AquaEdge®
19DV High-Efficiency Semi-Hermetic Centrifugal Liquid Chillers with Greenspeed® Intelligence, PIC5 Controls, and HFO R-1233zd(E)
50/60 Hz
500 to 800 Nominal Tons (1758 to 2813 kW)

Installation Instructions

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.

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.

(Warnings continued on next page.)

⚠ WARNING

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.

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.

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.

CONTENTS

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.

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 cooler) 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 PIC5 control system.

Purge System — The purge is an independent assembly located under 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 PIC5 control system.

PIC5 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 PIC5 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 PIC5 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

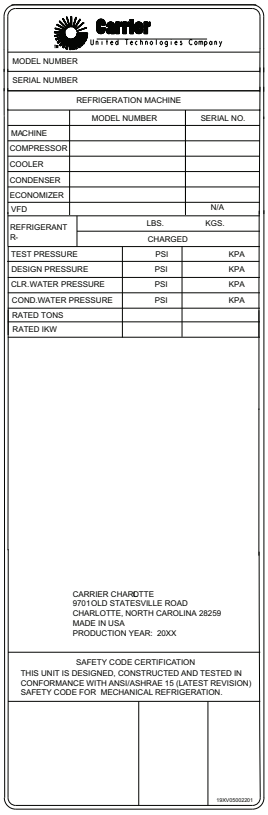
INSPECT SHIPMENT

⚠ 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 beginning 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 lubrication assembly before shipment. from the factory. Do not open lube assembly valves until unit is fully charged with refrigerant.

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.


Carrier
United Technologies Company

MODEL NUMBER		
SERIAL NUMBER		
REFRIGERATION MACHINE		
	MODEL NUMBER	SERIAL NO.
MACHINE		
COMPRESSOR		
COOLER		
CONDENSER		
ECONOMIZER		
VFD		N/A
REFRIGERANT R-	LBS. CHARGED	KGS.
TEST PRESSURE	PSI	KPA
DESIGN PRESSURE	PSI	KPA
CLR.WATER PRESSURE	PSI	KPA
COND.WATER PRESSURE	PSI	KPA
RATED TONS		
RATED IKW		

CARRIER CHARDTTE
9701 OLD STATESVILLE ROAD
CHARLOTTE, NORTH CAROLINA 28259
MADE IN USA
PRODUCTION YEAR: 20XX

SAFETY CODE CERTIFICATION
THIS UNIT IS DESIGNED, CONSTRUCTED AND TESTED IN CONFORMANCE WITH ANSI/ASHRAE 15 (LATEST REVISION) SAFETY CODE FOR MECHANICAL REFRIGERATION.

19XV05002301

Fig. 1 — 19DV Refrigeration Machine Nameplate

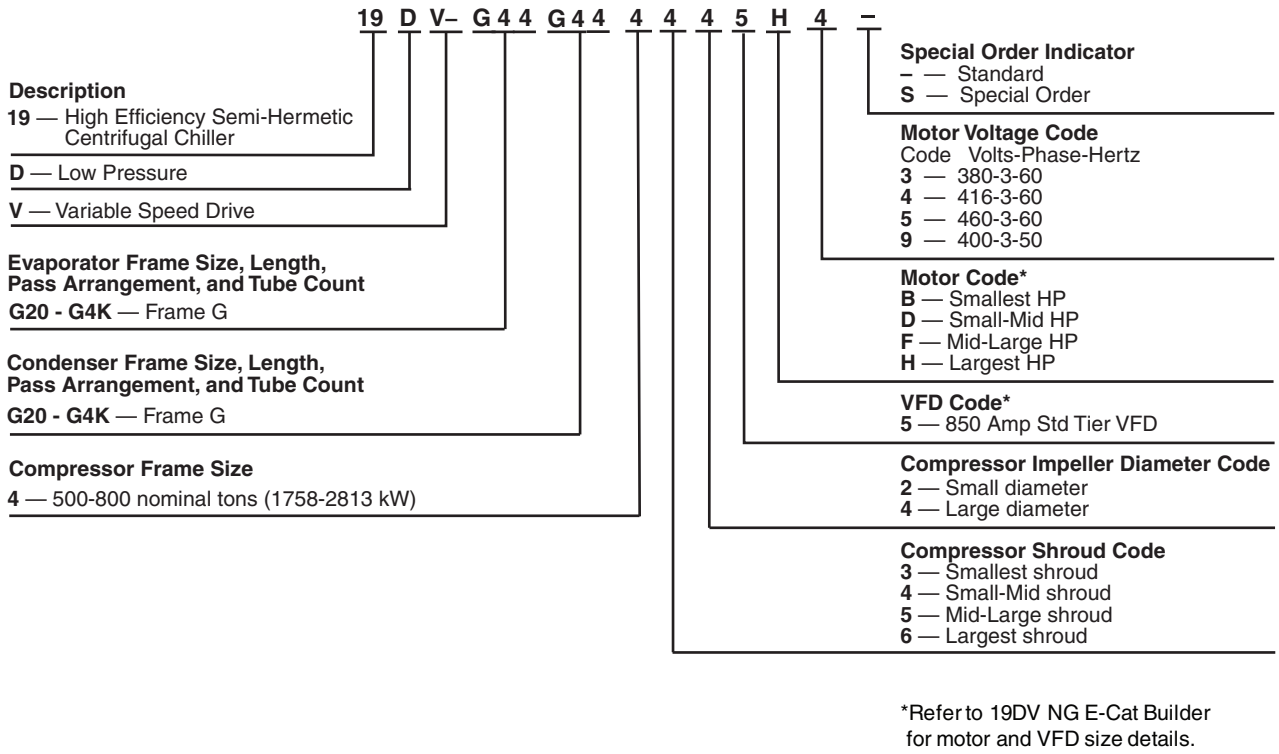
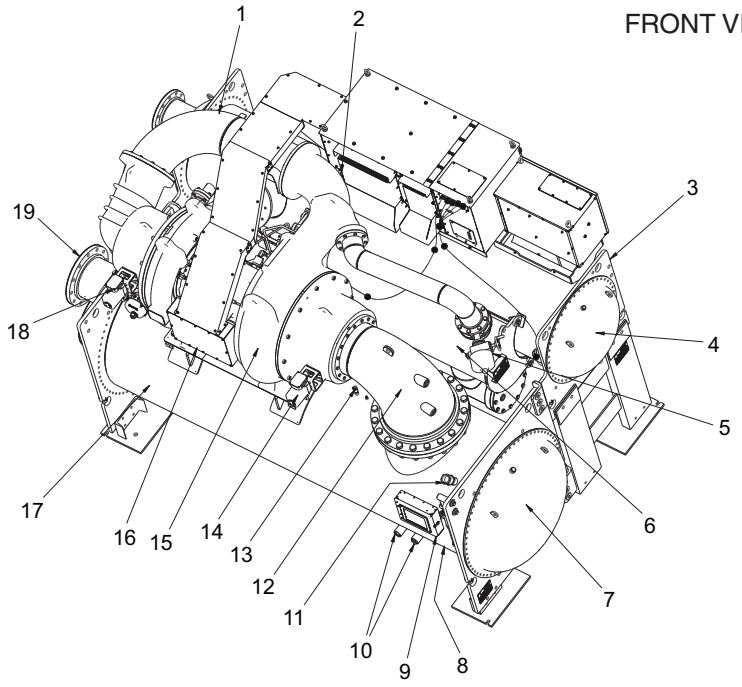
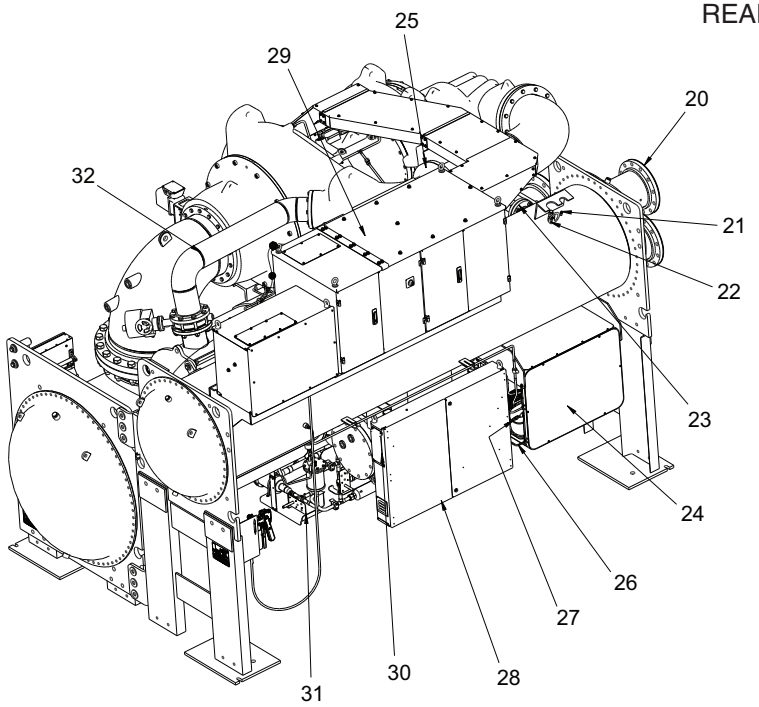


Fig. 2 — 19DV Chiller Model Number Identification



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 - PIC5 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 - CONDENSER WATERBOX NOZZLES
21 - CONDENSER PRESSURE TRANSDUCER
22 - CONDENSER CHARGING VALVE
23 - ENVELOPE STABILITY CONTROL PIPE
24 - PURGE ASSEMBLY
25 - DISCHARGE PIPE
26 - PURGE VENT (HIDDEN)
27 - MOTOR VFD COOLING MOISTURE INDICATOR
28 - CONTROL PANEL
29 - VFD
30 - CHILLER NAME PLATE LABEL
31 - LUBRICATION ASSEMBLY
32 - ECONOMIZER PIPE

Fig. 3 — Typical 19DV Compressor Chiller Components

INSTALLATION REQUIREMENTS — Prior to starting the chiller's 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).

Recommended 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 there are adequate service clearances as identified in Fig. 4.

