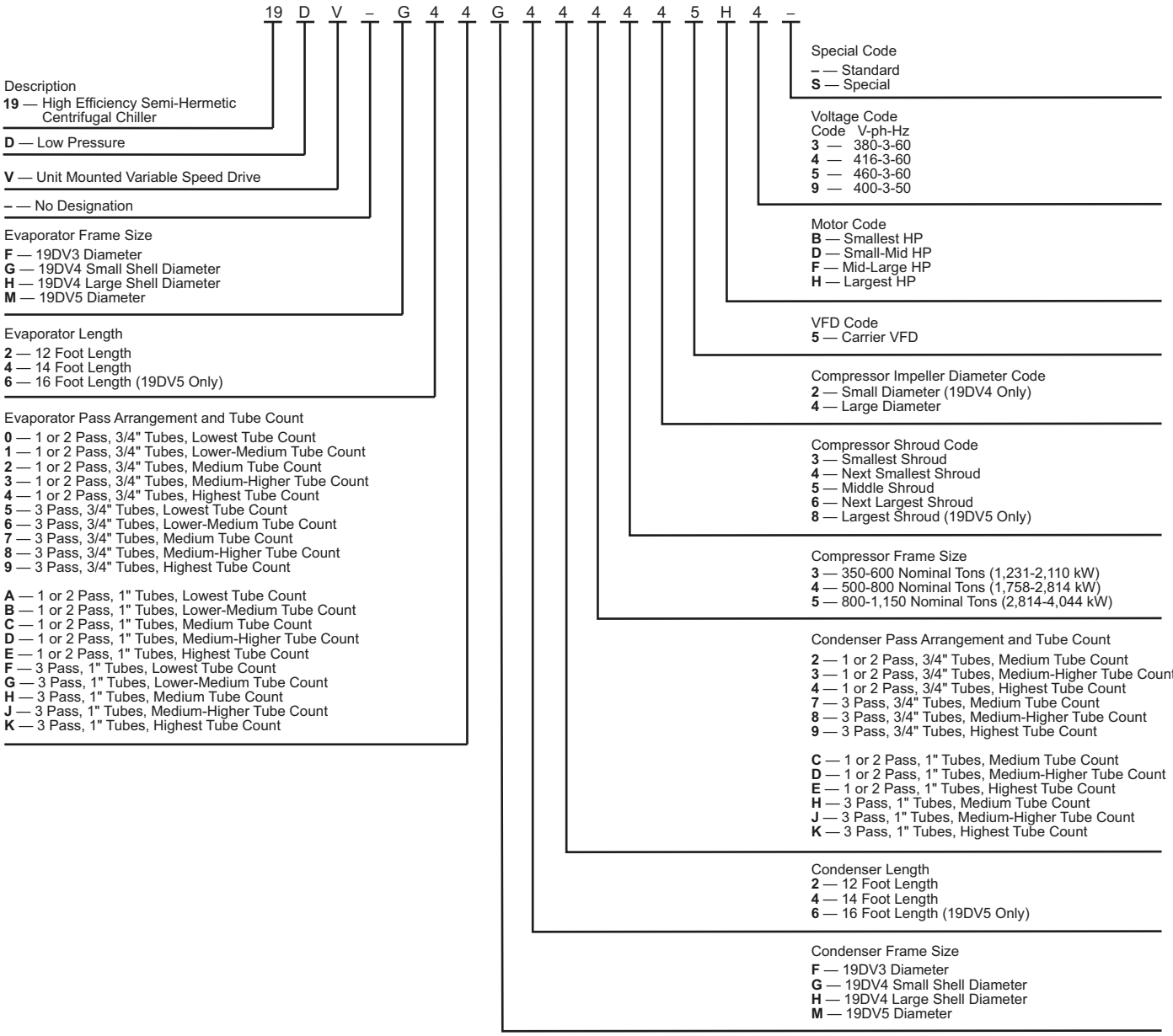
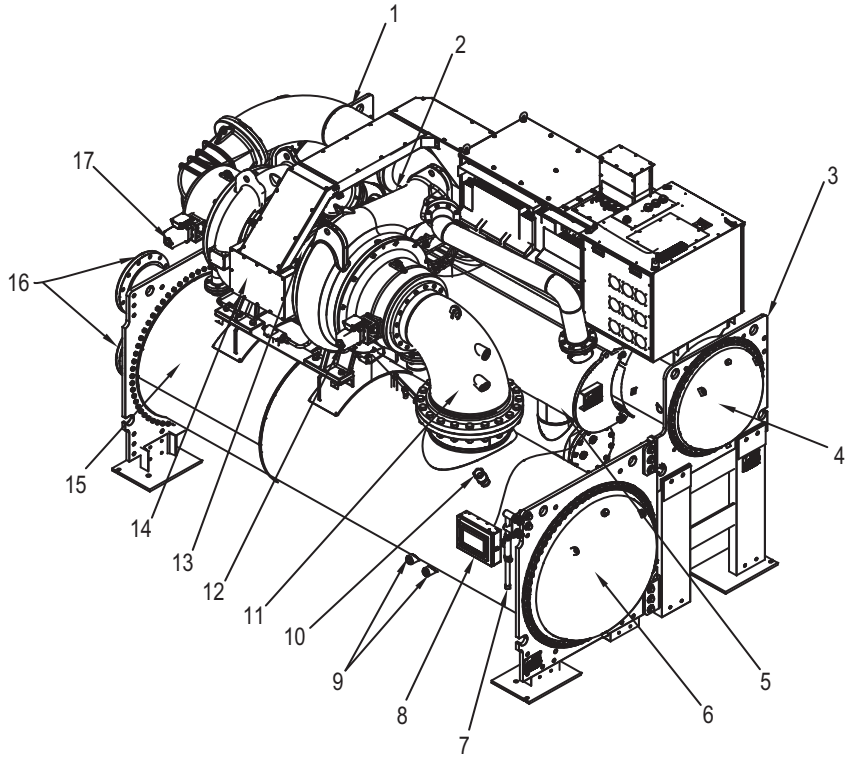
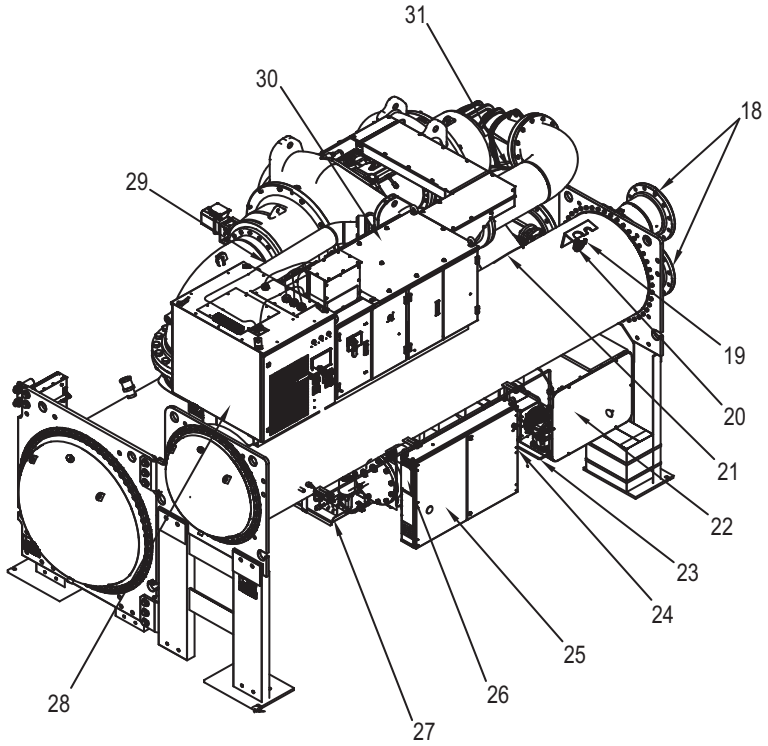


Fig. 2 — 19DV Chiller Model Number Identification



FRONT VIEW

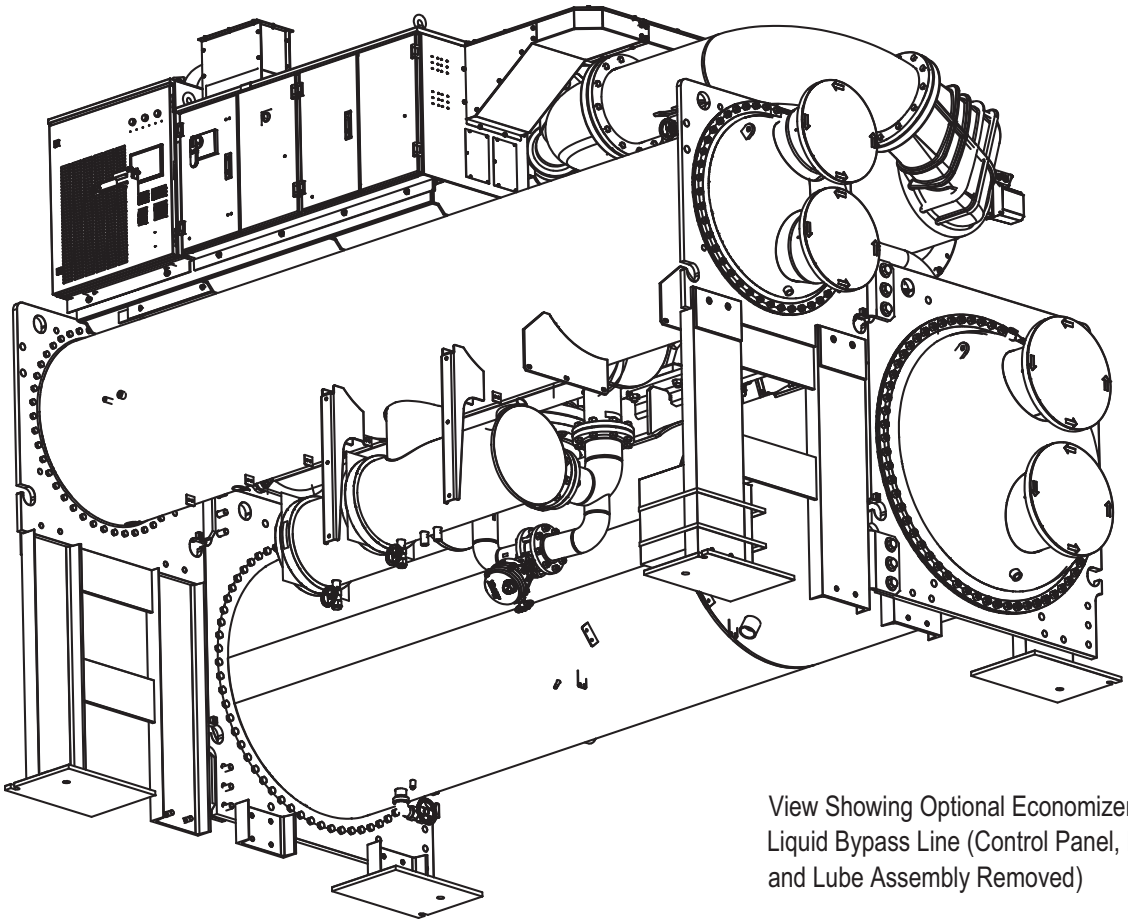
1 — Interconnecting Compressor Piping
2 — VFD Drain (Field Drain Piping Required)
3 — Condenser
4 — Condenser Waterbox Return End
5 — Economizer
6 — Evaporator Waterbox Return End
7 — Vacuum/Charging Valve (Hidden)
8 — PIC6 HMI Touchscreen Panel
9 — Evaporator Bundle Sight Glasses
10 — Rupture Disc
11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



REAR VIEW

18 — Condenser Waterbox Nozzles
19 — Condenser Pressure Transducer
20 — Condenser Charging Valve
21 — Envelope Stability Control Pipe
22 — Purge Assembly
23 — Purge Vent (Hidden)
24 — Motor VFD Cooling Moisture Indicator (Hidden)
25 — Control Panel
26 — Chiller Name Plate Label
27 — Lubrication Assembly
28 — Harmonic Filter
29 — Economizer Pipe
30 — VFD
31 — Discharge Pipe

Fig. 3 — Typical 19DV Compressor Chiller Components



View Showing Optional Economizer
Liquid Bypass Line (Control Panel, Purge,
and Lube Assembly Removed)

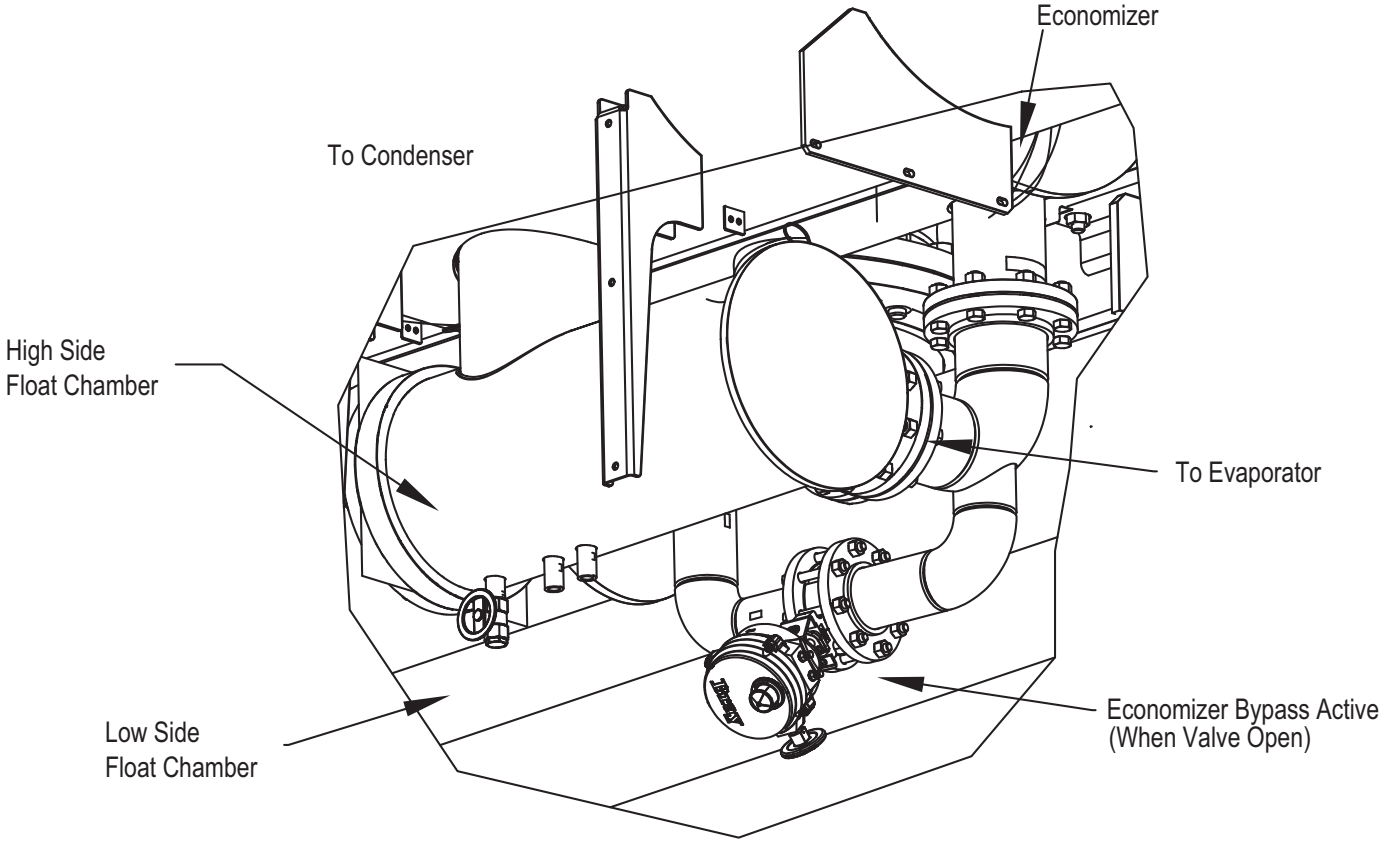
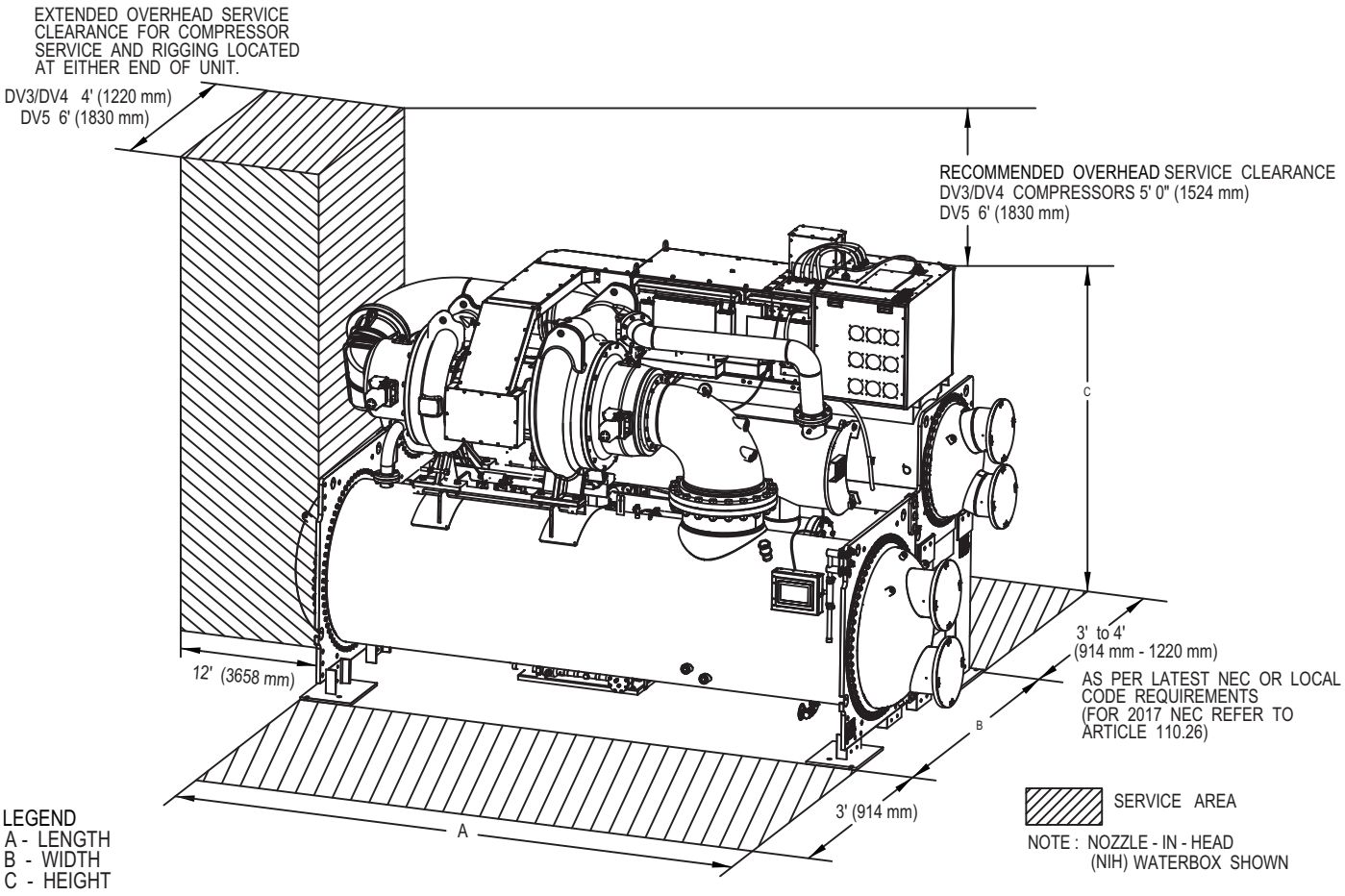


