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

DO NOT VENT refrigerant relief devices within a building. Outlet from rupture disc or relief valve must be vented outdoors in accordance with the latest edition of ANSI/ASHRAE 15 (American National Standards Institute/American Society of Heating, Refrigeration 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 when a solid state or inside-delta mechanical starter is used. Open the power supply disconnect before touching motor leads or terminals.

⚠ WARNING

DO NOT WELD OR FLAMECUT any refrigerant line or vessel until all refrigerant (liquid and vapor) has been removed from chiller. Traces of vapor should be displaced with dry air or nitrogen and the work area should be well ventilated. *Refrigerant in contact with an open flame produces toxic gases.*

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, starters, or oil heater until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors or solid-state components.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are deenergized 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.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., while machine is under pressure or while machine is running. Be sure pressure is at 0 psig (0 kPa) before breaking any refrigerant connection.

CAREFULLY INSPECT all relief valves, rupture discs, and other 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 valve when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. Replace the valve.

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.

⚠ CAUTION

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 STARTER, TOWER FAN, OR PUMPS. Open the disconnect *ahead of* the starter, 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.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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INTRODUCTION

General — The 19XR, 19XRV machine is factory assembled, wired, and leak tested. Installation (not by Carrier) 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.

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

INSTALLATION

Receiving the Machine

INSPECT SHIPMENT

⚠ CAUTION

Do not open any valves or loosen any connections. The 19XR or 19XRV machine may be shipped with a full refrigerant charge. Some machines may be shipped with a nitrogen holding charge as an option.

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 oil charge is placed in the oil sump before shipment.

IDENTIFY MACHINE — The machine model number, serial number, and heat exchanger sizes are stamped on machine identification nameplate (Fig. 1 and 2). Check this information against shipping papers and job data.

PROVIDE MACHINE PROTECTION — Protect machine and starter from construction dirt and moisture. Keep protective shipping covers in place until machine is ready for installation.

If machine is exposed to freezing temperatures after water circuits have been installed, open waterbox drains and remove all water from cooler and condenser. Leave drains open until system is filled.

Rigging the Machine — The 19XR, 19XRV machine can be rigged as an entire assembly. It also has flanged connections that allow the compressor, cooler, and condenser sections to be separated and rigged individually.

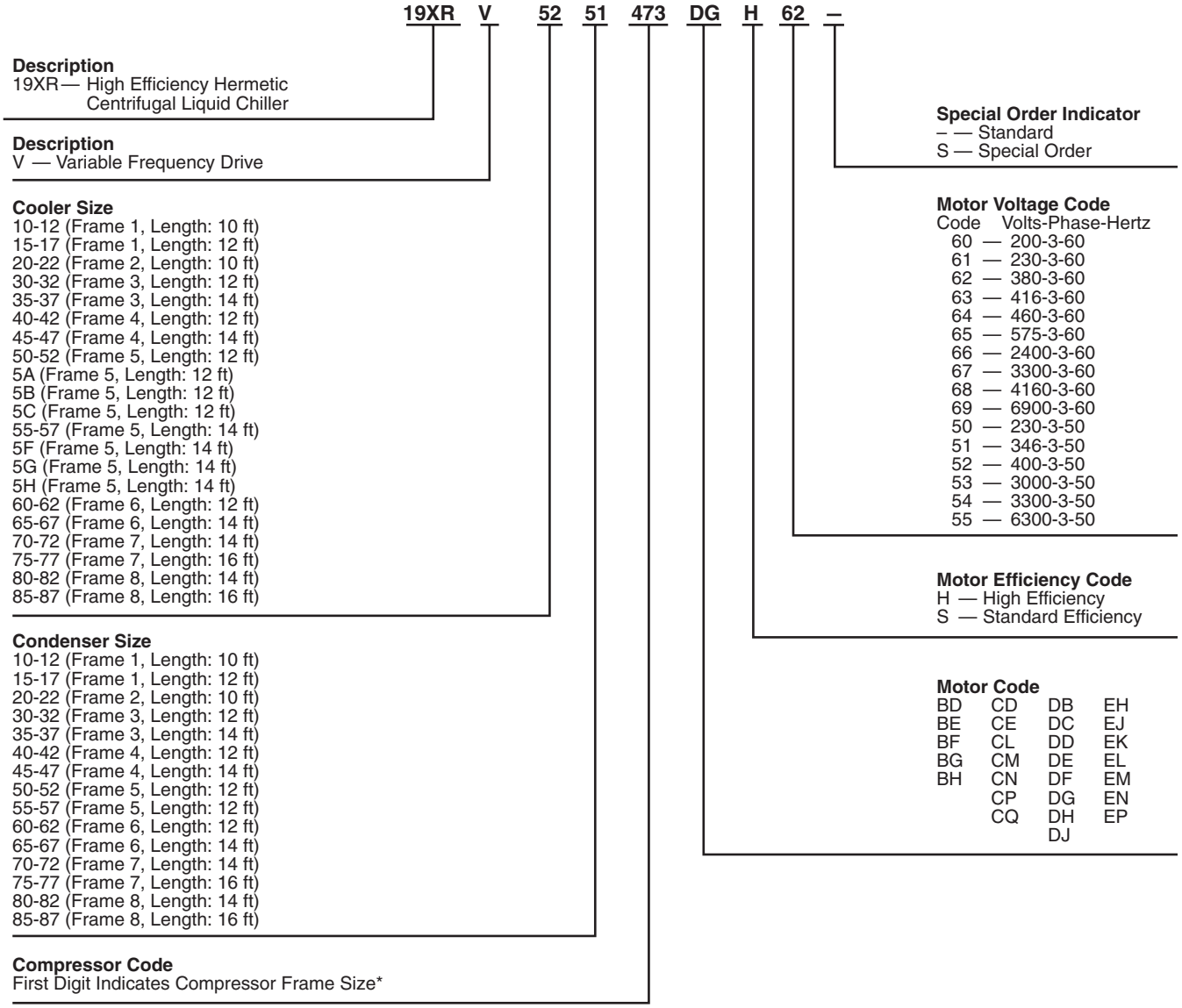
RIG MACHINE ASSEMBLY — See rigging instructions on label attached to machine. Also refer to rigging guide (Fig. 3 and 4), physical data in Fig. 5, and Tables 1-8B. *Lift machine only from the points indicated in rigging guide.* Each lifting cable or chain must be capable of supporting the entire weight of the machine.

⚠ WARNING

Lifting machine from points other than those specified may result in serious damage to the unit and personal injury. Rigging equipment and procedures must be adequate for machine weight. See Fig. 3 and 4 for machine weights.

NOTE: These weights are broken down into component sections for use when installing the unit insections. For the complete machine weight, add all component sections and refrigerant charge together. See Tables 4-8B for machine component weights.

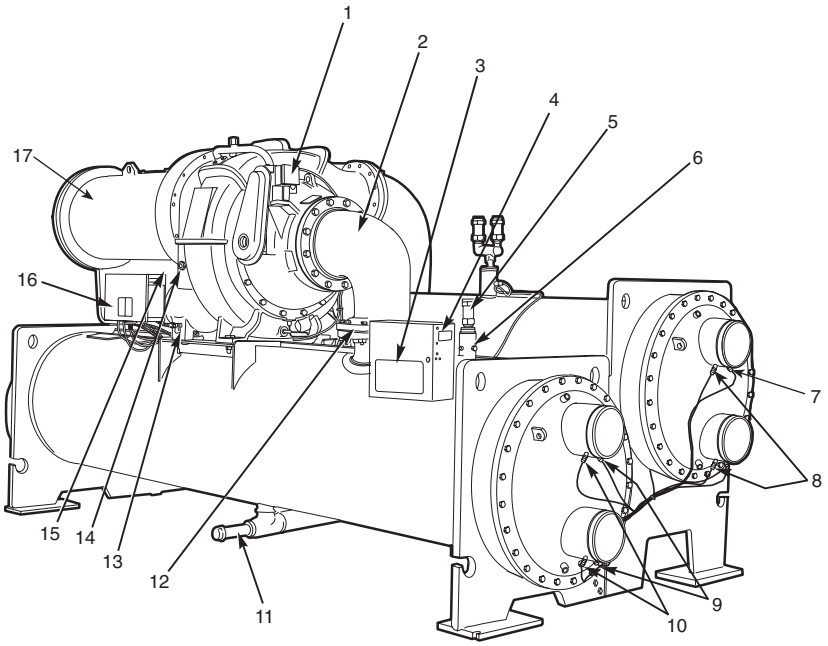
IMPORTANT: Ensure that rigging cable is over the cable hook on the motor end cover before lifting if cooler size is 10 through 67.



*Second digit will be a letter (ex. 4G3) on units equipped with split ring diffuser.

Fig. 1 — Model Number Identification

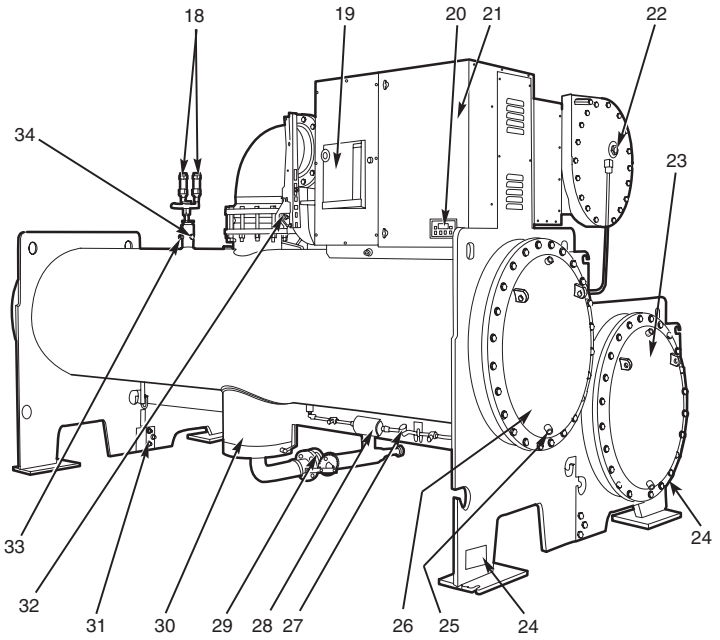
FRONT VIEW



LEGEND

1 — Guide Vane Actuator
2 — Suction Elbow
3 — Chiller Visual Controller/ International Chiller Visual Control (CVC/ICVC)
4 — Chiller Identification Nameplate
5 — Cooler, Auto Reset Relief Valves
6 — Cooler Pressure Transducer
7 — Condenser In/Out Temperature Thermistors
8 — Condenser Waterflow Device (ICVC Inputs available)
9 — Cooler In/Out Temperature Thermistors
10 — Cooler Waterflow Device (ICVC Inputs available)
11 — Refrigerant Charging Valve
12 — Typical Flange Connection
13 — Oil Drain Charging Valve
14 — Oil Level Sight Glasses
15 — Refrigerant Oil Cooler (Hidden)
16 — Auxiliary Power Panel
17 — Compressor Motor Housing

REAR VIEW



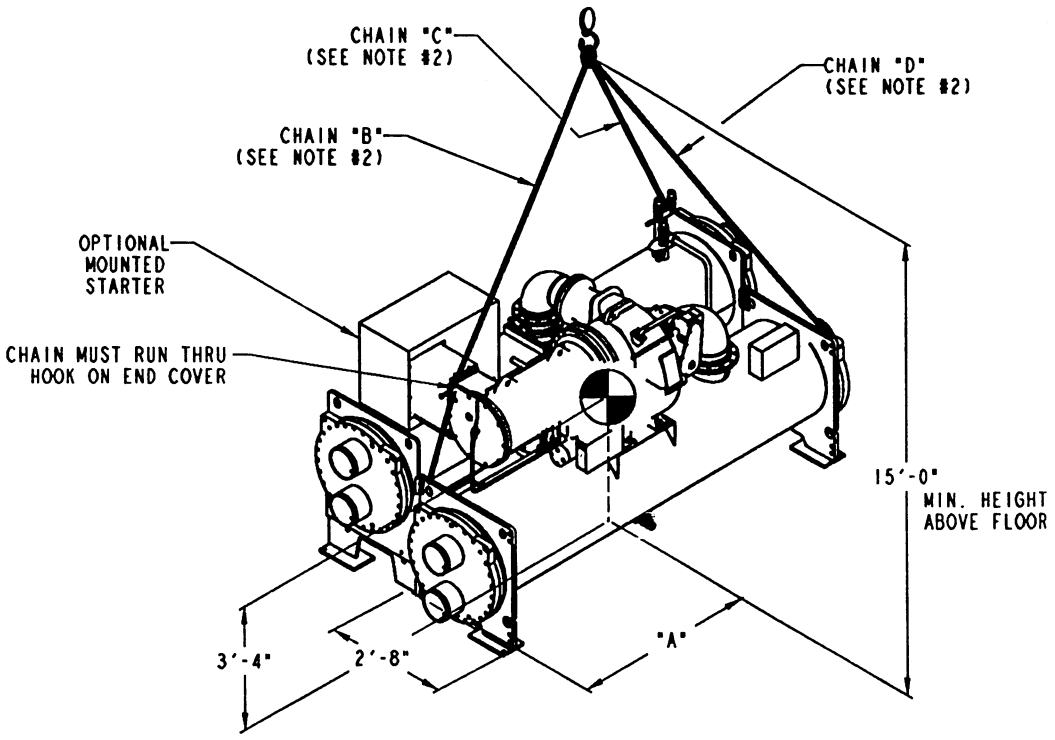
LEGEND

18 — Condenser Auto. Reset Relief Valves
19 — Compressor Motor Circuit Breaker
20 — Solid-State Starter Control Display
21 — Unit-Mounted Starter (Optional) Solid-State Starter Shown
22 — Motor Sight Glass
23 — Cooler Return-End Waterbox Cover
24 — ASME Nameplate (One Hidden)
25 — Typical Waterbox Drain Port
26 — Condenser Return-End Waterbox Cover
27 — Refrigerant Moisture/Flow Indicator
28 — Refrigerant Filter/Drier
29 — Liquid Line Isolation Valve (Optional)
30 — Linear Float Valve Chamber
31 — Vessel Take-Apart Connector
32 — Discharge Isolation Valve (Optional)
33 — Pumpout Valve
34 — Condenser Pressure Transducer

Fig. 2 — Typical 19XR Components

COMPRESSOR FRAME SIZE*	COOLER SIZE	MAXIMUM MACHINE WEIGHT (lb)	VESSEL LENGTH	DIM. "A"	CHAIN LENGTH		
					"B"	"C"	"D"
2	10-12	18,500	10′	4′- 7″	12′-7″	13′-0″	13′-0″
	15-17	19,000	12′	5′- 9″	13′-6″	13′-2″	13′-3″
	20-22	19,500	10′	4′- 7″	12′-7″	13′-0″	13′-0″
2 or 3	30-32	21,000	12′	5′- 9″	13′-6″	13′-2″	13′-3″
	35-37	22,500	14′	7′- 4″	14′-2″	13′-4″	13′-4″
3	40-42	29,700	12′	5′- 9″	12′-8″	12′-8″	13′-4″
	45-47	31,800	14′	6′-10″	13′-1″	13′-2″	13′-8″
	50-52	32,200	12′	5′- 9″	12′-7″	12′-9″	13′-5″
	5A-5C	32,200	12′	5′- 9″	12′-7″	12′-9″	13′-5″
	55-57	33,200	14′	6′-10″	13′-1″	18′-3″	15′-9″
	5F-5H	33,200	14′	6′-10″	13′-1″	18′-3″	15′-9″
4	50-52	32,530	12′	5′- 9″	13′-1″	12′-9″	13′-4″
	55-57	34,230	14′	6′- 2″	13′-7″	13′-1″	14′-4″
	60-62	34,950	12′	5′- 9″	13′-1″	12′-9″	13′-4″
	65-67	36,950	14′	6′- 2″	13′-7″	13′-1″	14′-4″

*The first digit of the 3-digit compressor code indicates the frame size of the compressor.



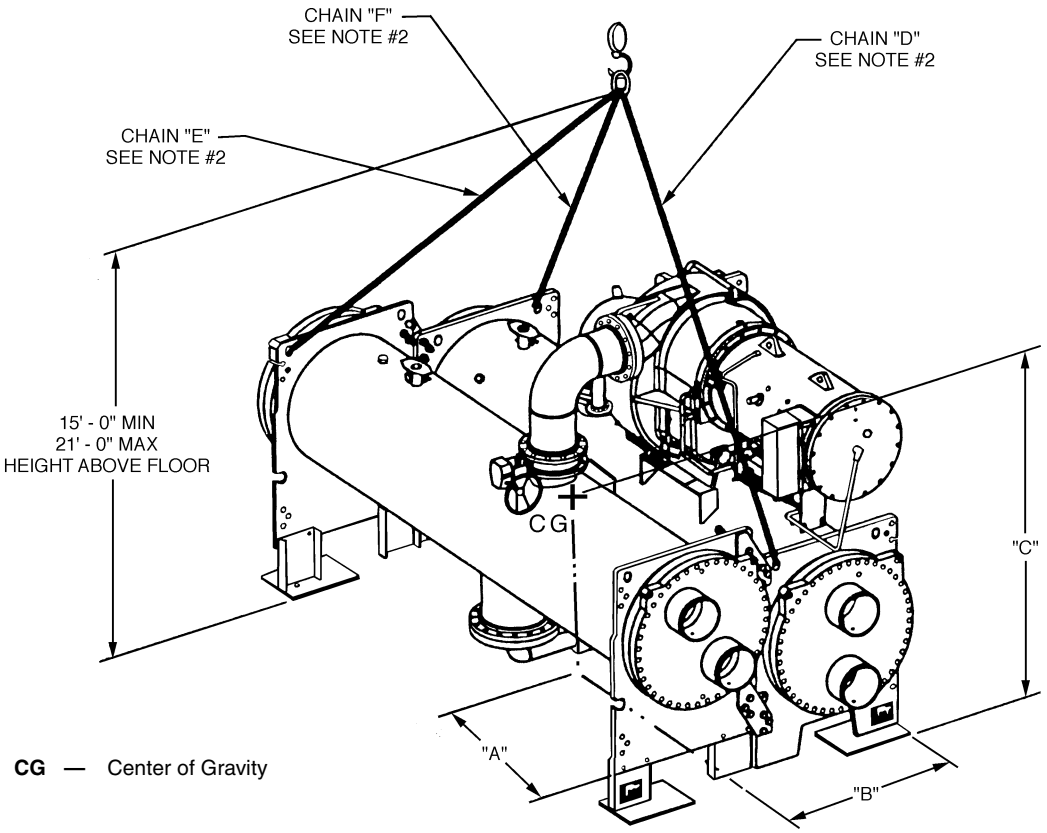
MACHINE RIGGING GUIDE

NOTES:
1. Each chain must be capable of supporting the entire weight of the machine. See chart for maximum weights.
2. Chain lengths shown are typical for 15′ lifting height. Some minor adjustments may be required.

Fig. 3 — Machine Rigging Guide (Cooler Size 10 Through 67)

COMPRESSOR FRAME SIZE*	COOLER SIZE	MAXIMUM MACHINE WEIGHT (lb)	VESSEL LENGTH	DIM. “A”	DIM. “B”	DIM. “C”	CHAIN LENGTH		
							“D”	“E”	“F”
4	70-72	40,410	14′	6′- 6″	3′-4″	3′-5″	11′-6″	12′-5″	12′-9″
5	70-72	45,600	14′	6′- 2″	3′-6″	3′-7″	11′-6″	12′-5″	12′-9″
	75-77	49,400	16′	6′-11″	3′-6″	3′-6″	12′-0″	13′-3″	13′-6″
	80-82	54,900	14′	6′- 2″	3′-6″	3′-7″	11′-6″	12′-5″	12′-9″
	85-87	58,300	16′	6′-11″	3′-6″	3′-6″	12′-0″	13′-3″	13′-6″

*The first digit of the 3-digit compressor code indicates the frame size of the compressor.



MACHINE RIGGING GUIDE

NOTES:
1. Each chain must be capable of supporting the entire weight of the machine. See chart for maximum weights.
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.