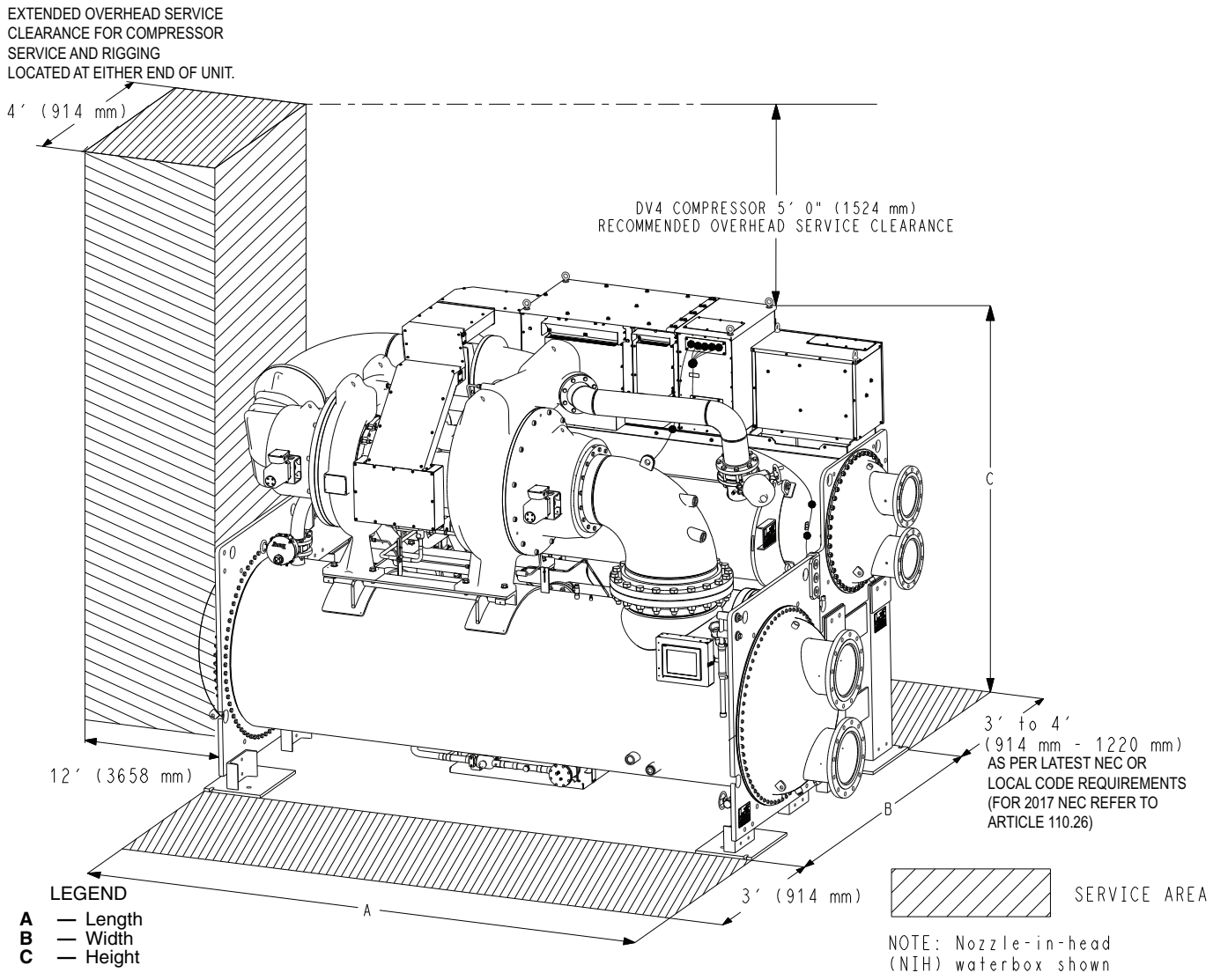
Match Power Module Input and Supply Power Ratings — It is important to verify that building power will meet the input power requirements of the Machine Electrical Data nameplate input power rating. Be sure the input power to the chiller corresponds to the chiller's nameplate voltage, current, and frequency 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.

⚠ 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.



NOTES:
1. Dished head (NIH) waterbox shown.
2. Service areas are minimum space required. For compressor service either 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

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.

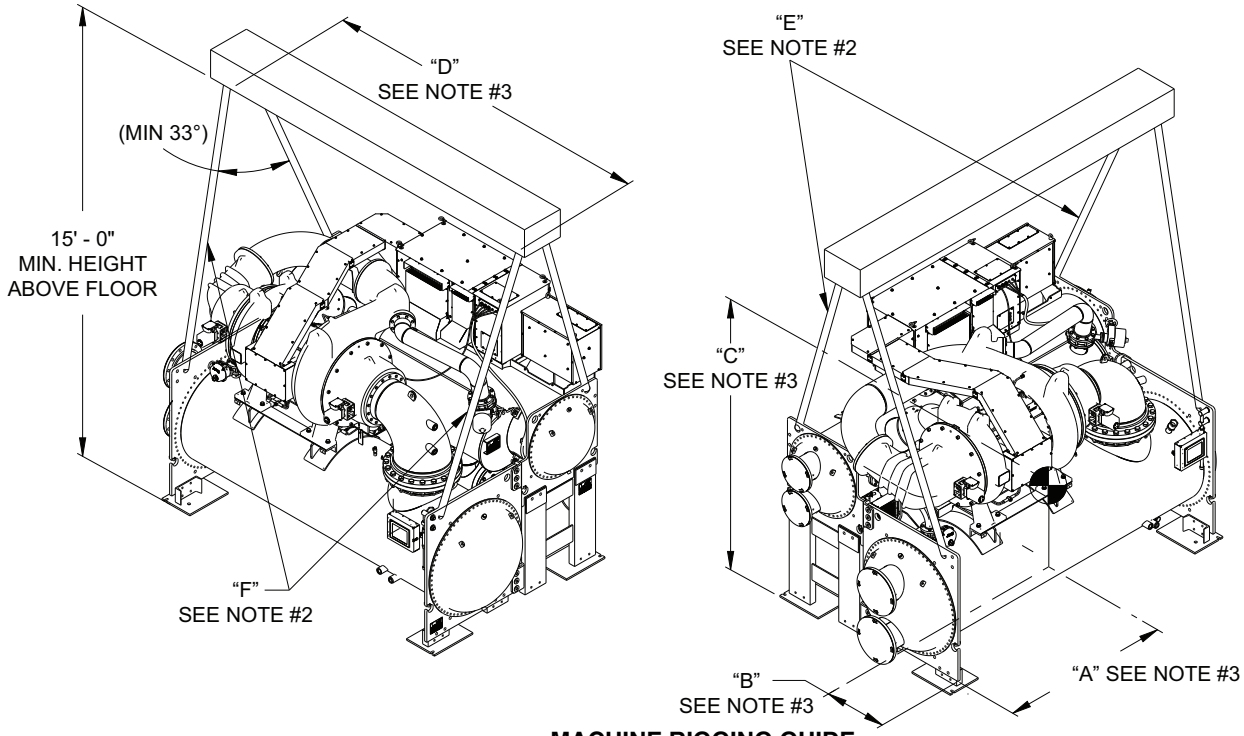
Contractors are not authorized to disassemble any part of the chiller without Carrier's supervision. Any request otherwise must be approved in writing by the Carrier Technical Service Manager. Non-conformance to this requirement may result in loss of product warranty.

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

⚠ 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.	"F" in.
4	G2A~G2K, G20~G29	37,188	39,522	12	92	35	58	168	106	126
	G4A~G4K, G40~G49	39,346	41,647	14	100	34	57	188	106	126



MACHINE RIGGING GUIDE

LEGEND

MWB — Marine Waterbox
NIH — Nozzle in Head

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 must be150 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	187.5	4763	108.4	2753	117.0	2972
	2 pass	180.4	4582				
	3 pass	184.0	4674				
G4*	1 pass	208.0	5283	99.9	2537	117.0	2972
	2 pass	200.9	5102				
	3 pass	204.5	5194				

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 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

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	99.9	2537	117.0	2972
	3 pass	231.3	5871				

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 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	346	156
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
ECONOMIZER BYPASS VALVE (OPTION)	121	55
FREE COOLING VALVE (OPTION)	200	91
LIQUID BYPASS AND ISOLATION VALVE (OPTION)	300	136
VFD 32VSS0850	1450	658
VFD HARMONIC FILTER	800	363
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	359
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

*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

*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	2	909	761	607	470	394	558

*Add to cooler and condenser weights for total weights. Cooler and condenser weights may be found in Tables 6 and 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 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	2	229	226	515	177	176	275

*Add to cooler and condenser weights for total weights. Condenser weights may be found in Tables 6 and 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 G	
		STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED
Dished Head, 150 psig	2	528	681	235	308
Dished Head (Return Cover), 150 psig	2	404	404	154	154
MWB End Cover, 150 psig	2	668	668	172	172
MWB End Cover (Return Cover), 150 psig	2	404	404	154	154

LEGEND

MWB — Marine Waterbox

NOTE: Weights for dished head cover and MWB end cover 150 psig are included in the heat exchanger weights shown on page 10.

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

WATERBOX DESCRIPTION	PASSES	EVAPORATOR		CONDENSER	
		FRAME G		FRAME G	
		STANDARD NOZZLES	FLANGED	STANDARD NOZZLES	FLANGED
Dished Head, 150 psig	2	239	309	107	140
Dished Head (Return Cover), 150 psig	2	183	183	107	107
MWB End Cover, 150 psig	2	183	183	107	107
MWB End Cover (Return Cover), 150 psig	2	183	183	107	107

LEGEND

MWB — Marine Waterbox

NOTE: Weights for dished head cover and MWB end cover 1034 kPa are included in the heat exchanger weights shown on page 11.

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.

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 cooler 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.

