Omnizone™
50XJ050-104
Water-Cooled
Indoor Self-Contained Systems

Installation and Service Instructions

CONTENTS

SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning components and equipment can be dangerous. Only trained, qualified installers and service mechanics should install, start-up, and service this equipment.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

⚠ CAUTION

Use care in handling, rigging, and setting bulky equipment.

⚠ WARNING

DO NOT USE TORCH to remove any component. System contains oil and refrigerant under pressure.

To remove a component, wear protective gloves and goggles and proceed as follows:

a. Shut off electrical power to unit.
b. Recover refrigerant to relieve all pressure 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. Use a pan to catch any oil that may come out of the lines and as a gage for how much oil to add to the system.
e. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

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

⚠ CAUTION

DO NOT re-use compressor oil or any oil that has been exposed to the atmosphere. Dispose of oil per local codes and regulations. 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 oil contamination when timely repairs cannot be completed. Failure to follow these procedures may result in damage to equipment.

GENERAL

Omnizone indoor packaged units are self-contained, water-cooled indoor units for use in VAV (variable air volume) applications. Base units are designed for vertical discharge; for horizontal discharge a plenum is required.

Each unit contains multiple scroll compressors piped in separate R-410A refrigerant circuits. Each circuit contains a shell and tube water-cooled condenser, TXV (thermostatic expansion valve), filter drier, sight glass, interlaced circuiting through a single common evaporator coil, and all interconnecting piping. Units are shipped fully charged.

Each unit is equipped with a forward-curved centrifugal blower, to ensure quiet air delivery to the conditioned space, and VFD (variable frequency drive) for variable air volume (VAV) applications. Determine sound level requirements

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before choosing a final unit installation site and related optional accessories.

The 50XJ units have removable front and side access panels for easy servicing. These panels allow access to controls, compressors, condensers, VFD, motor, blower, belts, pulleys, and refrigeration components.

INSTALLATION

Omnizone 50XJ units are intended for indoor installation only. Determine building alterations required to run piping, wiring and ductwork. Read all installation instructions before installing the unit.

Step 1 — Complete Pre-Installation Checks — Examine the unit for shipping damage. File a claim with the transit company immediately if damage is found. Check the shipment for completeness. Verify that the nameplate electrical requirements match the available power supply.

UNIT STORAGE — The 50XJ units are designed and packaged for indoor storage and use only. Outdoor transport or temporary storage require additional protection from weather.

Step 2 — Rig and Place Unit — The unit must be moved by the base rails only. When lifting, use a spreader bar and the provided rigging lugs (Fig. 1). Unit may be lifted without spreader bars *only if the top crate is left on* (Fig. 2 and 3). The unit may be fork lifted only if the forks extend across both the front and back base rails; *do not use a fork lift on side rails or if the forks only reach partially across the unit.* Refer also to Fig. 4 and 5 and Tables 1-10.

PLACING THE UNIT — Do not locate the unit adjacent to an acoustically sensitive space. The best locations for 50XJ units are mechanical rooms, near elevator shafts, near restrooms, near stairwells or other similar locations. Be sure to leave enough space for the return air inlet access to the evaporator and condenser for cleaning and maintenance. Refer to Fig. 4 for service clearances.

To reduce noise, consider the following:

- Locate mechanical room and ducts away from noise sensitive locations.
- Construct equipment room of concrete block or use a double offset stud wall with interwoven insulation. Seal all penetrations.
- Design the system for low total static pressure.
- Branch the ductwork in up to four directions to divide the flow and ducted sound at unit discharge.
- Use a discharge sound plenum.
- Place sound sensitive rooms on the side outlet of the sound plenum rather than in front or back.
- Use a minimum of 15 ft of supply ductwork before the first terminal.
- Use a minimum 15 ft of return ductwork after the last terminal.
- Use 2-in., 3-lb insulation.
- Use round duct or keep rectangular duct aspect ratios low (i.e., square).
- Elbow the return ducts in the equipment room to prevent line-of-sight.
- Do not exceed the recommended supply duct velocity of 2000 fpm (return of 1000 fpm).
- On 90-degree elbows, use turning vanes.