Fig. 4 — Machine Rigging Guide (Cooler Size 70 Through 87)

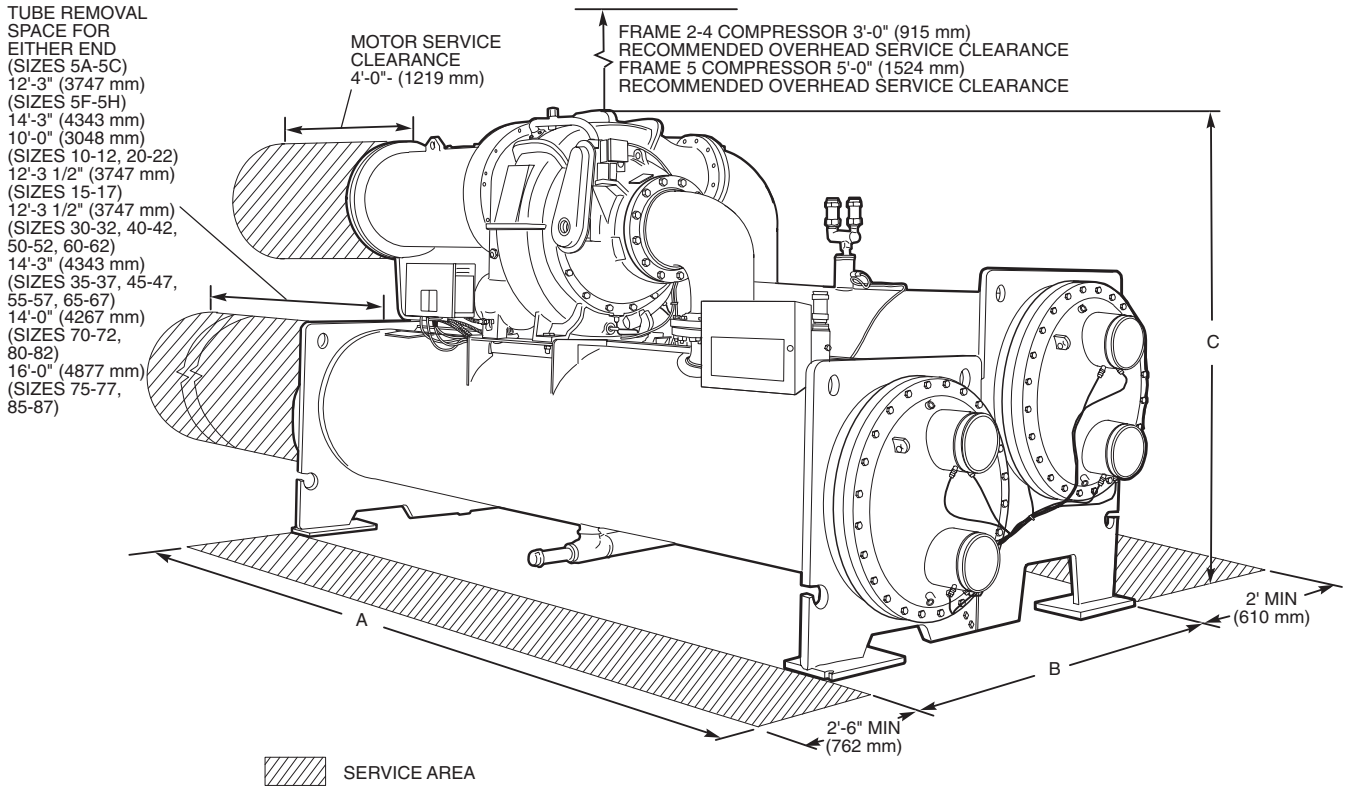


Fig. 5 — 19XR Dimensions (Refer to Tables 1 Through 3)

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

HEAT EXCHANGER SIZE	A (Length, with Nozzle-in-Head Waterbox)						B (Width)		19XR C (Height)		19XRV C (Height)	
	1 Pass		2-Pass*		3 Pass†							
	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
10 to 12	11-11	3632	11- 4	3454	11-11	3632	5- 2 7/8	1597	6- 1 1/4	1861	7-3	2210
15 to 17	14- 2 1/2	4331	13- 7 1/2	4153	14- 2 1/2	4331	5- 2 7/8	1597	6- 1 1/4	1861	7-3	2210
20 to 22	11-11 3/4	3651	11- 4 3/4	3473	11-11 3/4	3651	5- 6 7/16	1688	6- 3 1/4	1911	7-6 1/2	2299
30 to 32	14- 3 1/4	4350	13- 8 1/4	4172	14- 3 1/4	4350	5- 7 3/16	1707	6- 9 5/8	2073	7-4 7/8	2257
35 to 37	15-11 3/4	4870	15- 4 3/4	4693	15-11 3/4	4870	5- 7 3/16	1707	6- 9 5/8	2073	7-4 7/8	2257
40 to 42	14- 9	4496	14- 3 1/8	4347	14- 6	4420	6- 3 1/8	1908	7- 0 3/4	2153	7-9 1/16	2363
45 to 47	16- 5 1/2	5017	15-11 5/8	4867	16- 2 1/2	4940	6- 3 1/8	1908	7- 0 3/4	2153	7-9 1/16	2363
50 to 52	14-10	4521	14- 4 1/2	4382	14- 6 1/2	4432	6- 8 7/8	2054	7- 2 3/8	2194	8-4 7/8	2562
5A to 5C	14-10	4521	14- 4 1/2	4382	14- 6 1/2	4432	6- 8 7/8	2054	7- 2 3/8	2194	8-4 7/8	2562
55 to 57	16- 6 1/2	5042	16- 1	4902	16- 3	4953	6- 8 7/8	2054	7- 2 3/8	2194	8-4 7/8	2562
5F to 5H	16- 6 1/2	5042	16- 1	4902	16- 3	4953	6- 8 7/8	2054	7- 2 3/8	2194	8-4 7/8	2562
60 to 62	14-11	4547	14- 5 1/4	4400	14- 7	4445	6- 0 5/8	2124	7- 4 3/8	2245	8-7 7/8	2638
65 to 67	16- 7 1/2	5067	16- 1 3/4	4921	16- 3 1/2	4966	6- 0 5/8	2124	7- 4 3/8	2245	8-7 7/8	2638
70 to 72	17- 0 1/2	5194	16-11	5156	16- 9 1/4	5112	7-11 1/2	2426	9- 9	2972	—	—
75 to 77	19- 0 1/2	5804	18-11	5766	18- 9 1/4	5721	7-11 1/2	2426	9- 9	2972	—	—
80 to 82	17- 3 1/2	5271	17- 0 1/2	5194	16- 9 1/2	5118	8-10 3/4	2711	9-11 1/4	3029	—	—
85 to 87	19- 3 1/2	5880	19- 0 1/2	5804	18- 9 1/2	5728	8-10 3/4	2711	9-11 1/4	3029	—	—

*Assumes both cooler and condenser nozzles on same end of chiller.
†1 or 3 pass length applies if either (or both) cooler or condenser is a 1 or 3 pass design.

NOTES:
1. Service access should be provided per American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
2. Allow at least 3 ft (915 mm) overhead clearance for service rigging for frame 2-4 compressor. Overhead clearance for service rigging frame 5 compressor should be 5 ft (1524 mm).
3. Certified drawings available upon request.
4. Marine waterboxes may add 6 in., to the width of the machine. See certified drawings for details.
5. 'A' length dimensions shown are for standard 150 psi design and victaulic connections. The 300 psi design and/or flanges will add length. See certified drawings.
6. Dished head water box covers not available for 3 pass design.

Table 2 — 19XR Dimensions (Marine Waterbox)

HEAT EXCHANGER SIZE	A (Length, Marine Waterbox — not shown)				B WIDTH	
	2-Pass*		1 or 3 Pass†			
	ft-in.	mm	ft-in.	mm	ft-in.	mm
10 to 12	NA	NA	NA	NA	NA	NA
15 to 17	NA	NA	NA	NA	NA	NA
20 to 22	12- 5 1/2	3797	14- 1 1/4	4299	6- 1 1/16	1856
30 to 32	14- 9	4496	16- 4 3/4	4997	6- 1 1/16	1856
35 to 37	16- 5 1/2	5017	18- 1 1/4	5518	6- 1 1/16	1856
40 to 42	15- 2 3/4	4642	16- 3 1/4	5086	6- 3 1/4	1911
45 to 47	16-11 3/4	5163	18- 4 3/4	5607	6- 3 1/4	1911
50 to 52	15- 3 1/2	4661	16- 8 1/2	5093	6- 8 7/8	2054
5A to 5C	15- 3 1/2	4661	16- 8 1/2	5093	6- 8 7/8	2054
55 to 57	17- 0	5182	18- 5	5613	6- 8 7/8	2054
5F to 5H	17- 0	5182	18- 5	5613	6- 8 7/8	2054
60 to 62	15- 4 1/8	4677	16- 8 3/4	5099	6-11 3/4	2127
65 to 67	17- 0 5/8	5197	18- 5 1/4	5620	6-11 3/4	2127
70 to 72	18- 3 5/8	5579	19- 9 3/4	6039	8- 8 1/8	2645
75 to 77	20- 3 5/8	6188	21- 9 3/4	6648	8- 8 1/8	2645
80 to 82	18- 4	5583	19-10 1/2	6058	9- 5 5/8	2886
85 to 87	20- 4	6198	21-10 1/2	6668	9- 5 5/8	2886

*Assumes both cooler and condenser nozzles on same end of chiller.
†1 or 3 pass length applies if cooler is a 1 or 3 pass design.

NOTES:
1. Service access should be provided per American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 15, latest edition, National Fire Protection Association (NFPA) 70, and local safety code.
2. Allow at least 3 ft (915 mm) overhead clearance for service rigging for frame 2-4 compressor. Overhead clearance for service rigging frame 5 compressor should be 5 ft (1524 mm).
3. Certified drawings available upon request.
4. Marine waterboxes may add 6 in., to the width of the machine. See certified drawings for details.
5. 'A' length and 'B' width dimensions shown are for standard 150 psi design and victaulic connections. The 300 psi design and/or flanges will add length. See certified drawings.

Table 3 — 19XR Nozzle Size

FRAME SIZE	NOZZLE SIZE (in.) (Nominal Pipe Size)					
	Cooler			Condenser		
	1-Pass	2-Pass	3-Pass	1-Pass	2-Pass	3-Pass
1	8	6	6	8	6	6
2	10	8	6	10	8	6
3	10	8	6	10	8	6
4	10	8	6	10	8	6
5	10	8	6	10	10	8
6	10	10	8	10	10	8
7	14	12	10	14	12	12
8	14	14	12	14	14	12

Table 4 — 19XR Compressor Weights

MOTOR CODE	ENGLISH		SI	
	Total Compressor Weight* (lb)		Total Compressor Weight* (kg)	
	60 Hz	50 Hz	60 Hz	50 Hz
BD	3,755	3,755	1703	1703
BE	3,805	3,805	1726	1726
BF	3,870	3,870	1755	1755
BG	3,950	3,950	1792	1792
BH	3,950	3,950	1792	1792
CD	4,659	4,756	2134	2153
CE	4,685	4,771	2155	2165
CL	4,710	4,842	2137	2167
CM	4,737	4,868	2149	2209
CN	4,751	4,883	2156	2215
CP	4,806	4,898	2181	2212
CQ	4,874	4,898	2211	2212
DB	6,112	6,158	2772	2793
DC	6,138	6,224	2822	2823
DD	6,216	6,262	2819	2840
DE	6,224	6,351	2823	2881
DF	6,274	6,412	2846	2908
DG	6,364	6,466	2886	2933
DH	6,412	6,868	2908	3115
DJ	6,466	6,977	2933	3165
EH	8,025	11,135	3640	5051
EJ	11,085	11,265	5028	5110
EK	11,160	11,282	5062	5118
EL	11,181	11,435	5072	5187
EM	11,271	11,435	5113	5187
EN	11,335	11,635	5142	5278
EP	11,434	11,605	5186	5264

*Compressor weight is comprised of compressor, stator, rotor, end bell, suction elbow, and discharge elbow.

NOTE: For medium voltage motors (over 600 v), add 490 lb (222 kg).

Table 5 — 19XR Component Weights

COMPONENT	FRAME 2 COMPRESSOR*		FRAME 3 COMPRESSOR*		FRAME 4 COMPRESSOR*		FRAME 5 COMPRESSOR*	
	lb	kg	lb	kg	lb	kg	lb	kg
Suction Elbow	50	23	54	24	175	79	400	181
Discharge Elbow	60	27	46	21	157	71	325	147
Control Panel†	30	14	30	14	30	14	30	14
Optional Unit-Mounted Starter**	500	227	800	227	800	227	N/A	N/A
Optional Isolation Valves	35	16	115	52	115	52	200	91
VFD**	N/A	N/A	1035	470	1035	470	N/A	N/A

*To determine compressor frame size, refer to 19XR Computer Selection Program.

†Included in total cooler weight.

**Weight of optional factory-mounted starter or VFD (variable frequency drive) is not included and must be added to the heat exchanger weight.

Table 6 — 19XR Heat Exchanger Data

CODE	ENGLISH						SI					
	Dry Rigging Weight (lb)*		Machine Charge				Dry Rigging Weight (kg)*		Machine Charge			
	Cooler Only	Condenser Only	Refrigerant Weight (lb)		Water Volume (gal)		Cooler Only	Condenser Only	Refrigerant Weight (kg)		Water Volume (L)	
			Cooler	Condenser	Cooler	Condenser			Cooler	Condenser	Cooler	Condenser
10	2,742	2,704	290	200	34	42	1244	1226	132	91	128	158
11	2,812	2,772	310	200	37	45	1275	1257	141	91	140	170
12	2,883	2,857	330	200	40	49	1307	1296	150	91	152	185
15	3,003	2,984	320	250	39	48	1362	1353	145	113	148	182
16	3,089	3,068	340	250	43	52	1401	1391	154	113	163	197
17	3,176	3,173	370	250	47	57	1440	1439	168	113	177	215
20	3,442	3,523	345	225	48	48	1561	1598	157	102	182	181
21	3,590	3,690	385	225	55	55	1628	1673	175	102	207	210
22	3,746	3,854	435	225	62	63	1699	1748	197	102	233	239
30	4,137	3,694	350	260	55	55	1876	1675	159	118	210	210
31	4,319	3,899	420	260	64	65	1958	1768	190	118	241	246
32	4,511	4,100	490	260	72	74	2046	1859	222	118	273	282
35	4,409	4,606	400	310	61	62	2000	2089	181	141	232	233
36	4,617	4,840	480	310	70	72	2094	2195	218	141	266	273
37	4,835	5,069	550	310	80	83	2193	2300	249	141	303	314
40	5,898	6,054	560	280	89	96	2675	2745	254	127	338	362
41	6,080	6,259	630	280	97	106	2757	2839	286	127	368	398
42	6,244	6,465	690	280	105	114	2832	2932	313	127	396	434
45	6,353	6,617	640	330	98	106	2881	3001	290	150	372	399
46	6,561	6,851	720	330	108	117	2976	3107	327	150	407	440
47	6,748	7,085	790	330	116	127	3060	3213	358	150	438	481
50	7,015	7,285	750	400	115	128	3181	3304	340	181	435	482
51	7,262	7,490	840	400	126	137	3293	3397	381	181	477	518
52	7,417	7,683	900	400	133	136	3364	3484	408	181	502	552
5A	6,426	—	500	—	106	—	2915	—	227	—	401	—
5B	6,499	—	520	—	109	—	2949	—	236	—	412	—
5C	6,577	—	550	—	112	—	2984	—	250	—	424	—
55	7,559	7,980	870	490	127	142	3428	3619	395	222	481	533
56	7,839	8,214	940	490	139	152	3555	3725	426	222	527	575
57	8,016	8,434	980	490	147	162	3635	3825	444	222	557	613
5F	6,879	—	550	—	116	—	3121	—	250	—	429	—
5G	6,962	—	570	—	120	—	3159	—	259	—	454	—
5H	7,050	—	600	—	124	—	3199	—	272	—	464	—
60	8,270	8,286	940	420	144	159	3751	3758	426	190	546	601
61	8,462	8,483	980	420	153	168	3838	3847	444	190	578	636
62	8,617	8,676	1020	420	160	177	3908	3935	462	190	604	669
65	8,943	9,204	1020	510	160	176	4056	4174	462	231	605	668
66	9,161	9,428	1060	510	169	187	4155	4276	481	231	641	707
67	9,338	9,648	1090	510	177	197	4235	4376	494	231	671	745
70	12,395	13,139	1220	780	224	209	5621	5959	553	354	846	790
71	12,821	13,568	1340	780	243	229	5814	6153	608	354	917	865
72	13,153	13,969	1440	780	257	248	5965	6335	653	354	972	936
75	13,293	14,211	1365	925	245	234	6028	6445	619	420	926	883
76	13,780	14,702	1505	925	266	257	6259	6667	683	420	1007	969
77	14,159	15,160	1625	925	283	278	6421	6875	737	420	1070	1050
80	16,156	15,746	1500	720	285	264	7326	7141	680	327	1078	998
81	16,530	16,176	1620	720	302	284	7496	7336	735	327	1141	1073
82	16,919	16,606	1730	720	319	304	7673	7531	785	327	1205	1148
85	17,296	17,001	1690	860	313	295	7844	7710	766	390	1181	1116
86	17,723	17,492	1820	860	331	318	8039	7934	825	390	1252	1202
87	18,169	17,984	1940	860	351	341	8240	8156	880	390	1326	1288

*Rigging weights are for standard tubes of standard wall thickness (Turbo-B3 and Spikefin 2, 0.025-in. [0.635 mm] wall).

NOTES:
1. Cooler includes the control panel (ICVC/CVC), suction elbow, and $^1/_2$ the distribution piping weight.
2. Condenser includes float valve and sump, discharge elbow, and $^1/_2$ the distribution piping weight.
3. For special tubes refer to the 19XR Computer Selection Program.
4. All weights for standard 2-pass NIH (nozzle-in-head) design.

Table 7 — 19XR Additional Data for Marine Waterboxes*

HEAT EXCHANGER FRAME, PASS	ENGLISH			SI		
	Psig	Rigging Weight (lb)	Water Volume (gal)	kPa	Rigging Weight (kg)	Water Volume (L)
FRAME 2, 1 AND 3 PASS	150	730	84	1034	331	318
FRAME 2, 2 PASS	150	365	42	1034	166	159
FRAME 3, 1 AND 3 PASS	150	730	84	1034	331	317
FRAME 3, 2 PASS	150	365	42	1034	166	159
FRAME 4, 1 AND 3 PASS	150	1060	123	1034	481	465
FRAME 4, 2 PASS	150	530	61	1034	240	231
FRAME 5, 1 AND 3 PASS	150	1240	139	1034	562	526
FRAME 5, 2 PASS	150	620	69	1034	281	263
FRAME 6, 1 AND 3 PASS	150	1500	162	1034	680	612
FRAME 6, 2 PASS	150	750	81	1034	340	306
FRAME 7, 1 AND 3 PASS	150	2010	326	1034	912	1234
FRAME 7, 2 PASS	150	740	163	1034	336	617
FRAME 8, 1 AND 3 PASS	150	1855	406	1034	841	1537
FRAME 8, 2 PASS	150	585	203	1034	265	768
FRAME 2, 1 AND 3 PASS	300	860	84	2068	390	318
FRAME 2, 2 PASS	300	430	42	2068	195	159
FRAME 3, 1 AND 3 PASS	300	860	84	2068	390	317
FRAME 3, 2 PASS	300	430	42	2068	195	159
FRAME 4, 1 AND 3 PASS	300	1210	123	2068	549	465
FRAME 4, 2 PASS	300	600	61	2068	272	231
FRAME 5, 1 AND 3 PASS	300	1380	139	2068	626	526
FRAME 5, 2 PASS	300	690	69	2068	313	263
FRAME 6, 1 AND 3 PASS	300	1650	162	2068	748	612
FRAME 6, 2 PASS	300	825	81	2068	374	306
FRAME 7, 1 AND 3 PASS	300	3100	326	2068	1406	1234
FRAME 7, 2 PASS	300	2295	163	2068	1041	617
FRAME 8, 1 AND 3 PASS	300	2745	405	2068	1245	1533
FRAME 8, 2 PASS	300	1630	203	2068	739	768

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

NOTES:
1. Weight adder shown is the same for cooler and condenser of equal frame size.
2. For the total weight of a vessel with a marine waterbox, add these values to the heat exchanger weights (or volumes).

Table 8A — 19XR Waterbox Cover Weights — English (lb)

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 1		FRAME 2		FRAME 3	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	177	204	320	350	320	350
	NIH, 2 Pass Cover, 150 psig	185	218	320	350	320	350
	NIH, 3 Pass Cover, 150 psig	180	196	300	340	300	340
	NIH/MWB End Cover, 150 psig	136	136	300	300	300	300
	NIH, 1 Pass Cover, 300 psig	248	301	411	486	411	486
	NIH, 2 Pass Cover, 300 psig	255	324	411	518	411	518
	NIH, 3 Pass Cover, 300 psig	253	288	433	468	433	468
	NIH/MWB End Cover, 300 psig	175	175	400	400	400	400

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 4		FRAME 5		FRAME 6	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	148	185	168	229	187	223
	NIH, 2 Pass Cover, 150 psig	202	256	224	298	257	330
	NIH, 3 Pass Cover, 150 psig	473	489	629	655	817	843
	NIH/MWB End Cover, 150 psig	317	317	393	393	503	503
	NIH, 1 Pass Cover, 300 psig	593	668	764	839	959	1035
	NIH, 2 Pass Cover, 300 psig	594	700	761	878	923	1074
	NIH, 3 Pass Cover, 300 psig	621	656	795	838	980	1031
	NIH/MWB End Cover, 300 psig	569	569	713	713	913	913

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 7 COOLER		FRAME 7 CONDENSER	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	329	441	329	441
	NIH, 2 Pass Cover, 150 psig	426	541	426	541
	NIH, 3 Pass Cover, 150 psig	1202	1239	1113	1171
	NIH/MWB End Cover, 150 psig	789	789	703	703
	NIH, 1 Pass Cover, 300 psig	1636	1801	1472	1633
	NIH, 2 Pass Cover, 300 psig	1585	1825	1410	1644
	NIH, 3 Pass Cover, 300 psig	1660	1741	1496	1613
	NIH/MWB End Cover, 300 psig	1451	1451	1440	1440

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 8 COOLER		FRAME 8 CONDENSER	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	417	494	417	494
	NIH, 2 Pass Cover, 150 psig	531	685	531	685
	NIH, 3 Pass Cover, 150 psig	1568	1626	1438	1497
	NIH/MWB End Cover, 150 psig	1339	1339	898	898
	NIH, 1 Pass Cover, 300 psig	2265	2429	1860	2015
	NIH, 2 Pass Cover, 300 psig	2170	2499	1735	2044
	NIH, 3 Pass Cover, 300 psig	2273	2436	1883	1995
	NIH/MWB End Cover, 300 psig	1923	1923	1635	1635

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox

NOTE: Weight for NIH 2-Pass Cover, 150 psig is included in the heat exchanger weights shown in Table 6.

RIG MACHINE COMPONENTS — Refer to instructions below, Fig. 6-9, 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 while the machine is under pressure. Failure to relieve pressure can result in personal injury or damage to the unit.

⚠ CAUTION

Before rigging the compressor, disconnect all wires entering the power panel.

Table 8B — 19XR Waterbox Cover Weights — SI (kg)

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 1		FRAME 2		FRAME 3	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	80	93	145	159	145	159
	NIH, 2 Pass Cover, 150 psig	84	99	145	159	145	159
	NIH, 3 Pass Cover, 150 psig	82	89	136	154	140	154
	NIH/MWB End Cover, 150 psig	62	62	136	136	136	136
	NIH, 1 Pass Cover, 300 psig	112	137	186	220	186	220
	NIH, 2 Pass Cover, 300 psig	116	147	186	235	186	235
	NIH, 3 Pass Cover, 300 psig	115	131	196	212	196	212
	NIH/MWB End Cover, 300 psig	79	79	181	181	181	181

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 4		FRAME 5		FRAME 6	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	67	84	76	104	85	101
	NIH, 2 Pass Cover, 150 psig	92	116	107	135	117	150
	NIH, 3 Pass Cover, 150 psig	214	222	285	297	371	382
	NIH/MWB End Cover, 150 psig	144	144	178	178	228	228
	NIH, 1 Pass Cover, 300 psig	269	303	347	381	435	470
	NIH, 2 Pass Cover, 300 psig	269	317	345	398	419	487
	NIH, 3 Pass Cover, 300 psig	282	298	361	380	445	468
	NIH/MWB End Cover, 300 psig	258	258	323	323	414	414

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 7 COOLER		FRAME 7 CONDENSER	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	149	200	149	200
	NIH, 2 Pass Cover, 150 psig	193	245	193	245
	NIH, 3 Pass Cover, 150 psig	545	562	505	531
	NIH/MWB End Cover, 150 psig	357	358	319	319
	NIH, 1 Pass Cover, 300 psig	742	817	668	741
	NIH, 2 Pass Cover, 300 psig	719	828	640	746
	NIH, 3 Pass Cover, 300 psig	753	790	679	732
	NIH/MWB End Cover, 300 psig	658	658	653	653

HEAT EXCHANGER	WATERBOX DESCRIPTION	FRAME 8 COOLER		FRAME 8 CONDENSER	
		Standard Nozzles	Flanged	Standard Nozzles	Flanged
COOLER/ CONDENSER	NIH, 1 Pass Cover, 150 psig	189	224	189	224
	NIH, 2 Pass Cover, 150 psig	241	311	241	311
	NIH, 3 Pass Cover, 150 psig	711	738	652	679
	NIH/MWB End Cover, 150 psig	607	607	407	407
	NIH, 1 Pass Cover, 300 psig	1027	1102	844	914
	NIH, 2 Pass Cover, 300 psig	984	1134	787	927
	NIH, 3 Pass Cover, 300 psig	1031	1105	854	905
	NIH/MWB End Cover, 300 psig	872	872	742	742

LEGEND

NIH — Nozzle-in-Head
MWB — Marine Waterbox

NOTE: Weight for NIH 2-Pass Cover, 150 psig is included in the heat exchanger weights shown in Table 6.

NOTE: If the cooler 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 starter from the machine, remove wiring for the oil pump, oil heater, control wiring at the power panel, 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.