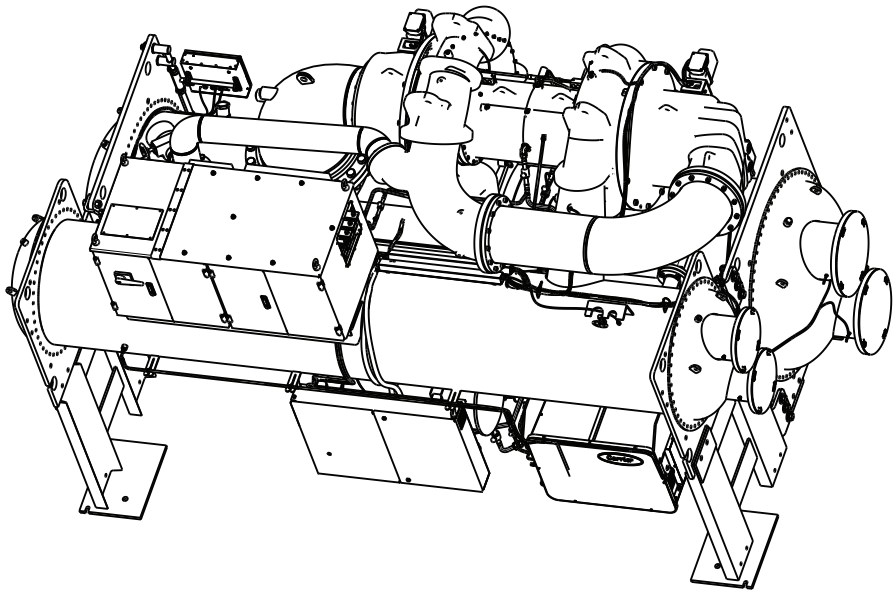


Fig. 6 — 19DV4, Side View

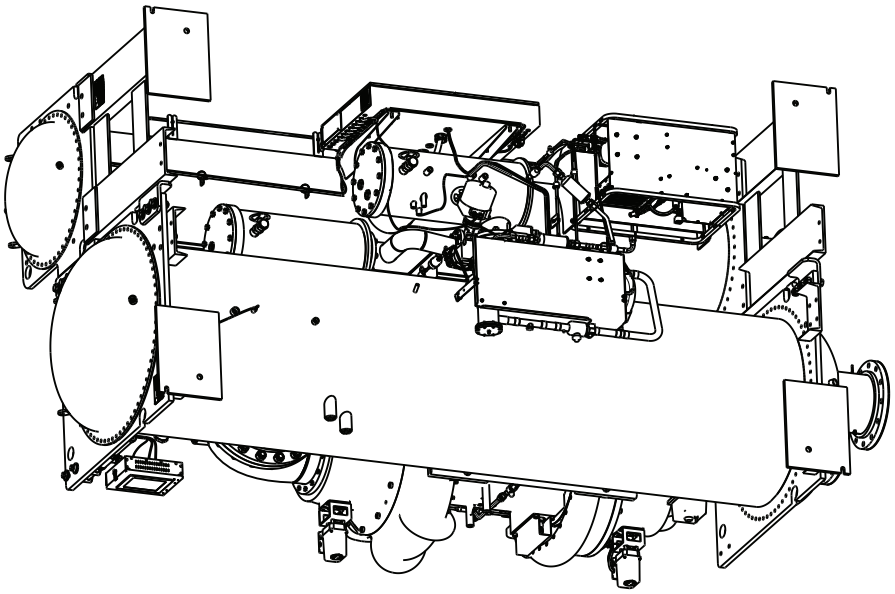
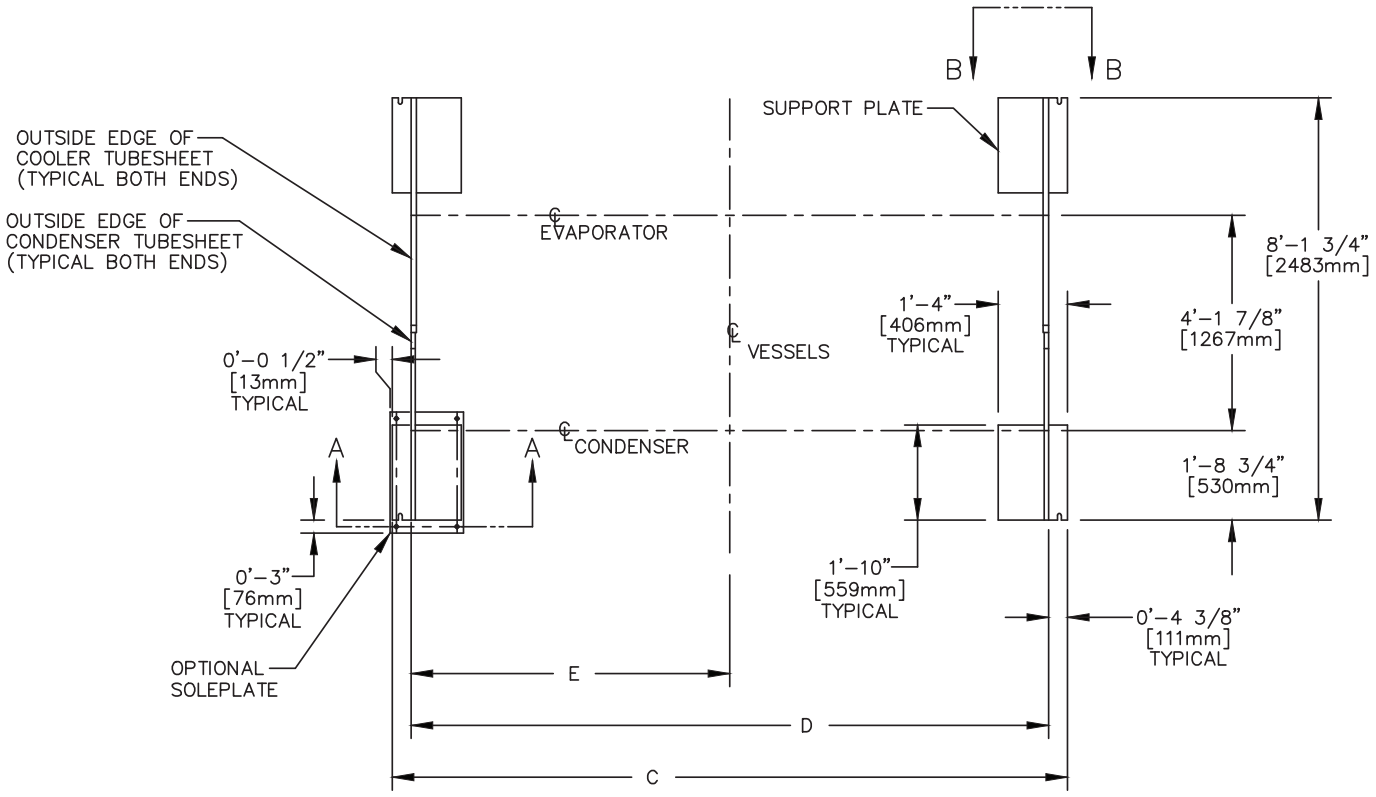


Fig. 7 — 19DV4, Bottom View



19DV HEAT EXCHANGER SIZE	19DV HEAT EXCHANGER SIZE	
	ft–in.	mm
G2*–G2*	13'–0 1/4"	3969
G4*–G4*	14'–8 3/4"	4490

DIMENSION C		DIMENSION D		DIMENSION E	
ft–in.	mm	ft–in.	mm	ft–in.	mm
13'–0 1/4"	3969	12'–3 1/2"	3747	6'–1 3/4"	1873
14'–8 3/4"	4490	14	4267	7'–0"	2134

NOTES:
1. A-A dimension refers to accessory soleplate. See page 15.
2. B-B dimension refers to standard support plate. See page 15.

Fig. 8 — 19DV Machine Footprint

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. 9.

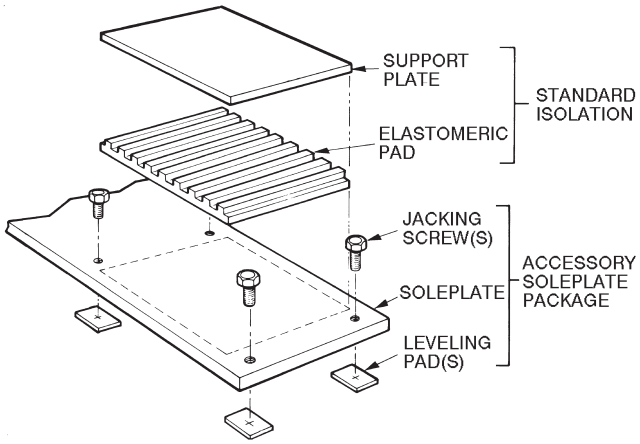
Chiller support plates must be level within 1/4-in. (6 mm) from one end to the other.

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

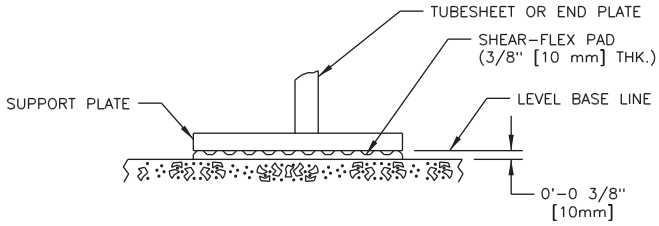
For adequate and long lasting machine support, proper grout selection and placement is essential. Carrier recommends that only pre-mixed, epoxy type, non-shrinking grout be used for machine installation. Follow manufacturer's instructions in applying grout.

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.

TYPICAL ISOLATION



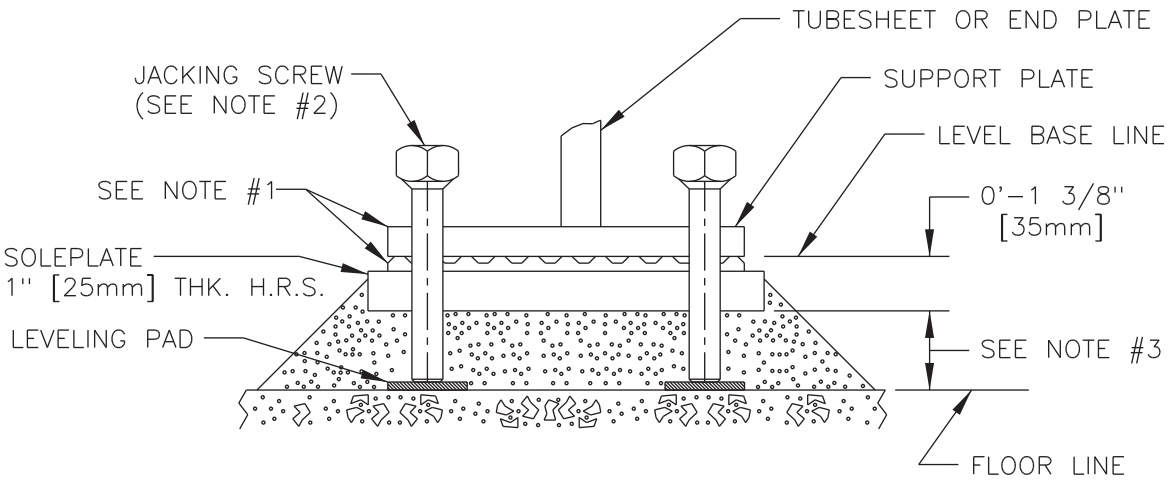
STANDARD ISOLATION



VIEW B-B

ISOLATION WITH STANDARD PACKAGE ONLY

NOTE: Isolation package includes 4 Shear-Flex isolation pads.



VIEW A-A

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 748 OR Embeco 636 Plus, 0′-1½″ (38.1 mm) to 0′-2¼″ (57 mm) thick.

Fig. 9 — 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. 10. 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.

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. 11.

⚠ CAUTION

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

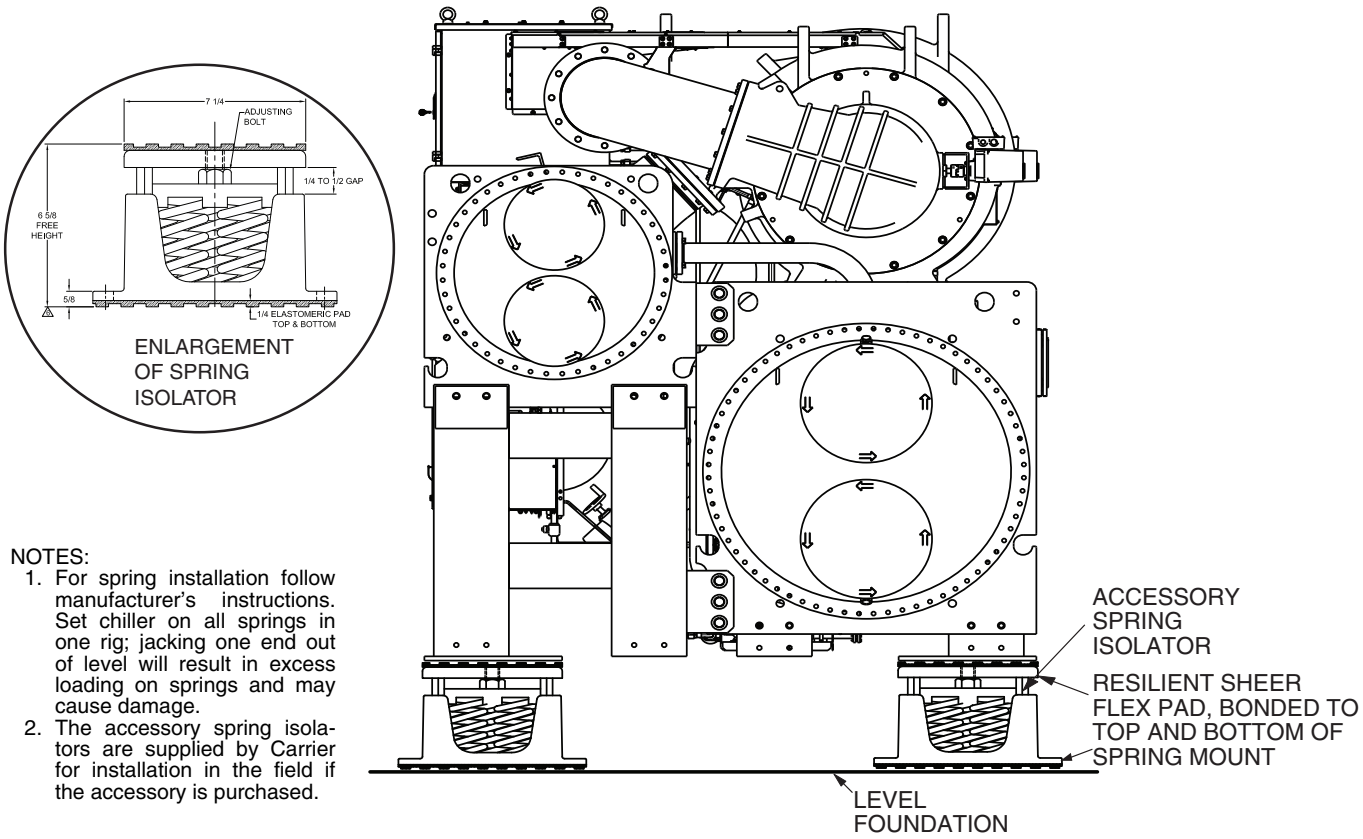
⚠ CAUTION

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).