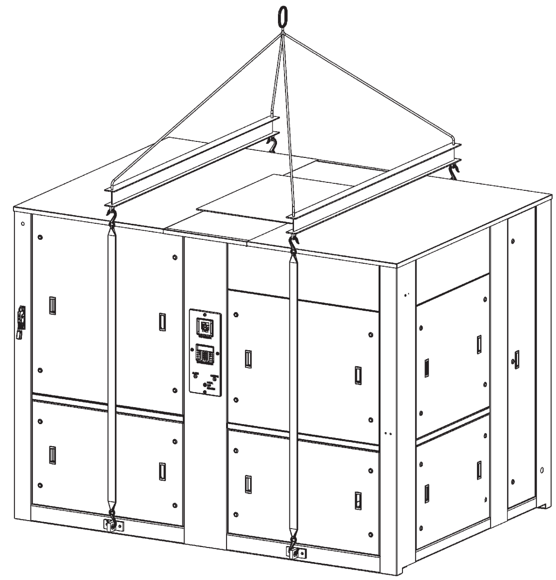


Fig. 1 — Lift Unit with Spreader Bars and Rigging Lugs

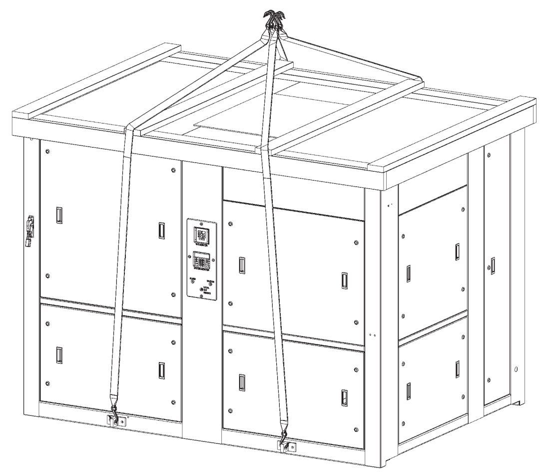