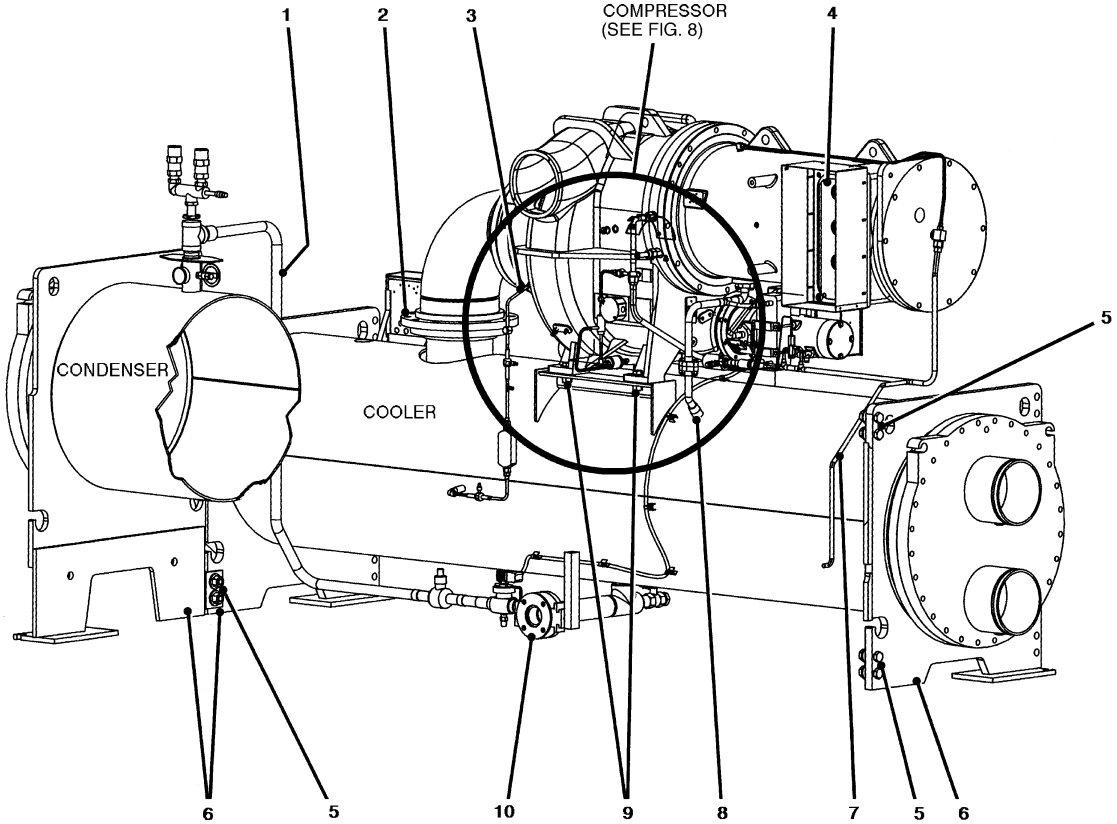
To Separate Cooler and Condenser:

1. Place a support plate under each tube sheet to keep each vessel level (Fig. 6, Item 6).
2. Cut the refrigerant motor cooling line at the location shown (Fig. 6, Item 7).

3. Disconnect the compressor discharge elbow at the compressor (Fig. 7, Item 6).
4. Cut the hot gas bypass line at the location shown (Fig. 6, Item 1).
5. Unbolt the cooler liquid feed line at the location shown (Fig. 6, Item 10).
6. Cover all openings.
7. Disconnect all wires and cables that cross from the cooler side of the machine to the condenser side, including:
   a. temperature sensor cable at the waterbox (Fig. 9, Item 5)
   b. waterside transducer cables at the transducer (Fig. 9, Item 4)
   c. condenser transducer cable at the transducer (Fig. 7, Item 7)
   d. motor power wires at the starter (Fig. 6, Item 4)
   e. wires and cable housings at the power panel that cross from the starter to the power panel (Fig. 7, Item 2).
8. Disconnect the rabbet-fit connectors on the tube sheets (Fig. 6, Item 5).
9. Rig the vessels apart.

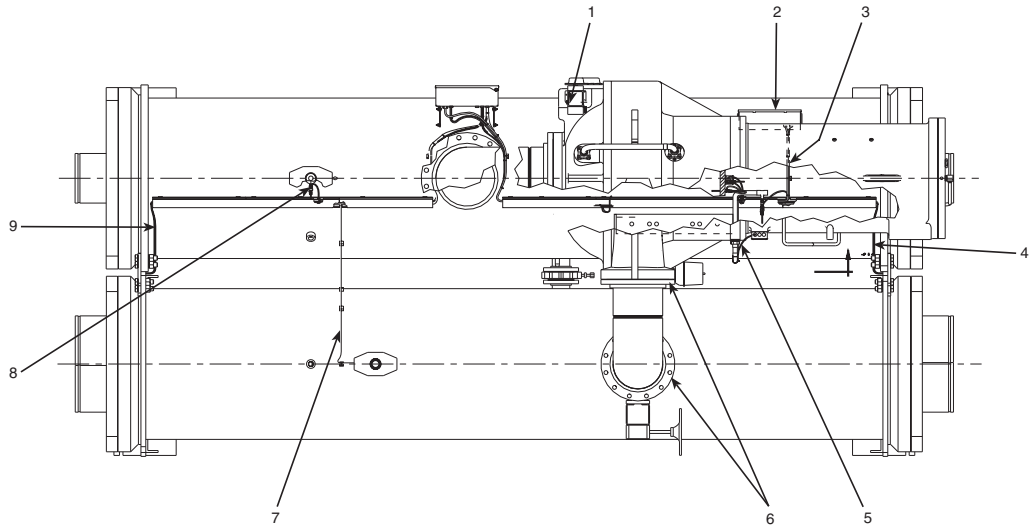
To Separate the Compressor from the Cooler:

1. Unbolt the compressor suction elbow at the cooler flange (Fig. 6, Item 2).
2. Cut the refrigerant motor cooling line at the location shown (Fig. 6, Item 7).
3. Disconnect the motor refrigerant return line (Fig. 6, Item 8).
4. Disconnect the following:
   a. compressor oil sump temperature sensor cable (Fig. 8, Item 4)
   b. bearing temperature sensor cable (Fig. 8, Item 2)
   c. motor temperature sensor cable (Fig. 8, Item 1)
   d. wires and cable housings that cross from the power panel to the starter and control panel (Fig. 7, Item 2)
   e. discharge temperature sensor cable (Fig. 8, Item 6)
   f. compressor oil sump pressure cable (Fig. 8, Item 3)
   g. compressor oil discharge pressure cable (Fig. 8, Item 5)
   h. guide vane actuator cable (Fig. 7, Item 1)
   i. diffuser actuator cable (Frame 5 compressor and Frame 4 units with split ring diffuser) — not shown Fig. 9, Item 2)
   j. diffuser pressure cable (Frame 5 compressor and Frame 4 units with split ring diffuser) (Fig. 8, Item 8).
5. Disconnect the flared fitting for the oil reclaim line (Fig. 6, Item 3).
6. Unbolt the compressor discharge elbow (Fig. 7, Item 6).
7. Cover all openings.
8. Disconnect motor power cables at the starter lugs (Fig. 6, Item 4).
9. Unbolt the compressor mounting from the cooler (Fig. 6, Item 9).
10. Rig the compressor.



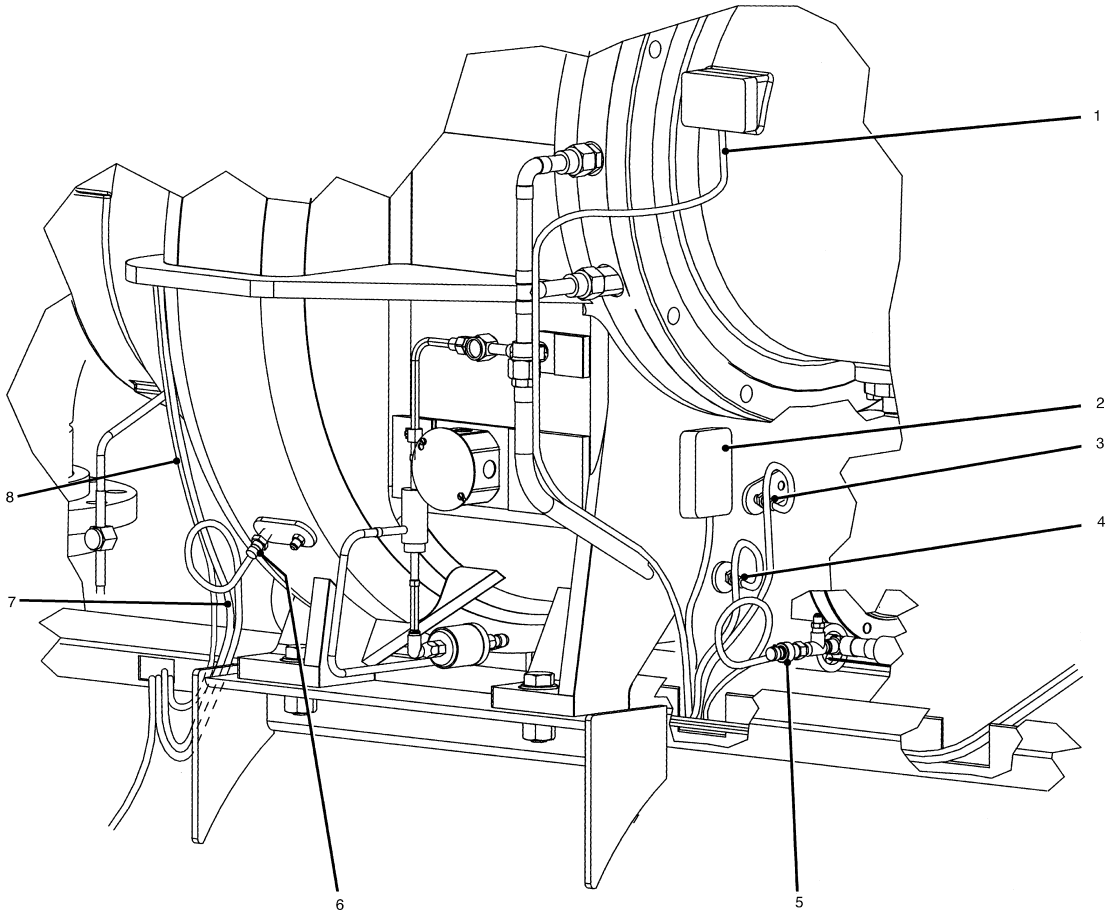
1 — Optional Hot Gas Bypass (Cut)
2 — Compressor Suction Elbow (Unbolt)
3 — Oil Reclaim Line (Unbolt)
4 — Starter Connector (Unbolt)
5 — Vessel Connectors (Unbolt)
6 — Tube Sheet
7 — Refrigerant Motor Cooling Line (Cut)
8 — Motor Drain (Unbolt)
9 — Compressor Mounting (Unbolt)
10 — Cooler Liquid Feed Line (Unbolt)

Fig. 6 — Cooler, Side View



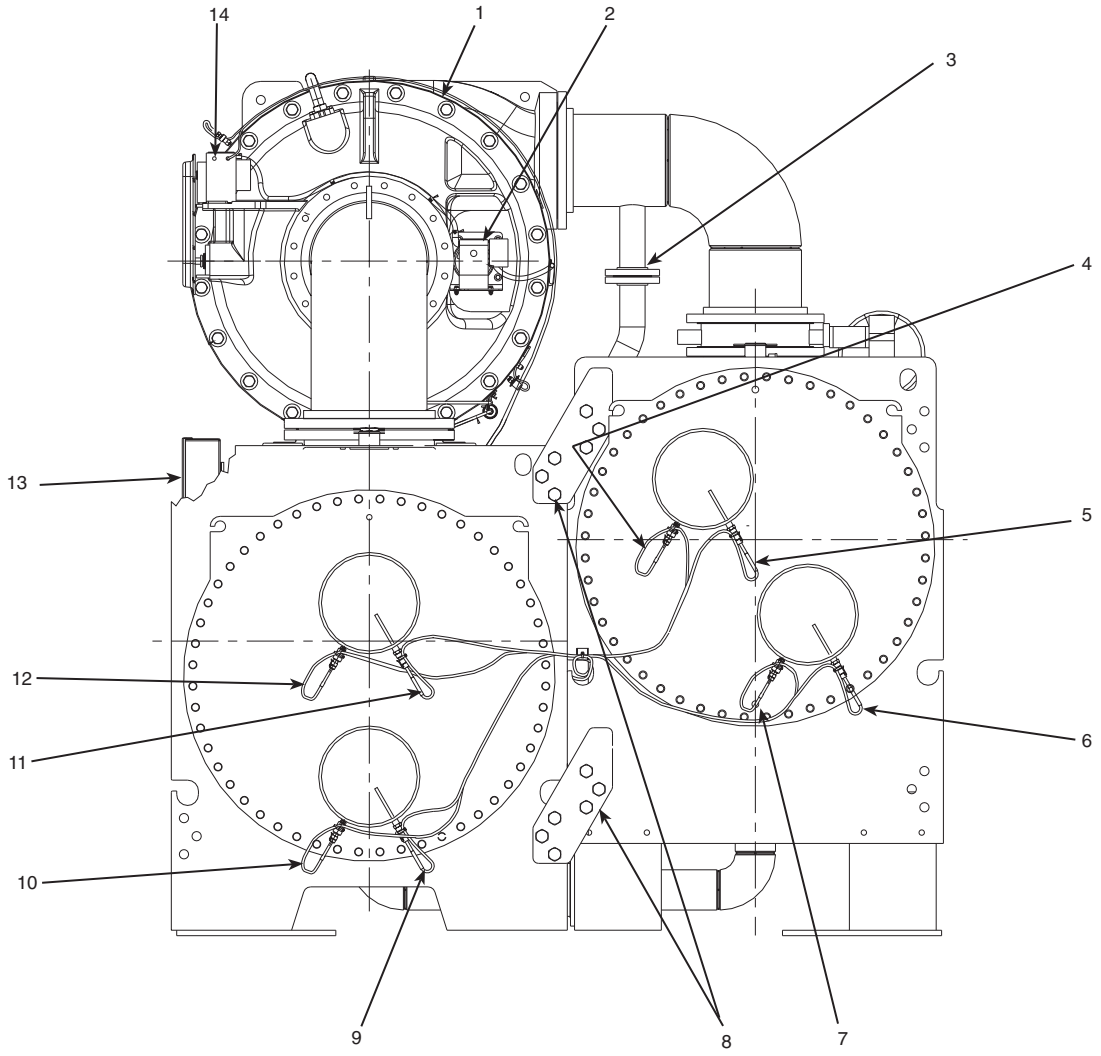
1 — Guide Vane Actuator Cable
2 — Power Panel
3 — Communication Cable
4 — Water Sensor Cables
5 — Motor Winding Temperature Cable
6 — Compressor Discharge Elbow Joints
7 — Condenser Pressure Cable
8 — Cooler Pressure Connection
9 — Water Sensor Cables

Fig. 7 — 19XR Chiller Top View



1 — Motor Temperature Sensor Cable
2 — Bearing Temperature Sensor Cable Connection (Inside Box)
3 — Compressor Oil Sump Pressure Cable
4 — Compressor Oil Sump Temperature Sensor Cable
5 — Compressor Oil Discharge Pressure Cable
6 — Discharge Temperature Sensor Cable
7 — Guide Vane Actuator Cable
8 — Diffuser Pressure and Actuator Cable (Frame 5 Compressor Only, Optional for Frame 4)

Fig. 8 — Compressor Detail



1 — Guide Vane Actuator Cables
2 — Diffuser Actuator (Frame 5 Compressor, Frame 4 Optional)
3 — Hot Gas Bypass Line (Optional)
4 — Condenser Leaving Water Pressure Cable (Optional for ICVC Units)
5 — Condenser Leaving Water Temperature Cable
6 — Condenser Entering Water Temperature Cable
7 — Condenser Entering Water Pressure Cable (Optional for ICVC Units)
8 — Vessel Take-Apart Connectors
9 — Cooler Entering Water Temperature Cable
10 — Cooler Entering Water Pressure Cable (Optional for ICVC Units)
11 — Cooler Leaving Water Temperature Cable
12 — Cooler Leaving Water Pressure Cable (Optional for ICVC Units)
13 — Chiller Visual Controller (CVC) or International Chiller Visual Controller (ICVC)
14 — Guide Vane Actuator

Fig. 9 — Chiller End View

To Rig Compressor

NOTE: The motor end of the 19XR compressor is heavy and will tip backwards unless these directions are followed:

1. Cut two 4 in. x 6 in. wooden beams to the same length as the compressor.
2. Drill holes into the beams and bolt them to the base of the compressor.

Additional Notes

1. Use silicon grease on new O-rings when refitting.
2. Use gasket sealant on new gaskets when refitting.
3. Cooler and condenser vessels may be rigged vertically. Rigging should be fixed to all 4 corners of the tube sheet.

Install Machine Supports

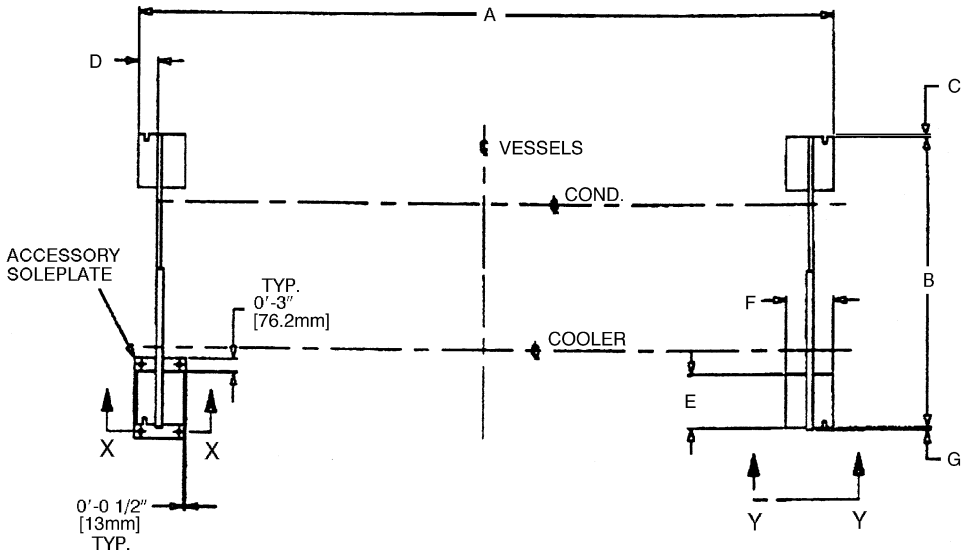
INSTALL STANDARD ISOLATION — Figures 10 and 11 show the position of support plates and shear flex pads, which together form the standard machine support system.

INSTALL ACCESSORY ISOLATION (if required) — Uneven floors or other considerations may dictate the use of accessory soleplates (supplied by Carrier for field installation) and leveling pads. Refer to Fig. 10 and 12.

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.

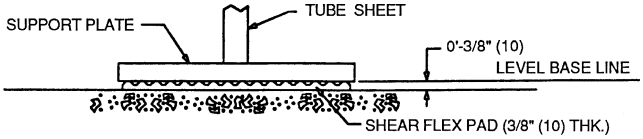


19XR HEAT EXCHANGER SIZE	DIMENSIONS (ft-in.)						
	A	B	C	D	E	F	G
10-12	10- 7 1/4	4-10 1/4	0-1	0-3	1-1 3/4	0-9	0-1/2
15-17	12-10 3/4	4-10 1/4	0-1	0-3	1-1 3/4	0-9	0-1/2
20-22	10- 7 1/4	5- 4 1/4	0-1	0-3	1-1 3/4	0-9	0-1/2
30-32	12-10 3/4	5- 4 1/4	0	0-3	1-1 3/4	0-9	0-1/2
35-37	14- 7 1/4	5- 4 1/4	0	0-3	1-1 3/4	0-9	0-1/2
40-42	12-10 3/4	6- 0	0-1 1/2	0-3	1-1 3/4	0-9	0-1/2
45-57	14- 7 1/4	6- 0	0-1 1/2	0-3	1-1 3/4	0-9	0-1/2
50-52	12-10 3/4	6- 5 1/2	0- 1/2	0-3	1-1 3/4	0-9	0-1/2
55-57	14- 7 1/4	6- 5 1/2	0- 1/2	0-3	1-1 3/4	0-9	0-1/2
60-62	12-10 3/4	6- 9 1/2	0- 1/2	0-3	1-1 3/4	0-9	0-1/2
65-67	14- 7 1/4	6- 9 1/2	0- 1/2	0-3	1-1 3/4	0-9	0-1/2
70-72	15- 1 7/8	7-10 1/2	0- 1/4	0-6	1-10	1-4	0-3/4
75-77	17- 1 7/8	7-10 1/2	0- 1/4	0-6	1-10	1-4	0-3/4
80-82	15- 1 7/8	8- 9 3/4	0- 15/16	0-6	1-10	1-4	0-1/16
85-87	17- 1 7/8	8- 9 3/4	0- 15/16	0-6	1-10	1-4	0-1/16

Fig. 10 — 19XR,XRV Machine Footprint

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. 13. Consult job data for specific arrangement. Low profile spring isolation assemblies can be field supplied to keep the machine at a convenient working height.

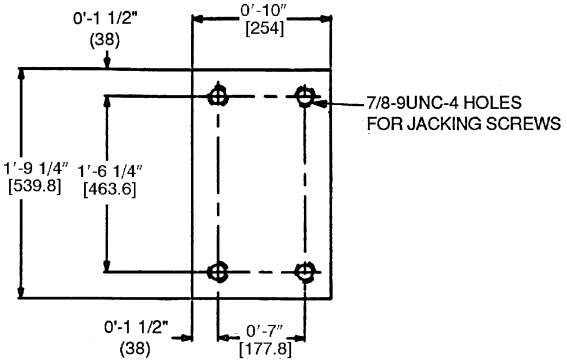
Obtain specific details on spring mounting and machine weight distribution from job data. Also, check job data for methods to support and isolate pipes that are attached to spring isolated machines.



VIEW Y-Y

NOTES:
1. Dimensions in ( ) are in millimeters.
2. Isolation package includes 4 shear flex pads.

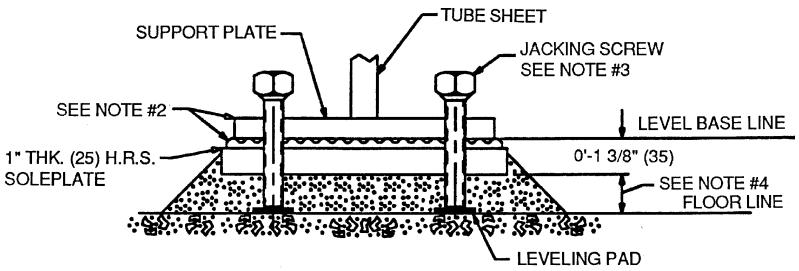
Fig. 11 — Standard Isolation



LEGEND

HRS — Hot Rolled Steel

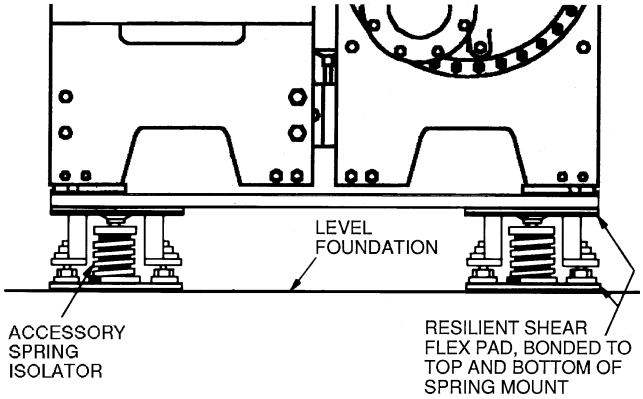
ACCESSORY SOLEPLATE DETAIL



VIEW X-X

NOTES:
1. Dimensions in ( ) are in millimeters.
2. Accessory (Carrier supplied, field installed) soleplate package includes 4 soleplates, 16 jacking screws and leveling pads.
3. Jacking screws to be removed after grout has set.
4. Thickness of grout will vary, depending on the amount necessary to level chiller. Use only pre-mixed non-shrinking grout, Ceilcote 648CP 0′-1″ (38.1) to 0′-2″ (57) thick.