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. 10 — 19DV Accessory Spring Isolation (Shown with Accessory Soleplates)

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. 12 and 13.

   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 cooler 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 cooler shell. Additionally for fire protection there are fusible plugs on the refrigerant lube assembly and purge assembly; see Fig. 14. 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. 15 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 cooler or condenser, they should be installed on the outlet piping.

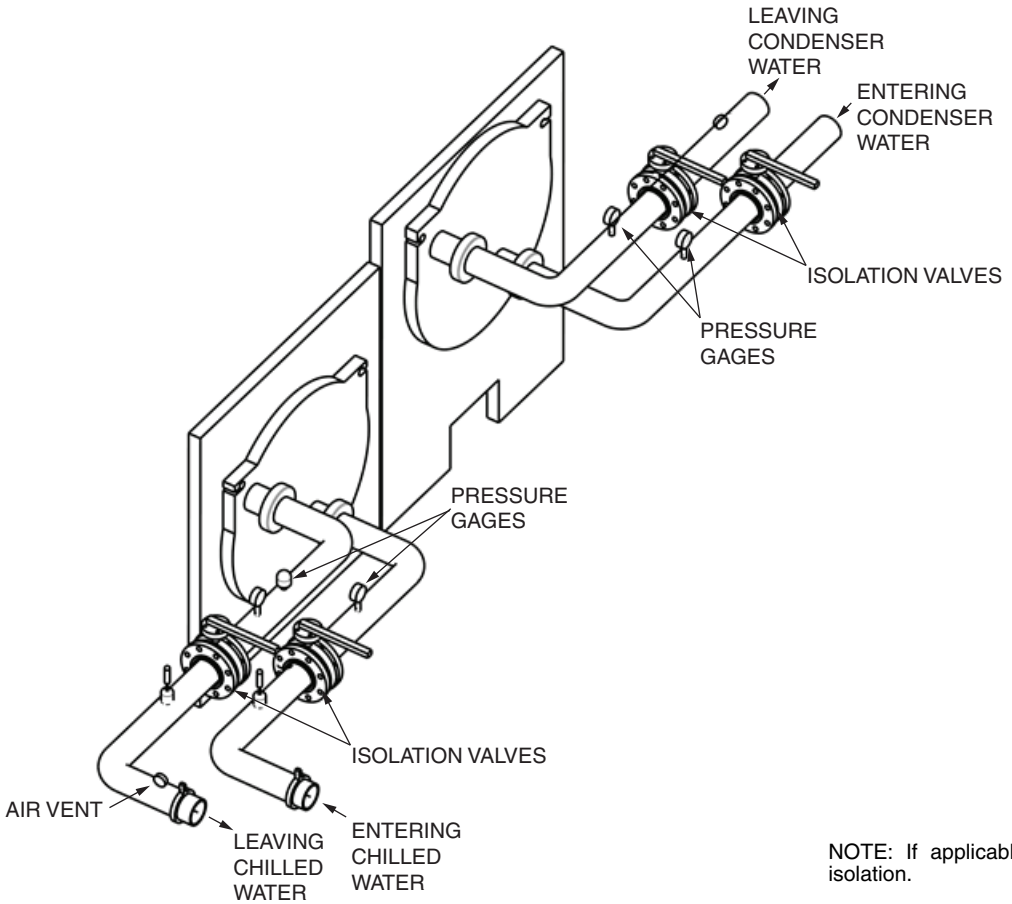
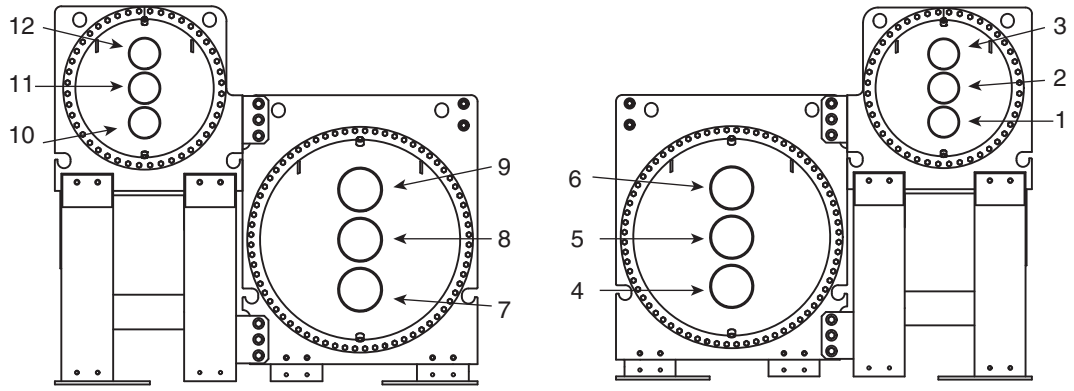


Fig. 11 — Typical Nozzle Piping

NOZZLE-IN HEAD (NIH) WATERBOXES



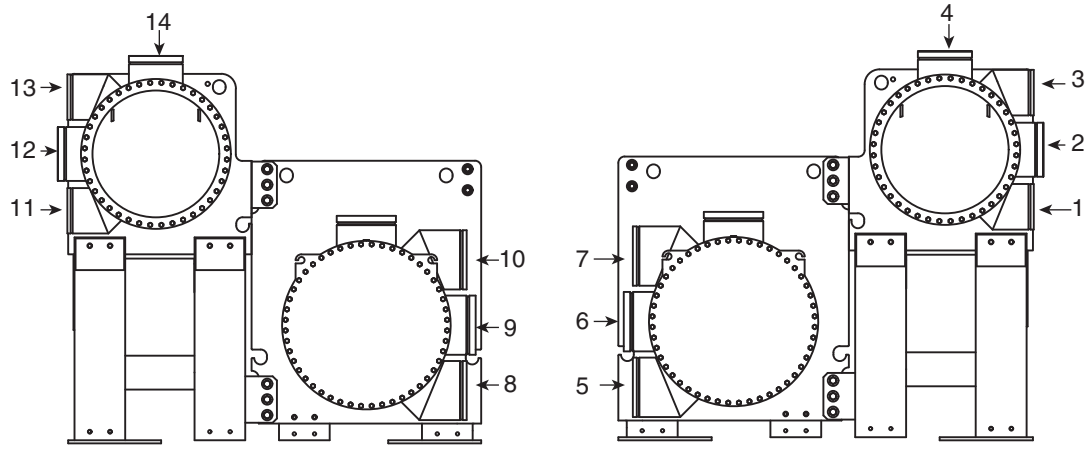
NOZZLE ARRANGEMENT CODES FOR 19DV NOZZLE-IN-HEAD WATERBOXES

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. 12 — 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. 13 — Nozzle Arrangement Codes for 19DV Marine Waterboxes

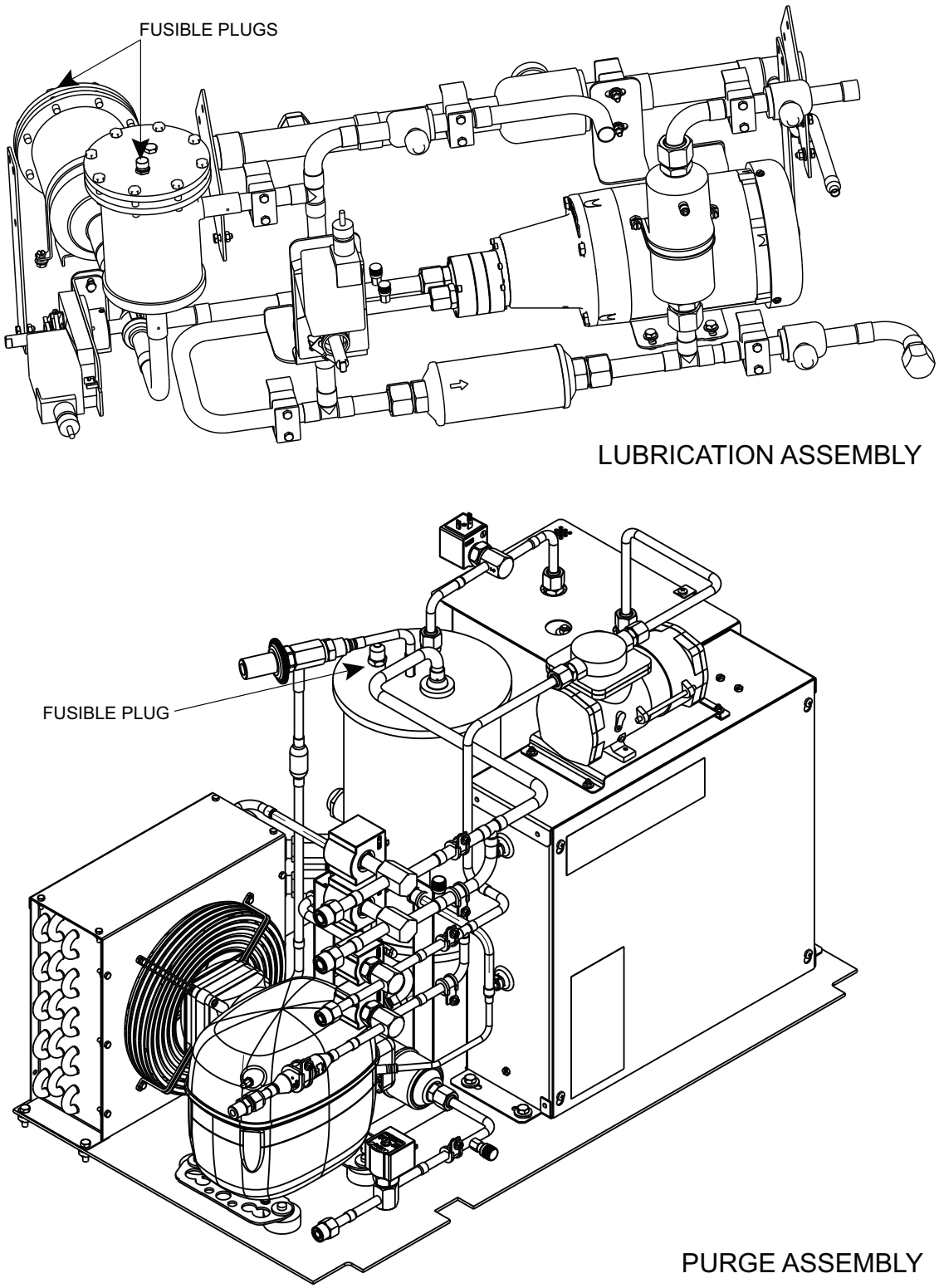
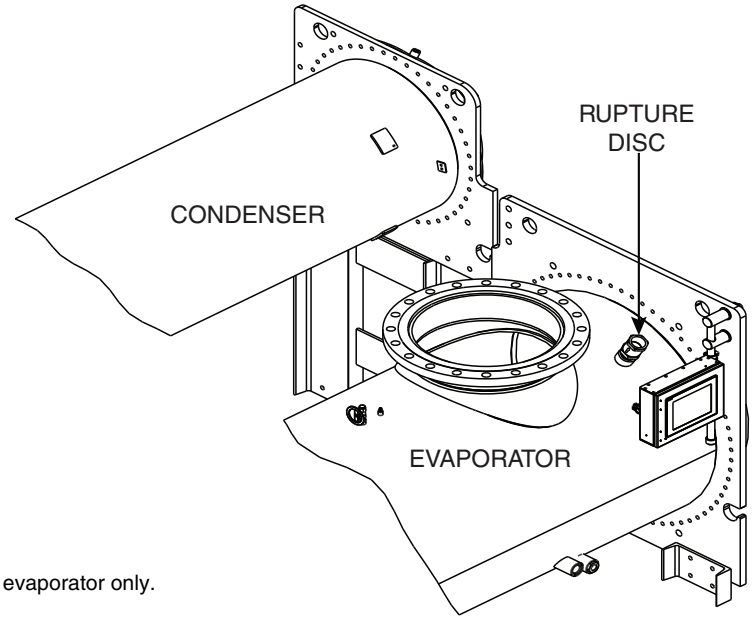


Fig. 14 — Location of Fusible Plugs in Lubrication Assembly and Purge Assembly

Table 13 — Relief Device Locations

LOCATION	FRAME SIZE	PRESSURE RELIEF DEVICE OUTLET SIZE
EVAPORATOR	G	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. 15 — 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. 16. The control panel optional wiring and HMI component layout are shown in Fig. 17.