Fig. 4 — Typical 19DV Compressor Chiller Liquid Bypass



NOTE(S):
1. Dished head (NIH) waterbox shown.
2. Service areas are minimum space required.
   - DV3/DV4: 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).
   - DV5: For compressor service either end allow 6 feet (1830 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 6 feet (1830 mm).
3. Tube pull area:
   - Length = length of heat exchanger
   - Width = width of heat exchanger.
   - Tube pull area can be located at either end of the evaporator or condenser; it extends past the tubesheet the same length as the heat exchanger.

Fig. 5 — 19DV Service Clearances

⚠ 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. See rigging guide in Fig. 6, dimensions in Fig. 5, 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.

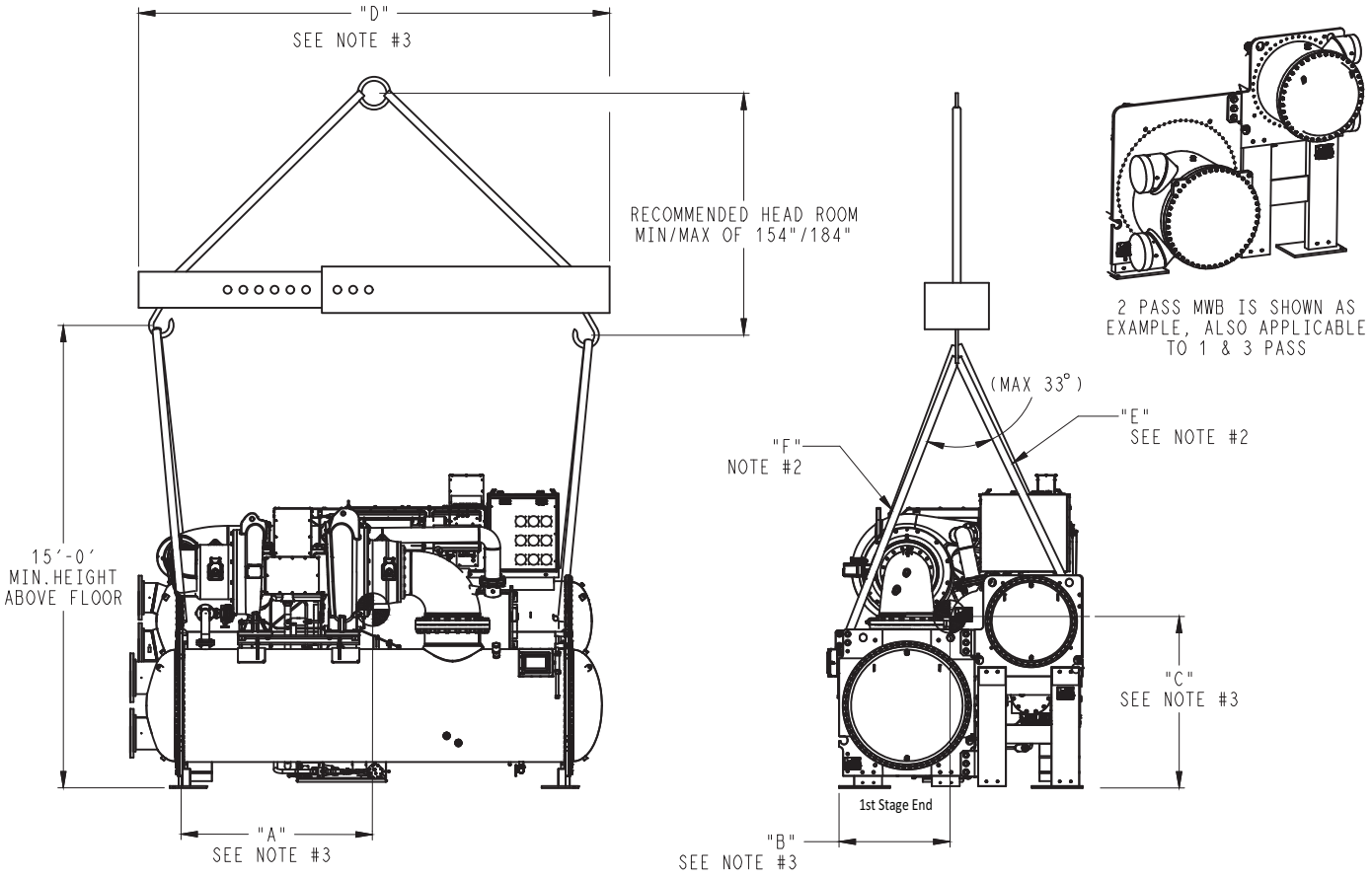
Contractors are not authorized to disassemble any part of the chiller without Carrier's supervision. Any request otherwise must be approved in writing by the Carrier Technical Service Manager. Non-conformance to this requirement may result in loss of product warranty.

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. All piping connected to the chiller should be designed to mitigate transmission to the structure.

⚠ 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. 6 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.)	"F" (in.)
3	F2A~F2K, F20~F29	29,000	31,500	12	70	44	54	168	106	126
	F4A~F4K, F40~F49	30,500	33,000	14	80	43	54	188	106	126
4	G2A~G2K, G20~G29	35,900	38,000	12	72	48	58	168	106	126
	G4A~G4K, G40~G49	38,000	40,100	14	83	47	58	188	106	126
	H2A~H2K, H20~H29	38,700	41,100	12	72	51	66	168	106	126
	H4A~H4K, H40~H49	41,200	43,500	14	82	50	66	188	106	126
5	M4A~M4K, M40~M49	56,170	58,080	14	80	63	75	192	103	117
	M6A~M6K, M60~M69	59,150	61,060	16	89	62	74	216	103	117



LEGEND

MWB — Marine Waterbox
NIH — Nozzle in Head

NOTE(S):

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 fromsteel and copper tubing, insulation, and refrigerant charge, excluding water weight.)
2. Chain lengths shown are typical for 15 ft 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. 6 — Machine Rigging Guide

Table 1 — 19DV Dimensions (Nozzle-In-Head Waterbox)[a,b,c,d,e,f,g,h]

HEAT EXCHANGER SIZE	PASSES	A (LENGTH)		B (WIDTH)		C (HEIGHT)	
		in.	mm	in.	mm	in.	mm
F2[i]	1 pass	186.0	4724.4	100.4	2549.0	111.1	2821.8
	2 pass	178.5	4534.7				
	3 pass	185.6	4714.2				
F4[i]	1 pass	206.5	5245.1	96.5	2450.1	111.1	2821.8
	2 pass	199.0	5055.4				
	3 pass	206.1	5234.9				
G2[i]	1 pass	189.0	4800.6	108.4	2753.4	117.0	2971.8
	2 pass	180.9	4594.9				
	3 pass	185.5	4711.7				
G4[i]	1 pass	209.5	5321.3	99.9	2537.5	117.0	2971.8
	2 pass	201.4	5115.6				
	3 pass	206.0	5232.4				
H2[i]	1 pass	190.8	4846.3	114.0	2896.6	123.9	3147.1
	2 pass	183.4	4658.4				
	3 pass	187.5	4762.5				
H4[i]	1 pass	211.3	5367.0	110.3	2801.6	123.9	3147.1
	2 pass	203.9	5179.1				
	3 pass	208.0	5283.2				
M4	1 pass	—	—	131.6	3343.0	147.4	3745.0
	2 pass	206.1	5234.0				
	3 pass	—	—				
M6	1 pass	—	—	131.6	3343.0	147.4	3745.0
	2 pass	225.9	5736.0				
	3 pass	—	—				

NOTE(S):

a. 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.
b. Overhead clearance for service rigging compressor should be at minimum 3 ft (914 mm) with 5 ft (1524 mm) recommended for easier overhead access.
c. Dimensions are approximate. Certified drawings available upon request.
d. Marine waterboxes typically add to the width of the machine. See certified drawings for details.
e. 'A' length dimensions shown are for standard 150 psig (1034 kPa) design and flanged connections. See certified drawings.
f. 19DV unit heights can vary depending on the configuration. Check 19DV certified drawings for height information.
g. Table contains heat exchanger dimensions. For arrangements where the compressor motor housing extends past the waterbox, consult the 19DV certified drawings.
h. Consult factory for configurations not listed in the above table.
i. Assumes both evaporator and condenser nozzles on same end of chiller; nozzle-in-head waterboxes, 150 psi rated.

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
F	14	12	12	10	10	8
G	14	14	12	12	10	10
H	14	14	12	12	12	10
M	—	16	—	—	14	—

Table 3 — 19DV Dimensions (Marine Waterbox, 150 psig)[a,b,c,d,e,f]

HEAT EXCHANGER SIZE	PASSES	A (LENGTH)		B (WIDTH)		C (HEIGHT)	
		in.	mm	in.	mm	in.	mm
F2[g]	1 pass	209.7	5326.4	100.4	2549.0	111.1	2821.8
	2 pass	188.1	4777.7				
	3 pass	204.7	5199.4				
F4[g]	1 pass	230.2	5847.1	97.9	2487.2	111.1	2821.8
	2 pass	208.6	5298.4	96.8	2458.5		
	3 pass	225.2	5720.1	96.5	2450.1		
G2[g]	1 pass	218.5	5549.9	108.4	2753.4	117.0	2971.8
	2 pass	192.3	4884.4				
	3 pass	210.8	5354.3				
G4[g]	1 pass	239.0	6070.6	102.2	2595.9	117.0	2971.8
	2 pass	212.8	5405.1				
	3 pass	231.3	5875.0				
H2[g]	1 pass	220.5	5600.7	114.0	2896.6	123.9	3147.1
	2 pass	194.2	4932.7				
	3 pass	212.5	5397.5				
H4[g]	1 pass	241.0	6121.4	112.9	2867.7	123.9	3147.1
	2 pass	214.7	5453.4				
	3 pass	233.0	5918.2				
M4	1 pass	—	—	131.6	3343.0	147.4	3745.0
	2 pass	230.1	5845.0				
	3 pass	—	—				
M6	1 pass	—	—	131.6	3343.0	147.4	3745.0
	2 pass	245.1	6455.0				
	3 pass	—	—				

NOTE(S):

a. 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.
b. Overhead clearance for service rigging compressor should be at minimum 3 ft (914 mm) with 5 ft (1524 mm) recommended for easier overhead access.
c. Dimensions are approximate. Certified drawings available upon request.
d. Marine waterboxes typically add to the width of the machine. See certified drawings for details.
e. 19DV unit height can vary depending on the configuration. Check 19DV certified drawings for height information.
f. 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.
g. Assumes both evaporator and condenser nozzles on same end of chiller; marine waterboxes, 150 psi rated.

Table 4 — Component Weights

COMPONENT	COMPRESSOR							
	DV3 Frame F		DV4 Frame G		DV4 Frame H		DV5 Frame M	
	lb	kg	lb	kg	lb	kg	lb	kg
SUCTION PIPE ASSEMBLY (includes flanges)	410	186	569	259	584	265	682	309
INTERSTAGE PIPING (section only from flange to flange)	316	144	346	157	335	152	1,019	462
DISCHARGE PIPING	5	2	5	2	5	2	197	89
HMI PANEL	72	33	72	33	72	33	80	36
CONTROL PANEL	170	77	170	77	170	77	200	91
HIGH SIDE FLOAT CHAMBER COVER	64	29	82	37	82	37	79	36
LOW SIDE FLOAT CHAMBER COVER	64	29	82	37	82	37	79	36
PURGE ASSEMBLY	263	120	263	120	263	120	270	122
ENVELOP CONTROL VALVE	30	14	97	44	97	44	34	15
ECONOMIZER BYPASS VALVE	85	39	121	55	121	55	62	28
FREE COOLING VALVE	62	28	200	91	200	91	75	34
FREE COOLING PIPE	91	41	276	125	285	130	257	117
ECONOMIZER VENT LINE PIPING	73	33	111	50	118	54	144	65
VFD 32VSS0680	1,354	615	—	—	—	—	—	—
VFD 32VSS0900	—	—	1,321	599	1,321	599	1,321	599
VFD 32VSS1060	—	—	—	—	—	—	1,321	599
VFD 32VSS1200	—	—	—	—	—	—	1,616	733
VFD PULLBOX	—	—	184	84	184	84	—	—
VFD ACTIVE HARMONIC FILTER	500	227	605	275	605	275	605	275
VFD CABLE	150	68	200	91	200	91	286	130
VFD TRAY	100	45	124	56	124	56	30	14

Table 5 — 19DV Compressor and Motor Weights[a] — High-Efficiency Motors

MOTOR CODE	ENGLISH			SI		
	Compressor Weight[b] (lb)	Stator and Housing Weight (lb)	Rotor and Shaft Weight (lb)	Compressor Weight[b] (kg)	Stator and Housing Weight (kg)	Rotor and Shaft Weight (kg)
DV3						
Voltage: 380/460						
B	5,605	926	242	2 542	420	110
D	5,605	926	242	2 542	420	110
F	5,605	1,041	281	2 542	472	127
H	5,605	1,093	302	2 542	496	137
DV4						
Voltage: 380/460						
B	6,195	1,090	330	2 810	494	150
D	6,195	1,150	340	2 810	522	154
F	6,195	1,230	350	2 810	558	159
H	6,195	1,316	364	2 810	597	165
DV5						
Voltage: 380/460						
B	10,677	1,956	584	4 843	887	265
D	10,677	1,991	593	4 843	903	269
F	10,677	2,025	603	4 843	919	273
H	10,677	2,094	622	4 843	950	282

NOTE(S):

a. Total compressor weight is the sum of the compressor aerodynamic components (compressor weight column), stator, and rotor.
b. Compressor aerodynamic component weight only, motor weight not included. Applicable to standard compressors only.