Fig. 12 — Accessory Isolation



NOTE: The accessory spring isolators are supplied by Carrier for installation in the field.

Fig. 13 — 19XR Accessory Spring Isolation (Shown with Accessory Soleplates)

Connect Piping

INSTALL WATER PIPING TO HEAT EXCHANGERS — Refer to Table 9 for nozzle sizes. 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

Remove chilled and condenser water and water pressure sensors before welding connecting piping to water nozzles. Refer to Fig. 9. Replace sensors after welding is complete.

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 access will be blocked.
2. Provide openings in water piping for required pressure gages and thermometers. For thorough mixing and temperature stabilization, wells in the leaving water pipe should extend inside pipe at least 2 in. (50 mm).
3. Install air vents at all high points in piping to remove air and prevent water hammer.
4. Install pipe hangers where needed. Make sure no weight or stress is placed on waterbox nozzles or flanges.
5. Water flow direction must be as specified in Fig. 15-18.

   NOTE: Entering water is always the lower of the 2 nozzles. Leaving water is always the upper nozzle for cooler or condenser.
6. Install waterbox vent and drain piping in accordance with individual job data. All connections are $^3/_4$-in. FPT.
7. Install waterbox drain plugs in the unused waterbox drains and vent openings.
8. Install optional pumpout system or pumpout system and storage tank as shown in Fig. 19-22.

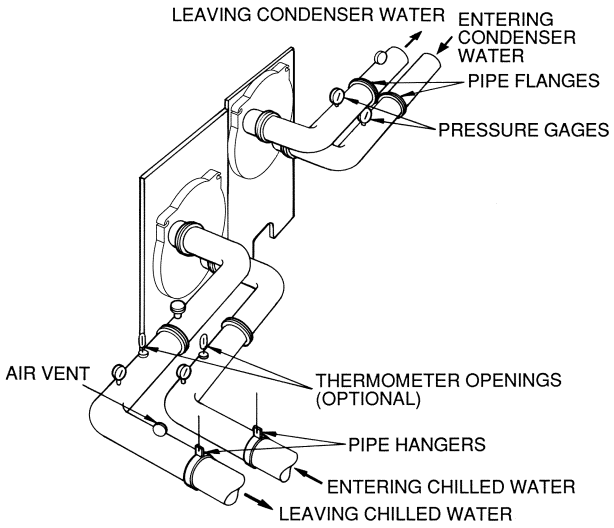
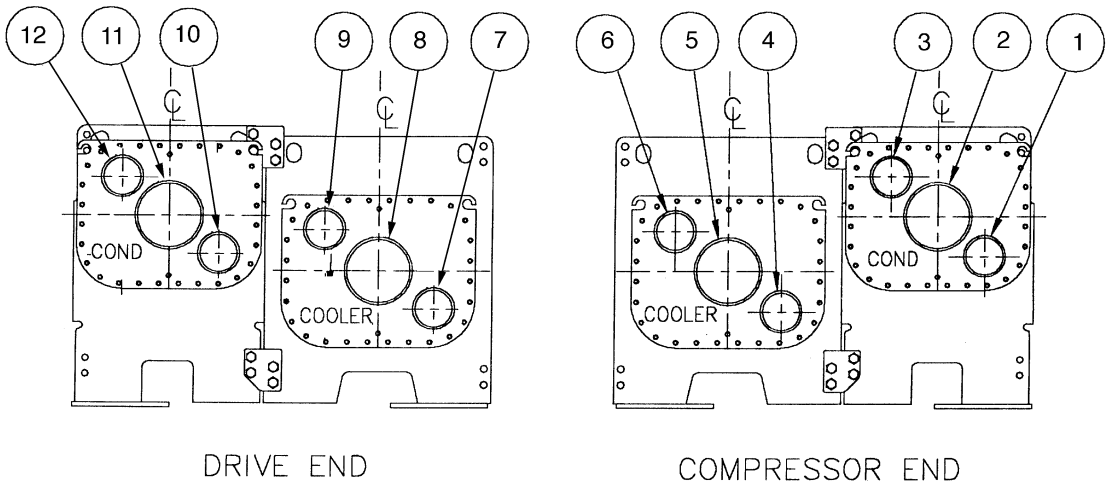
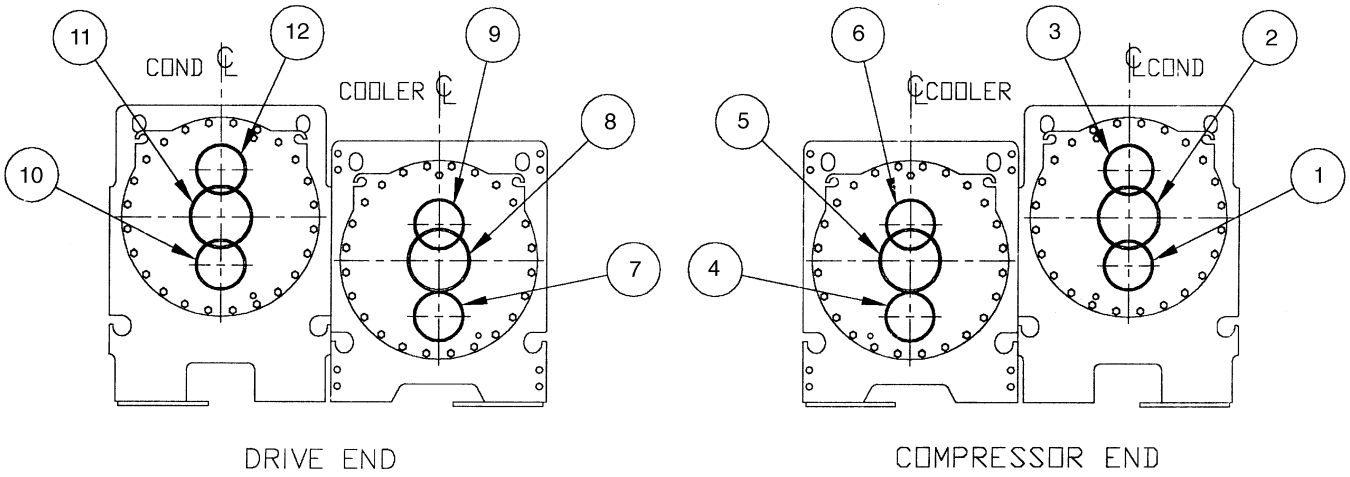


Fig. 14 — Typical Nozzle Piping

NOZZLE-IN HEAD WATERBOXES



FRAMES 1, 2, AND 3



FRAMES 4, 5, AND 6

NOZZLE ARRANGEMENT CODES FOR ALL 19XR NOZZLE-IN-HEAD WATERBOXES

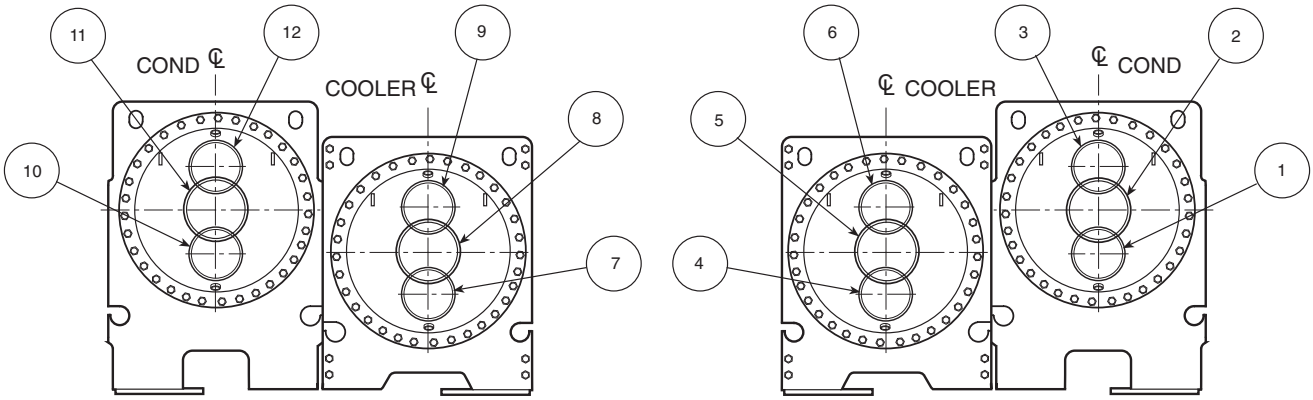
PASS	COOLER WATERBOXES		
	In	Out	Arrangement Code*
1	8	5	A
	5	8	B
2	7	9	C
	4	6	D
3	7	6	E
	4	9	F

PASS	CONDENSER WATERBOXES		
	In	Out	Arrangement Code*
1	11	2	P
	2	11	Q
2	10	12	R
	1	3	S
3	10	3	T
	1	12	U

*Refer to certified drawings.

Fig. 15 — Piping Flow Data (NIH, Frames 1 Through 6)

NOZZLE-IN HEAD WATERBOXES



FRAMES 7 AND 8

NOZZLE ARRANGEMENT CODES FOR ALL 19XR NOZZLE-IN-HEAD WATERBOXES

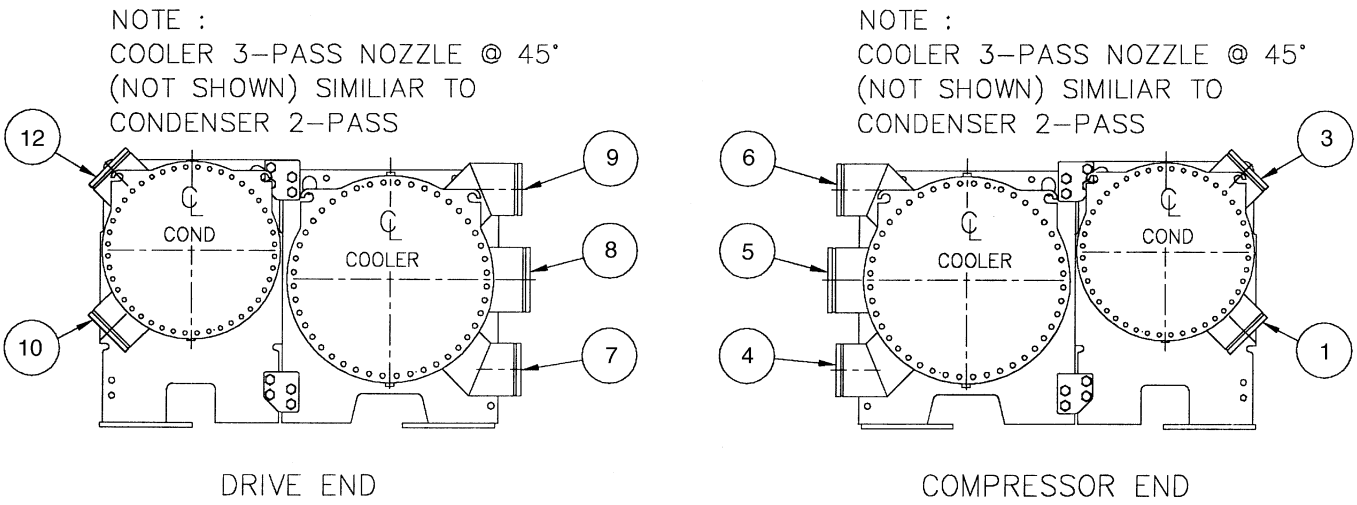
PASS	COOLER WATERBOXES		
	In	Out	Arrangement Code*
1	8	5	A
	5	8	B
2	7	9	C
	4	6	D
3	7	6	E
	4	9	F

PASS	CONDENSER WATERBOXES		
	In	Out	Arrangement Code*
1	11	2	P
	2	11	Q
2	10	12	R
	1	3	S
3	10	3	T
	1	12	U

*Refer to certified drawings.

Fig. 16 — Piping Flow Data (NIH, Frames 7 and 8)

MARINE WATERBOXES



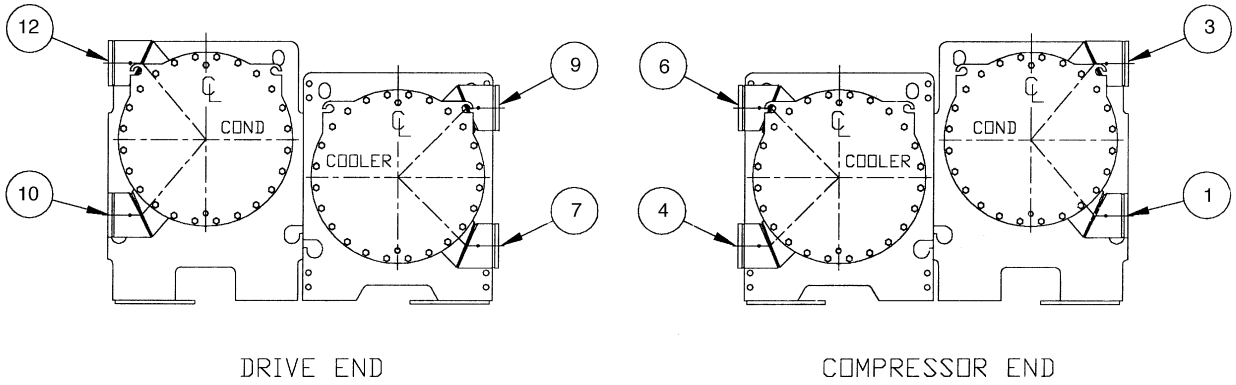
FRAMES 2 AND 3*

*There is no Frame 1 marine waterbox.

NOZZLE ARRANGEMENT CODES

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

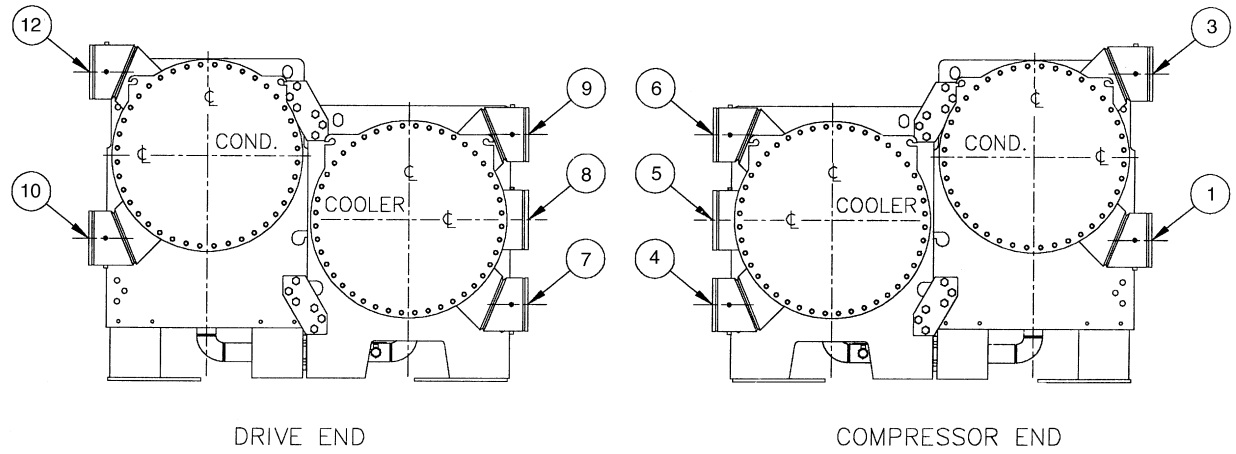
Fig. 17 — Piping Flow Data (MWB, Frames 2 and 3)



FRAMES 4, 5, AND 6

NOZZLE ARRANGEMENT CODES

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



FRAMES 7 AND 8

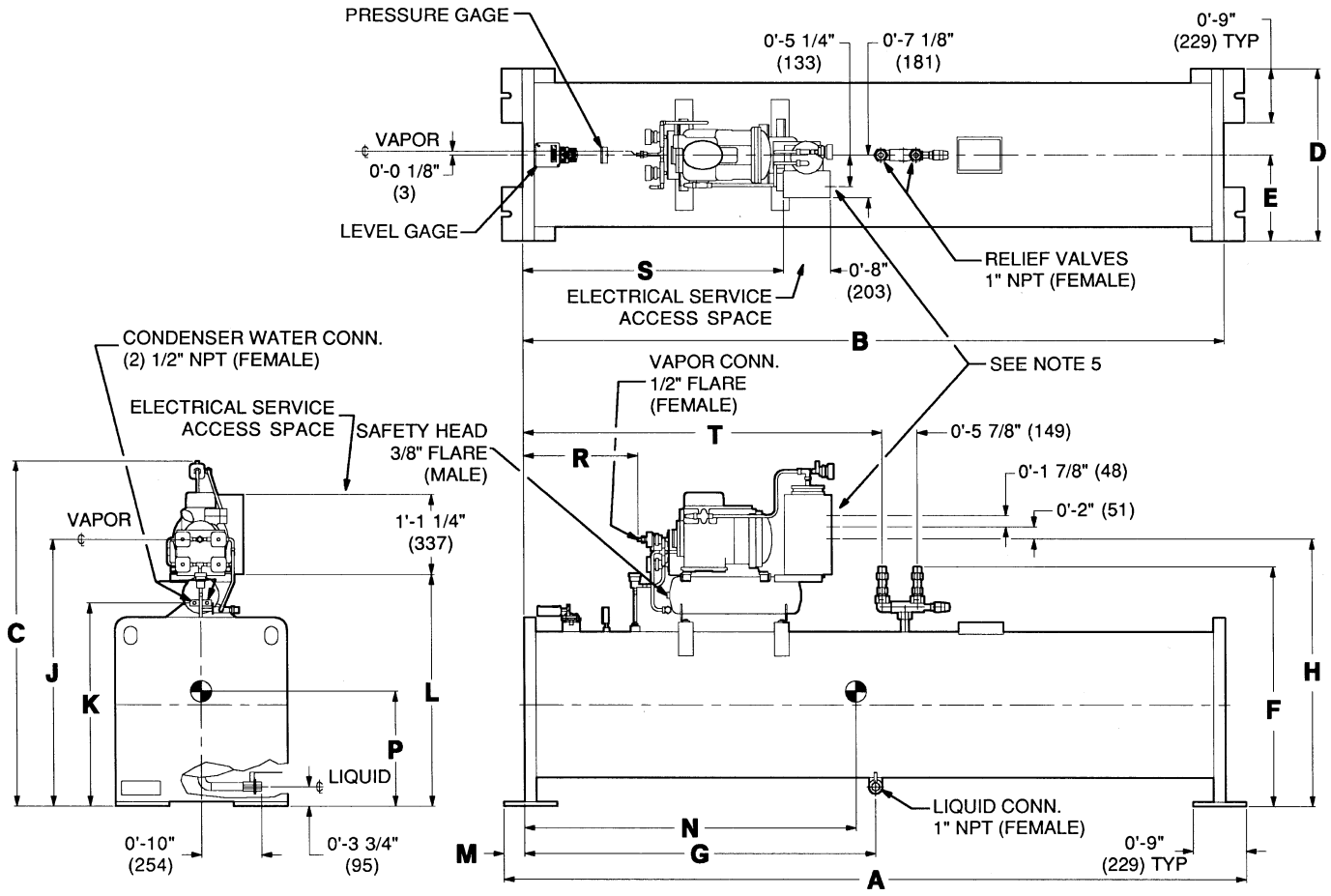
NOZZLE ARRANGEMENT CODES

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

Fig. 18 — Piping Flow Data (MWB, Frames 4 Through 8)

Table 9 — 19XR Waterbox Nozzle Sizes

FRAME SIZE	PRESSURE psig (kPa)	PASS	NOMINAL PIPE SIZE (in.)		ACTUAL PIPE ID (in.)	
			Cooler	Condenser	Cooler	Condenser
1	150/300 (1034/2068)	1	8	8	7.981	7.981
		2	6	6	6.065	6.065
		3	6	6	6.065	6.065
2	150/300 (1034/2068)	1	10	10	10.020	10.020
		2	8	8	7.981	7.981
		3	6	6	6.065	6.065
3	150/300 (1034/2068)	1	10	10	10.020	10.020
		2	8	8	7.981	7.981
		3	6	6	6.065	6.065
4	150/300 (1034/2068)	1	10	10	10.020	10.020
		2	8	8	7.981	7.981
		3	6	6	6.065	6.065
5	150/300 (1034/2068)	1	10	10	10.020	10.020
		2	8	10	7.981	10.020
		3	6	8	6.065	7.981
6	150/300 (1034/2068)	1	10	10	10.020	10.020
		2	10	10	10.020	10.020
		3	8	8	7.981	7.981
7	150 (1034)	1	14	14	13.250	13.250
		2	12	12	12.000	12.000
		3	10	12	10.020	12.000
	300 (2068)	1	14	14	12.500	12.500
		2	12	12	11.376	11.750
		3	10	12	9.750	11.750
8	150 (1034)	1	14	14	13.250	13.250
		2	14	14	13.250	13.250
		3	12	12	12.000	12.000
	300 (2068)	1	14	14	12.500	12.500
		2	14	14	12.500	12.500
		3	12	12	11.376	11.376



DIMENSIONS

ENGLISH (ft-in.)

TANK SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
0428	10- 5	9-10	4-9	2-4 3/4	1-2 3/8	3-1 3/16	4-11	3-8 1/8	3-8	2-9 7/16	3-2	0-3 1/2	4-8 3/4	1-7 7/8	1-7 5/16	3-7 3/4	5-0 1/4
0452	14-11 1/4	14- 4 1/2	5-0 7/8	2-8 1/2	1-4 1/4	3-4 7/16	7- 2 1/4	4-0	3-11 7/8	3-1 5/16	3-5 7/8	0-3 3/8	7-1 1/2	1-8 3/4	1-7 9/16	3-8	5-0 1/2

SI (mm)

TANK SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
0428	3175	2997	1448	730	365	945	1499	1121	1118	849	965	89	1442	505	491	1111	1530
0452	4553	4382	1546	826	413	1027	2191	1219	1216	948	1064	86	2172	528	497	1118	1537

1. ◒ Denotes center of gravity.
2. Dimensions in ( ) are in millimeters.
3. The weights and center of gravity values given are for an empty storage tank.
4. For additional information on the pumpout unit, see certified drawings.
5. The available conduit knockout sizes are:

QTY	TRADE SIZE	LOCATION
1	1/2″	top
1	3/4″	bottom
1	1″	middle
1	1 1/4″	middle

Fig. 19 — Optional Pumpout Unit and Storage Tank

RATED DRY WEIGHT AND REFRIGERANT CAPACITY

ENGLISH (lb)

TANK SIZE	TANK OD (in.)	DRY WEIGHT* (lb)	MAXIMUM REFRIGERANT CAPACITY (lb)	
			ANSI/ASHRAE 15	UL 1963
0428	24.00	2380	1860	1716
0452	27.25	3460	3563	3286

SI (kg)

TANK SIZE	TANK OD (mm)	DRY WEIGHT* (kg)	MAXIMUM REFRIGERANT CAPACITY (kg)	
			ANSI/ASHRAE 15	UL 1963
0428	610	1080	844	778
0452	592	1569	1616	1491

LEGEND

ANSI — American National Standard Institute
ASHRAE — American Society of Heating, Refrigeration, and Air Conditioning Engineers
OD — Outside Diameter
UL — Underwriters' Laboratories

*The above dry weight includes the pumpout condensing unit weight of 210 lbs (95 kg).