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. 18-24.

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.

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.

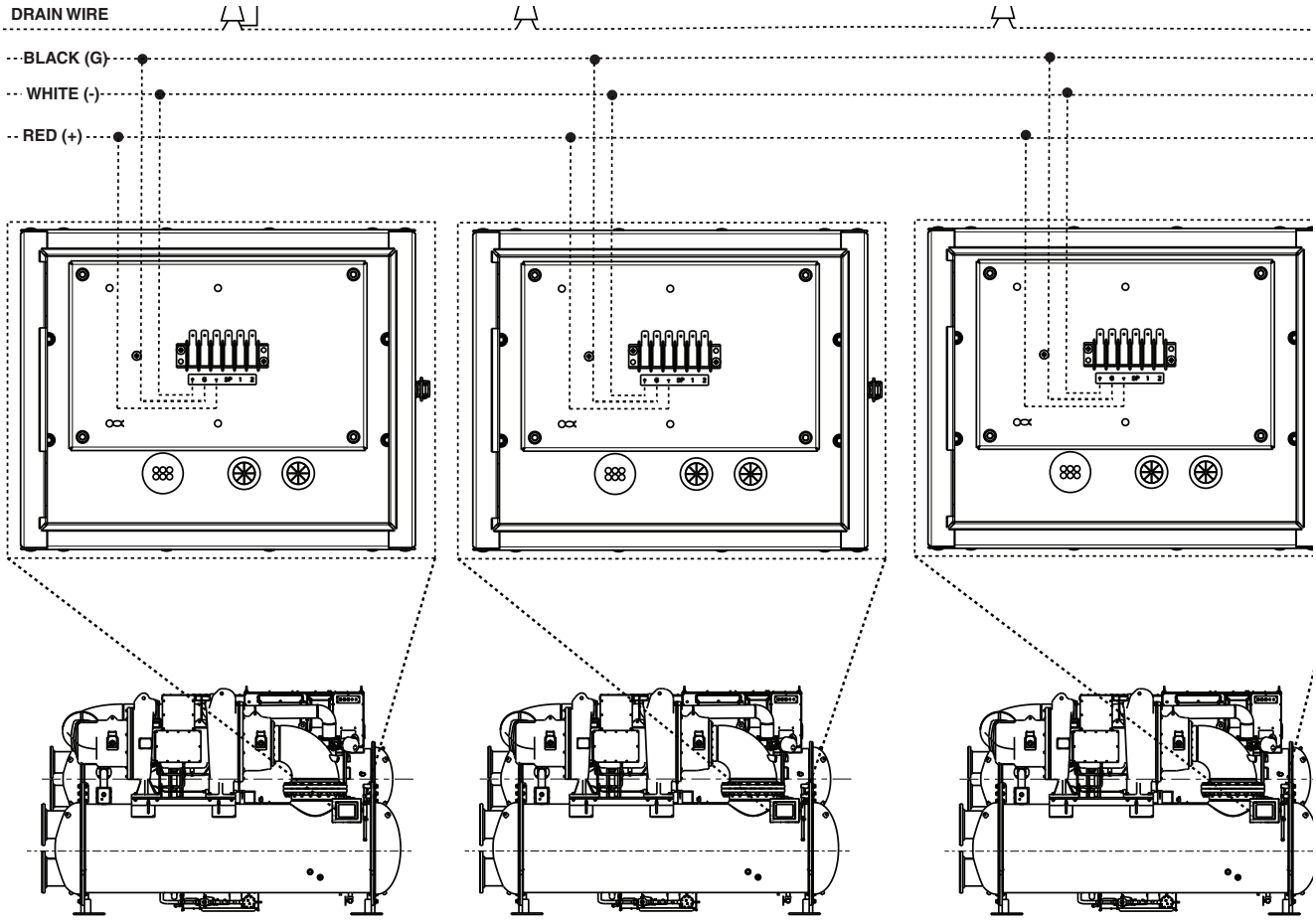
NOTE: A suitable 24 VAC relay is Carrier part number 19XV05005503. Carrier recommends using a relay with a contact rating of 10 amp sealed RMS or greater.