Table 6 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
F20	7,272	—	—	—	1,311	—
F21	7,376	—	—	—	1,359	—
F22	7,529	6,127	—	311	1,432	1,156
F23	7,684	6,356	—	319	1,504	1,248
F24	7,837	6,534	—	326	1,577	1,321
F25	7,287	—	—	—	1,290	—
F26	7,399	—	—	—	1,342	—
F27	7,536	5,999	—	311	1,408	1,008
F28	7,691	6,189	—	319	1,480	1,085
F29	7,845	6,398	—	326	1,553	1,170
F40	7,856	—	—	—	1,384	—
F41	7,975	—	—	—	1,440	—
F42	8,151	6,625	—	386	1,522	1,259
F43	8,330	6,888	—	395	1,605	1,365
F44	8,506	7,092	—	403	1,688	1,447
F45	7,865	—	—	—	1,361	—
F46	7,993	—	—	—	1,420	—
F47	8,151	6,476	—	386	1,495	1,103
F48	8,329	6,695	—	395	1,578	1,191
F49	8,506	6,934	—	403	1,660	1,288
F2A	6,972	—	—	—	1,346	—
F2B	7,072	—	—	—	1,414	—
F2C	7,169	5,666	—	288	1,481	1,222
F2D	7,269	5,796	—	292	1,548	1,300
F2E	7,372	5,975	—	298	1,615	1,405
F2F	6,972	—	—	—	1,306	—
F2G	7,062	—	—	—	1,367	—
F2H	7,169	5,548	—	288	1,441	1,054
F2J	7,261	5,678	—	292	1,501	1,132
F2K	7,379	5,866	—	298	1,582	1,243
F4A	7,513	—	—	—	1,425	—
F4B	7,629	—	—	—	1,502	—
F4C	7,741	6,099	—	349	1,578	1,335
F4D	7,857	6,249	—	354	1,655	1,423
F4E	7,975	6,455	—	361	1,731	1,543
F4F	7,505	—	—	—	1,380	—
F4G	7,608	—	—	—	1,448	—
F4H	7,733	5,961	—	349	1,532	1,156
F4J	7,838	6,111	—	354	1,601	1,244
F4K	7,975	6,328	—	361	1,693	1,371
G20	8,611	—	—	—	1,723	—
G21	8,772	—	—	—	1,799	—
G22	8,942	6,713	—	360	1,879	1,332
G23	9,111	6,956	—	370	1,959	1,430
G24	9,330	7,222	—	379	2,063	1,539
G25	8,677	—	—	—	1,695	—
G26	8,802	—	—	—	1,754	—
G27	8,972	6,669	—	360	1,834	1,245
G28	9,147	6,884	—	370	1,917	1,333
G29	9,339	7,140	—	379	2,007	1,437
G40	9,260	—	—	—	1,808	—
G41	9,446	—	—	—	1,895	—
G42	9,641	7,275	—	437	1,986	1,453
G43	9,836	7,555	—	448	2,076	1,566
G44	10,088	7,860	—	459	2,195	1,689
G45	9,326	—	—	—	1,780	—
G46	9,470	—	—	—	1,847	—
G47	9,665	7,220	—	437	1,938	1,363
G48	9,867	7,467	—	448	2,032	1,463
G49	10,087	7,760	—	459	2,135	1,581
G2A	8,225	—	—	—	1,740	—
G2B	8,324	—	—	—	1,807	—
G2C	8,433	6,198	—	397	1,881	1,424
G2D	8,540	6,402	—	403	1,952	1,544
G2E	8,699	6,585	—	411	2,059	1,653
G2F	8,236	—	—	—	1,675	—
G2G	8,331	—	—	—	1,739	—
G2H	8,450	6,180	—	397	1,819	1,340

Table 6 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
G2J	8,580	6,359	—	403	1,907	1,446
G2K	8,710	6,504	—	411	1,994	1,532
G4A	8,818	—	—	—	1,827	—
G4B	8,933	—	—	—	1,904	—
G4C	9,059	6,688	—	462	1,988	1,558
G4D	9,182	6,922	—	469	2,068	1,696
G4E	9,365	7,133	—	477	2,191	1,819
G4F	8,821	—	—	—	1,757	—
G4G	8,931	—	—	—	1,830	—
G4H	9,068	6,663	—	462	1,922	1,471
G4J	9,218	6,869	—	469	2,021	1,591
G4K	9,368	7,036	—	477	2,121	1,690
H20	9,572	—	—	—	2,127	—
H21	9,755	—	—	—	2,213	—
H22	9,936	7,933	—	484	2,298	1,726
H23	10,177	8,253	—	495	2,412	1,856
H24	10,420	8,601	—	507	2,527	1,996
H25	9,518	—	—	—	2,101	—
H26	9,697	—	—	—	2,185	—
H27	9,906	7,815	—	484	2,284	1,678
H28	10,115	8,125	—	495	2,383	1,803
H29	10,356	8,450	—	507	2,497	1,936
H40	10,315	—	—	—	2,235	—
H41	10,526	—	—	—	2,334	—
H42	10,734	8,618	—	484	2,430	1,882
H43	11,011	8,985	—	495	2,560	2,029
H44	11,291	9,384	—	507	2,690	2,189
H45	10,253	—	—	—	2,205	—
H46	10,459	—	—	—	2,302	—
H47	10,700	8,482	—	563	2,414	1,827
H48	10,940	8,837	—	576	2,527	1,969
H49	11,218	9,211	—	590	2,657	2,121
H2A	9,025	—	—	—	2,111	—
H2B	9,149	—	—	—	2,195	—
H2C	9,294	7,294	—	431	2,293	1,852
H2D	9,453	7,532	—	439	2,400	1,991
H2E	9,623	7,791	—	448	2,514	2,143
H2F	8,990	—	—	—	2,088	—
H2G	9,115	—	—	—	2,172	—
H2H	9,253	7,210	—	431	2,266	1,802
H2J	9,402	7,425	—	439	2,363	1,929
H2K	9,568	7,675	—	448	2,477	2,075
H4A	9,692	—	—	—	2,218	—
H4B	9,835	—	—	—	2,313	—
H4C	10,002	7,889	—	499	2,424	2,025
H4D	10,185	8,163	—	508	2,546	2,183
H4E	10,381	8,461	—	518	2,676	2,356
H4F	9,652	—	—	—	2,191	—
H4G	9,795	—	—	—	2,286	—
H4H	9,956	7,792	—	499	2,393	1,969
H4J	10,126	8,040	—	508	2,504	2,113
H4K	10,318	8,327	—	518	2,634	2,279
M40	12,453	—	—	—	2,395	—
M41	12,734	—	—	—	2,529	—
M42	13,053	12,679	—	551	2,679	2,538
M43	13,366	13,245	—	571	2,829	2,773
M44	13,767	13,869	—	594	3,018	3,032
M60	13,520	—	—	—	2,568	—
M61	13,845	—	—	—	2,721	—
M62	14,213	13,889	—	684	2,892	2,835
M63	14,576	14,543	—	708	3,064	3,105
M64	15,038	15,264	—	734	3,280	3,400
M4A	11,155	—	—	—	1,828	—
M4B	11,287	—	—	—	1,895	—
M4C	11,446	10,196	—	543	1,977	1,578
M4D	11,624	10,475	—	557	2,068	1,703
M4E	11,830	10,781	—	572	2,171	1,840
M6A	12,032	—	—	—	1,919	—

Table 6 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
M6B	12,186	—	—	—	1,996	—
M6C	12,373	11,051	—	677	2,090	1,739
M6D	12,581	11,376	—	693	2,194	1,882
M6E	12,820	11,735	—	711	2,311	2,038

NOTE(S):

a. Evaporator weight includes two-pass Victaulic dished heads.
b. Condenser weight includes the high side float chamber, discharge pipe, and two-pass Victaulic dished heads; does not include economizer weight.
c. See Model Number Nomenclature.
d. 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.
e. Actual evaporator refrigerant charge weight is calculated based on pass and nozzle arrangement as well as selected capacity. Therefore charge weight is not included in this publication. Charge weight for condenser and economizer are for reference only. User must consult unit name plate or the as sold performance sheet or E-Cat selection sheet in order to obtain accurate refrigerant charge information.

Table 7 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
F20	3 299	—	—	—	595	—
F21	3 346	—	—	—	616	—
F22	3 415	2 779	—	141	650	524
F23	3 485	2 883	—	145	682	566
F24	3 555	2 964	—	148	715	599
F25	3 305	—	—	—	585	—
F26	3 356	—	—	—	609	—
F27	3 418	2 721	—	141	639	457
F28	3 489	2 807	—	145	671	492
F29	3 558	2 902	—	148	704	531
F40	3 563	—	—	—	628	—
F41	3 617	—	—	—	653	—
F42	3 697	3 005	—	175	690	571
F43	3 778	3 124	—	179	728	619
F44	3 858	3 217	—	183	766	656
F45	3 568	—	—	—	617	—
F46	3 626	—	—	—	644	—
F47	3 697	2 937	—	175	678	500
F48	3 778	3 037	—	179	716	540
F49	3 858	3 145	—	183	753	584
F2A	3 162	—	—	—	611	—
F2B	3 208	—	—	—	641	—
F2C	3 252	2 570	—	131	672	554
F2D	3 297	2 629	—	132	702	590
F2E	3 344	2 710	—	135	733	637
F2F	3 162	—	—	—	592	—
F2G	3 203	—	—	—	620	—
F2H	3 252	2 517	—	131	654	478
F2J	3 294	2 575	—	132	681	513
F2K	3 347	2 661	—	135	718	564
F4A	3 408	—	—	—	646	—
F4B	3 460	—	—	—	681	—
F4C	3 511	2 766	—	158	716	606
F4D	3 564	2 834	—	161	751	645
F4E	3 617	2 928	—	164	785	700
F4F	3 404	—	—	—	626	—
F4G	3 451	—	—	—	657	—
F4H	3 508	2 704	—	158	695	524
F4J	3 555	2 772	—	161	726	564
F4K	3 617	2 870	—	164	768	622
G20	3 906	—	—	—	782	—
G21	3 979	—	—	—	816	—
G22	4 056	3 045	—	163	852	604
G23	4 133	3 155	—	167	889	649
G24	4 232	3 276	—	172	936	698
G25	3 936	—	—	—	769	—
G26	3 993	—	—	—	796	—
G27	4 070	3 025	—	163	832	565
G28	4 149	3 123	—	167	870	605
G29	4 236	3 239	—	172	910	652
G40	4 200	—	—	—	820	—
G41	4 285	—	—	—	860	—
G42	4 373	3 300	—	198	901	659
G43	4 462	3 427	—	203	942	710
G44	4 576	3 565	—	208	996	766
G45	4 230	—	—	—	807	—
G46	4 296	—	—	—	838	—
G47	4 384	3 275	—	198	879	618
G48	4 476	3 387	—	203	922	664
G49	4 575	3 520	—	208	968	717
G2A	3 731	—	—	—	789	—
G2B	3 776	—	—	—	820	—
G2C	3 825	2 811	—	180	853	646
G2D	3 874	2 904	—	182	885	700
G2E	3 946	2 987	—	186	934	750
G2F	3 736	—	—	—	760	—
G2G	3 779	—	—	—	789	—
G2H	3 833	2 803	—	180	825	608

Table 7 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
G2J	3 892	2 884	—	182	865	656
G2K	3 951	2 950	—	186	904	695
G4A	4 000	—	—	—	829	—
G4B	4 052	—	—	—	864	—
G4C	4 109	3 034	—	209	902	707
G4D	4 165	3 140	—	212	938	769
G4E	4 248	3 235	—	216	994	825
G4F	4 001	—	—	—	797	—
G4G	4 051	—	—	—	830	—
G4H	4 113	3 022	—	209	872	667
G4J	4 181	3 116	—	212	917	722
G4K	4 249	3 191	—	216	962	767
H20	4 342	—	—	—	965	—
H21	4 425	—	—	—	1 004	—
H22	4 507	3 599	—	220	1 042	783
H23	4 616	3 744	—	225	1 094	842
H24	4 726	3 901	—	230	1 146	905
H25	4 317	—	—	—	953	—
H26	4 399	—	—	—	991	—
H27	4 493	3 545	—	220	1 036	761
H28	4 588	3 685	—	225	1 081	818
H29	4 698	3 833	—	230	1 133	878
H40	4 679	—	—	—	1 014	—
H41	4 774	—	—	—	1 058	—
H42	4 869	3 909	—	220	1 102	853
H43	4 995	4 075	—	225	1 161	920
H44	5 121	4 256	—	230	1 220	993
H45	4 651	—	—	—	1 000	—
H46	4 744	—	—	—	1 044	—
H47	4 853	3 847	—	255	1 095	829
H48	4 962	4 008	—	261	1 146	893
H49	5 088	4 178	—	268	1 205	962
H2A	4 094	—	—	—	958	—
H2B	4 150	—	—	—	996	—
H2C	4 216	3 308	—	195	1 040	840
H2D	4 288	3 416	—	199	1 089	903
H2E	4 365	3 534	—	203	1 140	972
H2F	4 078	—	—	—	947	—
H2G	4 134	—	—	—	985	—
H2H	4 197	3 270	—	195	1 028	818
H2J	4 265	3 368	—	199	1 072	875
H2K	4 340	3 481	—	203	1 124	941
H4A	4 396	—	—	—	1 006	—
H4B	4 461	—	—	—	1 049	—
H4C	4 537	3 578	—	226	1 100	919
H4D	4 620	3 703	—	230	1 155	990
H4E	4 709	3 838	—	235	1 214	1 069
H4F	4 378	—	—	—	994	—
H4G	4 443	—	—	—	1 037	—
H4H	4 516	3 535	—	226	1 086	893
H4J	4 593	3 647	—	230	1 136	958
H4K	4 680	3 777	—	235	1 195	1 034
M40	5 648	—	—	—	1 087	—
M41	5 776	—	—	—	1 147	—
M42	5 921	5 751	—	250	1 215	1 151
M43	6 063	6 008	—	259	1 283	1 258
M44	6 244	6 291	—	269	1 369	1 375
M60	6 132	—	—	—	1 165	—
M61	6 280	—	—	—	1 234	—
M62	6 447	6 300	—	310	1 312	1 286
M63	6 612	6 596	—	321	1 390	1 408
M64	6 821	6 924	—	333	1 488	1 542
M4A	5 060	—	—	—	829	—
M4B	5 120	—	—	—	859	—
M4C	5 192	4 625	—	246	897	716
M4D	5 273	4 751	—	253	938	773
M4E	5 366	4 890	—	259	985	835
M6A	5 458	—	—	—	871	—

Table 7 — 19DV 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[e]	Condenser Only	Evaporator Only	Condenser Only
M6B	5 528	—	—	—	905	—
M6C	5 612	5 013	—	307	948	789
M6D	5 706	5 160	—	314	995	854
M6E	5 815	5 323	—	323	1 048	925

NOTE(S):

a. Evaporator weight includes two-pass Victaulic dished heads.
b. Condenser weight includes the high side float chamber, discharge pipe, and two-pass Victaulic dished heads; does not include economizer weight.
c. See Model Number Nomenclature.
d. 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.
e. Actual evaporator refrigerant charge weight is calculated based on pass and nozzle arrangement as well as selected capacity. Therefore charge weight is not included in this publication. Charge weight for condenser and economizer are for reference only. User must consult unit name plate or the as sold performance sheet or E-Cat selection sheet in order to obtain accurate refrigerant charge information.

Table 8 — 19DV Economizer Weight

COMPRESSOR SIZE	DRY WEIGHT (lb)[a]	REFRIGERANT WEIGHT (lb)	OPERATION WEIGHT (lb)	DRY WEIGHT (kg)[a]	REFRIGERANT WEIGHT (kg)	OPERATION WEIGHT (kg)
DV3	1501	227	1728	681	103	784
DV4	1931	342	2273	876	155	1 031
DV5	2785	570	3355	1263	259	1 522

NOTE(S):

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

Table 9 — Additional Weights for 19DV 150 psig (1034 kPa) Marine Waterboxes — English (lb)[a,b]

FRAME	NUMBER OF PASSES	EVAPORATOR			CONDENSER		
		Rigging Weight		Water Weight	Rigging Weight		Water Weight
		Victaulic	Flange		Victaulic	Flange	
F	1	352	426	961	255	293	561
	2	397	509	930	311	381	596
	3	356	411	886	233	259	457
G	1	365	441	1142	323	380	779
	2	450	598	1212	337	413	689
	3	375	432	1056	305	340	661
H	1	460	534	1236	397	453	927
	2	466	614	1317	462	575	981
	3	381	437	1132	382	417	787
M	2	1008	1201	2517	760	910	2009

NOTE(S):

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

Table 10 — Additional Weights for 19DV 150 psig (1034 kPa) Marine Waterboxes — SI (kg)[a,b]

FRAME	NUMBER OF PASSES	EVAPORATOR			CONDENSER		
		Rigging Weight		Water Weight	Rigging Weight		Water Weight
		Victaulic	Flange		Victaulic	Flange	
F	1	160	193	436	116	133	254
	2	180	231	422	141	173	270
	3	161	186	402	106	117	207
G	1	166	200	518	147	172	353
	2	204	271	550	153	187	313
	3	170	196	479	138	154	300
H	1	209	242	561	180	205	420
	2	211	279	597	210	261	445
	3	173	198	513	173	189	357
M	2	457	545	1142	345	413	911

NOTE(S):

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

Table 11 — 19DV Waterbox Cover Weights — English (lb)[a]

WATERBOX	PASSES	EVAPORATOR								CONDENSER							
		Frame F		Frame G		Frame H		Frame M		Frame F		Frame G		Frame H		Frame M	
		Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic
NIH Dished Cover, 150 psig	1	406	328	494	417	515	437	—	—	191	154	232	172	249	187	—	—
	2	536	419	682	528	714	560	—	—	294	220	308	235	390	273	717	523
	2 return	315		404		424		—		134		154		168		404	
	3	459	401	557	499	588	529	—	—	212	186	247	210	268	232	—	—
MWB Flat Cover, 150 psig	1	426	352	668		759		—		293	255	138		172		—	
	2	509	397					476		381	311	172		214		476	
	2 return	315		404		422		436		134		154		168		436	
	3	411	356	668		759		—		259	233	172		215		—	

NOTE(S):

a. 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 — SI (kg)[a]

WATERBOX	PASSES	EVAPORATOR								CONDENSER							
		Frame F		Frame G		Frame H		Frame M		Frame F		Frame G		Frame H		Frame M	
		Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic	Flange	Victaulic
NIH Dished Cover, 150 psig	1	184	149	224	189	234	198	—	—	87	70	105	78	113	85	—	—
	2	243	190	309	239	324	254	—	—	133	100	140	107	177	124	325	237
	2 return	143		183		192		—		61		70		76		183	
	3	208	182	253	226	267	240	—	—	96	84	112	95	122	105	—	—
MWB Flat Cover, 150 psig	1	193	160	303		344		—		133	116	63		78		—	
	2	231	180					216		173	141	78		97		216	
	2 return	143		183		191		198		61		70		76		198	
	3	186	161	303		344		—		117	106	78		98		—	

NOTE(S):

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

LEGEND

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

RIG MACHINE COMPONENTS

Refer to instructions below, Fig. 7-9, and Carrier certified drawings 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. 10). 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.