Fig. 19 — Optional Pumpout Unit and Storage Tank (cont)

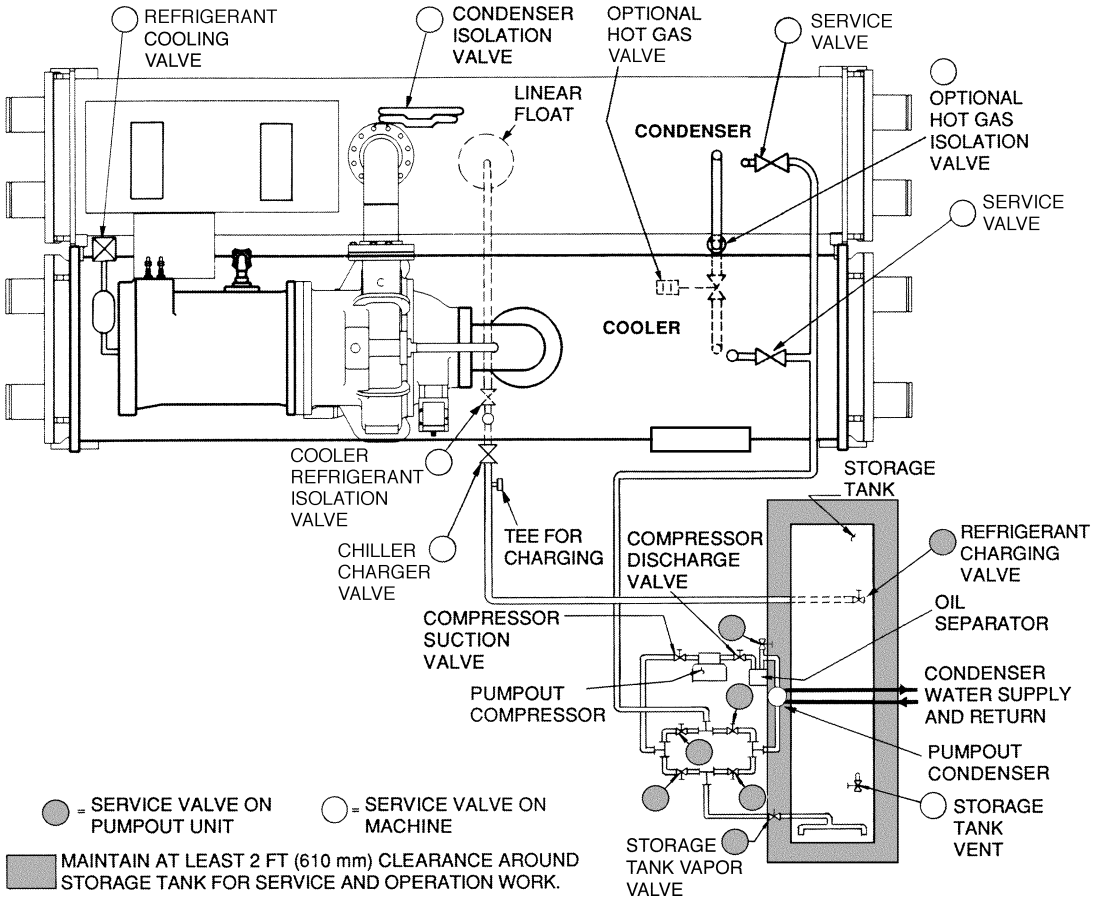


Fig. 20 — Optional Pumpout System Piping Schematic with Storage Tank

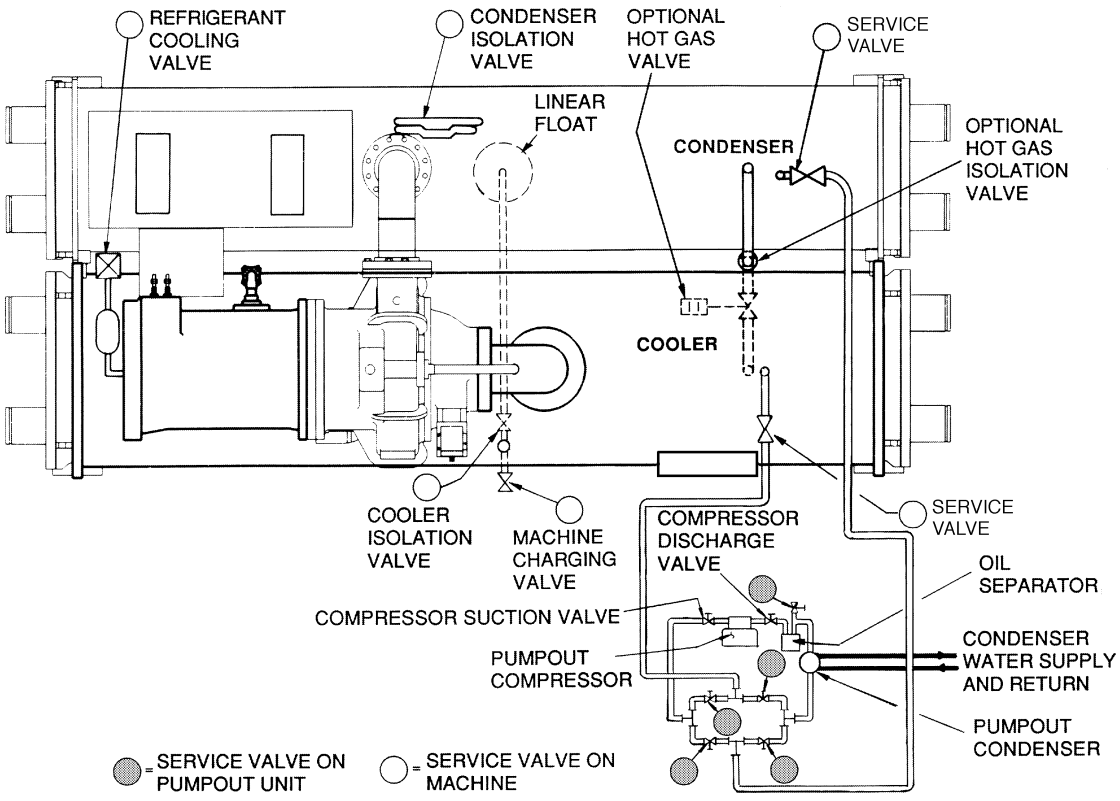


Fig. 21 — Optional Pumpout System Piping Schematic without Storage Tank

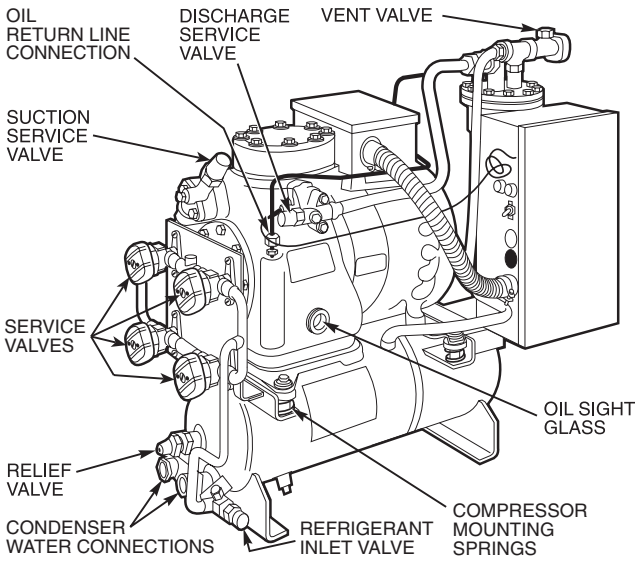


Fig. 22 — Pumpout Unit

INSTALL VENT PIPING TO RELIEF VALVES — The 19XR, 19XRV chiller is factory equipped with relief valves on the cooler and condenser shells. Refer to Fig. 23 and Tables 10 and 11 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.

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

⚠ CAUTION

Do not run 120-v wiring into the control cabinet. The control cabinet should only be used for additional extra-low voltage wiring (50 v maximum).

Wiring diagrams in this publication (Fig. 24-34) are for reference only and are not intended for use during actual installation; follow job specific wiring diagrams.

⚠ WARNING

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

CONNECT CONTROL INPUTS — Wiring may be specified for a spare safety switch, and a remote start/stop contact can be wired to the starter terminal strip. Additional spare sensors and Carrier Comfort Network modules may be specified as well. These are wired to the machine control panel as indicated in Fig. 24.

Table 10 — Relief Valve Locations

LOCATION	FRAME SIZE	RELIEF VALVE OUTLET SIZE	QUANTITY	
			Frame 5 Compressor With Frame 7 or 8 Heat Exchanger	All Others
Cooler	1-2	1-in. NPT FEMALE CONNECTOR	4	2
	3-8	1 1/4-in. NPT FEMALE CONNECTOR		
Condenser	1-2	1-in. NPT FEMALE CONNECTOR	4	2
	3-8	1 1/4-in. NPT FEMALE CONNECTOR		
Optional Storage Tank	N/A	1-in. NPT FEMALE CONNECTOR	2	2

NOTE: All valves relieve at 185 psi (1275 kPa).

Table 11 — Cooler/Relief Valve Arrangement

HEAT EXCHANGER FRAME SIZE	COMPRESSOR FRAME SIZE	DISCHARGE COOLER INLET DESCRIPTION	SEE FIG NO.
1, 2	2	With optional isolation	23B
		Without optional isolation	23C
3	2	Without optional isolation	23C
		With optional isolation	23B
3, 4, 5	3	Without optional isolation	23C
		With optional isolation	23B
5, 6, 7	4	With optional isolation	23B
		Without optional isolation	23C
7, 8	5	With optional isolation	23A
		Without optional isolation	23D

WITH OPTIONAL ISOLATION OF DISCHARGE AND COOLER (Fig. A, B)

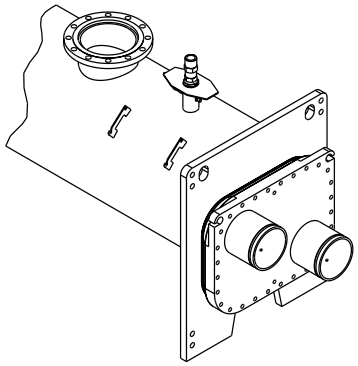


FIG. A

FRAME 1-6

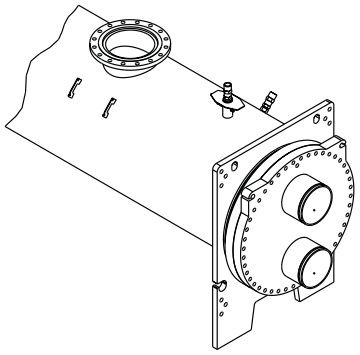


FIG. B

FRAMES 7, 8

WITHOUT ISOLATION OPTION OF DISCHARGE AND COOLER (Fig. C, D)

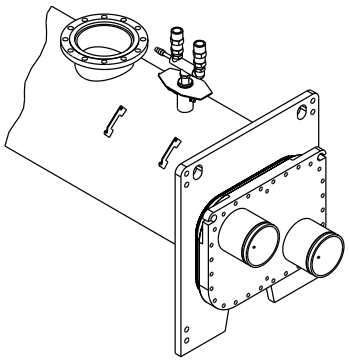


FIG. C

FRAME 1-6

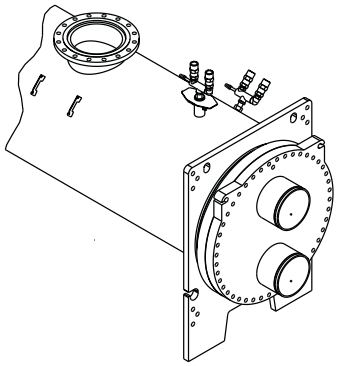


FIG. D

FRAME 7, 8

CONDENSER RELIEF VALVE ARRANGEMENT — WITH OR WITHOUT OPTIONAL ISOLATION (Fig. E, F)

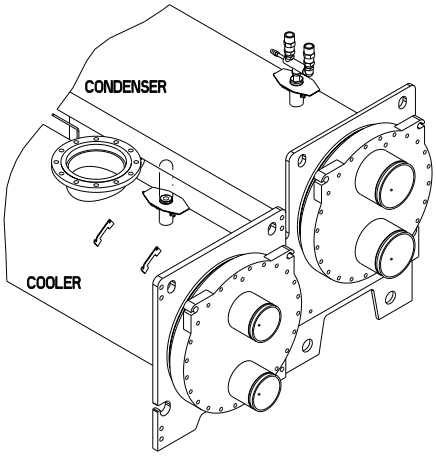


FIG. E

FRAME 1-6

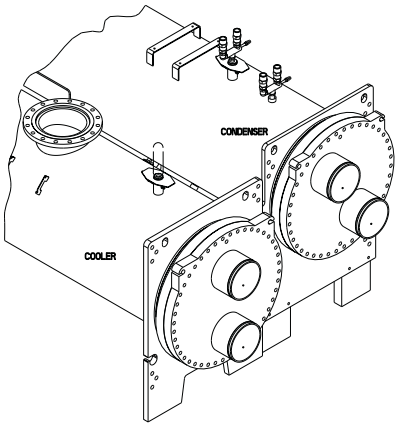
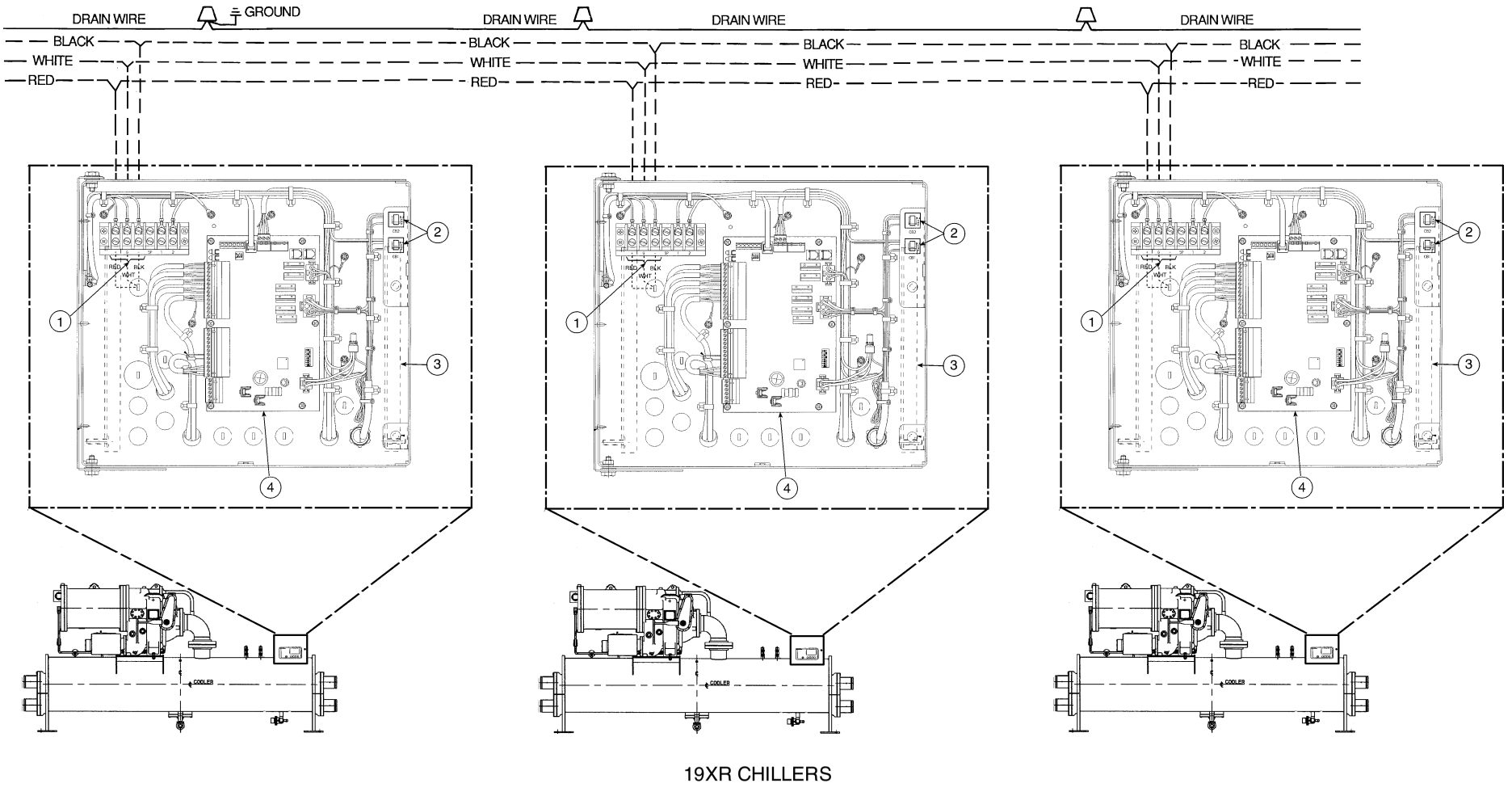


FIG. F

FRAME 7, 8

Fig. 23 — Relief Valve Arrangements



19XR CHILLERS

LEGEND

1 — Carrier Comfort Network (CCN) Interface
2 — Circuit Breakers
3 — Control Panel Internal View
4 — Chiller Control Module (CCM)
——— Factory Wiring
– – – – Field Wiring

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

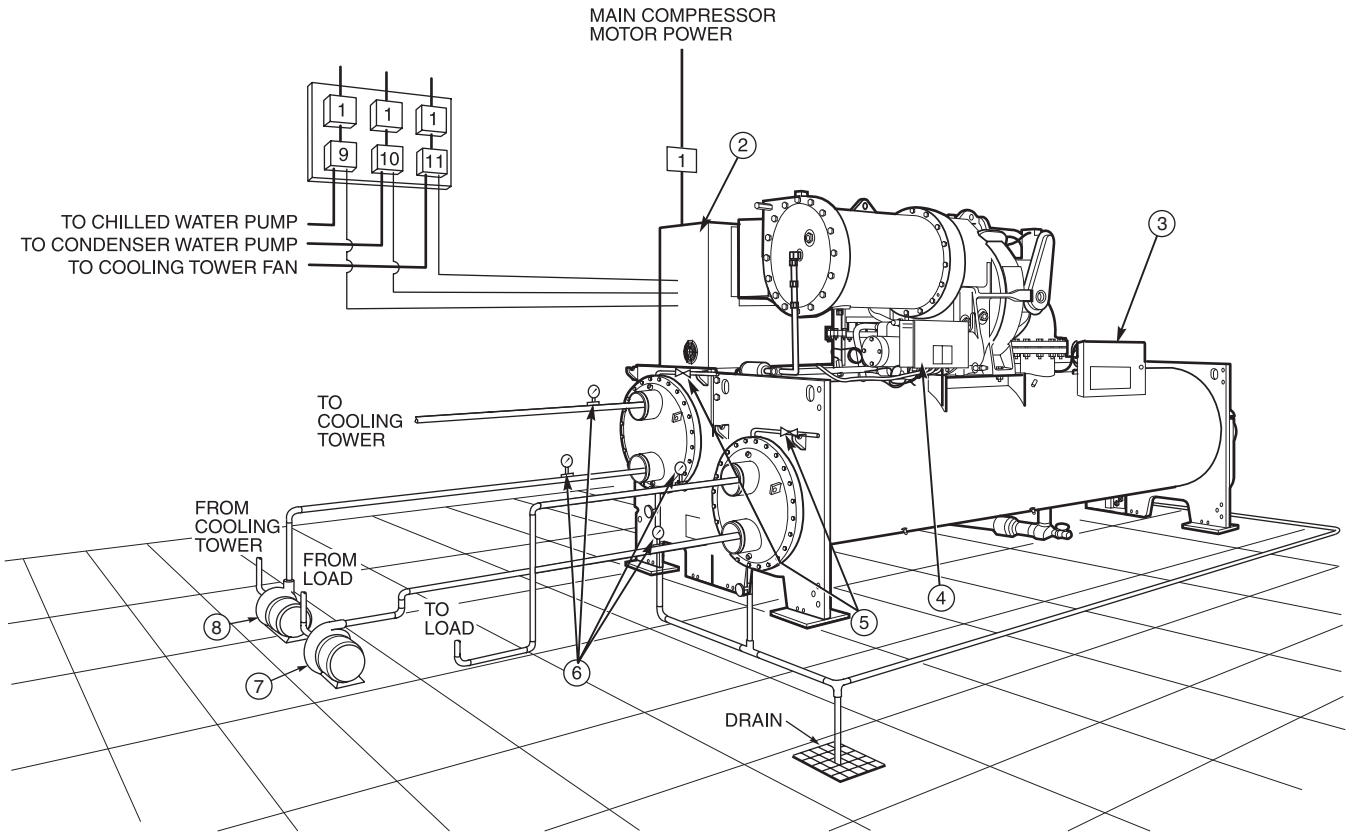
Fig. 24 — CCN Communication Wiring For Multiple Chillers (Typical)

CONNECT CONTROL OUTPUTS — Connect auxiliary equipment, chilled and condenser water pumps, and spare alarms as required and indicated on job wiring drawings.

CONNECT STARTER — The 19XR is available with a unit-mounted, factory-installed starter, a factory-installed VFD starter, or a free-standing, field-installed starter (Fig. 25-31).

Unit Mounted, Factory-Installed Starter or VFD — Attach power leads by connecting them from inside the starter cabinet to the line side circuit breaker terminals. See Fig. 25 and 27. Machines with electro-mechanical starters (wye-delta) will have a top hat shipped with the machine if the RLA (rated load amps) is greater than 935 amps. If the machine is equipped with a solid-state starter, a top hat is provided if the RLA exceeds 740 amps. The top hat is shipped in the knocked-down position and must be assembled and installed on top of the starter cabinet, over the line side circuit breaker. During assembly, remove the access plate and use it as the cover piece of the top hat. The top hat provides additional wire bending space to attach line side power leads to the circuit breaker within the starter.

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.



Piping
Control Wiring
Power Wiring

LEGEND

1 — Disconnect (Fused on VFD only) NOT by Carrier
2 — Optional Line Reactor (VFD only)
3 — Unit Mounted Starter
4 — Control Panel
5 — Power Panel
6 — Vents
7 — Pressure Gages
8 — Chilled Water Pump
9 — Condenser Water Pump
10 — Chilled Water Pump Starter
11 — Condensing Water Pump Starter
12 — Cooling Tower Fan Starter

IMPORTANT: 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.

NOTES:
1. All wiring must comply with applicable codes.
2. Refer to Carrier System Design Manual for details regarding piping techniques.
3. Wiring not shown for optional devices such as:
   - remote start-stop
   - remote alarm
   - optional safety device
   - 4 to 20 mA (1 to 5 VDC) resets
   - optional remote sensors
   - kW output
   - head pressure reference

Fig. 25 — 19XR with Optional Unit-Mounted Starter

Free-Standing, Field-Installed Starter — Assemble and install compressor terminal box in desired orientation, and cut necessary conduit openings in conduit support plates. See Fig. 26, 28 and 30. Attach power leads to compressor terminals in accordance with job wiring drawings, observing caution label in terminal box. Use only copper conductors. The motor must be grounded in accordance with NEC (National Electrical Code), applicable local codes, and job wiring diagrams. Installer is responsible for any damage caused by improper wiring between starter and compressor motor.