Fig. 2 — Lift Unit with Top Crating On

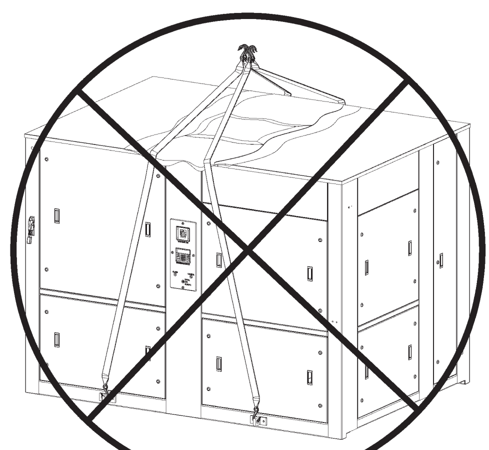
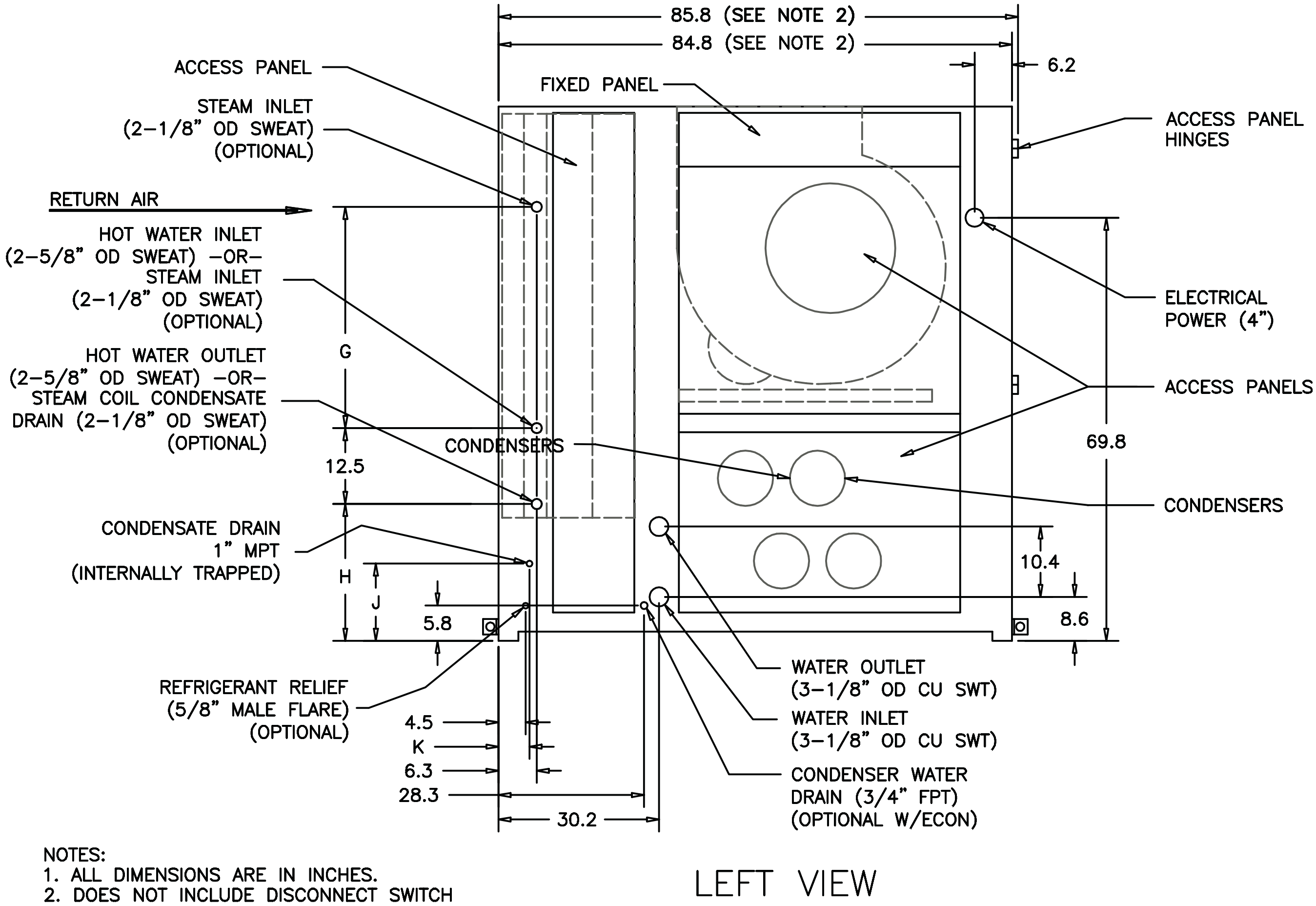