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

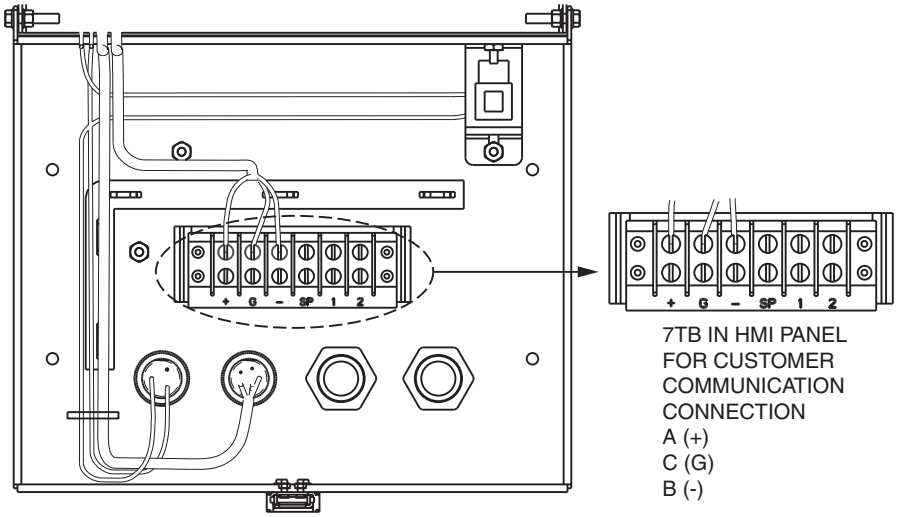


Fig. 17 — HMI Panel

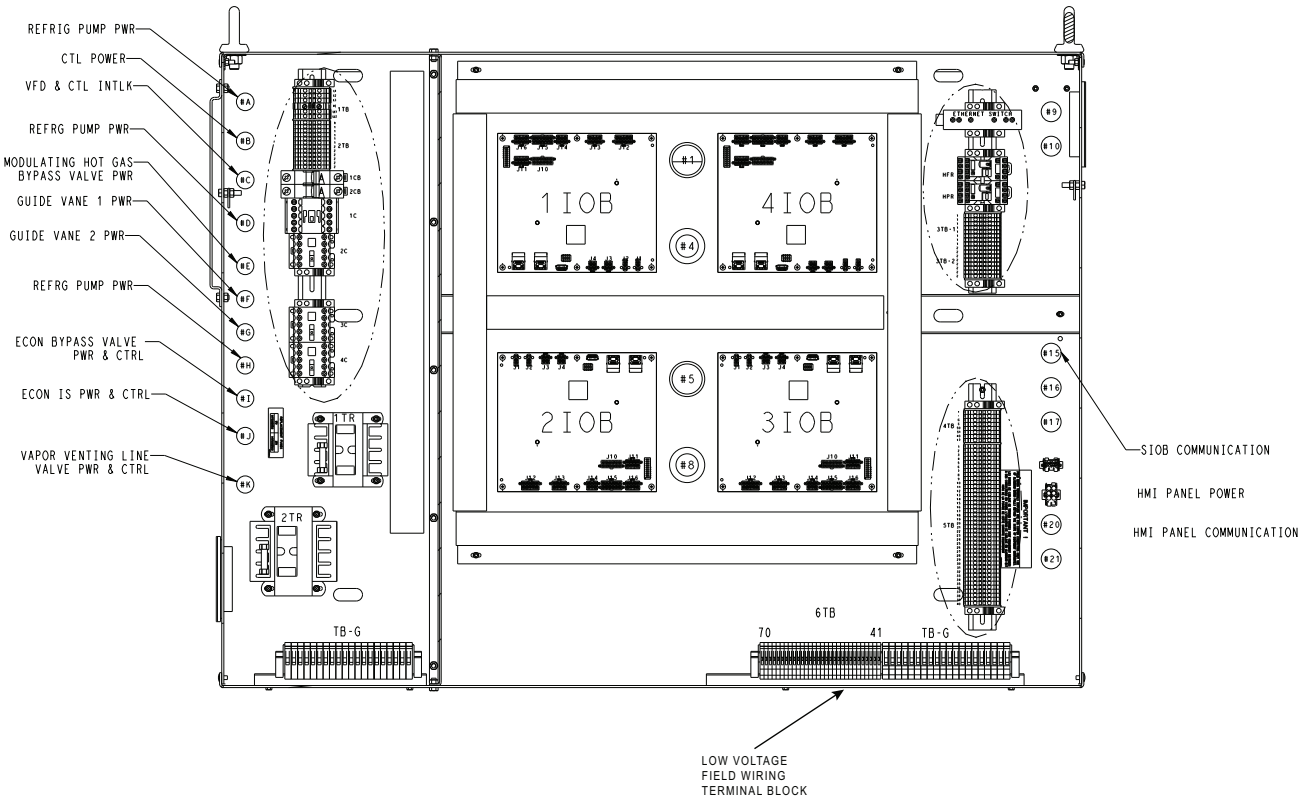


Fig. 18 — Control Panel, IOB Layer

LEGEND						
○	DENOTES INTERNAL COMPONENT TERMINAL		ECBY_VLV	ECONOMIZER BYPASS VALVE		
→)(←	DENOTES CONDUCTOR MALE/FEMALE CONNECTOR		ECDW	ENTERING CONDENSER WATER TEMPERATURE	461	LEAVING CHILLED WATER TEMPERATURE THERMISTOR
			ECON_IV	ECONOMIZER VENT VALVE ACTUATOR	462	EVAPORATOR PRESSURE TRANSDUCER
			ECW	ENTERING CHILLED WATER TEMPERATURE	463	EVAPORATOR REFRIGERANT LIQUID TEMPERATURE THERMISTER
- - - - -	FIELD WIRING		EVAP_CV	EVAPORATOR CONTROL VALVE	M60	MOTOR WINDING TEMPERATURE 1(THERMISTOR/PT100)
— ———	OPTIONAL WIRING				P00	PURGE DEVICE
——— - -	COMPONENT/PANEL ENCLOSURE		EVAP_EWP	ENTERING EVAPORATOR WATER PRESSURE	R04-1	CONDENSER CONTROL VALVE
	SHIELD WIRE		EVAP_FL	EVAPORATOR WATER FLOW MEASUREMENT	R04-2	EVAPORATOR CONTROL VALVE
	TWISTED WIRE		EVAP_FS	EVAPORATOR WATER FLOW SWITCH	R10-1	REFRIGERANT PUMP OUTLET PRESSURE TRANSDUCER
□	TERMINAL BLOCK FOR FIELD WIRING		EVAP_LWP	LEAVING EVAP WATER PRESSURE	R10-2	BEARING OUTLET PRESSURE TRANSDUCER
•	WIRE SPLICE		EVAP_P	EVAPORATOR PRESSURE	R10-3	BEARING INLET PRESSURE TRANSDUCER
ø	INTERNAL TERMINAL BLOCK/TERMINAL		EVAP_T	EVAPORATOR REFRIGERANT TEMPERATURE	R10-4	REFRIGERANT PUMP INLET PRESSURE TRANSDUCER
			FC_MODE	FREE COOLING MODE	R15	BEARING REF SUPPLY TEMP THERMISTOR
BLK	BLACK		FC_SS	FREE COOLING START SWITCH	R45	REFRIGERANT PUMP
BLU	BLUE		FIRE_LOCK	FIRE ALARM INTERLOCK	R55	HIGH FLOAT LIQUID LEVEL SWITCH
BRN	BROWN		GV1/2_POS	IGV1/2 ACTUAL POS	S01-2	HIGH FLOAT LIQUID LEVEL SWITCH
GRN	GREEN		GV1/2_OUT	IGV1/2 OUTPUT	S02-1	ECONOMIZER VENT VALVE ACTUATOR
GRY	GREY		HDPV_OUT	HEAD PRESSURE OUTPUT	S02-2	MODULATING HOT GAS CONTROL VALVE ACTUATOR
RED	RED		HGBP_MA	MODULATING HOT GAS VALVE FEEDBACK	S02-3	FREE COOLING VENT VALVE ACTUATOR
ORG	ORANGE		HGBP_OUT	MODULATING HOT GAS VALVE OUTPUT MA	INSTRUMENT CODE(WITHIN THE CONTROL PANEL)	
WHT	WHITE		HF_LS	HIGH FLOAT LIQUID LEVEL SWITCH	1C	REFRIGERANT PUMP CONTACTOR
YEL	YELLOW		HP_SW	HIGH PRESSURE SWITCH	2C	LIQUID BYPASS VALVE RELAY
G/Y	GREEN/YELLOW		ICE_CON	ICE BUILD CONTACT	3C	ECONOMIZER VENT VALVE RELAY
CONTROL ABBREVIATION LIST			LCDW	LEAVING CONDENSER WATER TEMPERATURE	4C	FREE COOLING VENT VALVE RELAY
ALM	CHILLER ALARM		LCW	LEAVING CHILLED WATER TEMPERATURE	1-3CB	MICRO CIRCUIT BREAKER
AUTO_DEM	DEMAND LIMIT INPUT		MTRW1	MOTOR WINDING TEMPERATURE 1	1FU	FUSE,5A,TIME-DELAY,13/32" X 1-1/2"
AUTO_RES	AUTO WATER TEMP RESET		PUMPI_P	PUMP INLET PRESSURE	2FU	FUSE,5A,TIME-DELAY,13/32" X 1-1/2"
BRGI_P	BEARING INLET PRESSURE		PUMPO_P	PUMP OUTLET PRESSURE	1-4 IOB	1-4 INPUT OUTPUT BOARD 1-4
BRGI_T	BEARING REF SUPPLY TEMP		REF_LEAK	REFRIGERANT LEAK DETECTOR	1TB	TERMINAL BLOCK FOR POWER CONNECTION
BRGO_P	BEARING OUTLET PRESSURE		REF_PUMP	REFRIGERANT PUMP	2TB	INTERNAL 115/120 V TERMINAL BLOCK
CBH1_T	1ST STAGE BEARING TEMP		REM_CON	REMOTE CONTACT INPUT	3TB	INTERNAL 24V TERMINAL BLOCK
CBH2_T	2ND STAGE BEARING TEMP		TFR_HIGH	TOWER FAN HIGH	4TB	TERMINAL BLOCK FOR VFD CONNECTION
CDWP	CONDENSER WATER PUMP		TFR_LOW	TOWER FAN LOW	5TB	TERMINAL BLOCK FOR CUSTOMER OPTIONAL CONNECTION
CDWP_V	CONDENSER WATER PUMP(VARIABLE SPEED OUTPUT)		TOW_FAN	TOWER FAN(VARIABLE)		
CHWP	CHILLED WATER PUMP		VAPL_SV	VAPOR VENTING LINE SV	7TB	230V/115V TERMINAL BLOCK (PURGE PANEL)
CHWP_V	CHILLED WATER PUMP(VARIABLE SPEED OUTPUT)		INSTRUMENT CODE (OUTSIDE CONTROL PANEL REFER PID DRAWING)		1TR	TRANSFORMER 1 230V-115V/24V 100VA
CHST_OUT	CHILLER RUNNING(ON/OFF/READY)		103	1ST STAGE IGV	2TR	TRANSFORMER 2 230V-115V/24V 100VA
COND_CV	CONDENSER CONTROL VALVE		104	2ND STAGE IGV	CN1A/B	CONNECTOR FOR HMI POWER
COND_DCV	CONDENSER DRAIN VALVE		161	1ST BEARING TEMP THERMISTOR	CN2A/B	CONNECTOR FOR HMI COMMUNICATION
COND_EWP	ENTERING CONDENSER WATER PRESSURE		162	2ND BEARING TEMP THERMISTOR	HFR	HIGH FLOAT LEVEL SWITCH
COND_FL	CONDENSER WATER FLOW MEASUREMENT		166	2ND STAGE COMPRESSOR DISCHARGE TEMPERATURE THERMISTOR	HPR	HIGH PRESSURE SWITCH RELAY
COND_FS	CONDENSER WATERFLOW SWITCH		168	HIGH PRESSURE SWITCH	HMI	HMI TOUCH SCREEN AND MAIN BOARD SAIA
COND_LWP	LEAVING COND WATER PRESSURE		260	ENTERING CONDENSER WATER TEMPERATURE THERMISTOR	SIOB	STANDARD INPUT OUTPUT BOARD (PURGE PANEL)
COND_P	CONDENSER PRESSURE		261	LEAVING CONDENSER WATER TEMPERATURE THERMISTOR	TB-G	COPPER TERMINAL BLOCK FOR GROUND
CUS_ALE	CUSTOMER ALERT		262	CONDENSER PRESSURE TRANSDUCER		
DGT	COMPRESSOR DISCHARGE TEMPERATURE		460	ENTERING CHILLED WATER TEMPERATURE THERMISTOR		

Fig. 19 — 19DV Control Panel Abbreviations

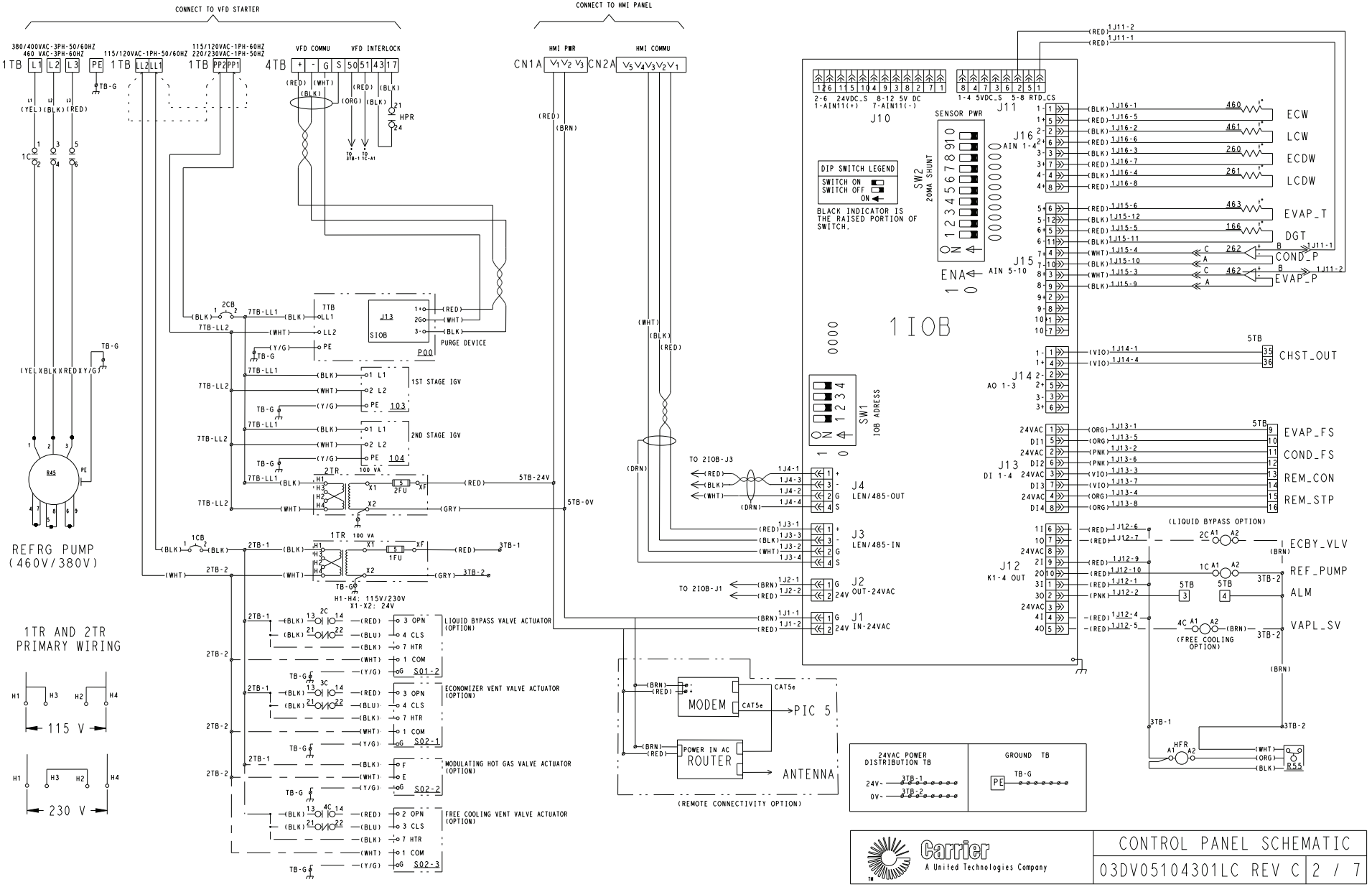

CONNECT TO VFD STARTER
CONNECT TO HMI PANEL
380/400VAC-3PH-50/60HZ
460 VAC-3PH-60HZ
115/120VAC-1PH-50/60HZ
220/230VAC-1PH-50HZ
115/120VAC-1PH-60HZ
VFD COMMU
VFD INTERLOCK
HMI PWR
HMI COMMU
CN1A
CN2A
J10
J11
J16
J15
J14
J13
J12
SENSOR PWR
DIP SWITCH LEGEND
SWITCH ON
SWITCH OFF
BLACK INDICATOR IS THE RAISED PORTION OF SWITCH.
SW2
20MA SHUNT
ENA
SW1
IOB ADRESS
1IOB
ECW
LCW
ECDW
LCDW
EVAP_T
DGT
COND_P
EVAP_P
CHST_OUT
EVAP_FS
COND_FS
REM_CON
REM_STP
ECBY_VLV
REF_PUMP
ALM
VAPL_SV
PURGE DEVICE
1ST STAGE IGV
2ND STAGE IGV
REFRG PUMP
(460V/380V)
1TR AND 2TR
PRIMARY WIRING
115 V
230 V
LIQUID BYPASS VALVE ACTUATOR (OPTION)
ECONOMIZER VENT VALVE ACTUATOR (OPTION)
MODULATING HOT GAS VALVE ACTUATOR (OPTION)
FREE COOLING VENT VALVE ACTUATOR (OPTION)
LIQUID BYPASS OPTION
FREE COOLING OPTION
MODEM
ROUTER
PIC 5
ANTENNA
CAT5e
REMOTE CONNECTIVITY OPTION
24VAC POWER DISTRIBUTION TB
GROUND TB
Carrier
A United Technologies Company
CONTROL PANEL SCHEMATIC
03DV05104301LC REV C
2 / 7