IMPORTANT: Do not insulate terminals until wiring arrangement has been checked and approved by Carrier start-up personnel. Also, make sure correct phasing is followed for proper motor rotation.

Insulate Motor Terminals and Lead Wire Ends — Insulate compressor motor terminals, lead wire ends, and electrical wires to prevent moisture condensation and electrical arcing. For low-voltage units (up to 600 v), obtain insulation material from machine shipping package consisting of 3 rolls of insulation putty and one roll of vinyl tape.

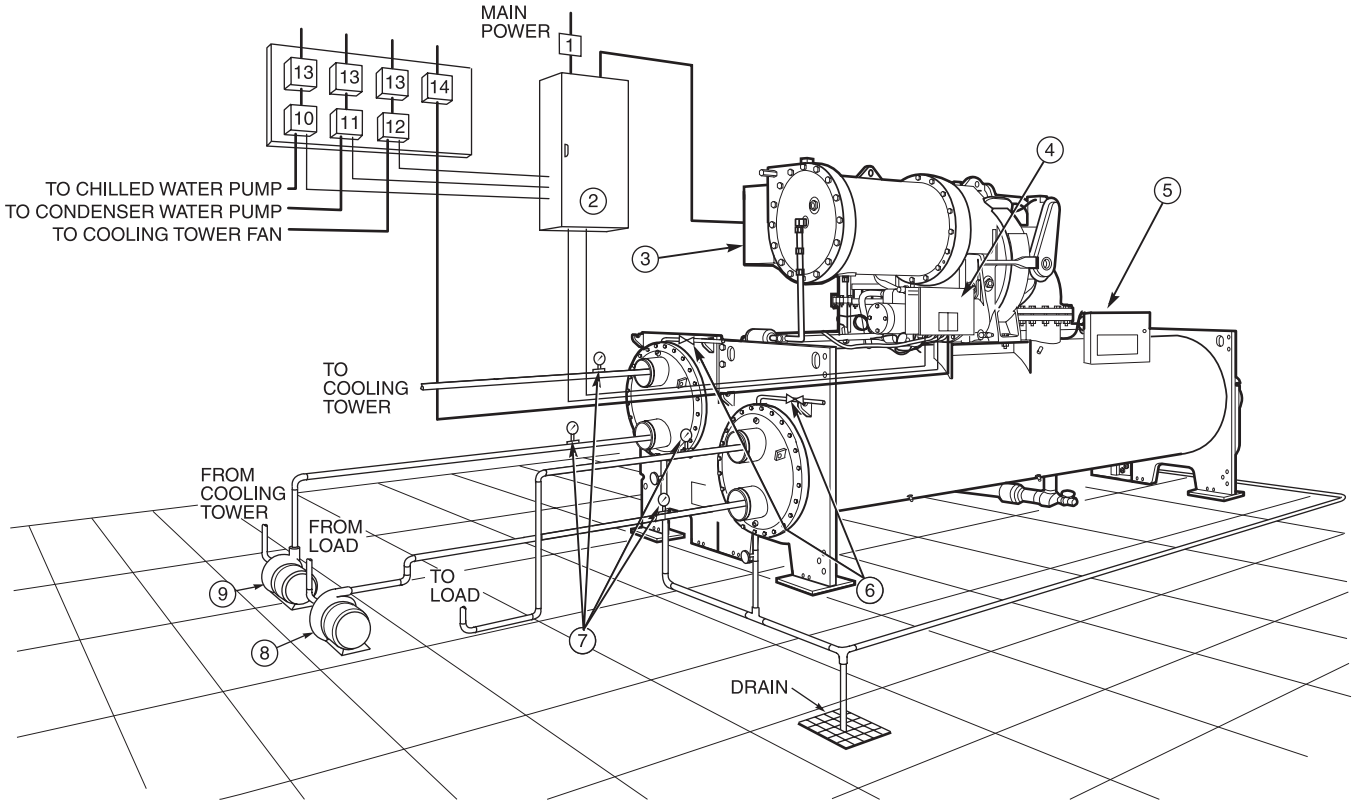
1. Insulate each terminal by wrapping with one layer of insulation putty.
2. Overwrap putty with 4 layers of vinyl tape.

High Voltage Units — High-voltage units require special terminal preparation. Follow local electrical codes for high-voltage installation. Vinyl tape is not acceptable; a high voltage terminal method must be used.

Connect Power Wires to Oil Pump Starter — See Fig. 33. Connect power wires to oil pump starter mounted in machine power panel. Use separate fused disconnect or circuit breaker as shown on job wiring diagrams and Fig. 33. Check that power supply voltage agrees with oil pump voltage. Follow correct phasing for proper motor rotation.

⚠ CAUTION

Do not punch holes or drill into the top surface of the power panel. Knockouts are provided in the bottom of the power panel for wiring connections.



Piping
Control Wiring
Power Wiring

LEGEND

1 — Disconnect
2 — Free-Standing Compressor Motor Starter
3 — Compressor Motor Terminal Box
4 — Chiller Power Panel
5 — Control Panel
6 — Vents
7 — Pressure Gages
8 — Chilled Water Pump
9 — Condenser Water Pump
10 — Chilled Water Pump Starter
11 — Condensing Water Pump Starter
12 — Cooling Tower Fan Starter
13 — Disconnect
14 — Oil Pump Disconnect (see Note 4)

IMPORTANT: 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.

NOTES:
1. All wiring must comply with applicable codes.
2. Refer to Carrier System Design Manual for details regarding piping techniques.
3. Wiring not shown for optional devices such as:
   - remote start-stop
   - remote alarm
   - optional safety device
   - 4 to 20 mA (1-5 VDC) resets
   - optional remote sensors
   - kW output
   - head pressure reference
4. Oil pump disconnect may be located within the enclosure of Item 2 — Free-Standing Compressor Motor Starter.

Fig. 26 — 19XR with Free-Standing Starter

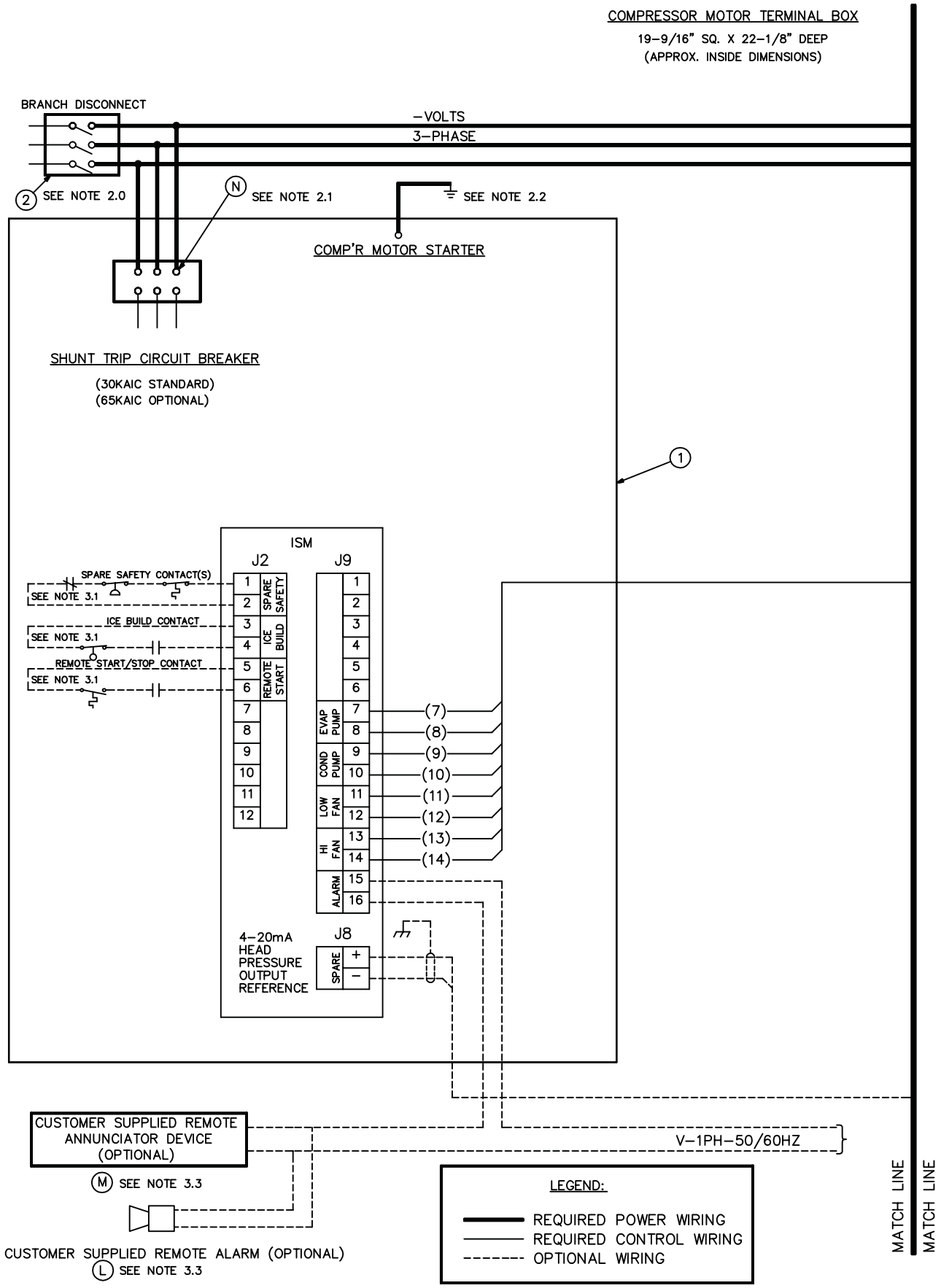


Fig. 27 — 19XR Typical Field Wiring with Optional Unit-Mounted Starter

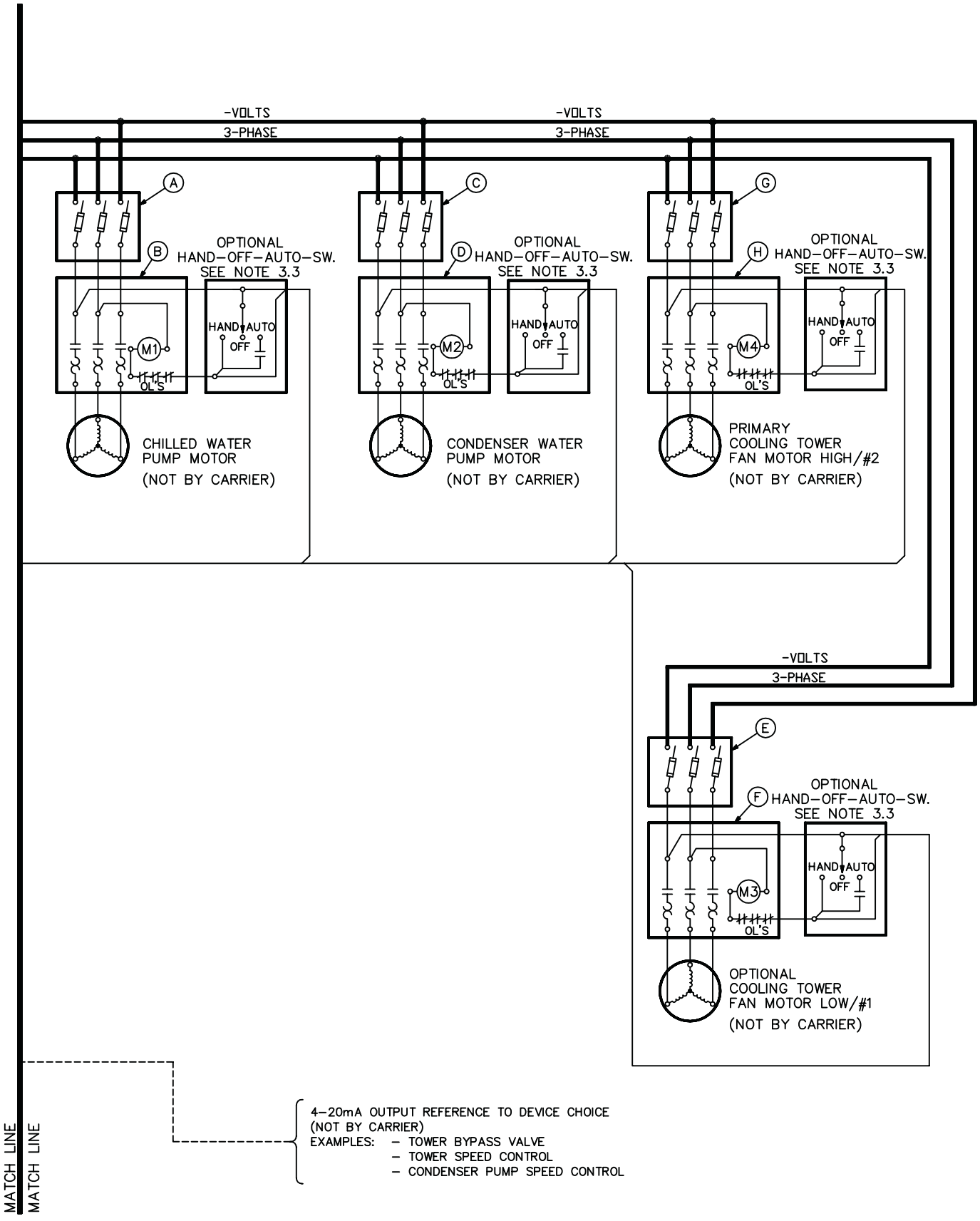


Fig. 27 — 19XR Typical Field Wiring with Optional Unit-Mounted Starter (cont)

NOTES FOR FIG. 27

REFERENCE NUMBER	EXPLANATION
1	3 Phase Under/Over Voltage
	Phase Loss/Imbalance/Reversal
	Motor Overload Protection
	Frequency Shift
	kW Transducer/kW Hours/Demand kW
	Single Cycle Dropout
	Motor/Starter Overcurrent
	Control Power Transformer (3KVA) (Integral)
	Controls and Oil Heater Circuit Breaker (integral)
	Oil Pump Circuit Breaker (Integral)
	3 Phase Analog Volts/Amps Meter Package
	Power Factor Correction Package
	Lightning/Surge Arrestor Package
	Phase to Phase to Ground Fault Detection
	Phase to Ground Fault Detection
2	Compressor Motor Starter Branch Disconnect
A	Chilled Water Pump Starter Disconnect
B	Chilled Water Pump Motor Starter
C	Condenser Water Pump Starter Disconnect
D	Condenser Water Pump Motor Starter
E	Cooling Tower Fan Motor Starter Disconnect (Low/#1)
F	Cooling Tower Fan Motor Starter (Low/#1)
G	Cooling Tower Fan Motor Starter Disconnect (High/#2)
H	Cooling Tower Fan Motor Motor Starter (High #2)
L	Remote Alarm See Note 3.3
M	Remote Annunciation See Note 3.3
N	Lug Adapters See Note 2.1

See Notes on page 45.

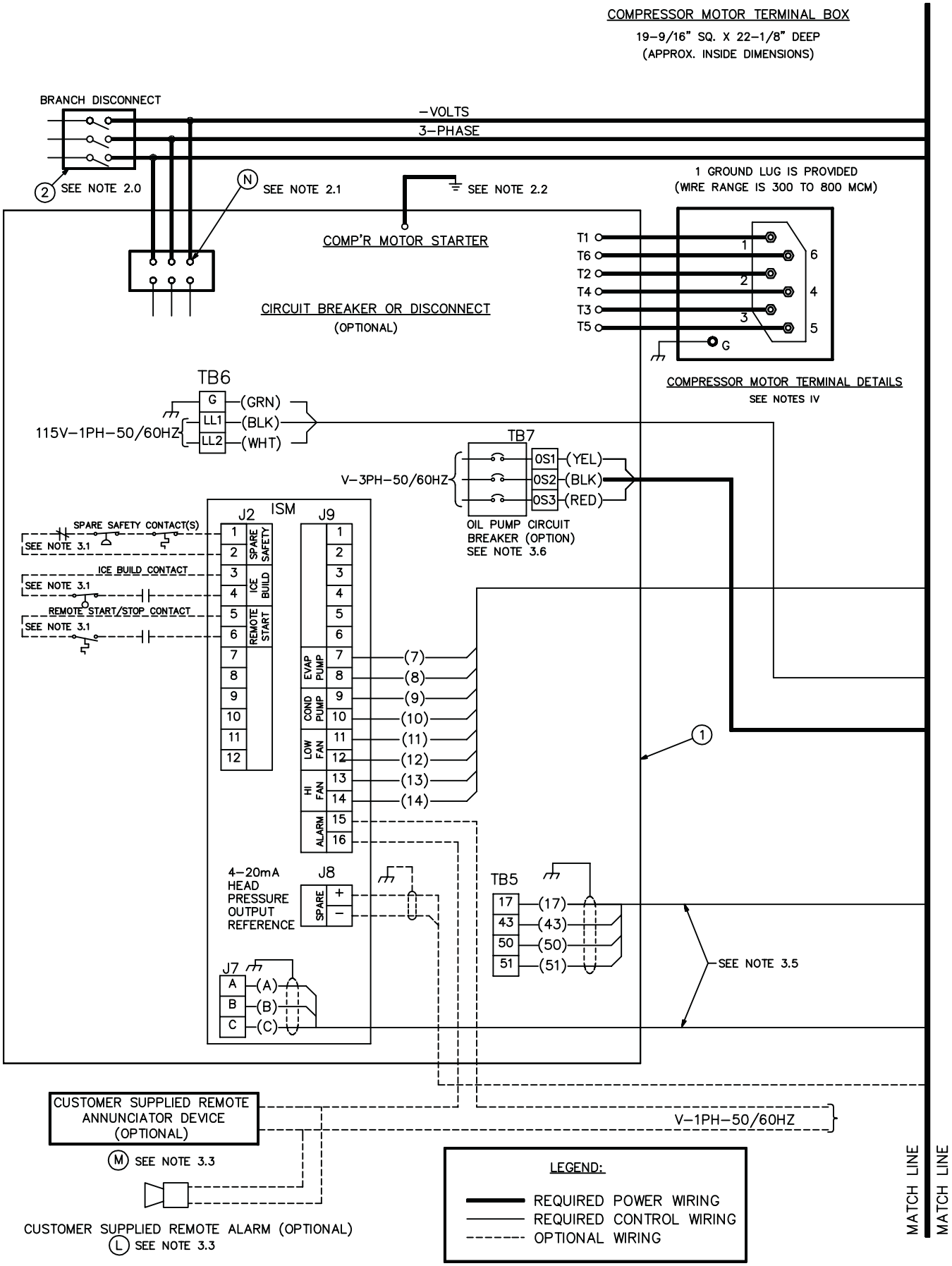


Fig. 28 — 19XR Typical Field Wiring with Free-Standing Starter (Low Voltage)

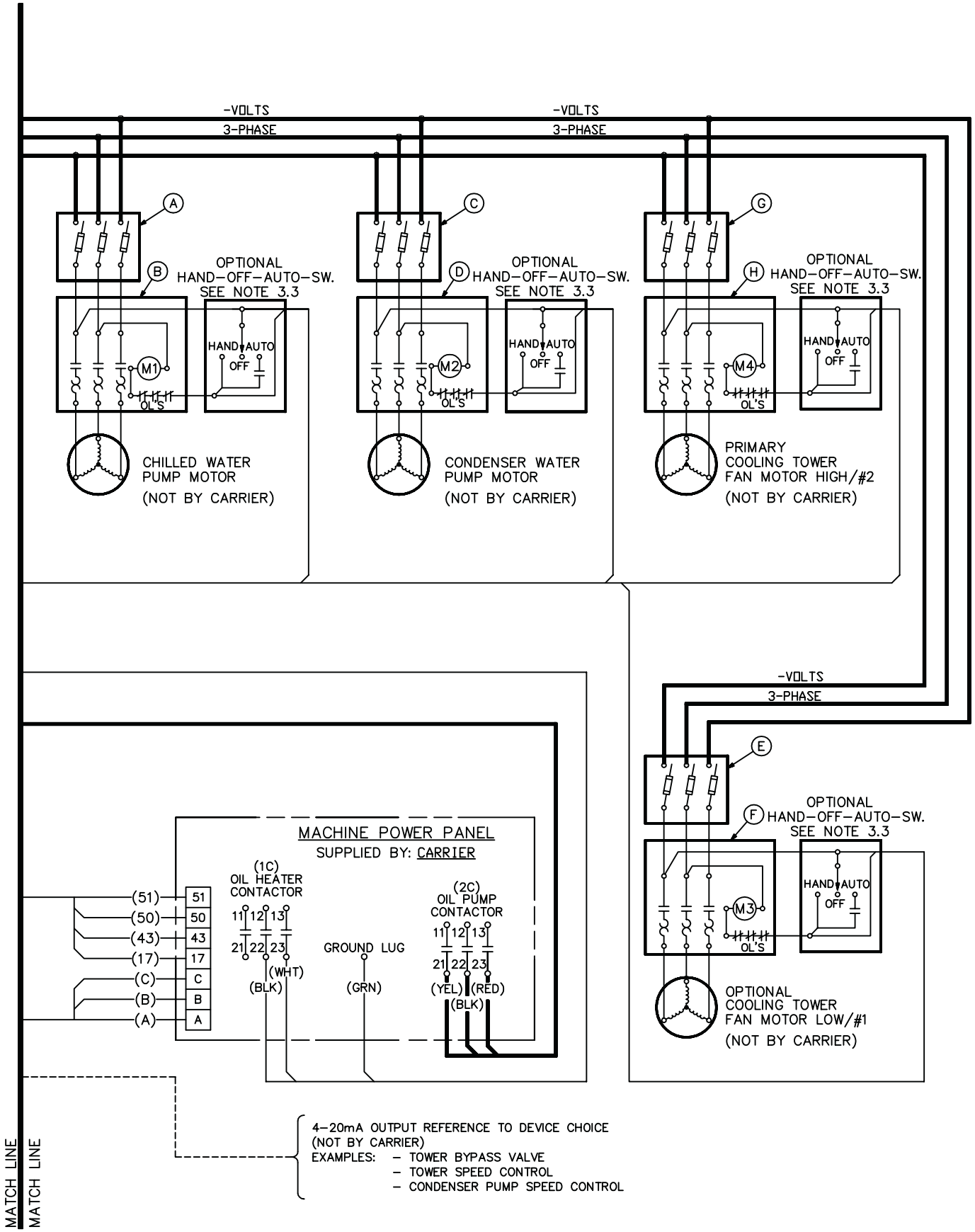
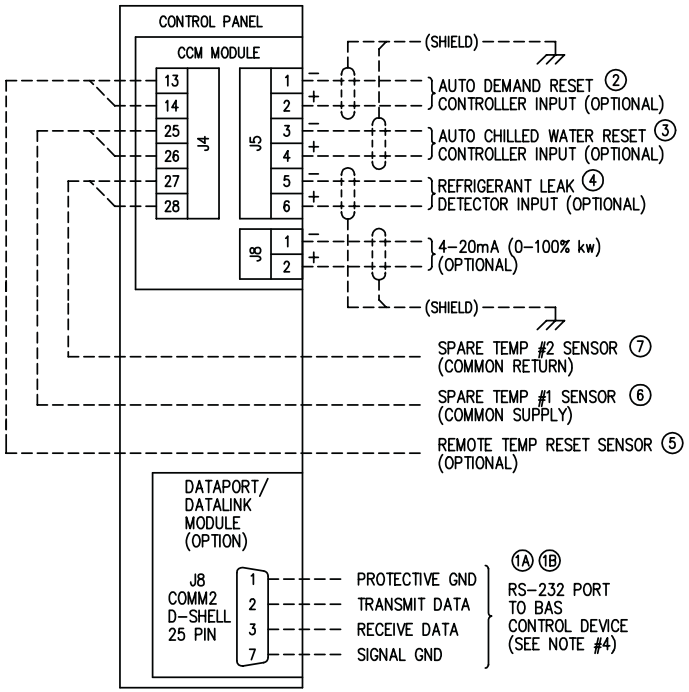


Fig. 28 — 19XR Typical Field Wiring with Free-Standing Starter (Low Voltage) (cont)

NOTES FOR FIG. 28

REFERENCE NUMBER	EXPLANATION
1	3 Phase Under/Over Voltage
	Phase Loss/Imbalance/Reversal
	Motor Overload Protection
	Frequency Shift
	kW Transducer/kW Hours/Demand kW
	Single Cycle Dropout
	Motor/Starter Overcurrent
	Control Power Transformer (3KVA) (Integral)
	Controls and Oil Heater Circuit Breaker (integral)
	Oil Pump Circuit Breaker
	3 Phase Analog Volts/Amps Meter Package
	Power Factor Correction Package
	Lightning/Surge Arrestor Package
	Auxiliary Run Status Contacts N.O./N.C.
	Run Indicating Light
	Emergency Stop Switch
	Phase to Phase to Ground Fault Detection
	Phase to Ground Fault Detection
2	Compressor Motor Starter Branch Disconnect
A	Chilled Water Pump Starter Disconnect
B	Chilled Water Pump Motor Starter
C	Condenser Water Pump Starter Disconnect
D	Condenser Water Pump Motor Starter
E	Cooling Tower Fan Motor Starter Disconnect (Low/#1)
F	Cooling Tower Fan Motor Starter (Low/#1)
G	Cooling Tower Fan Motor Starter Disconnect (High/#2)
H	Cooling Tower Fan Motor Motor Starter (High #2)
L	Remote Alarm See Note 3.3
M	Remote Annunciation See Note 3.3
N	Lug Adapters See Note 2.1

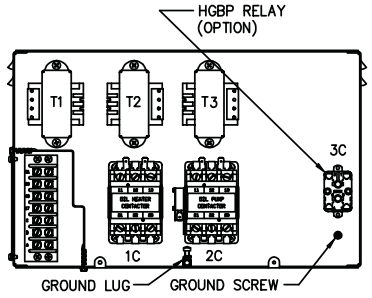
See Notes on page 45.