Fig. 3 — DO NOT Lift Unit without Spreader Bars or Top Crating

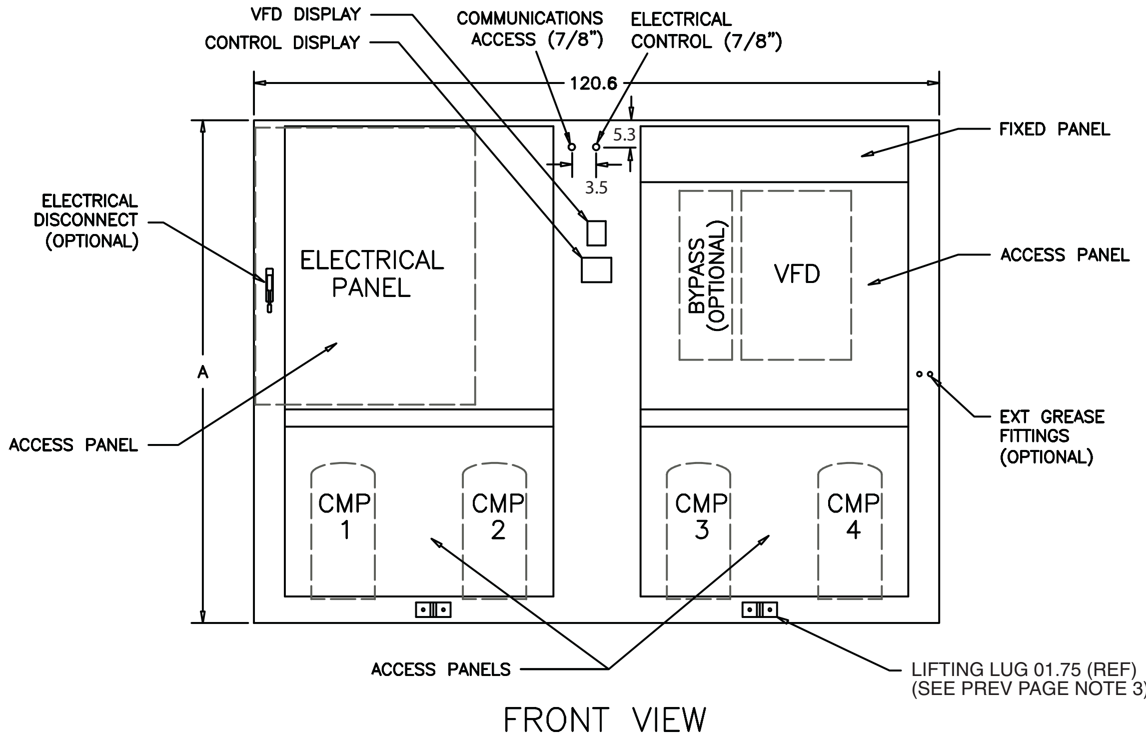


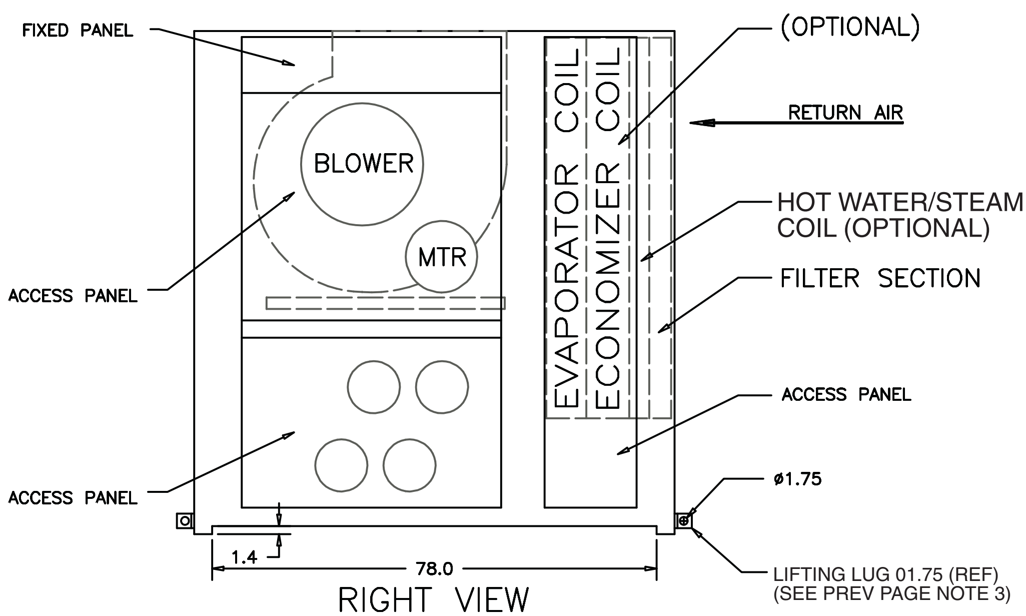
NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. DOES NOT INCLUDE DISCONNECT SWITCH (OPTIONAL— SHIPPED LOOSE).
3. LIFTING LUGS Ø1.75 (REF) REMOVABLE AFTER INSTALLATION.

DIMENSION	50XJ050-084	50XJ094-104
G	32.0	32.0
H	22.3	21.4
J	11.5	9.5
K	5.2	5.2
Filter Rows	3	4
Filter Size (Quantity)	20 x 25 (12) 20 x 20 (6)	20 x 20 (24)

NOTE: All dimensions are in inches.