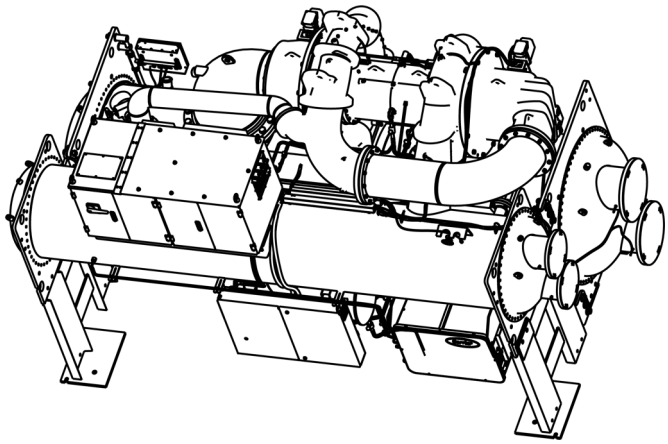


Fig. 7 — 19DV, Side View (DV4 Shown)

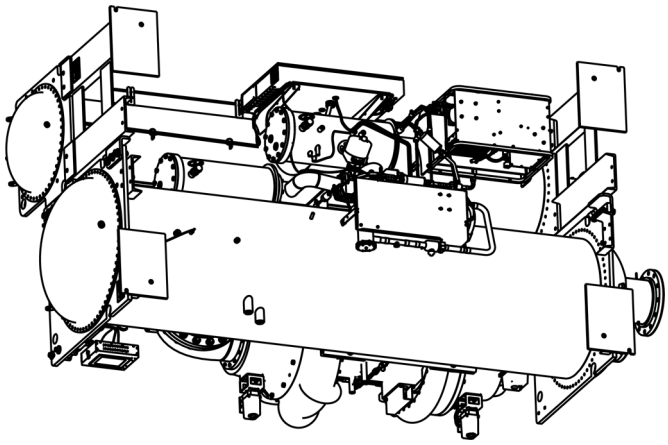
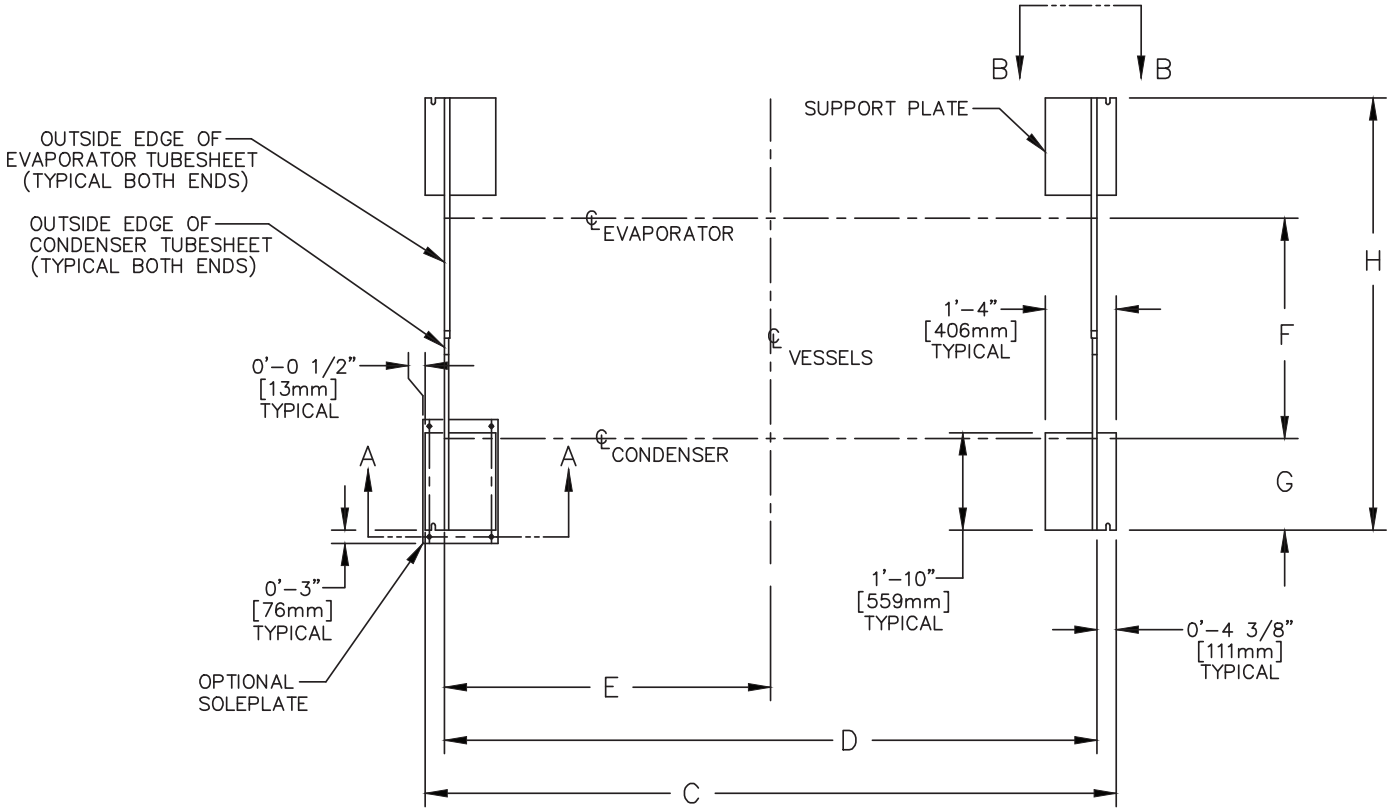


Fig. 8 — 19DV, Bottom View (DV4 Shown)



A-A dimension refers to accessory soleplate. See page 23.
B-B dimension refers to standard support plate. See page 23.

	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
F2[a]	13-0-1/4	3969	12-3-1/2	3747	6-1-3/4	1873	3-11-3/4	1211	1-6	457	7-5-7/8	2283
F4[a]	14-8-3/4	4490	14-0	4267	7-0	2134	3-11-3/4	1211	1-6	457	7-5-7/8	2283
G2[a]	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[a]	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[a]	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[a]	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
M4[a]	14-6-1/4	4427	14-0	4267	7-0	2134	7-7-1/2	2324	2-5-1/2	746	10-5-7/8	3197
M6[a]	16-6-1/4	5037	16-0	4877	8-0	2439	7-7-1/2	2324	2-5-1/2	746	10-5-7/8	3197

NOTE(S):

a. Assumes both evaporator and condenser nozzles on same end of chiller; nozzle-in-head waterboxes, 150 psi rated.

Fig. 9 — 19DV Machine Footprint

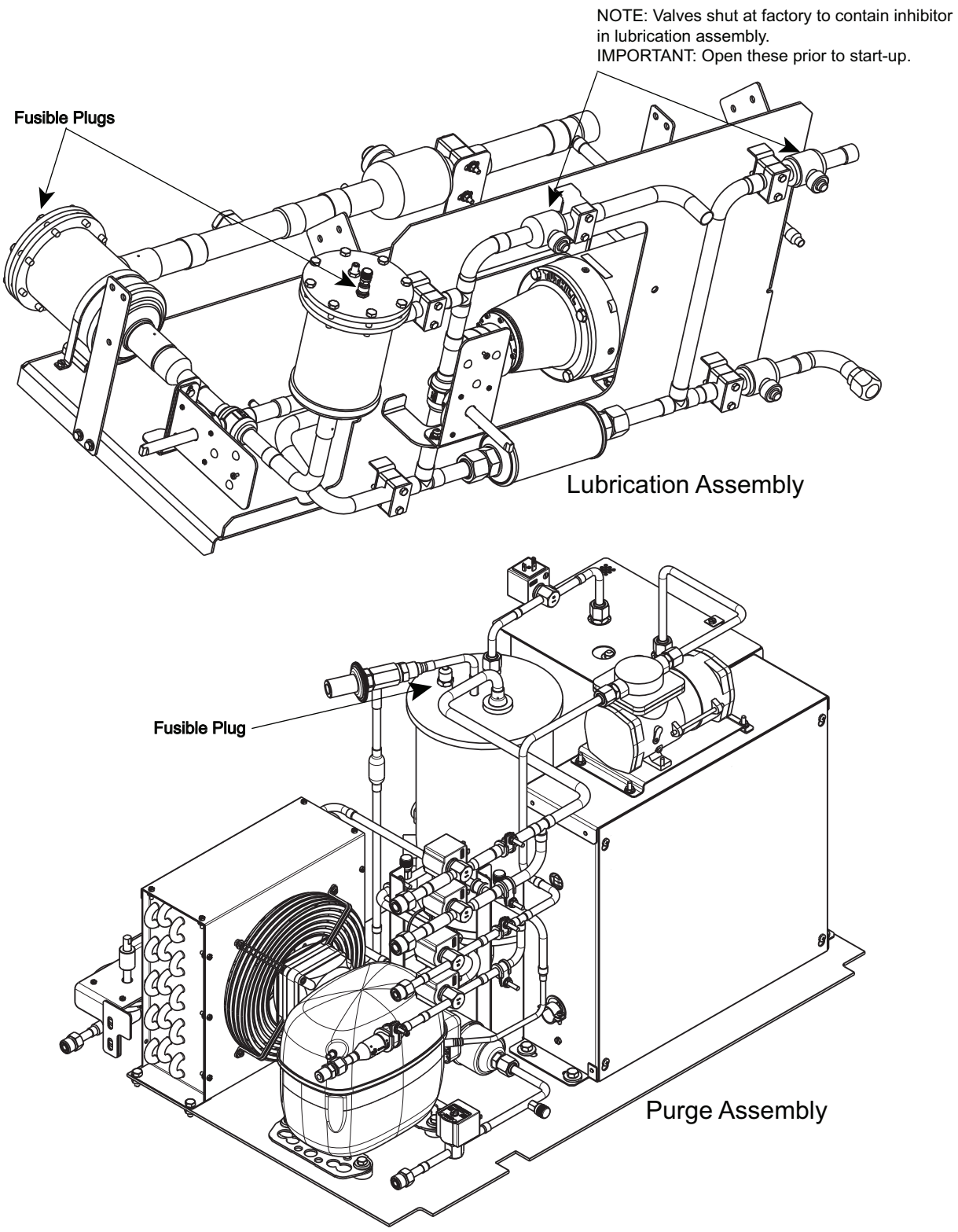


Fig. 10 — Location of Fusible Plugs in Lubrication Assembly and Purge Assembly

Step 3 — Install Machine Supports

INSTALL STANDARD ISOLATION

Figure 9 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)

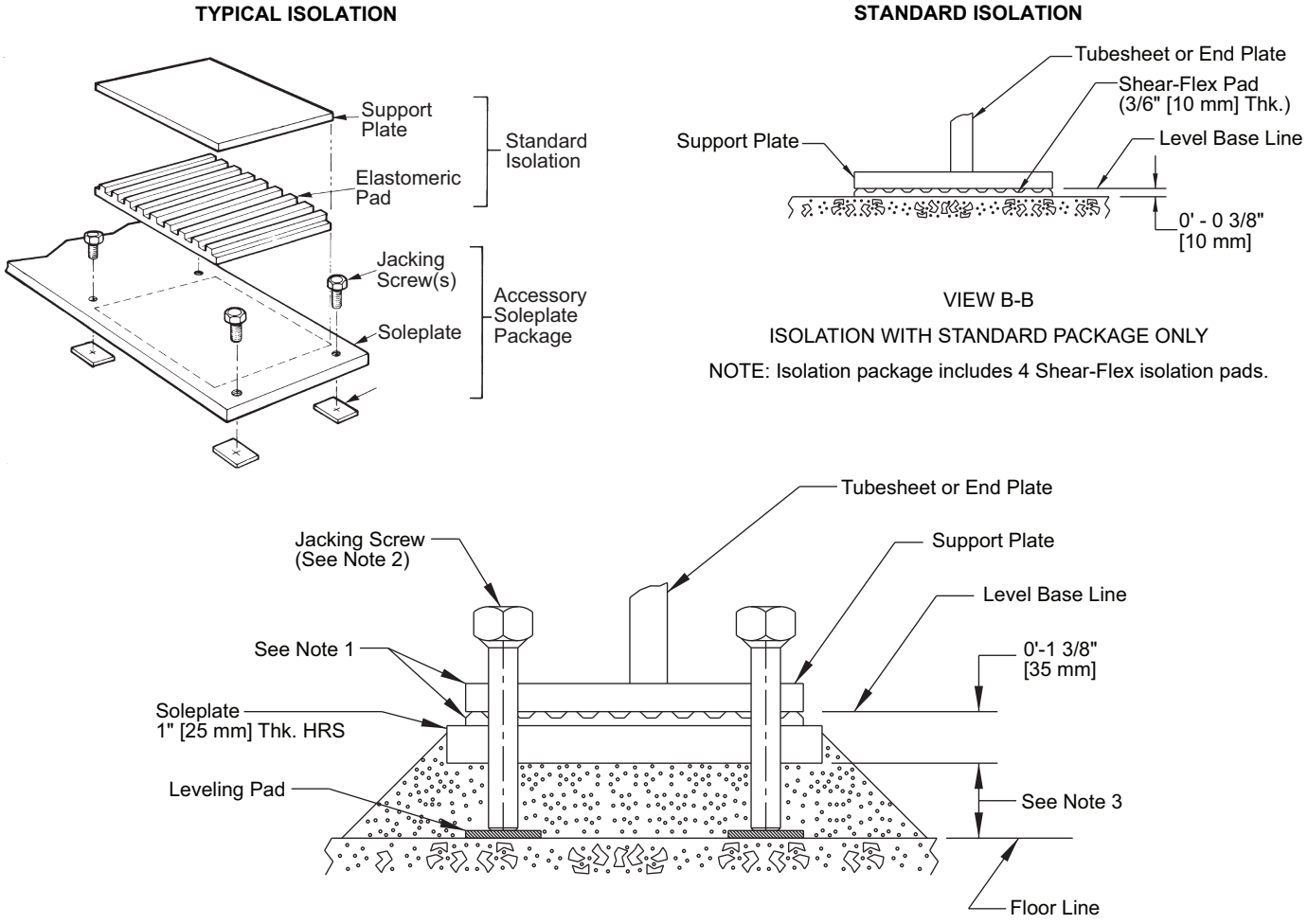
Uneven floors or other considerations may dictate the use of accessory soleplates (supplied by Carrier for field installation) and leveling pads. See Fig. 11.

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'-1-1/2" (38.1 mm) to 0'-2-1/2" (57 mm) thick.

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

Fig. 11 — 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. 12. 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.