CONTROL PANEL OPTIONAL WIRING

NOTES:

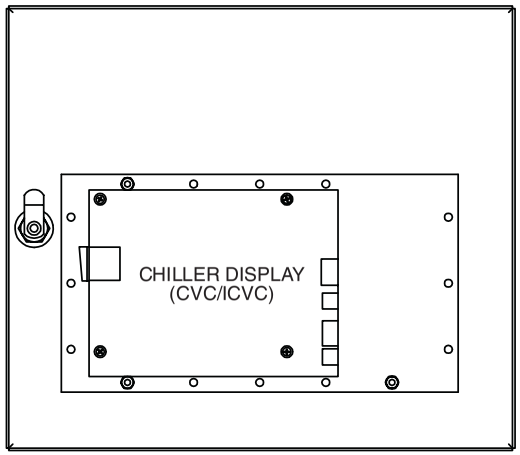
1. THIS FEATURE IS STANDARD IN THE PIC II CONTROLS, BUT REQUIRES A 4–20mA OR 1–5Vdc CONTROLLER, NOT BY CARRIER.
2. THIS FEATURE IS STANDARD IN THE PIC II CONTROLS, BUT REQUIRES AN EXTERNAL 4–20mA CONTROLLER, NOT BY CARRIER.
3. THIS FEATURE IS STANDARD IN THE PIC II CONTROLS, BUT REQUIRES A SENSOR PACKAGE OPTION, BY CARRIER.
4. PINS SHOWN FOR REFERENCE ONLY. ACTUAL PIN LAYOUT NOT SHOWN.



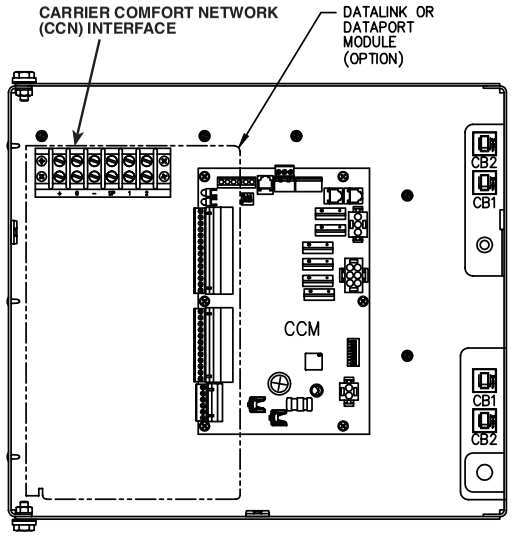
POWER PANEL COMPONENT LAYOUT

(SHOWN WITH COVER REMOVED)

OPTION LISTING			
ITEM	DESCRIPTION	BY CARRIER	
		YES	NO
1A	DATAPORT MODULE		
1B	DATALINK MODULE		
2	AUTO DEMAND RESET OPTION (4–20mA CONTROLLER) SEE NOTE 1		
3	AUTO CHILLED WATER RESET OPTION (4–20mA CONTROLLER) SEE NOTE 1		
4	REFRIGERANT LEAK SENSOR SEE NOTE 2		
5	REMOTE TEMP RESET SENSOR SEE NOTE 3		
6	SPARE TEMP 1 (COMMON SUPPLY SENSOR) SEE NOTE 3		
7	SPARE TEMP 2 (COMMON RETURN SENSOR) SEE NOTE 3		



INSIDE PANEL COVER



CONTROL PANEL COMPONENT LAYOUT

Fig. 29 — PIC II Control Panel Optional Wiring and Power Panel Component Layout

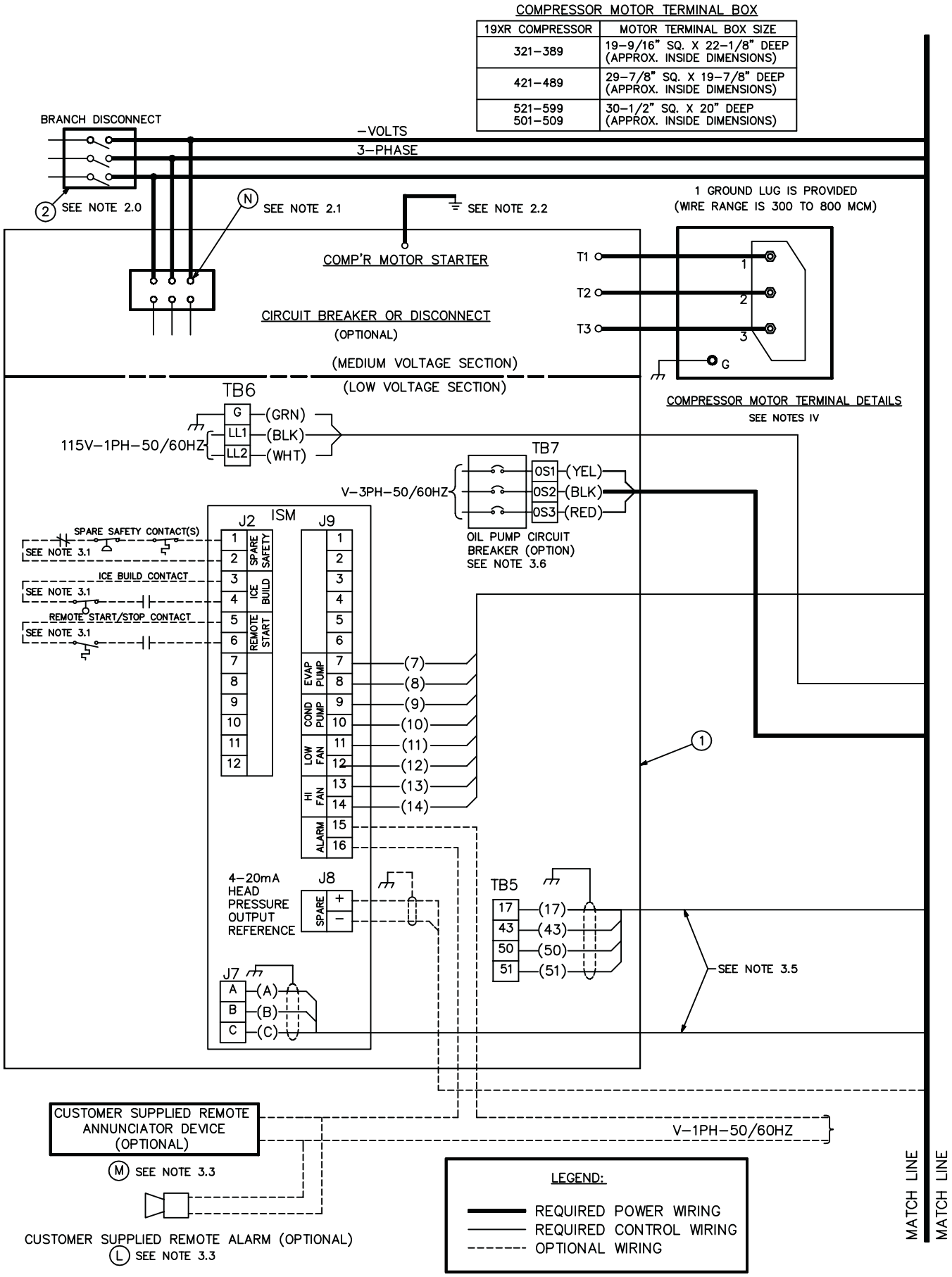


Fig. 30 — 19XR Typical Field Wiring with Free-Standing Starter (Medium Voltage)

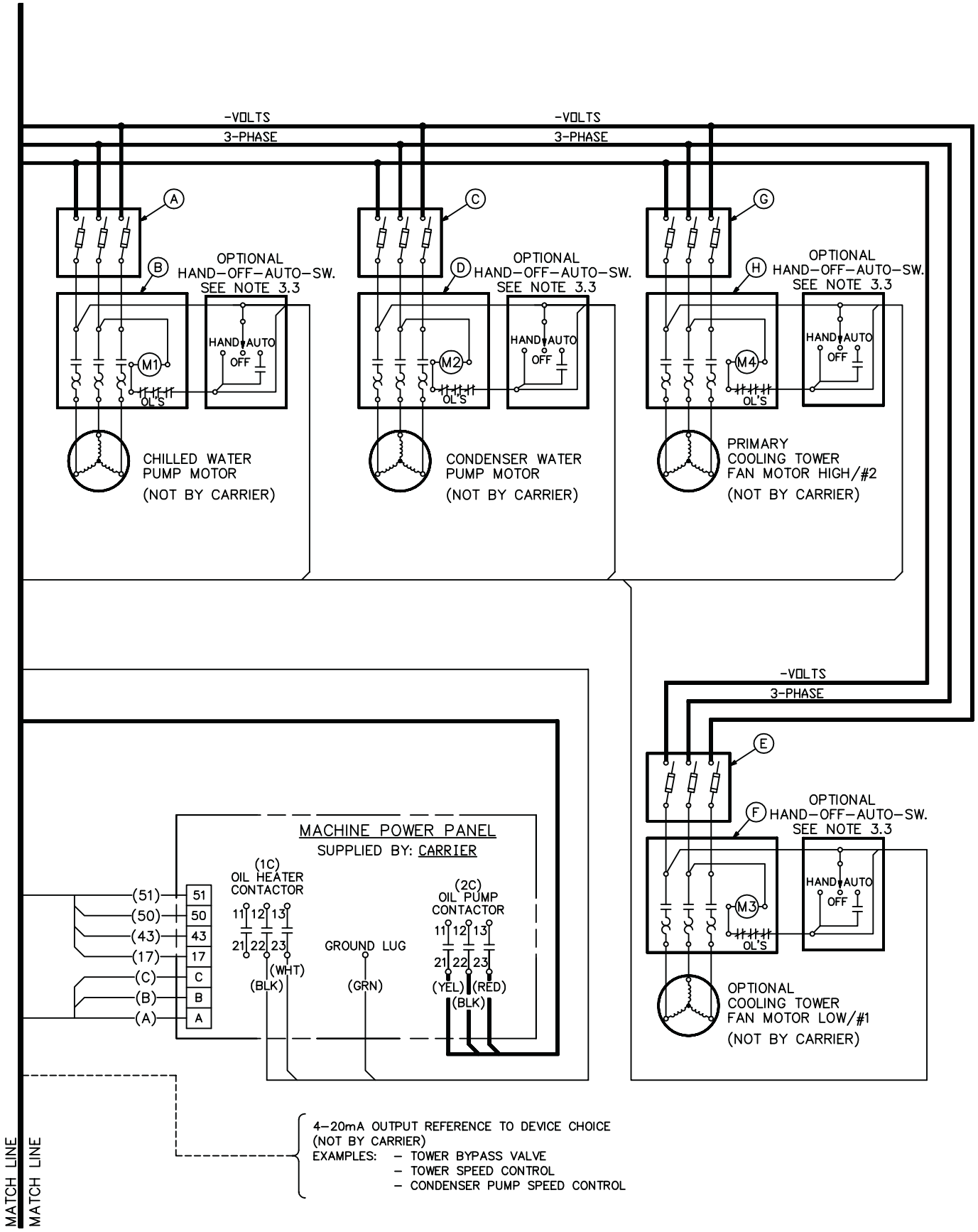


Fig. 30 — 19XR Typical Field Wiring with Free-Standing Starter (Medium Voltage) (cont)

NOTES FOR FIG. 30

REFERENCE NUMBER	EXPLANATION
1	3 Phase Under/Over Voltage
	Phase Loss/Imbalance/Reversal
	Motor Overload Protection
	Frequency Shift
	kW Transducer/kW Hours/Demand kW
	Single Cycle Dropout
	Motor/Starter Overcurrent
	Control Power Transformer (3KVA) (Integral)
	Controls and Oil Heater Circuit Breaker (integral)
	Oil Pump Circuit Breaker
	3 Phase Analog Volts/Amps Meter Package
	Power Factor Correction Package
	Lightning/Surge Arrestor Package
	Auxiliary Run Status Contacts N.O./N.C.
	Run Indicating Light
	Emergency Stop Switch
	Phase to Phase to Ground Fault Detection
	Phase to Ground Fault Detection
2	Compressor Motor Starter Branch Disconnect
A	Chilled Water Pump Starter Disconnect
B	Chilled Water Pump Motor Starter
C	Condenser Water Pump Starter Disconnect
D	Condenser Water Pump Motor Starter
E	Cooling Tower Fan Motor Starter Disconnect (Low/#1)
F	Cooling Tower Fan Motor Starter (Low/#1)
G	Cooling Tower Fan Motor Starter Disconnect (High/#2)
H	Cooling Tower Fan Motor Motor Starter (High #2)
L	Remote Alarm See Note 3.3
M	Remote Annunciation See Note 3.3
N	Lug Adapters See Note 2.1

See Notes on page 45.

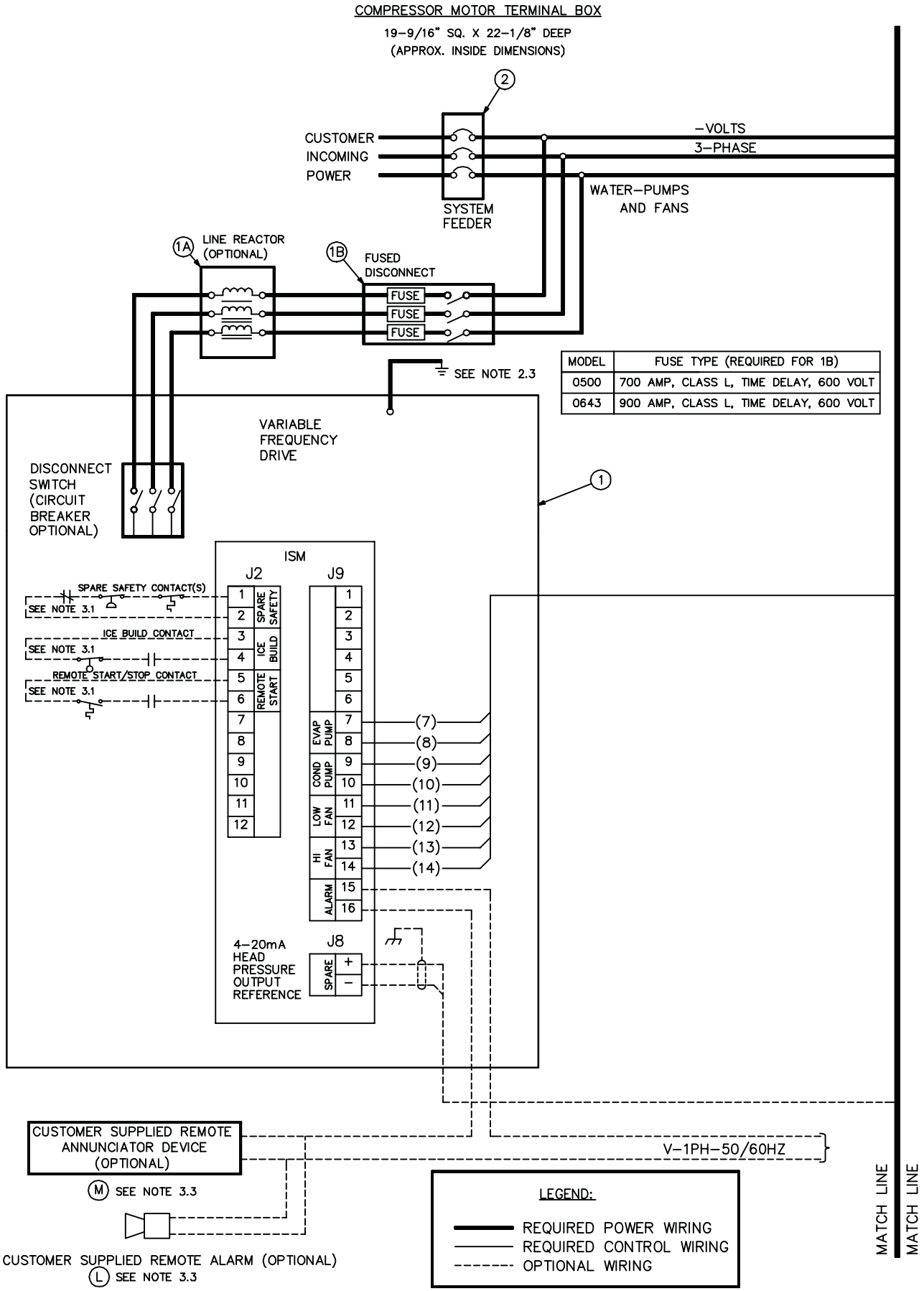


Fig. 31 — 19XR Typical Wiring with Unit-Mounted Variable Frequency Drive

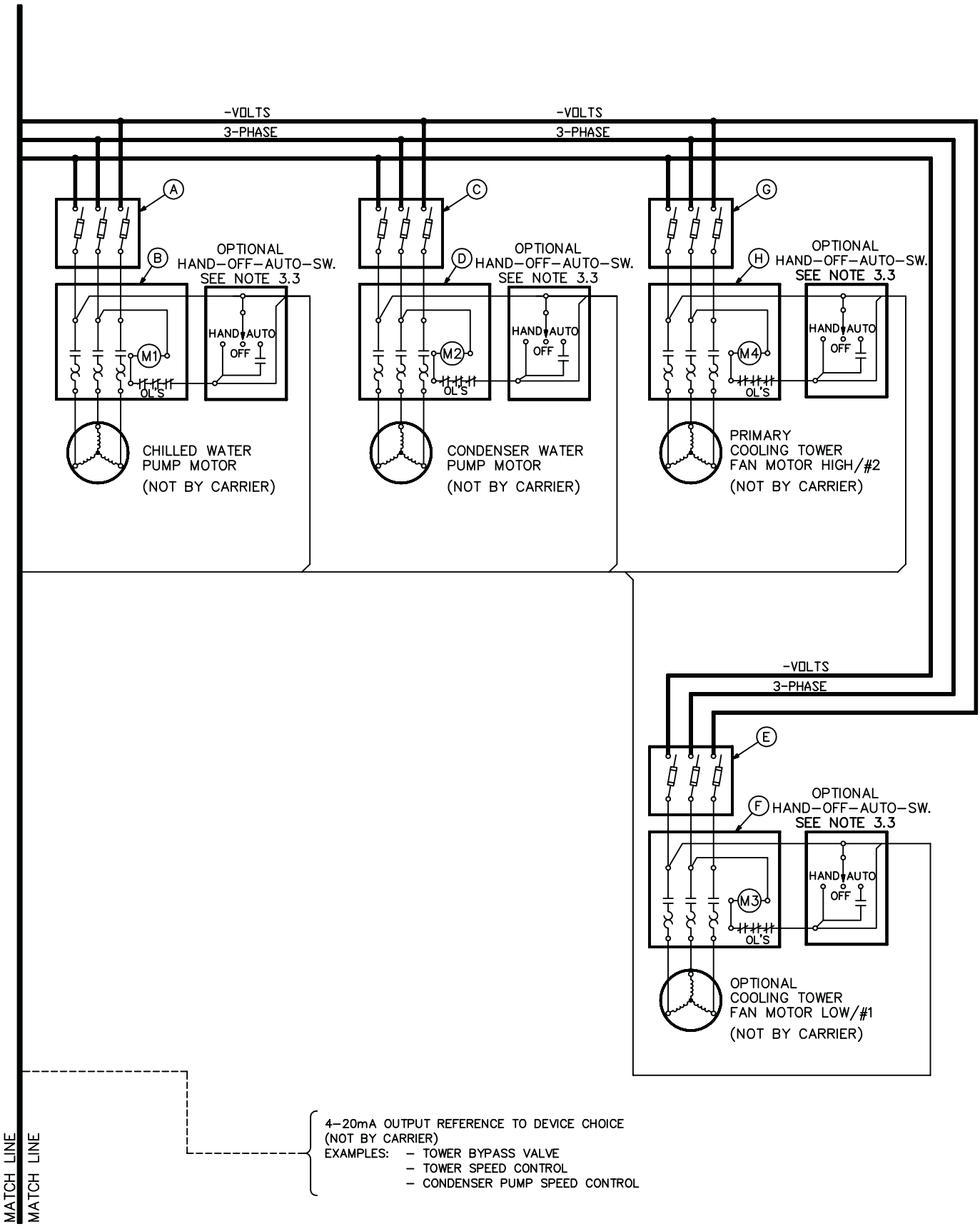


Fig. 31 — 19XR Typical Wiring with Unit-Mounted Variable Frequency Drive (cont)

NOTES FOR FIG. 31

REFERENCE NUMBER	EXPLANATION
1	3 Phase Under/Over Voltage (Line Side)
	Phase Loss/Imbalance/Reversal (Line Side)
	Frequency Shift (Line Side)
	kW Transducer/kW Hours/Demand kW
	Over Current
	Control Power Transformer (3KVA)
	Controls and Oil Heater Fused Disconnect (FU2)
	Oil Pump Circuit Fused Disconnect (FU1)
	3 Phase Analog Volts/Amps Meter Package
1A	Line Reactor
1B	Compressor VFD/Motor Branch Fused Disconnect
2	System Feeder (Short Circuit, Ground Fault & Protection)
A	Chilled Water Pump Starter Disconnect
B	Chilled Water Pump Motor Starter
C	Condenser Water Pump Starter Disconnect
D	Condenser Water Pump Motor Starter
E	Cooling Tower Fan Motor Starter Disconnect (Low/#1)
F	Cooling Tower Fan Motor Starter (Low/#1)
G	Cooling Tower Fan Motor Starter Disconnect (High/#2)
H	Cooling Tower Fan Motor Motor Starter (High #2)
L	Remote Alarm See Note 3.3
M	Remote Annunciation See Note 3.3

NOTES FOR FIG. 27-31

NOTES:

I. GENERAL

1.0 Starters shall be designed and manufactured in accordance with Carrier Engineering Requirement Z-415. VFD Must meet Carrier Engineering Requirement Z-416.