Fig. 4 — Base Unit Dimensions

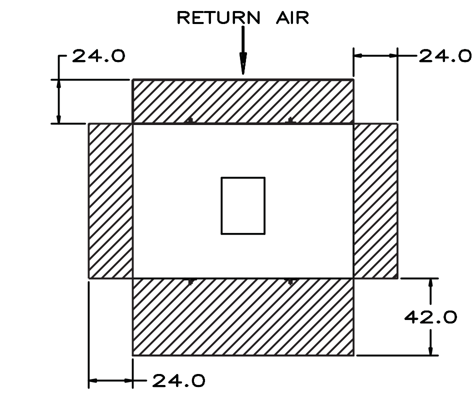




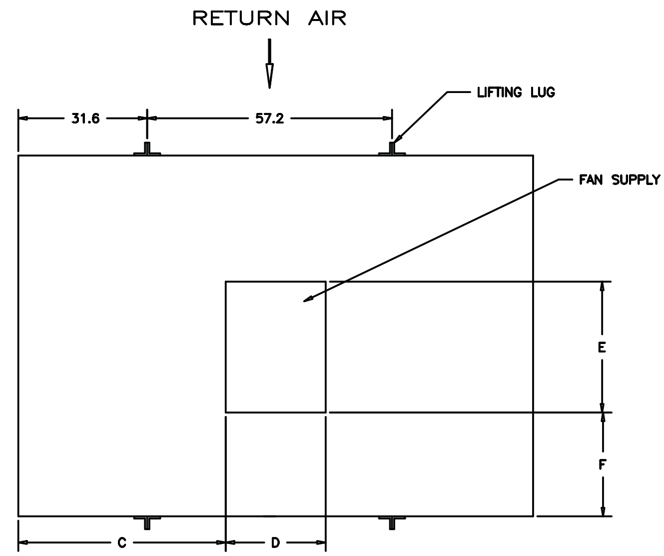
DIMENSION	50XJ050-084	50XJ094-104
A	87.5	95.5
Filter Rows	3	4
Filter Size (Quantity)	20 x 25 (12) 20 x 20 (6)	20 x 20 (24)

NOTE: All dimensions are in inches.

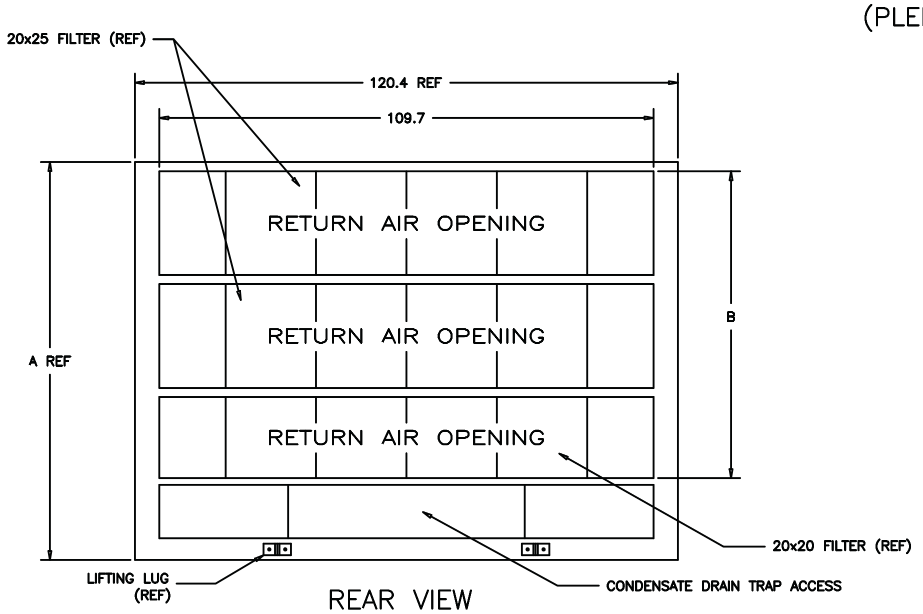
Fig. 4 — Base Unit Dimensions (cont)



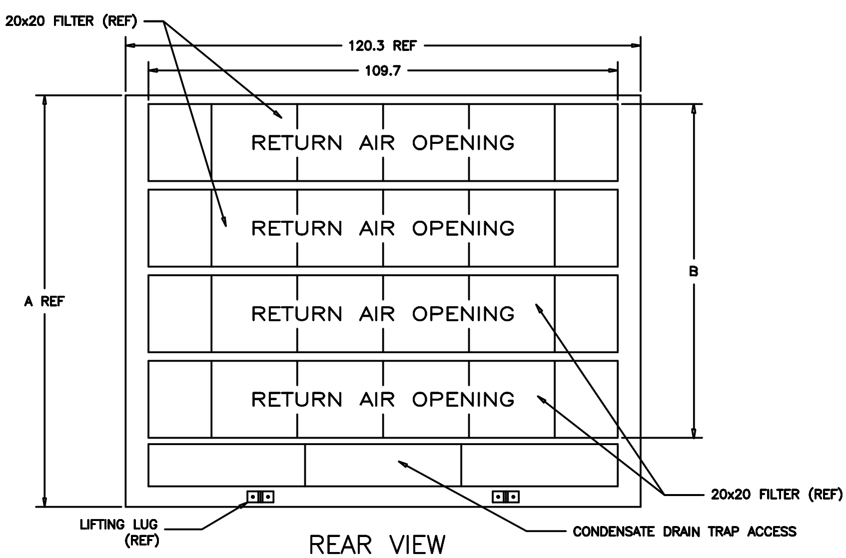
TOP VIEW
SERVICE CLEARANCE



TOP VIEW
(PLENUM NOT SHOWN)



REAR VIEW
SIZES 064-084



REAR VIEW
SIZES 094,104

DIMENSION	50XJ050-084	50XJ094-104
A	87.5	95.5
B	67.6	77.6
C	47.2	44.3
D	26.2	31.8
E	31.2	34.5
F	24.3	23.3
Filter Rows	3	4
Filter Size (Quantity)	20 x 25 (12) 20 x 20 (6)	20 x 20 (24)

NOTE: All dimensions are in inches.