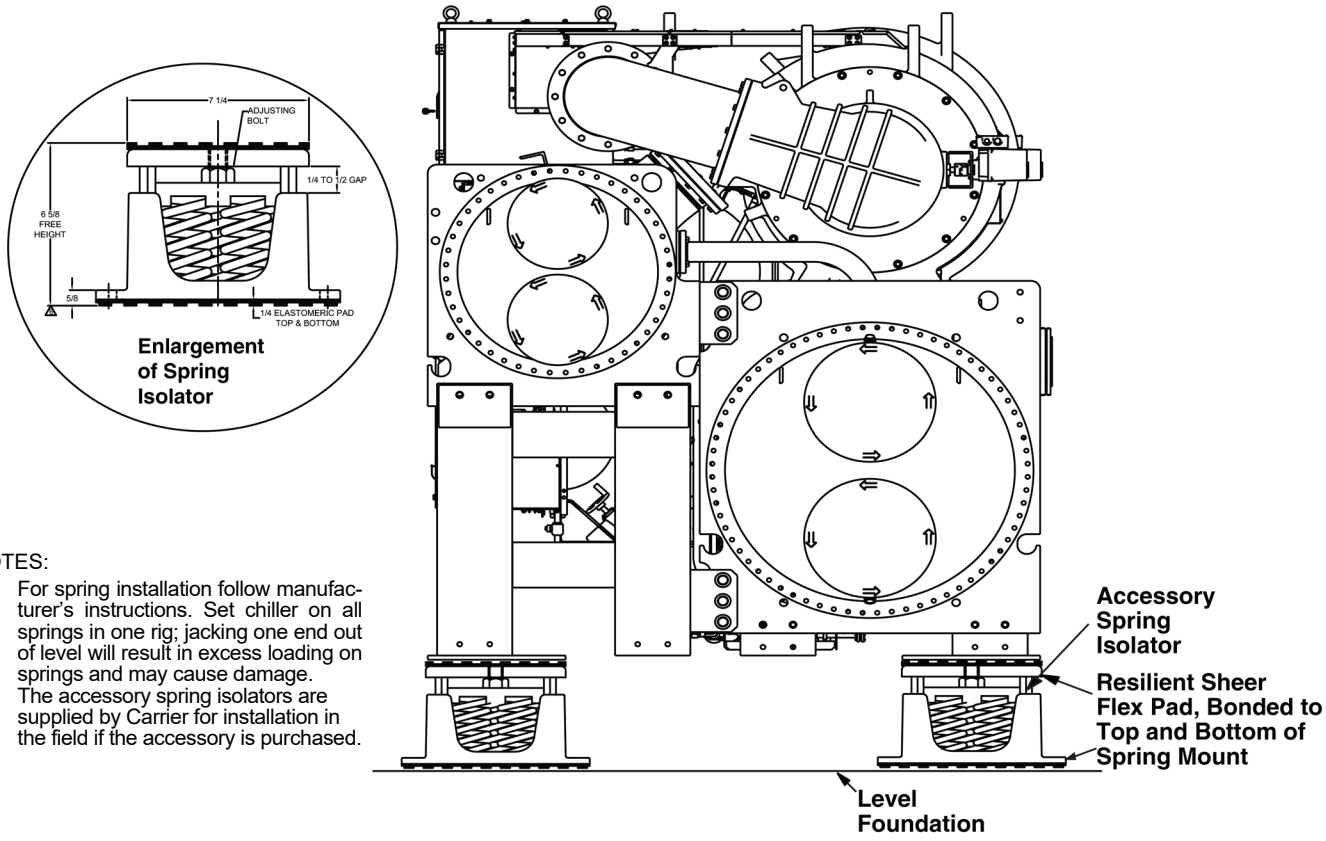
NOTE: The springs are designed to support the weight of the chiller only. Connected piping must be supported independently of the chiller. The entire chiller should be lifted for spring installation to prevent damage to the optional isolation springs. If the springs are installed on a single end with the other end lifted, it will result in damage to the isolation springs.

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 32VSC VFD - AHF OPTION AND 680 AMP DRIVE).

For DV5 units, the top hat is factory installed. The purpose of the top hat is to provide the minimum bend radius of the field-installed wiring. For DV3/4 units, the top hat is shipped separately (strapped to chiller leg). To install, remove existing cover on top of the VFD and install top hat with removable access cover facing outwards. Cut holes in top cover as appropriate for the selected conduit size and run the individual wires to the appropriate termination points. See Fig. 13.



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. 12 — 19DV Accessory Spring Isolation (Shown with Accessory Soleplates)

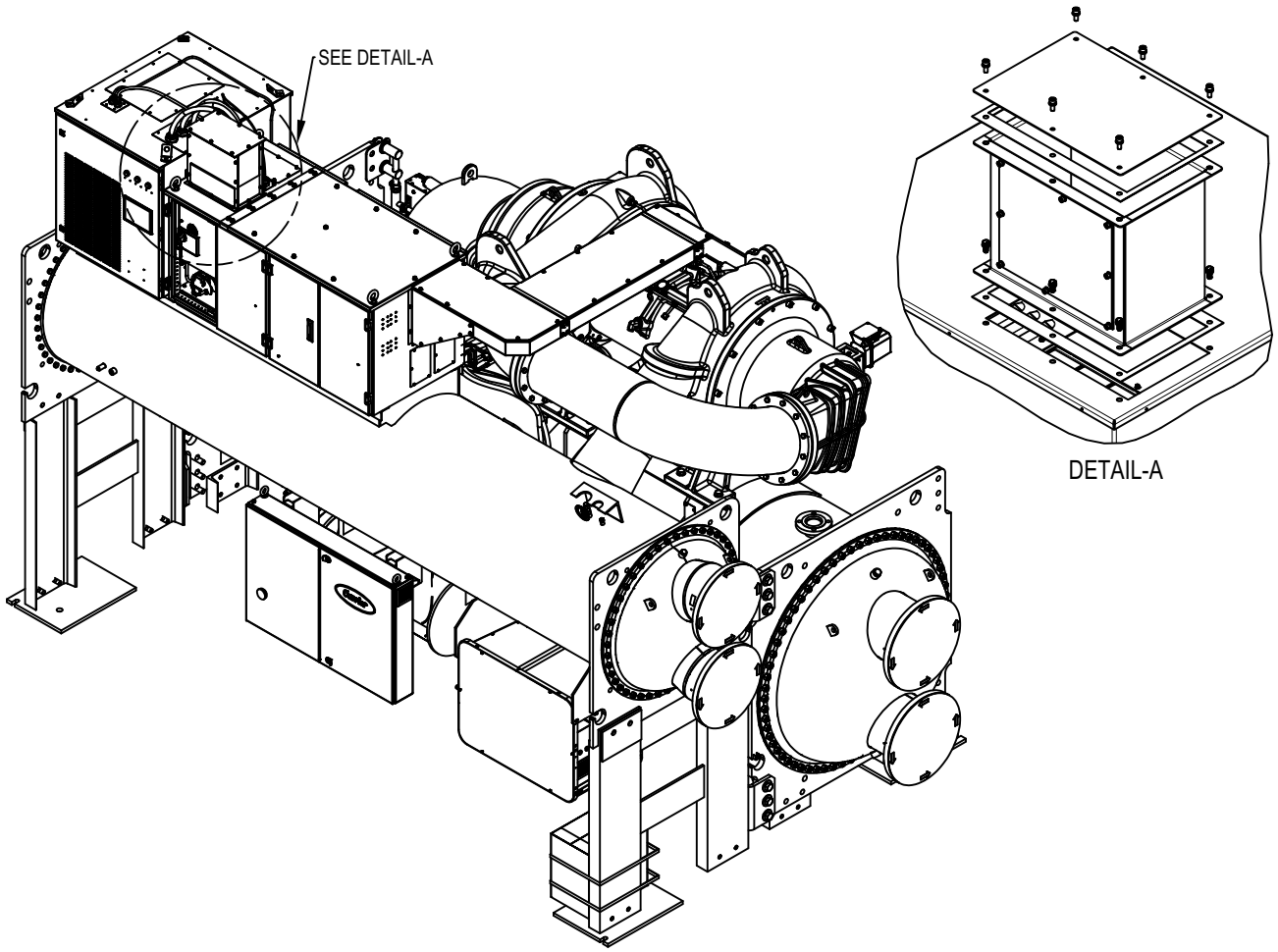


Fig. 13 — Top Hat Installation

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. 14.

⚠ 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 gauges 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. 15 and 16. 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 according to 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; refer to Fig. 10. 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. See Table 13 and Fig. 17 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 visual inspection of the 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.

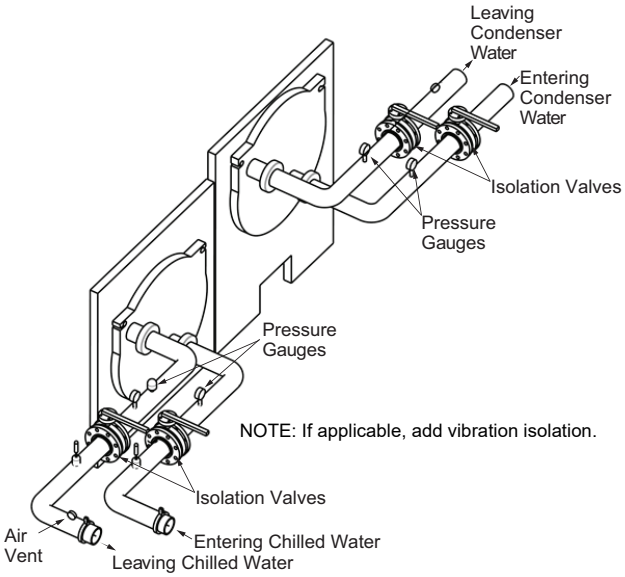
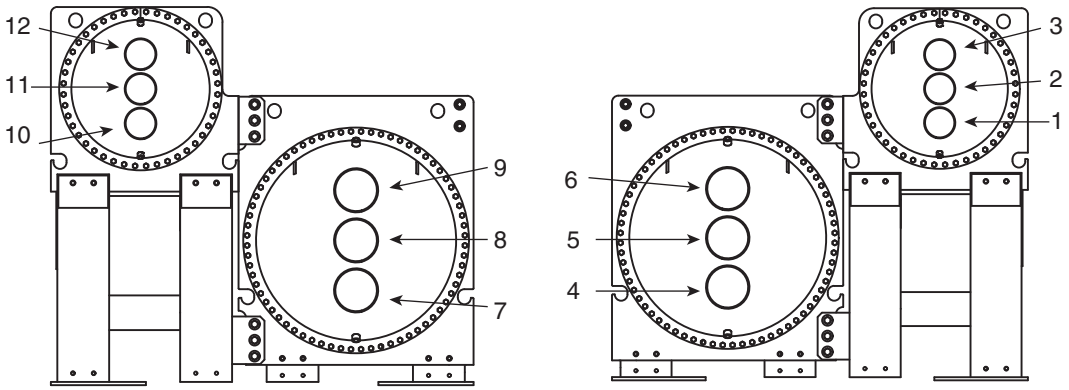


Fig. 14 — Typical Nozzle Piping

Nozzle-in-Head (NIH) Waterboxes



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

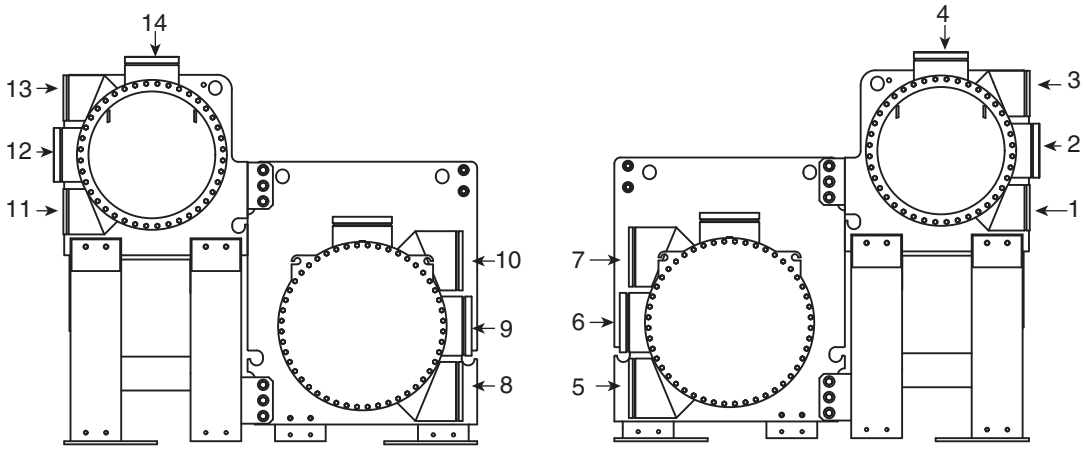
PASS	EVAPORATOR WATERBOXES			CONDENSER WATERBOXES		
	In	Out	Arrangement Code[a]	In	Out	Arrangement Code[a]
1	8	5	A	11	2	P
	5	8	B	2	11	Q
2	7	9	C	10	12	R
	4	6	D	1	3	S
3	7	6	E	10	3	T
	4	9	F	1	12	U

NOTE(S):

a. Refer to certified drawings.

Fig. 15 — Nozzle Arrangement Codes for 19DV Nozzle-in-Head Waterboxes

Marine Waterboxes (MWB)



NOZZLE ARRANGEMENT CODES

EVAPORATOR MARINE WATERBOXES			
PASS	**In**	**Out**	**Arrangement Code[a]**
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[a]**
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

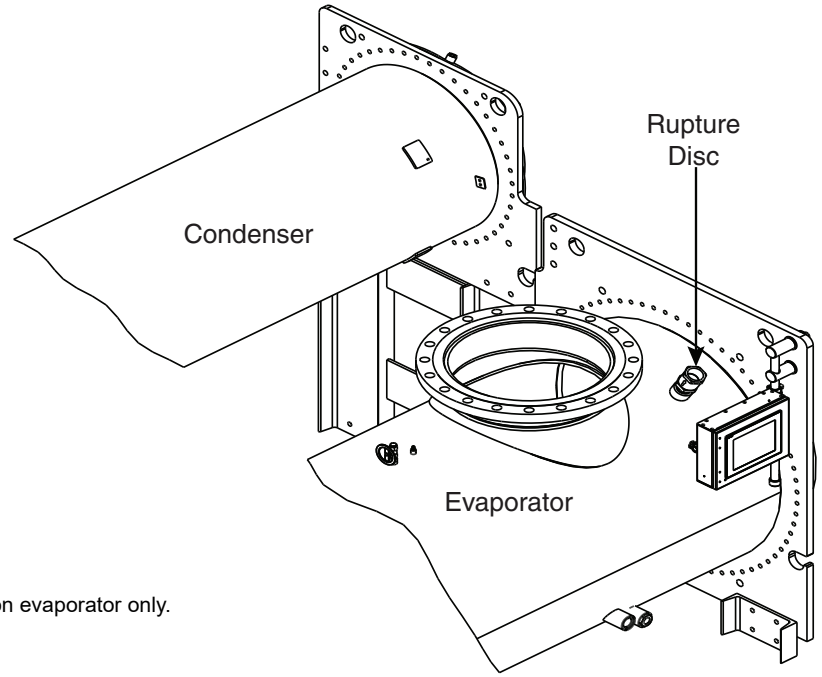
NOTE(S):

a. Refer to certified drawings.

Fig. 16 — Nozzle Arrangement Codes for 19DV Marine Waterboxes

Table 13 — Relief Device Locations

LOCATION	FRAME SIZE	PRESSURE RELIEF DEVICE OUTLET SIZE
EVAPORATOR	F, G, H, M	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. 17 — 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. 18 and 19.

CONNECT CONTROL OUTPUTS

Connect auxiliary equipment, chilled and condenser water pumps, and spare alarms as required and indicated on job wiring drawings. Terminal block 5TB is factory wired for low voltage field connections.

With fourth IOB configured, the hydraulic control function will be available; with this function, the tower fan can 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. 20-26 for control panel details and layout, IOB details, optional field wiring, and typical factory unit-mounted VFD. Control board contact output can control loads rated 1 amp AC RMS steady state and 4 amps surge. Coil voltage of output relay is 24 vac. Be sure to use pilot relays to avoid damage to the IOBs for outputs to devices such as evaporator pump, condenser pump, tower fan low, tower fan high, and other outputs with large starters. Suggested rating of pilot relay is 10 amps; for example, 19XV05005503.

⚠ CAUTION

Provision for Carrier to start water pumps and establish flows must be provided to assure machine protection. If primary pump and flow are controlled by other means, also provide parallel means for control by Carrier. Failure to do so could result in machine freeze-up or overpressure and loss of warranty.

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 (see the 19DV Chiller with VFD figure on page 39). See the notes for "19DV with 32VS VFD" on page 38, VFD Conductor Usage Table, for specifics.

NOTE: For 32VSC (AHF option) a top hat is required to be installed to the top of the AHF for adequate wire installation space (Fig. 13).