1.1 All field-supplied conductors, devices, and the field-installation wiring, termination of conductors and devices, must be 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 shut down.

1.5 WARNING — Do not use aluminum conductors.

1.6 Installer is responsible for any damage caused by improper wiring between starter and machine.

II. POWER WIRING TO STARTER OR VFD

2.0 Provide a means of disconnecting power to starter. Fused disconnect is required on VFD.

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

2.2 Lug adapters may be required if installation conditions dictate that conductors be sized beyond the minimum ampacity required. For low and medium voltage free-standing starters contact starter supplier for lug information. For unit-mounted starters, breaker lugs will accommodate the quantity (#) and size (MCM) cables (per phase) as depicted on the table on page 46. For unit-mounted VFDs, disconnect lugs will accommodate the quantity (#) and size (MCM) cables (per phase) as depicted in the table on page 46.

2.3 Power conductors to starter must enter through top of enclosure. Flexible conduit should be used for the last few feet to the enclosure to provide unit vibration isolation.

2.4 Compressor motor and controls must be grounded by using equipment grounding lugs provided inside unit mounted starter enclosure.

2.5 Unit-mounted starters with “Rated Load Amps” (RLA) greater than 700 RLA (Benshaw) or 935 RLA (Cutler Hammer) require the assembly and the installation of a “Top Hat” (located inside enclosure) to provide the required wire bending space for incoming power leads.

III. CONTROL WIRING

3.0 Field supplied control conductors to be at least 18 AWG or larger.

3.1 Optional ice build start/terminate device contacts, optional remote start/stop device contacts and optional spare safety device contacts, 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 Remove jumper wire between J2-1 and J2-2 before connecting auxiliary safeties between these terminals.

3.3 ISM contact outputs can control cooler and condenser pump and tower fan motor contactor coil loads (VA) rated 5 amps at 115 VAC up to 3 amps at 277 VAC. Control wiring required for Carrier to start pumps and tower fan motors must be provided to assure machine protection. If primary pump and tower fan motor control is by other means, also provide a parallel means for control by Carrier. Do not use starter control transformer as the power source for contactor coil 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 alongside wires carrying 50 v or higher.

3.5 Control wiring between free-standing starter and power panel must be separate shielded cables with minimum rating of 600 v, 80° C. Ground shield at starter.

3.6 If optional oil pump circuit breaker is not supplied within the starter enclosure as shown, it must be located within sight of the chiller with wiring routed to suit.

NOTES FOR FIG. 27-31 (cont)

IV. POWER WIRING BETWEEN FREE-STANDING STARTER AND COMPRESSOR MOTOR

4.0 Low voltage (600 v or less) compressor motors have (6) $^{5}/_{8}$″ terminal studs (lead connectors not supplied by Carrier). Either 3 or 6 conductors must be run between compressor motor and starter, depending on the size of the conductors or the type of motor starter employed. If only 3 leads are utilized, jumper motor terminals as follows : 1 to 6, 2 to 4, 3 to 5. Center to center distance between terminals is 3-$^{5}/_{32}$″. Compressor motor starter must have nameplate stamped as to conforming with Carrier Engineering requirement "Z-415."

4.1 Medium voltage [over 600 volts] compressor motors have (3) terminals. Connections are $^{9}/_{16}$-threaded stud. A compression lug with a single $^{9}/_{16}$ DIA hole can be connected directly to the stud or 3 adapters are supplied for connecting a NEMA lug. Use suitable connectors and insulation for high voltage alternating current cable terminations (these items are not supplied by Carrier). Compressor motor starter must have nameplate stamped as to conforming with Carrier Engineering requirement "Z-415."

4.2 Power conductor rating must meet minimum unit nameplate voltage and compressor motor RLA. (Conductor as defined below may be a single lead or multiple smaller ampacity leads in parallel for the purpose of carrying the equivalent or higher current of a single larger lead.)

When (3) conductors are used:

Minimum ampacity per conductor = 1.25 x compressor RLA

When (6) conductors are used:

Minimum ampacity per conductor = 0.721 x compressor RLA

4.3 When more than one conduit is used to run conductors from starter to compressor motor terminal box, an equal number of leads from each phase (conductor) must be in each conduit, to prevent excessive heating (e.g., conductors to motor terminals 1, 2, & 3 in one conduit, and those to 4, 5, & 6 in another).

4.4 Compressor motor power conductors may enter terminal box through top, left side or bottom left using holes cut by contractor to suit conduit. Flexible conduit should be used for the last few feet to the terminal box for unit vibration isolation. For the medium voltage free-standing starter, use of stress cones may require an oversize (special) motor terminal box (not supplied by Carrier). For low voltage free-standing starter use of stress cones or 12 conductors larger than 500 MCM may require an oversize (special) motor terminal box (not supplied by Carrier). Lead connections between 3-phase motors and their starters must not be insulated until Carrier personnel have checked compressor and oil pump rotations.

4.5 Compressor motor frame to be grounded in accordance with the National Electrical Code (NFPA-70) and applicable codes. Means for grounding compressor motor is a #4 AWG-500 MCM pressure connector, supplied and located in the lower left side corner of the compressor motor terminal box.

4.6 Do not allow motor terminals to support weight of wire cables. Use cable supports and strain reliefs as required.

4.7 For low voltage free-standing starter use backup wrench when tightening lead connectors to motor terminal studs. Torque to 45 lb-ft max.

BENSHAW (SOLID-STATE STARTER)			CUTLER HAMMER/ALLEN BRADLEY (WYE DELTA)			ROCKWELL (VFD)		
Starter RLA	Lug Capacity (Per Phase)		Starter RLA	Lug Capacity (Per Phase)		Max RLA	Lug Capacity (Per Phase)	
	# Conductors	Conductor Range		# Conductors	Conductor Range		# Conductors	Conductor Range
0-200A	1	#4 — 350 MCM	**186-207A**	1	#3 — 350 MCM	**414**	2	4/0 to 500 MCM
201-300A	2	#1 — 250 MCM	**208-298A**	2	2/0 — 250 MCM	**500**	2	3/0 to 350 MCM
301-480A	2	3/0 — 500 MCM	**297-444A**	2	250 — 350 MCM	**643**	3	3/0 to 400 MCM
481-740A	3	3/0 — 500 MCM	**445-606A**	2	1 — 500 MCM			
741-1250A	4	350 — 750 MCM	**607-888A**	4	4/0 — 500 MCM			
			889-1316A	4	500 — 1000 MCM			

PART NO.	ROCKWELL AUTOMATION PART NO.	AMPS FUNDAMENTAL	INDUCTANCE (mH)	A	B	C	D	E	F	G	H	J	K	M	N	P	WEIGHT
19XV04000701	1321–3RA250–C	250	0.150	0'–9 1/2" (241mm)	0'–5" (127mm)	0'–0 1/4" (6mm)	0'–3" (76mm)	0'–4" (102mm)	0'–7 1/2" (191mm)	0'–7 1/2" (191mm)	1'–0 1/2" (318mm)	1'–3 1/2" (394mm)	2'–0" (610mm)	1'–5" (432mm)	1'–1" (330mm)	1'–5" (432mm)	185 LBS. (84 kg.)
19XV04000702	1321–3RA320–C	320	0.125	0'–10" (254mm)	0'–5 3/4" (146mm)	0'–0 1/4" (6mm)	0'–2 5/8" (67mm)	0'–4 1/2" (114mm)	0'–7" (178mm)	0'–7" (178mm)	1'–0" (305mm)	1'–3 1/2" (394mm)	2'–0" (610mm)	1'–5" (432mm)	1'–1" (330mm)	1'–5" (432mm)	235 LBS. (107 kg.)
19XV04000703	1321–3RA400–C	400	0.105	0'–9 3/4" (248mm)	0'–4 3/4" (121mm)	0'–0 1/4" (6mm)	0'–2 3/4" (70mm)	0'–4" (102mm)	0'–7 3/4" (197mm)	0'–7 3/4" (197mm)	1'–0 3/8" (314mm)	1'–3 1/2" (394mm)	2'–0" (610mm)	1'–5" (432mm)	1'–1" (330mm)	1'–5" (432mm)	245 LBS. (111 kg.)
19XV04000704	1321–3RA500–C	500	0.085	0'–9 1/2" (241mm)	0'–5" (127mm)	0'–0 1/4" (6mm)	0'–3 1/4" (83mm)	0'–4 1/2" (114mm)	0'–7 3/4" (197mm)	0'–9 1/2" (241mm)	1'–0 3/4" (324mm)	1'–3 1/2" (394mm)	2'–0" (610mm)	1'–5" (432mm)	1'–1" (330mm)	1'–5" (432mm)	335 LBS. (152 kg.)
19XV04000705	1321–3RA600–C	600	0.065	0'–9 1/4" (235mm)	0'–4 5/8" (117mm)	0'–0 1/4" (6mm)	0'–2 3/4" (70mm)	0'–5 1/4" (133mm)	0'–7 5/8" (194mm)	0'–9 3/4" (248mm)	1'–0 3/4" (324mm)	1'–3 1/2" (394mm)	2'–0" (610mm)	1'–5" (432mm)	1'–1" (330mm)	1'–5" (432mm)	335 LBS. (152 kg.)
19XV04000706	1321–3RA750–C	750	0.048	0'–11 3/4" (298mm)	0'–7 3/4" (197mm)	0'–0 1/4" (6mm)	0'–3 7/8" (98mm)	0'–6 7/8" (175mm)	0'–11" (279mm)	1'–2 1/8" (359mm)	1'–6 1/4" (464mm)	1'–10 1/2" (572mm)	2'–6" (762mm)	2'–0" (610mm)	1'–8" (508mm)	2'–0" (610mm)	445 LBS. (202 kg.)

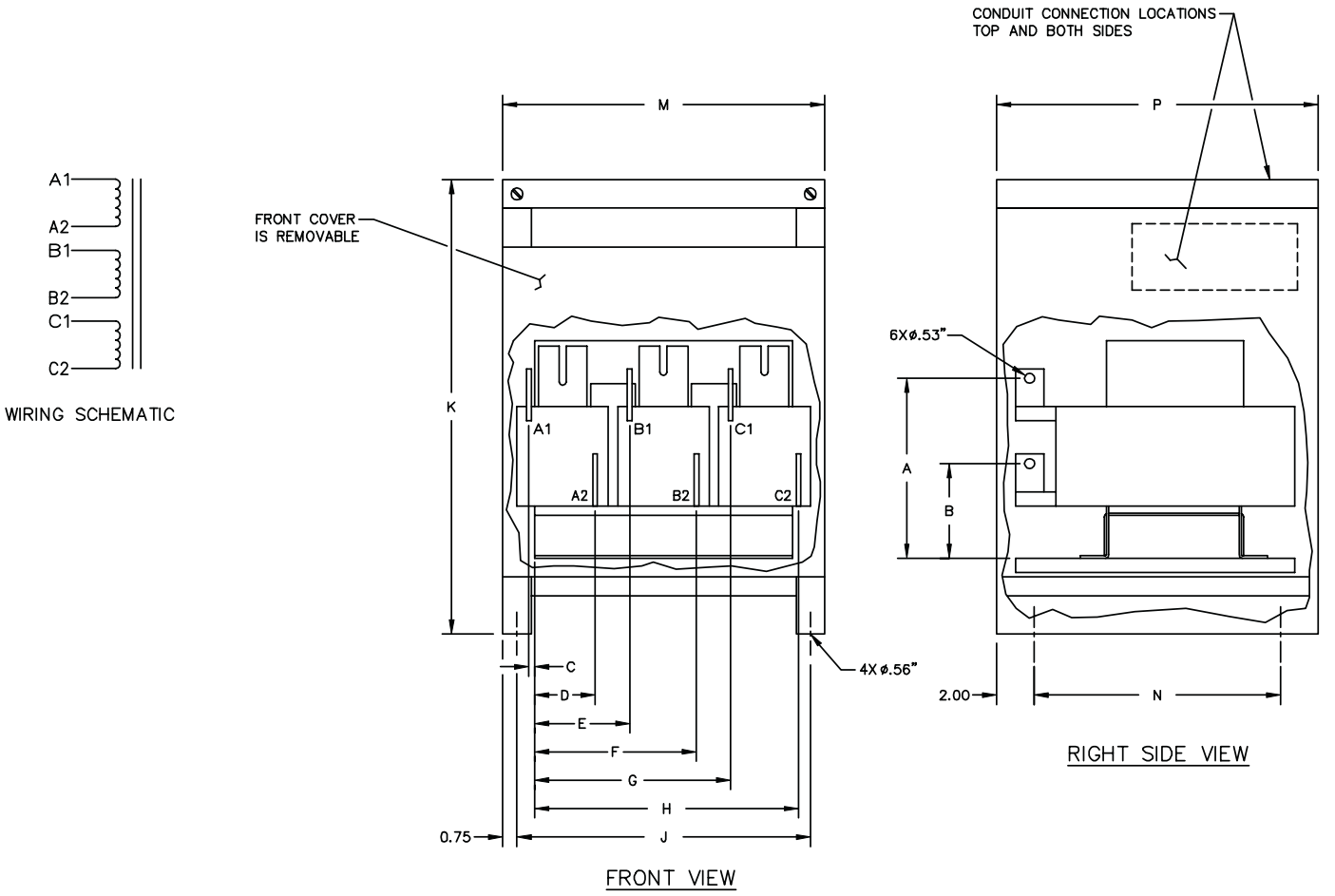


Fig. 32 — 19XRV Optional Line Reactor Physical Dimensions and Field Wiring for Unit Mounted Variable Frequency Drive Applications

Connect Power Wires to Oil Heater Contactor — Connect control power wiring between the oil heater contactor terminals and terminals LL1 and LL2 on the field wiring strip in the compressor motor starter. Refer to Fig. 34 and wiring label on the machine power panel.

⚠ WARNING

Voltage to terminals LL1 and LL2 comes from a control transformer in a starter built to Carrier specifications. Do not connect an outside source of control power to the compressor motor starter (terminals LL1 and LL2). An outside power source will produce dangerous voltage at the line side of the starter, because supplying voltage at the transfomer secondary terminals produces input level voltage at the transformer primary terminals.

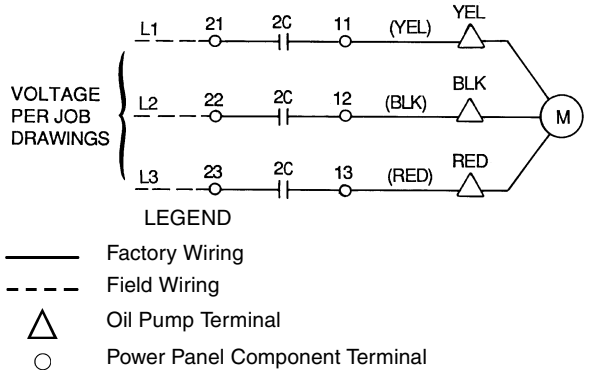


Fig. 33 — Oil Pump Wiring

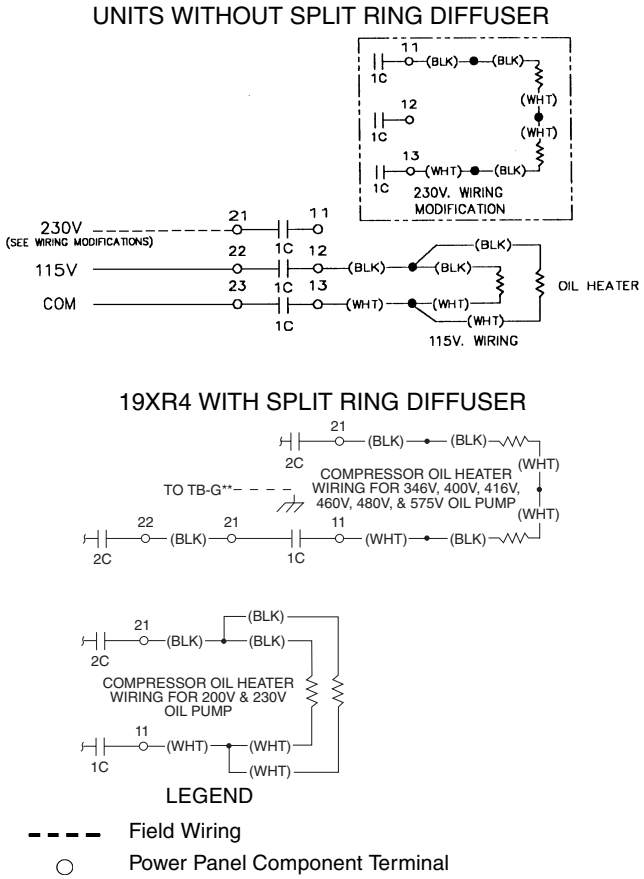


Fig. 34 — Oil Heater and Control Power Wiring

Connect Wiring from Starter to Power Panel — Connect control wiring from main motor starter to the machine power panel. All control wiring must use shielded cable. Also, connect the communications cable. Refer to the job wiring diagrams for cable type and cable number. Make sure the control circuit is grounded in accordance with applicable electrical codes and instructions on machine control wiring label.

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. 24 for location of the CCN network connections on the terminal strip labelled 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, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –4 F to 140 F (–20 C to 60 C) is required. See table below for cables that meet the requirements.

MANUFACTURER	CABLE NO.
Alpha	2413 or 5463
American	A22503
Belden	8772
Columbia	02525

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

SIGNAL TYPE	CCN BUS CONDUCTOR INSULATION COLOR	CCN NETWORK INTERFACE (Control Panel)
+	Red	+
Ground	White	G
–	Black	–

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

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. See Fig. 24. If the communication bus cable exits from one building and enters another, the shields must be connected to ground at the lightening suppressor in each building where the cable enters or exits the building (one point only).

To connect the 19XR chiller to the network, proceed as follows (see Fig. 24):

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.

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
- cooler shell
- cooler tube sheets
- suction piping
- motor cooling drain
- oil reclaim piping
- oil cooler refrigerant side tubing
- refrigerant liquid line to cooler

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 (Fig. 35).

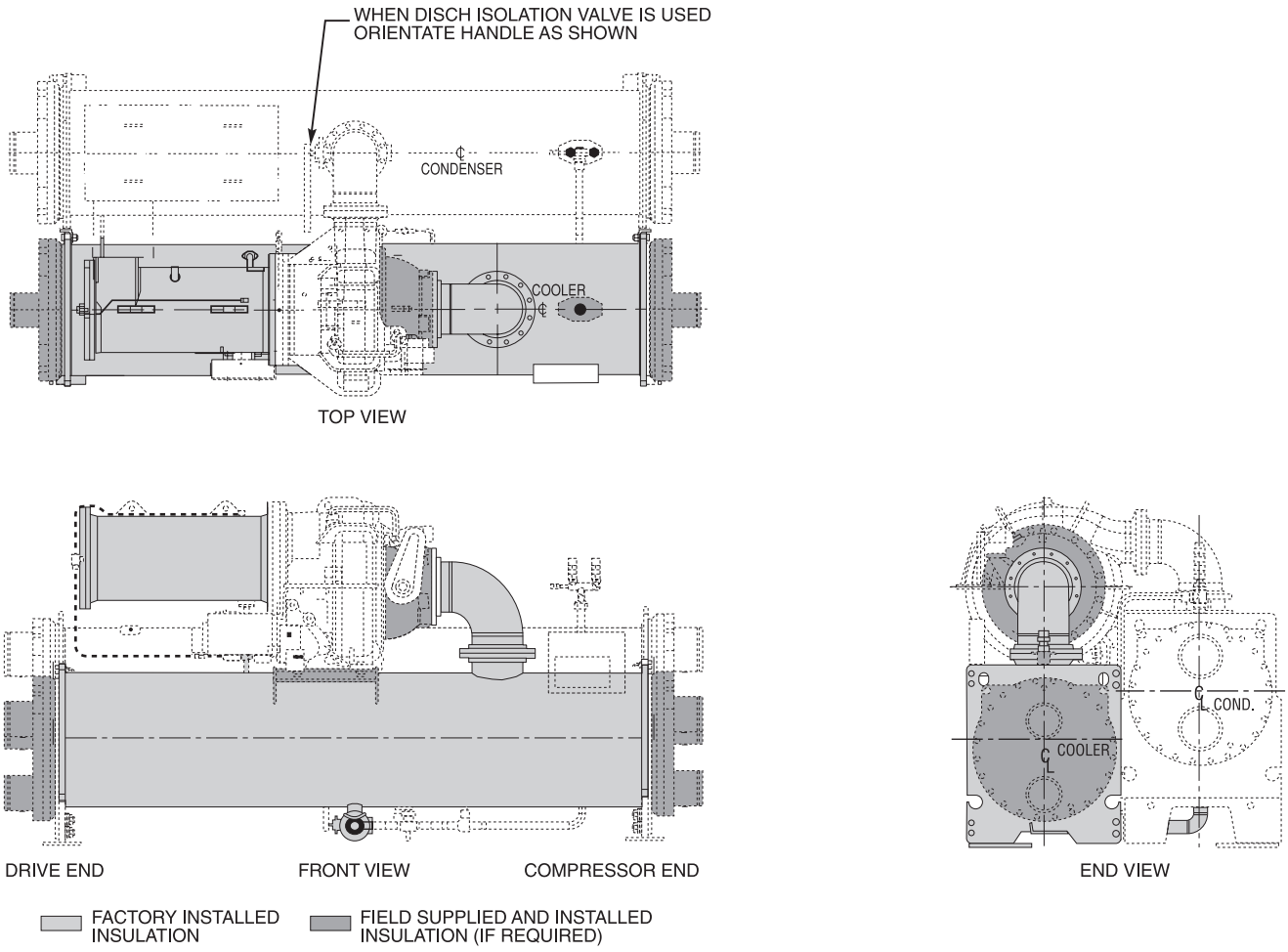


Fig. 35 — 19XR Insulation Area

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INSTALLATION START-UP REQUEST CHECKLIST

Machine Model Number: 19XR Serial Number: _____

To: _____

_____

_____

Attn: _____

Date _____

_____
Project Name

_____
Carrier Job 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 valves 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 condenser piping (if installed)		
e. 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 starter wiring is complete. The wiring is installed per installation instructions and certified prints.		
a. Power wiring to compressor motor. (Motor leads will not be taped until the Carrier technician megger tests the motor.)		
b. Oil pump wiring		
c. Oil heater/control wiring		
d. Other _____		
8. The motor starter has not been supplied by Carrier. It has been installed according to the manufacturer's instructions.		
9. The motor starter has not been supplied by Carrier and it has been checked for proper operation.		

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	_____	_____
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 is at the machine.	_____	_____
6. Services such as electrical power and control air will be available at start-up.	_____	_____
7. The electrical and mechanical representatives will be available to assist in commissioning the machine.	_____	_____
8. 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 _____

Beeper 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

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