Fig. 20 — IOB1

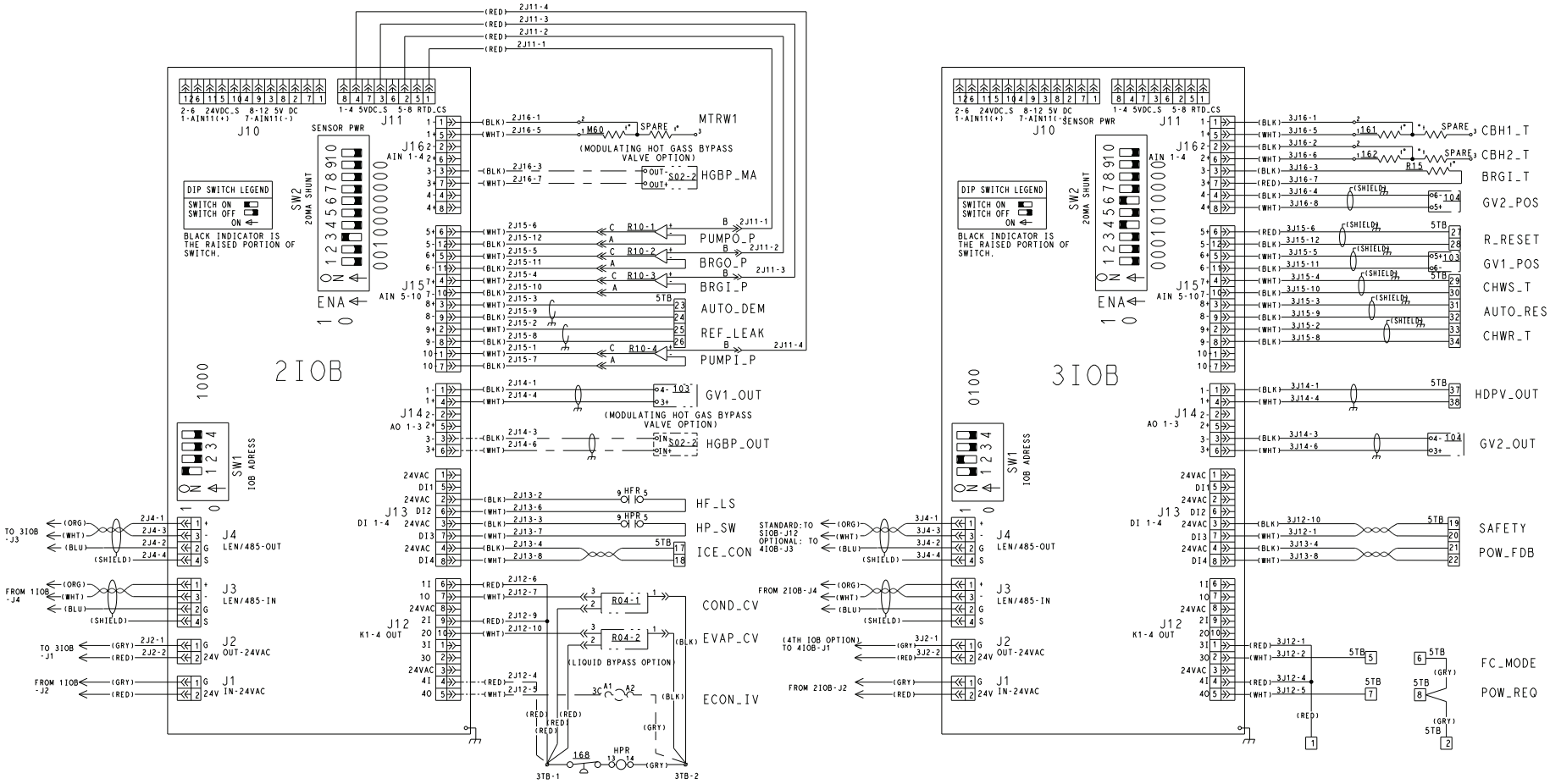
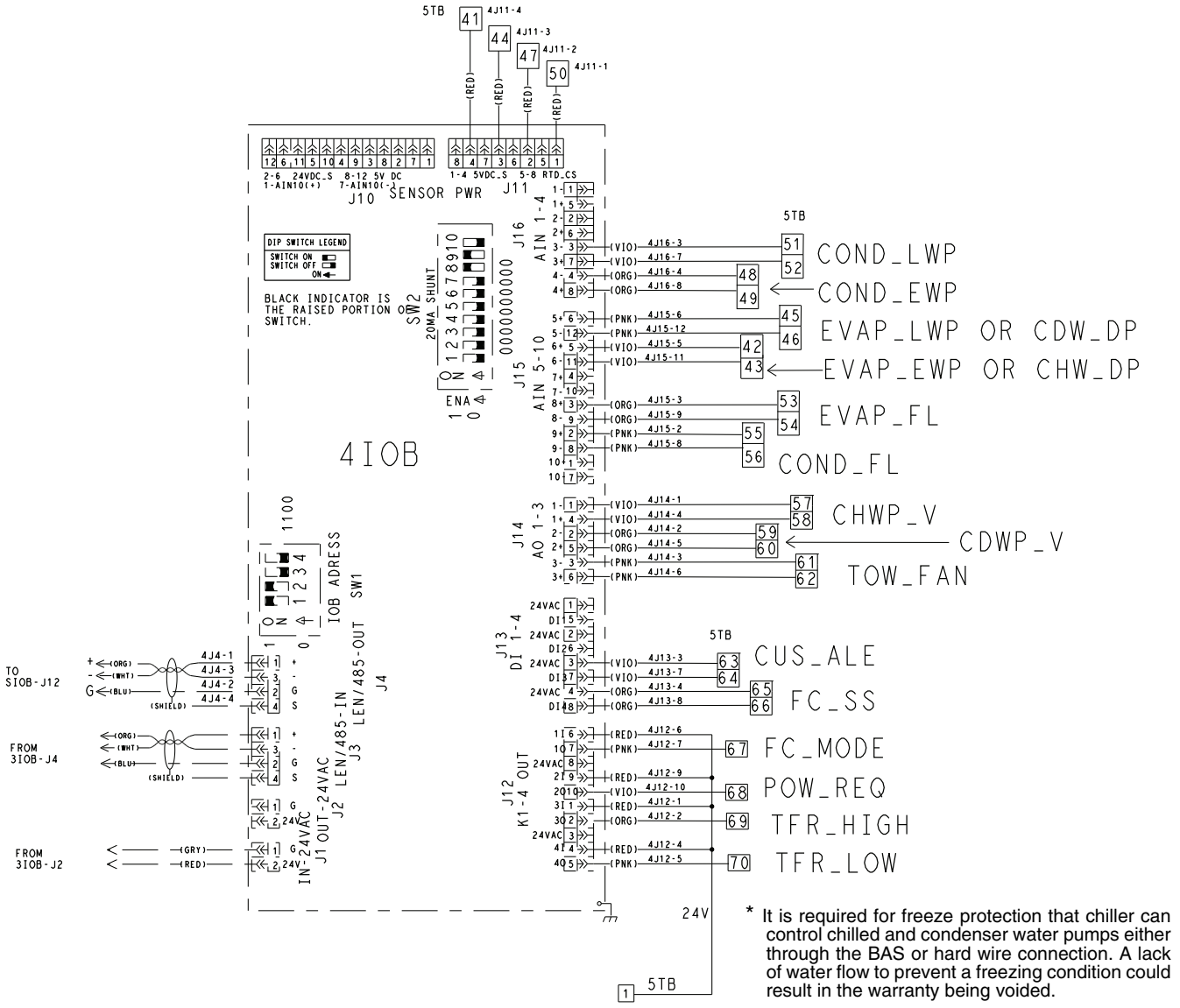


Fig. 21 — IOB2 and IOB3



* It is required for freeze protection that chiller can control chilled and condenser water pumps either through the BAS or hard wire connection. A lack of water flow to prevent a freezing condition could result in the warranty being voided.