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

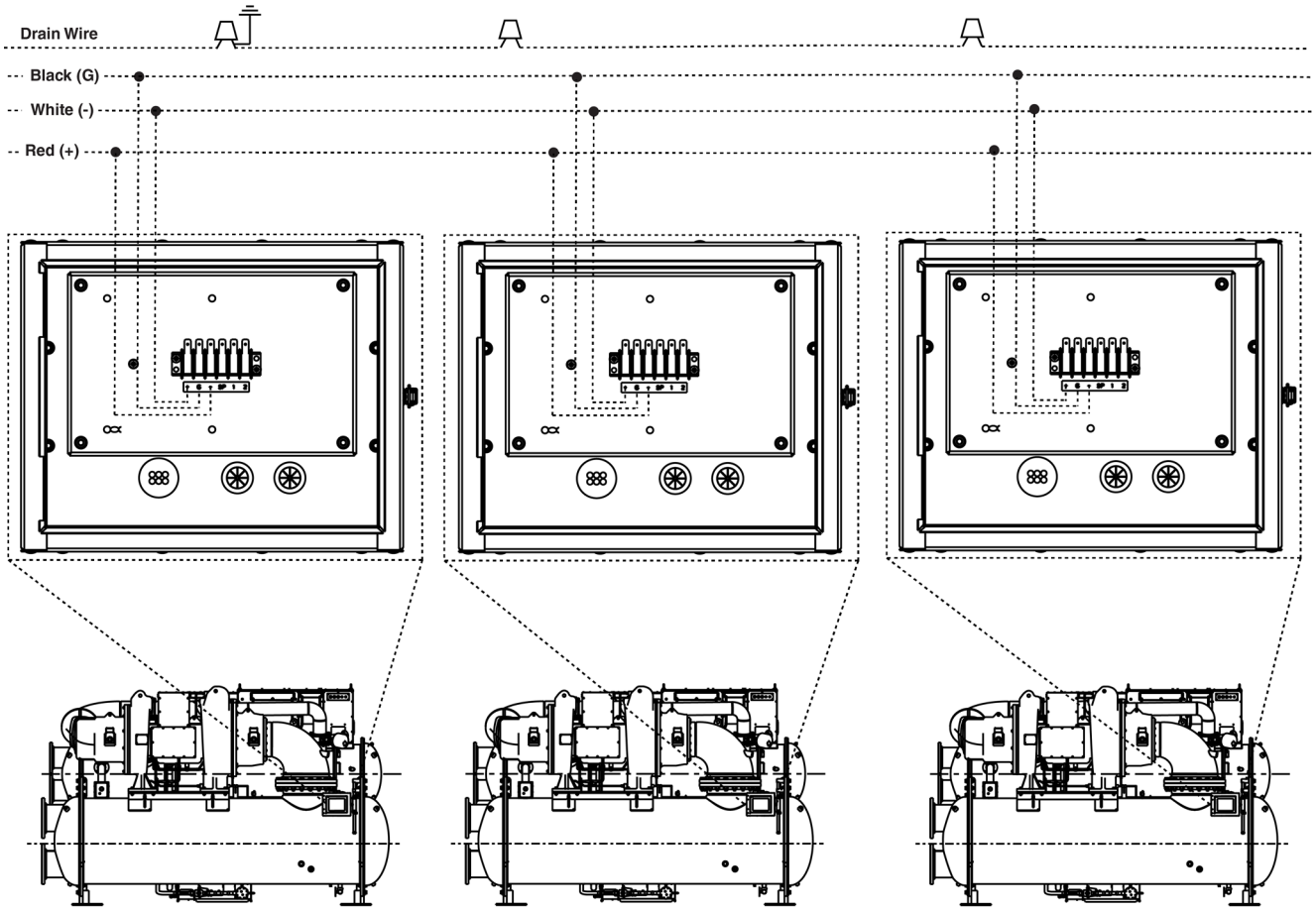
Use the knockouts provided in the control panels for wiring connections. Do not punch holes or drill into the top surface of any control enclosure. Damage to machine could result and could require component replacement.

⚠ 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. 18 — CCN Communication Wiring for Multiple Chillers (Typical)

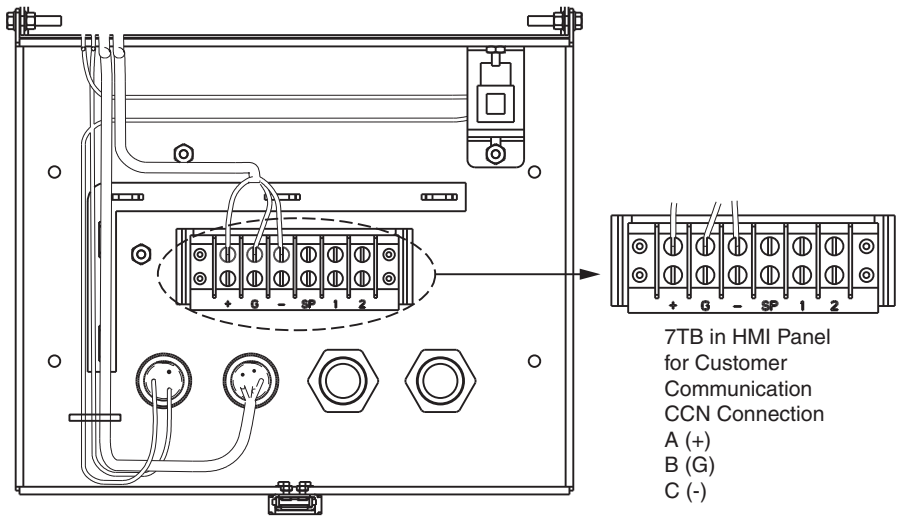


Fig. 19 — HMI Panel

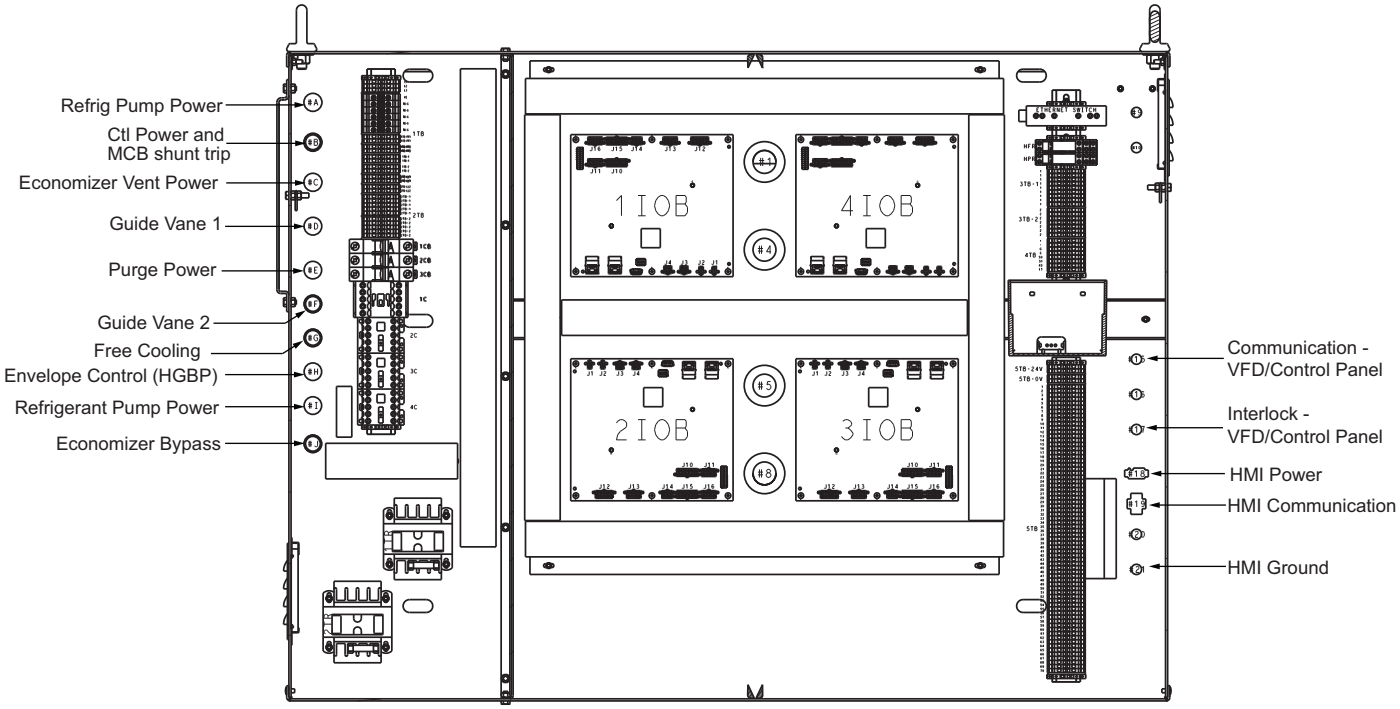
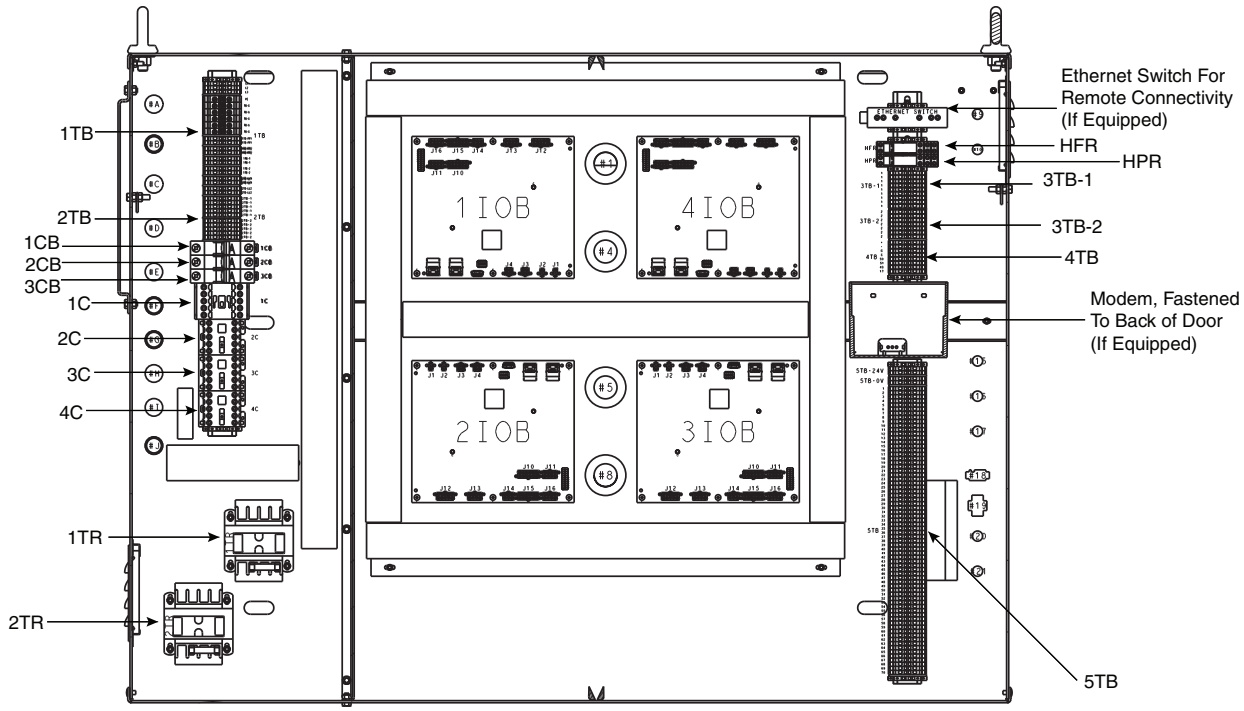
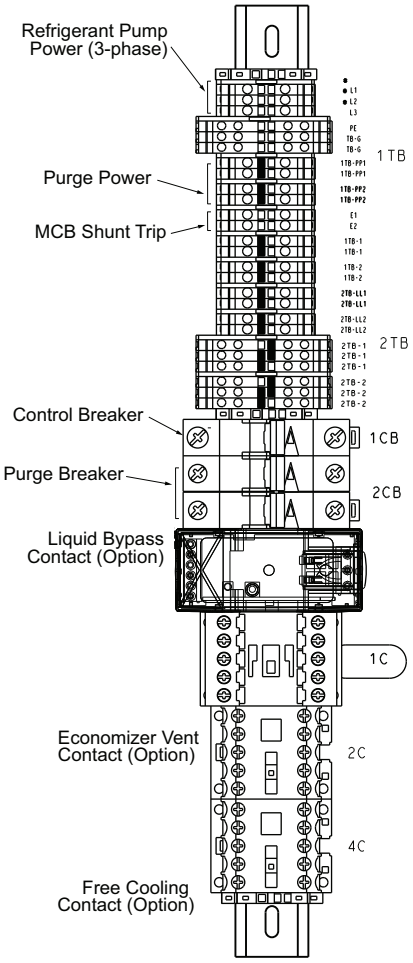
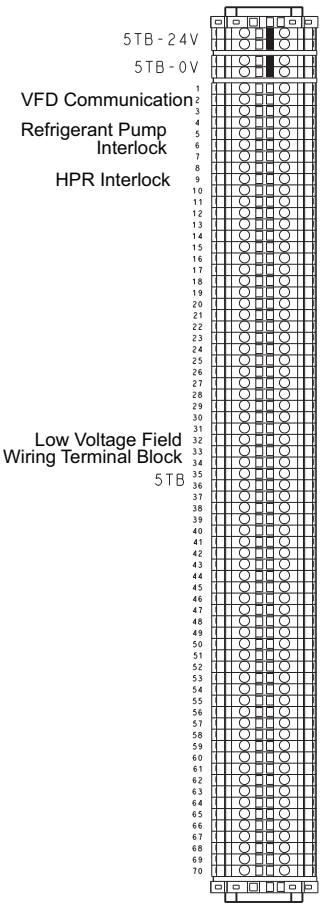


Fig. 20 — Control Panel, IOB Layer







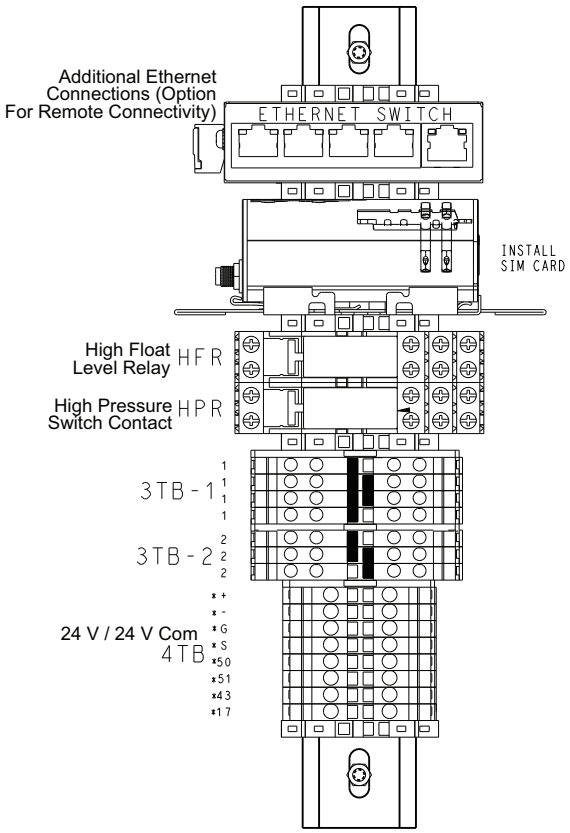


Fig. 21 — Control Panel Layout

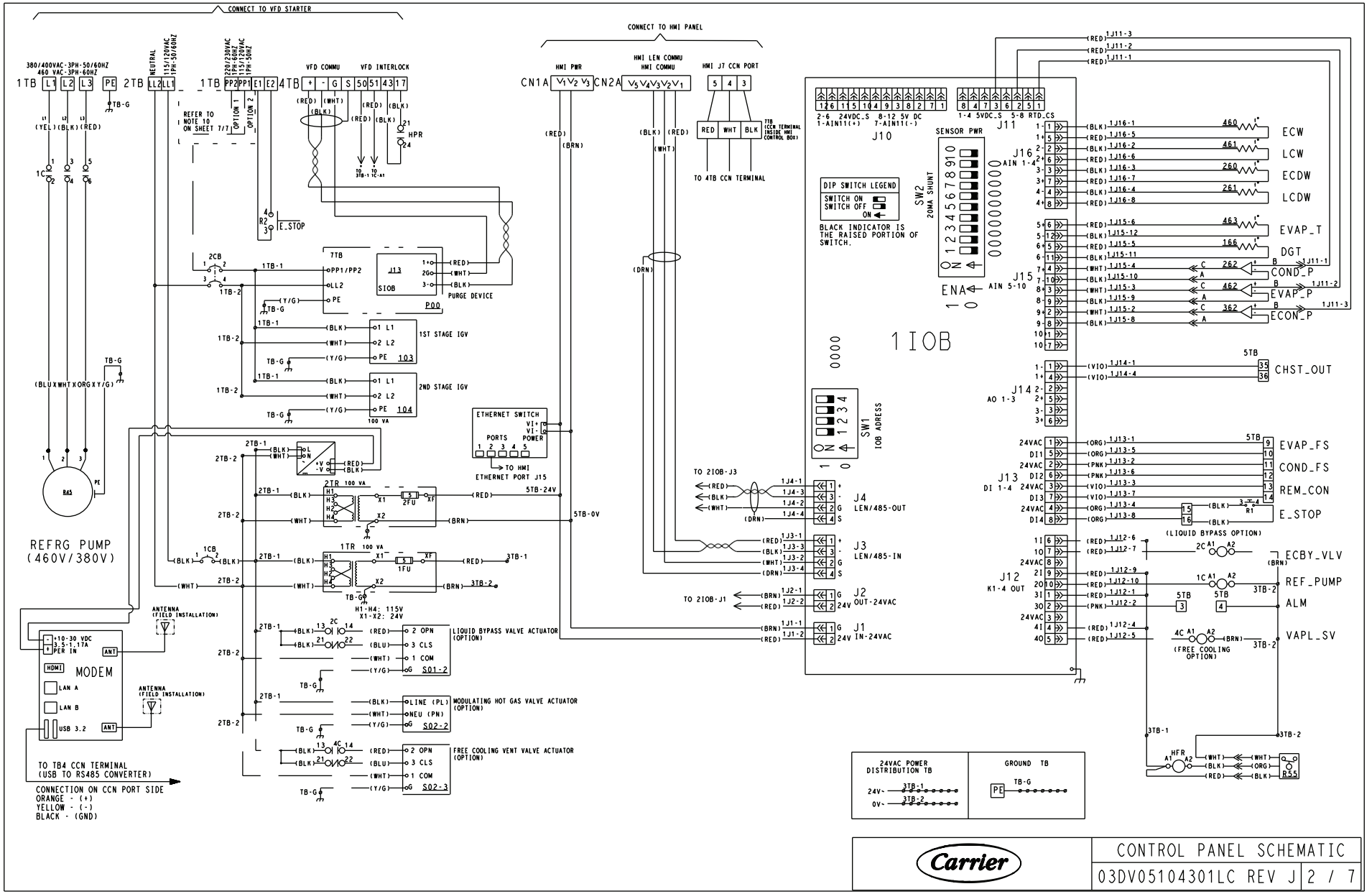
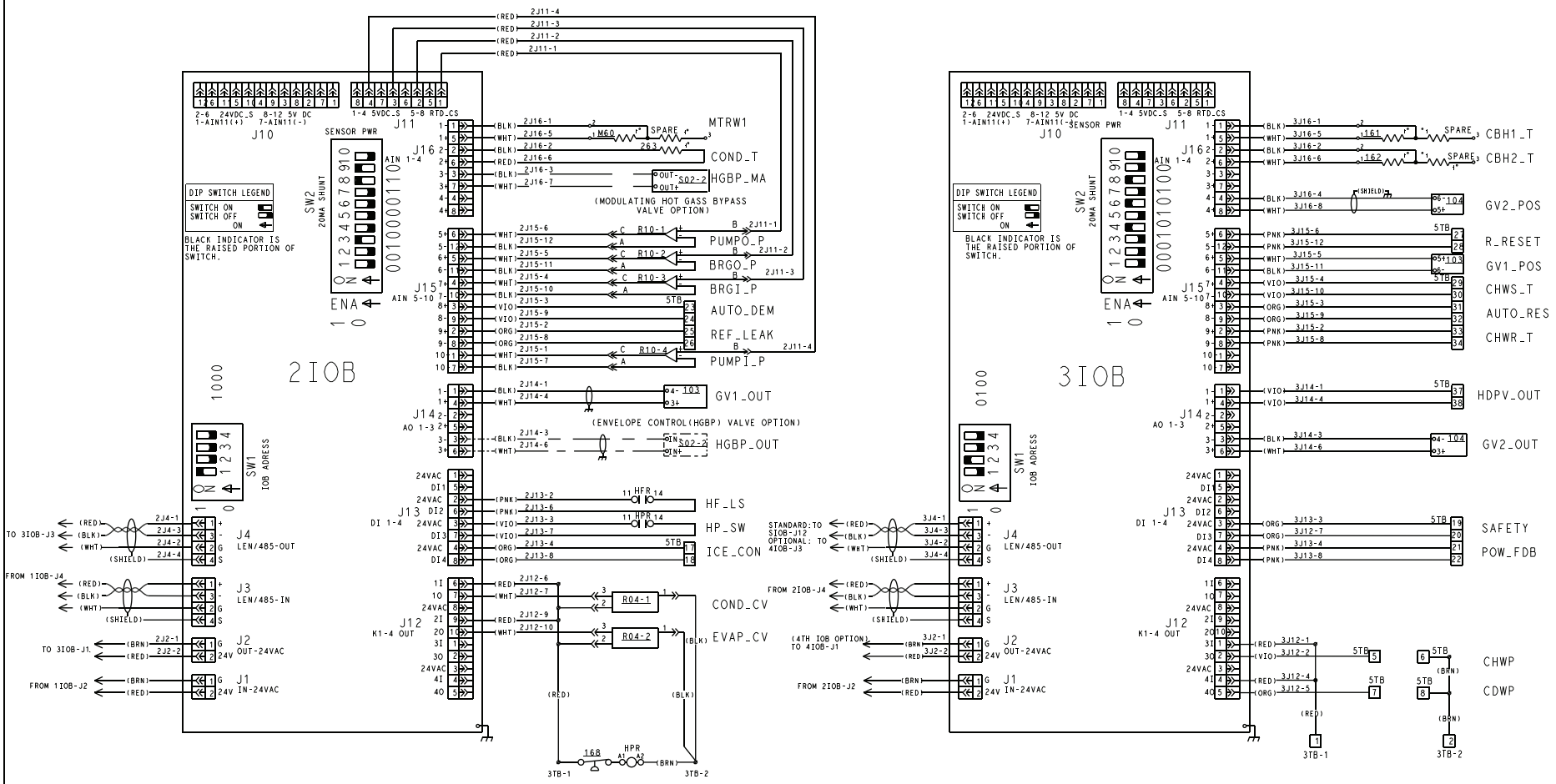

CONNECT TO VFD STARTER
CONNECT TO HMI PANEL
1IOB
REFRG PUMP
(460V/380V)
MODEM
ETHERNET SWITCH
DIP SWITCH LEGEND
SWITCH ON
SWITCH OFF
ON
BLACK INDICATOR IS THE RAISED PORTION OF SWITCH.
SENSOR PWR
SW2
20MA SHUNT
SW1
IOB ADRESS
ECW
LCW
ECDW
LCDW
EVAP_T
DGT
COND_P
EVAP_P
ECON_P
CHST_OUT
EVAP_FS
COND_FS
REM_CON
E_STOP
ECBY_VLV
REF_PUMP
ALM
VAPL_SV
1ST STAGE IGV
2ND STAGE IGV
PURGE DEVICE
LIQUID BYPASS VALVE ACTUATOR (OPTION)
MODULATING HOT GAS VALVE ACTUATOR (OPTION)
FREE COOLING VENT VALVE ACTUATOR (OPTION)
TO TB4 CCN TERMINAL (USB TO RS485 CONVERTER)
CONNECTION ON CCN PORT SIDE
ORANGE - (+)
YELLOW - (-)
BLACK - (GND)
24VAC POWER DISTRIBUTION TB
GROUND TB
CONTROL PANEL SCHEMATIC
03DV05104301LC REV J
2 / 7

Fig. 22 — IOB1

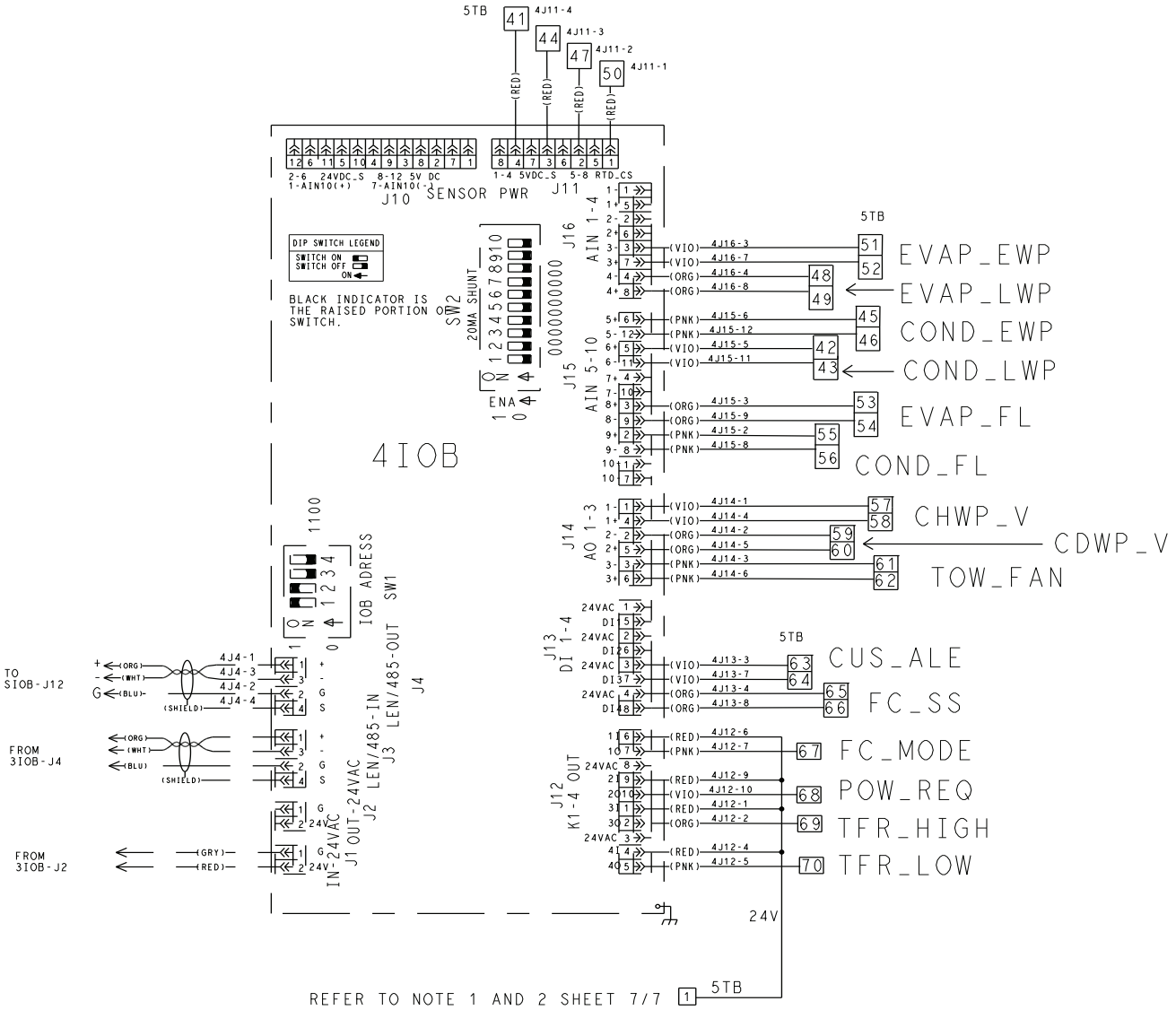


Carrier

CHILLER CONTROL SCHEMATIC

03DV05104301LC REV H | 3 / 7

Fig. 23 — IOB2 and IOB3



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

Carrier	CONTROL PANEL SCHEMATIC
	03DV05104301LC REV H | 4 / 7

Fig. 24 — IOB 4

LEGEND FOR Fig. 20-24

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	—	2nd 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

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

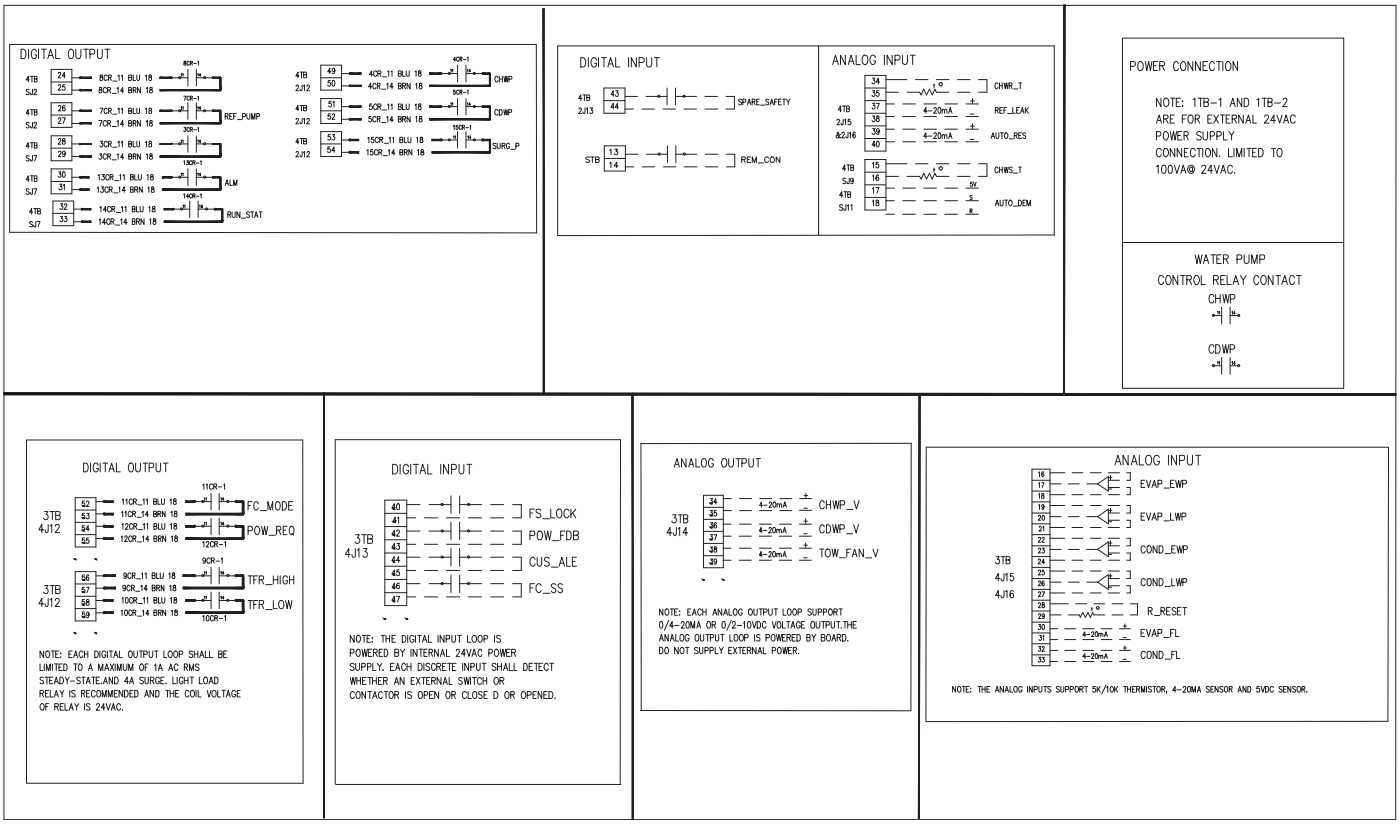


Fig. 25 — Optional Field Wiring

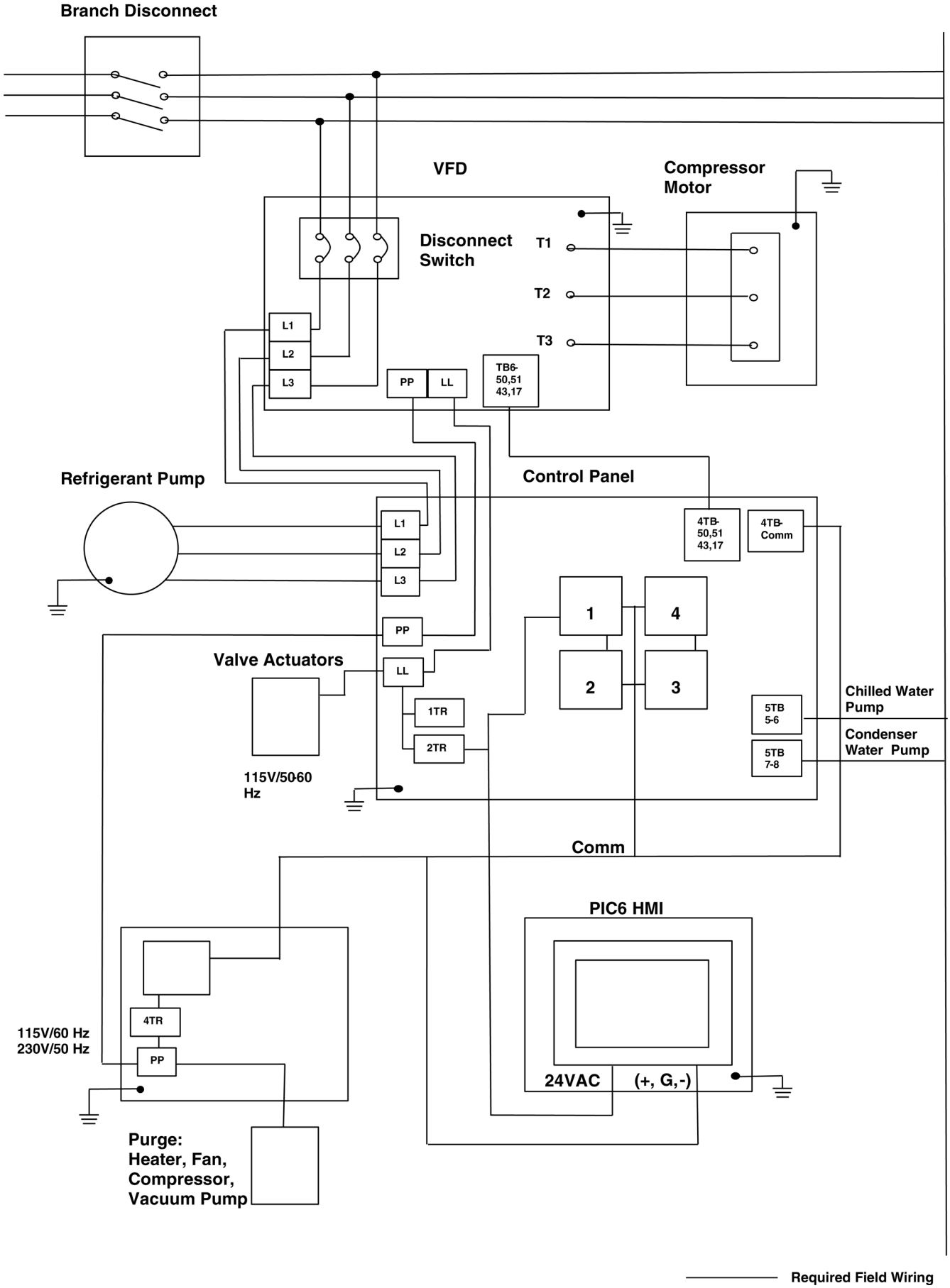


Fig. 26 — Typical 19DV VFD — Factory Unit Mounted

NOTES FOR FIG. 22-26
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). If larger lugs are required, they may be purchased from the manufacturer of the circuit breaker. See VFD Conductor Usage table for lug sizes. It is not the responsibility of Carrier to provide alternative lug connectors for different conductor sizes or quantity than shown below.