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

Fig. 22 — IOB 4

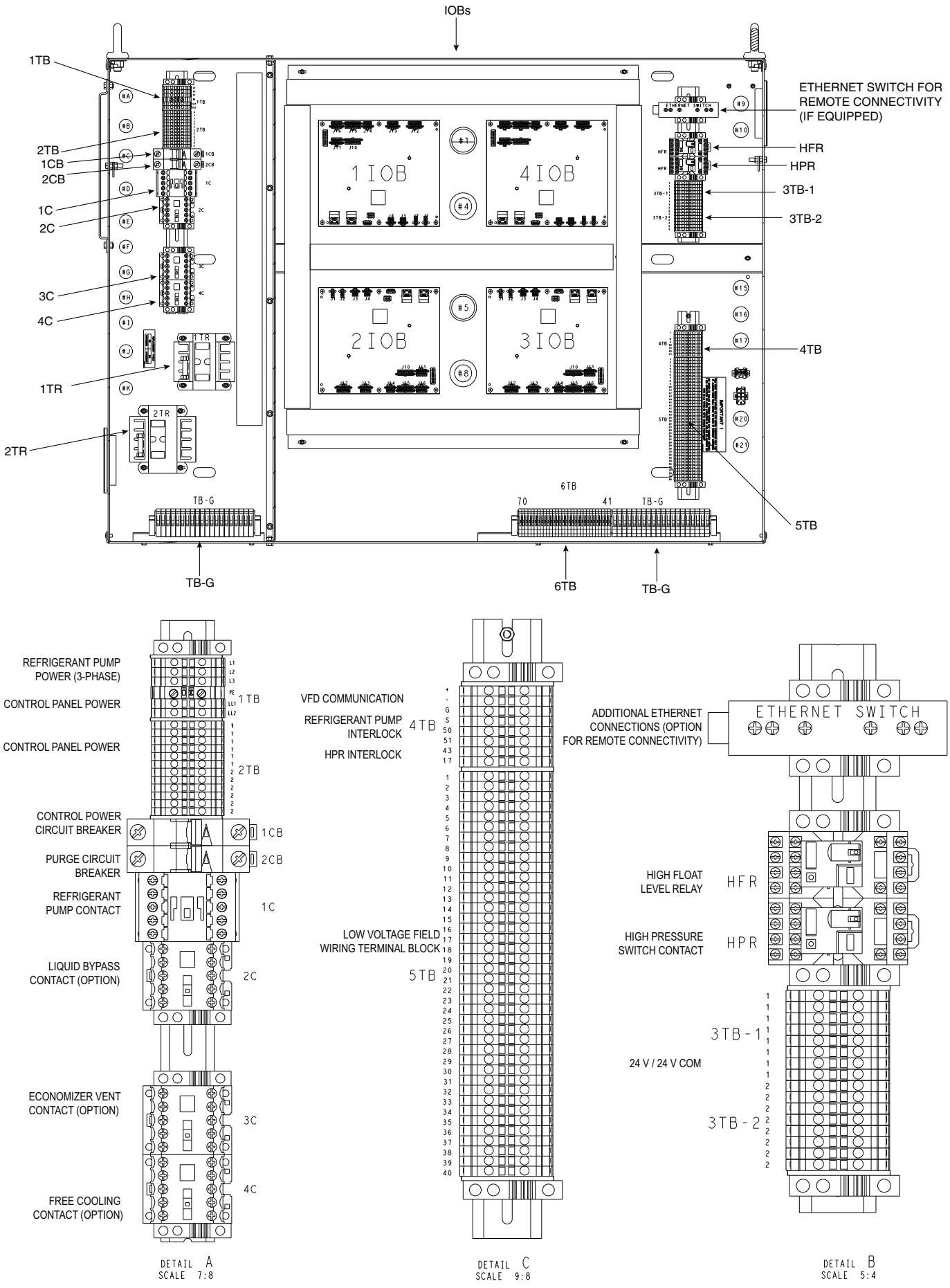


Fig. 23 — Control Panel Layout

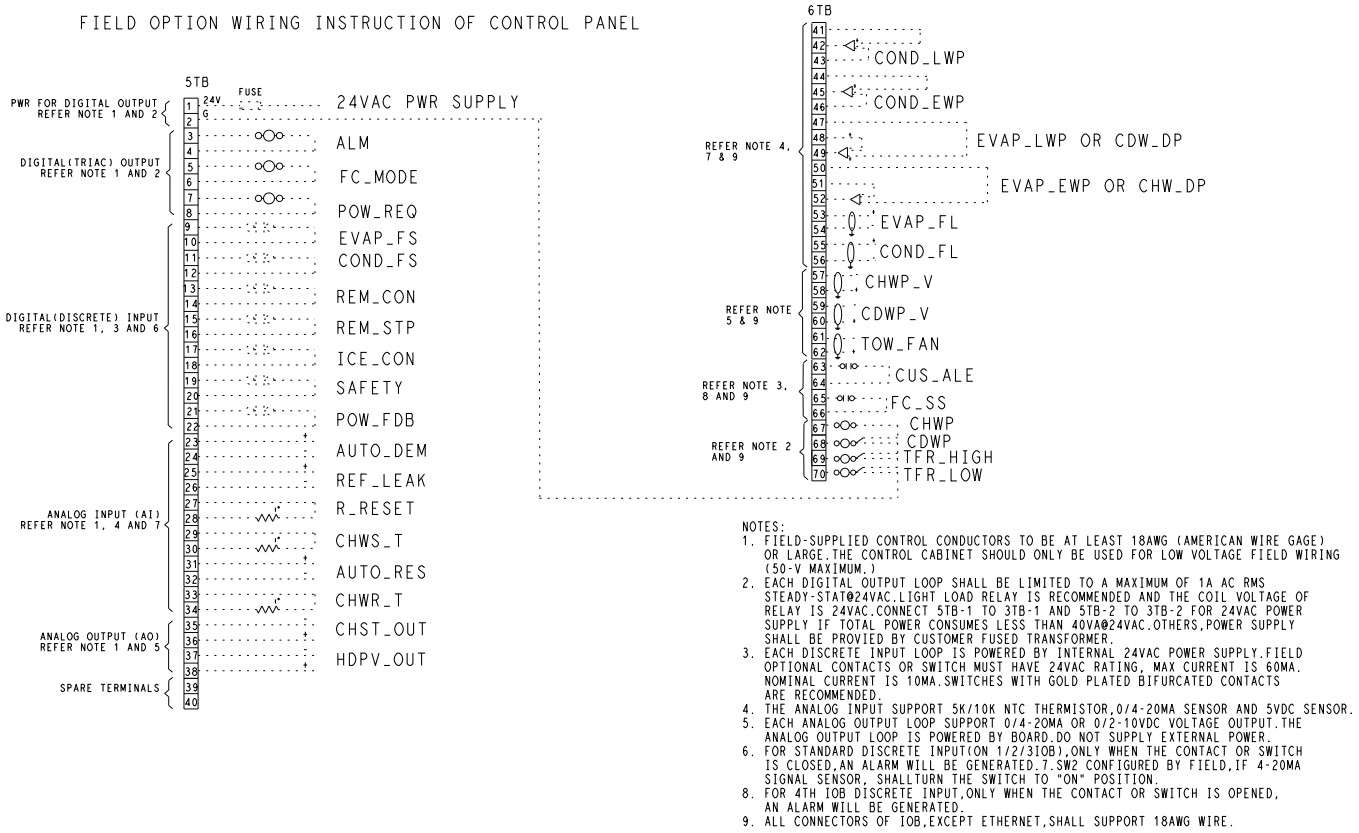
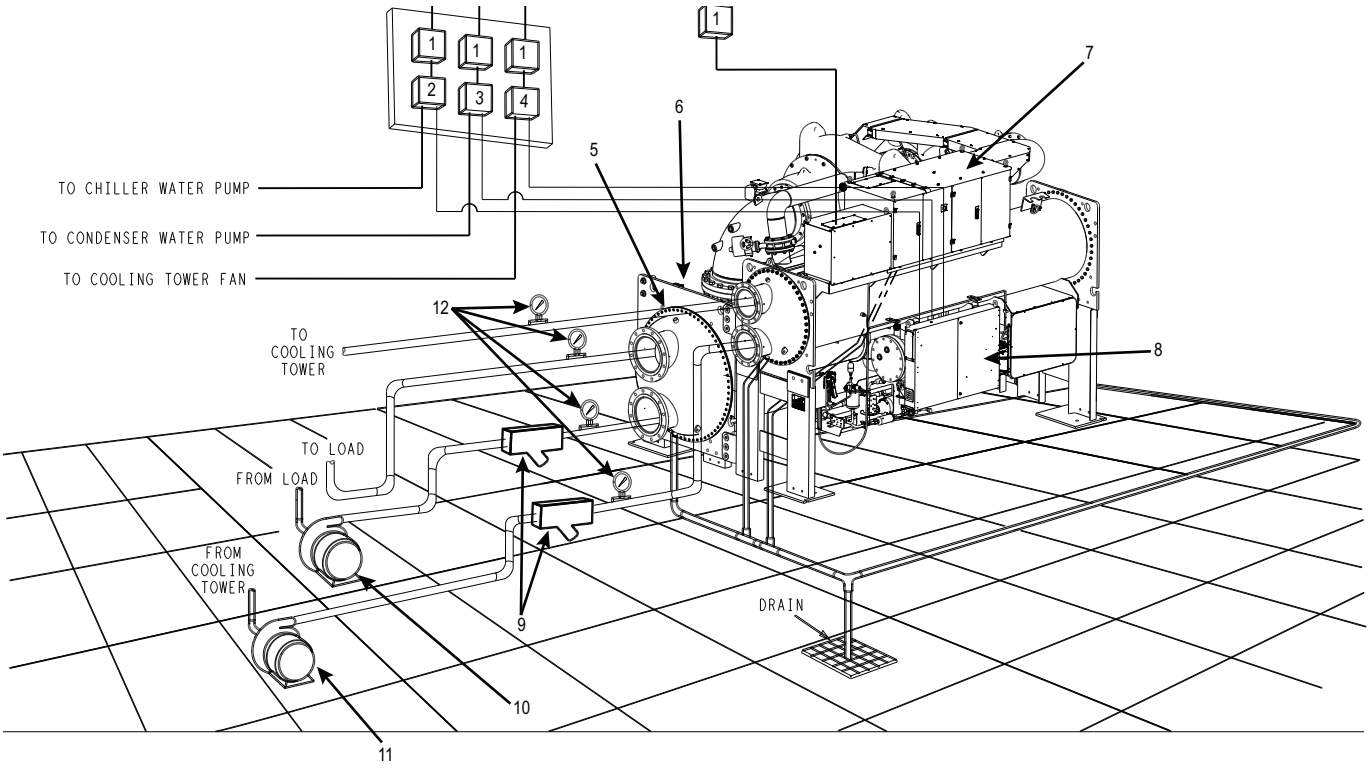


Fig. 24 — Optional Field Wiring



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
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 cooler 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 Unit-Mounted Starter

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 - 500 kcmil	2/0

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. 16 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.

1. Teflon is a registered trademark of DuPont.

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. 16. 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. 16):

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
- cooler shell
- cooler 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.

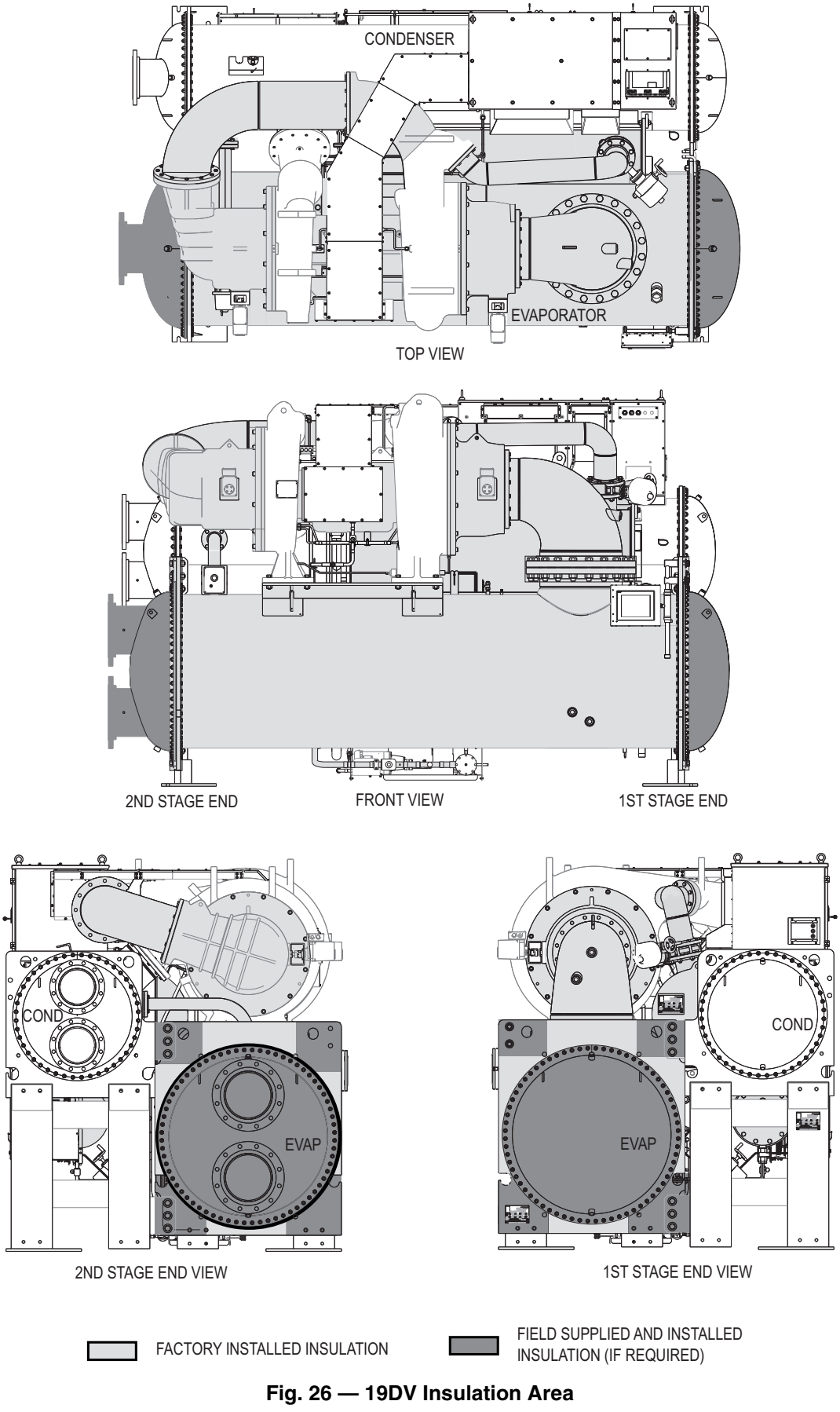


Fig. 26 — 19DV Insulation Area

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 cooler 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 cooler 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