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 Gauge) 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 1 amp AC RMS steady-state and 4 amps surge. Coil voltage of relay is 24 vac. Be sure to use pilot relays to avoid damage to the IOBs. Suggested rating of pilot relay is 10 amps; for example, 19XV05005503.

⚠ 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.

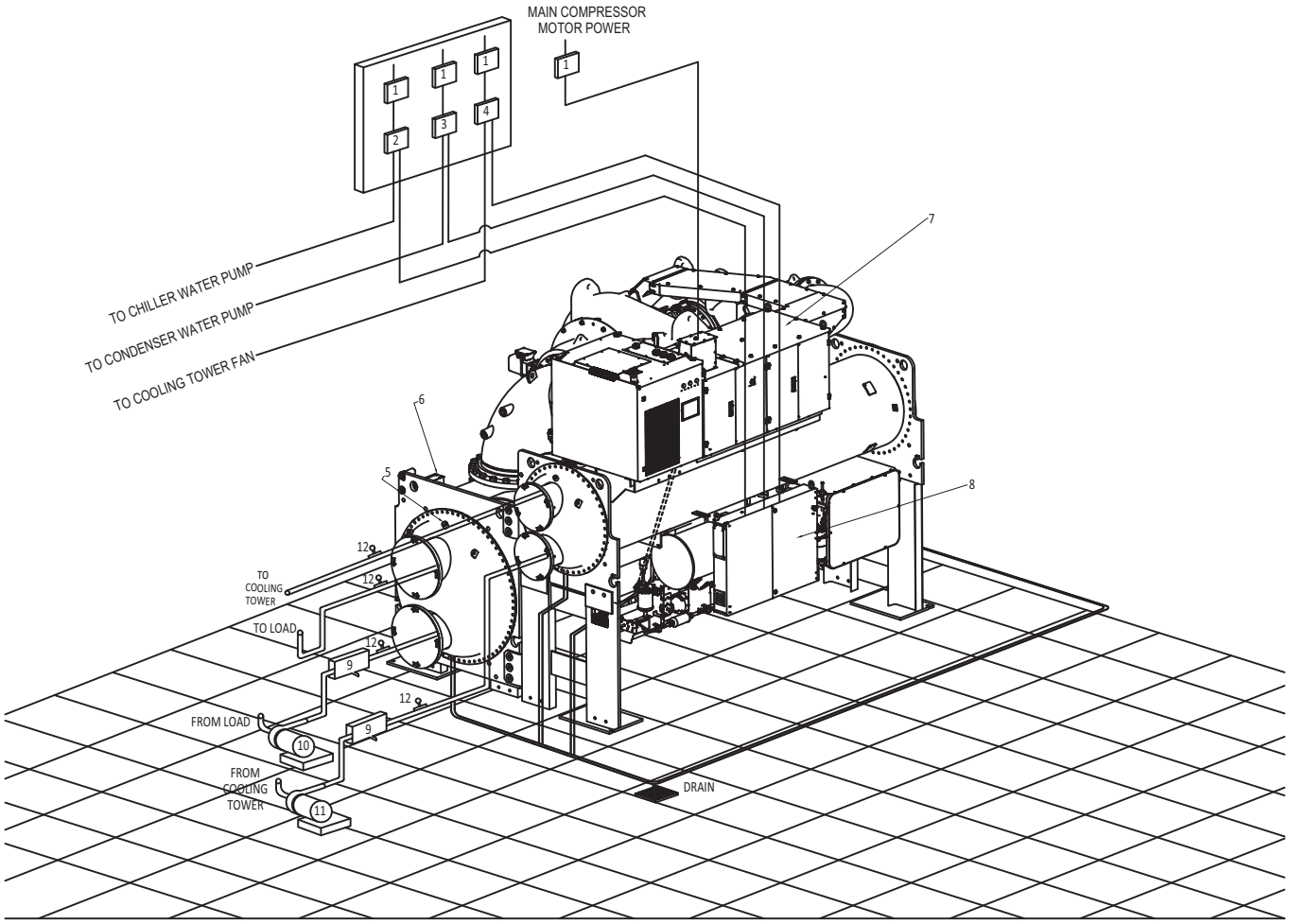
3.5 Head pressure 4 to 20 mA output signal is designed for controllers with a non-grounded 4 to 20 mA input signal and a maximum input impedance of 500 ohms.

VFD CONDUCTOR USAGE

VFD MAX INPUT AMPS	STANDARD 100 kAIC LUG CAPACITY (PER PHASE)		
	NO. OF CONDUCTORS	CONDUCTOR RANGE	GROUND CONNECTOR
Carrier 32VSS0680	2	4/0 to 500 kcmil	2/0[a]
Carrier 32VSC0680	4	4/0 to 500 kcmil	2/0[a]
Carrier 32VSS0900	4	4/0 to 500 kcmil	2/0[a]
Carrier 32VSC0900	4	4/0 to 500 kcmil	2/0[a]
Carrier 32VSS1060	4	4/0 to 500 kcmil	2/0[a]
Carrier 32VSC1060	4	4/0 to 500 kcmil	2/0[a]
Carrier 32VSS1200	4	#2 to 600 kcmil	3/0

NOTE(S):

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



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
7 — Unit-Mounted VFD
8 — Control Panel
9 — Strainers
10 — Chilled Water Pump
11 — Condenser Water Pump
12 — Pressure Gages
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:
   a. Remote Start/Stop
   b. Remote Alarms
   c. Optional Safety Device
   d. 4 to 20 mA Resets
   e. 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.
7. Be sure to pipe 3/8 in. VFD condensate pipe to drain.

Fig. 27 — 19DV Chiller with VFD

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. Refer to Fig. 18 for location of the CCN network connections on the terminal strip labeled CCN.

NOTE: Conductors and drain wire must be 20 AWG (American Wire Gauge) 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. The table shows 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.

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

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. 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 (refer to Fig. 18 and 19):

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. 28 and 29.

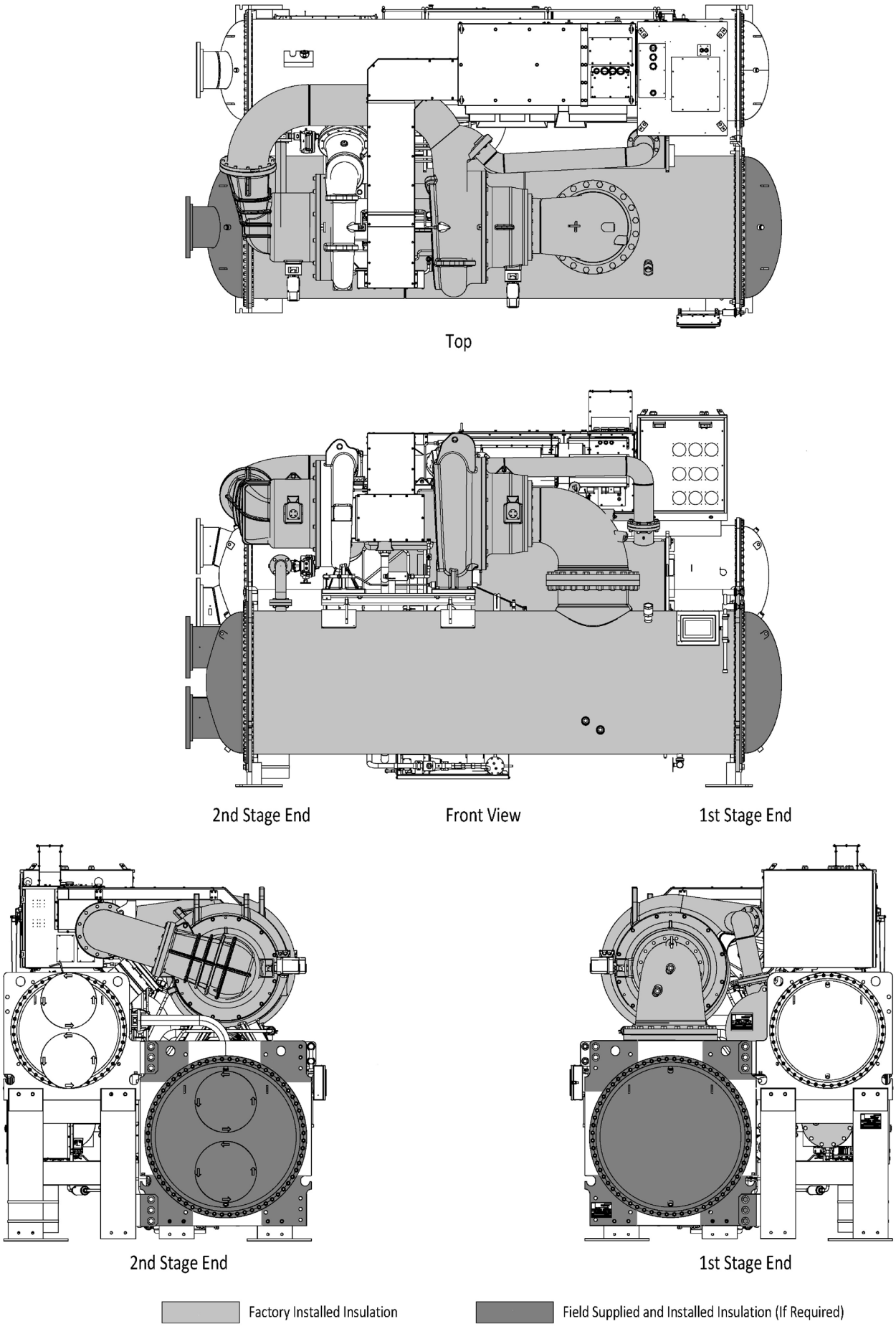
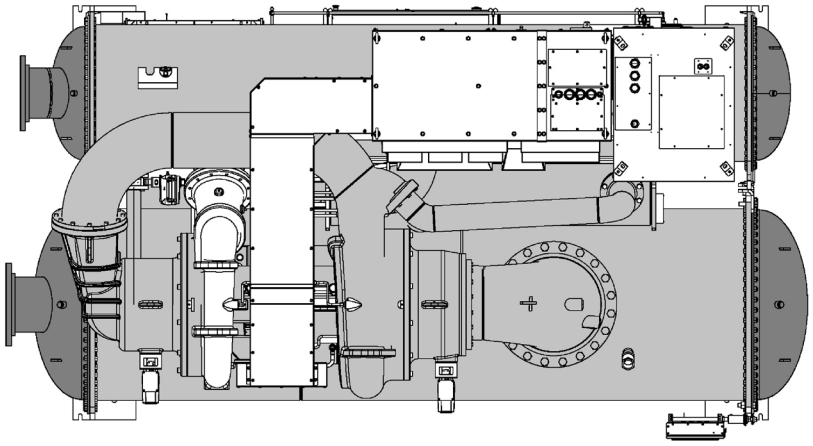
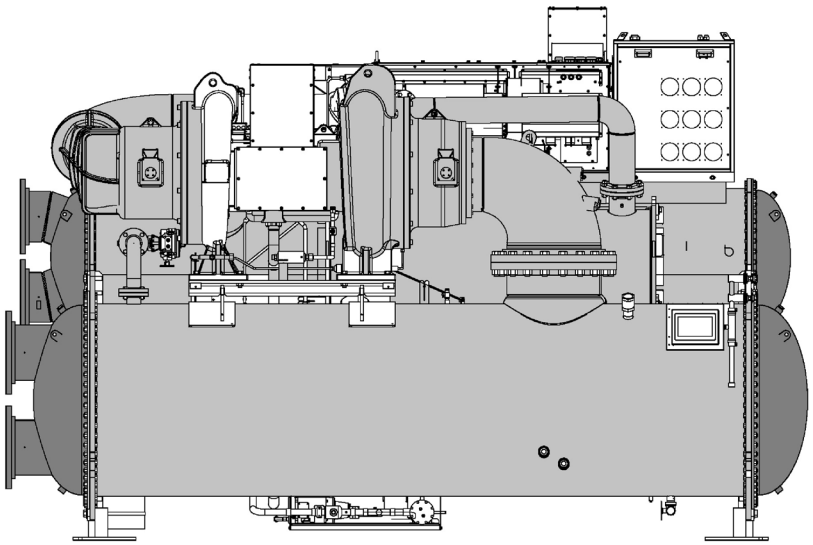


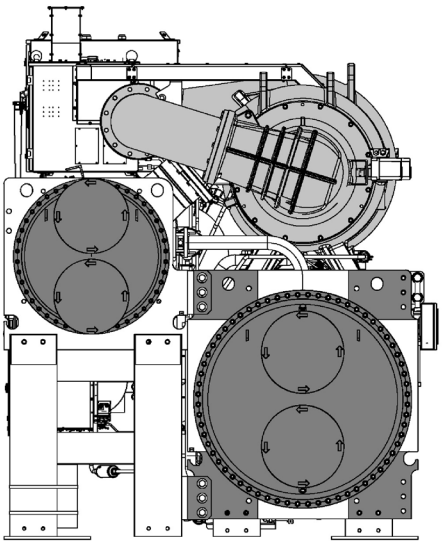
Fig. 28 — 19DV Standard Insulation Area



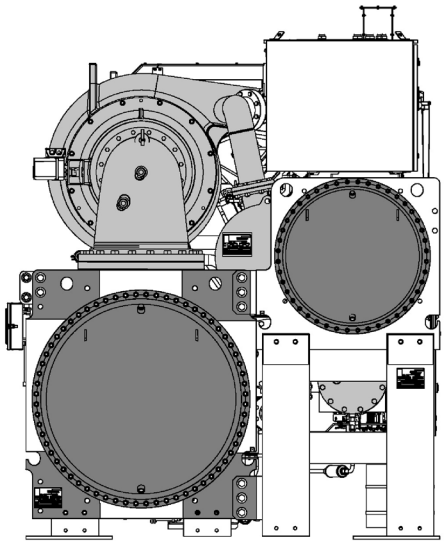
Top



2nd Stage End Front View 1st Stage End



2nd Stage End



1st Stage End

Factory Installed Insulation

Field Supplied and Installed Insulation (If Required)

Fig. 29 — 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 the preceding sections of this Controls, Start-Up, Operation and Troubleshooting 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
The machine is level.		
The machine components are installed and connected in accordance with the installation instructions.		
The isolation package and grouting (if necessary) are installed.		
The relief devices are piped to the atmosphere.		
All piping is installed and supported. Direction of flow is indicated in accordance with the installation instructions and job prints.		
Chilled water piping		
Condenser water piping		
Waterbox drain piping		
Pumpout unit piping (if installed)		
VFD drain piping		
Other _____		
Gauges are installed as called for on the job prints required to establish design flow for the evaporator and condenser.		
Water pressure gauges IN and OUT		
Water temperature gauges IN and OUT		
The machine's wiring is complete. The wiring is installed per installation instructions and certified prints.		
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.)		
Carrier controls can independently energize water pumps.		
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.		
Line side voltage is within ±10% of chiller nameplate voltage		
Other _____		
Was the chiller disassembled/reassembled during the installation?		
Was this work supervised by a Carrier Service Representative?		
Does the mechanical room meet the current ASHRAE requirements?		

Comments:

_____

_____

_____

_____

_____

TESTING

	YES/NO	DATE TO BE COMPLETED
The cooling tower fan has been checked for blade pitch and proper operation.		
The chilled water and condenser water lines have been:		
Filled		
Tested		
Flushed		
Vented		
Strainers cleaned		
Chemically treated		
The chilled water and condenser water pumps have been checked for proper rotation and flow.		
The following cooling load will be available for start-up:		
25%		
50%		
75%		
100%		
The refrigerant charge identified and will be available near machine for commissioning. Rigging is available to lift refrigerant drums.		
Services such as electrical power and control air will be available at start-up, up over evaporator for gravity feed.		
The building automation system is operational.		
The electrical, building automation and mechanical representatives will be available to assist in commissioning the machine. Note that while BACnet/Modbus is included with PIC6 the integration with building automation system (BAS) is not included in the standard startup time. Please coordinate with the local Carrier Service Office that will be performing the equipment startup, for control technician pricing associated with the BAS integration.		
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