Fig. 4 — Base Unit Dimensions (cont)

					FRONT OPENING			BACK OPENING			RIGHT SIDE OPENING			LEFT SIDE OPENING		
Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Example	**X**	**F**	**D**	**2**	**D**	**6**	**A**	**D**	**0**	**F**	**X**	**0**	**0**	**X**	**0**	**0**
Meaning	50XJ Plenum	Unit Size	Plenum Height	Wall Thickness	Duct Height	Duct Width in inches, up to plenum width less 8 inches.		Duct Height	Duct Width in inches, up to plenum width less 8 inches.		Duct Height	Duct Width in inches, up to plenum width less 8 inches.		Duct Height	Duct in inches, up to plenum width less 8 inches.	
						Hexadecimal Notation			**Hexadecimal Notation**			**Hexadecimal Notation**			**Hexadecimal Notation**	
	X -- 50XJ Plenum	**F** -- 050-084 **G** -- 094-104	**C** -- 22" **D** -- 24" **F** -- 28" **J** -- 34" **M** -- 40" **P** -- 46"	**2** -- 2" W all **4** -- 4" W all	**A** -- 12" **B** -- 14" **C** -- 16" **D** -- 18" **E** -- 20" **F** -- 22" **G** -- 24" **H** -- 26" **J** -- 28" **K** -- 30" **L** -- 32" **M** -- 34" **N** -- 36" **X** -- None	**0** -- 0" **1** -- 16" **2** -- 32" **3** -- 48" **4** -- 64" **5** -- 80" **6** -- 96" **7** -- 107"	**0** -- 0" **1** -- 1" **2** -- 2" **3** -- 3" **4** -- 4" **5** -- 5" **6** -- 6" **7** -- 7" **8** -- 8" **9** -- 9" **A** -- 10" **B** -- 11" **C** -- 12" **D** -- 13" **E** -- 14" **F** -- 15"	**A** -- 12" **B** -- 14" **C** -- 16" **D** -- 18" **E** -- 20" **F** -- 22" **G** -- 24" **H** -- 26" **J** -- 28" **K** -- 30" **L** -- 32" **M** -- 34" **N** -- 36" **X** -- None	**0** -- 0" **1** -- 16" **2** -- 32" **3** -- 48" **4** -- 64" **5** -- 80" **6** -- 96" **7** -- 107"	**0** -- 0" **1** -- 1" **2** -- 2" **3** -- 3" **4** -- 4" **5** -- 5" **6** -- 6" **7** -- 7" **8** -- 8" **9** -- 9" **A** -- 10" **B** -- 11" **C** -- 12" **D** -- 13" **E** -- 14" **F** -- 15"	**A** -- 12" **B** -- 14" **C** -- 16" **D** -- 18" **E** -- 20" **F** -- 22" **G** -- 24" **H** -- 26" **J** -- 28" **K** -- 30" **L** -- 32" **M** -- 34" **N** -- 36" **X** -- None	**0** -- 0" **1** -- 16" **2** -- 32" **3** -- 48" **4** -- 64"	**0** -- 0" **1** -- 1" **2** -- 2" **3** -- 3" **4** -- 4" **5** -- 5" **6** -- 6" **7** -- 7" **8** -- 8" **9** -- 9" **A** -- 10" **B** -- 11" **C** -- 12" **D** -- 13" **E** -- 14" **F** -- 15"	**A** -- 12" **B** -- 14" **C** -- 16" **D** -- 18" **E** -- 20" **F** -- 22" **G** -- 24" **H** -- 26" **J** -- 28" **K** -- 30" **L** -- 32" **M** -- 34" **N** -- 36" **X** -- None	**0** -- 0" **1** -- 16" **2** -- 32" **3** -- 48" **4** -- 64"	**0** -- 0" **1** -- 1" **2** -- 2" **3** -- 3" **4** -- 4" **5** -- 5" **6** -- 6" **7** -- 7" **8** -- 8" **9** -- 9" **A** -- 10" **B** -- 11" **C** -- 12" **D** -- 13" **E** -- 14" **F** -- 15"

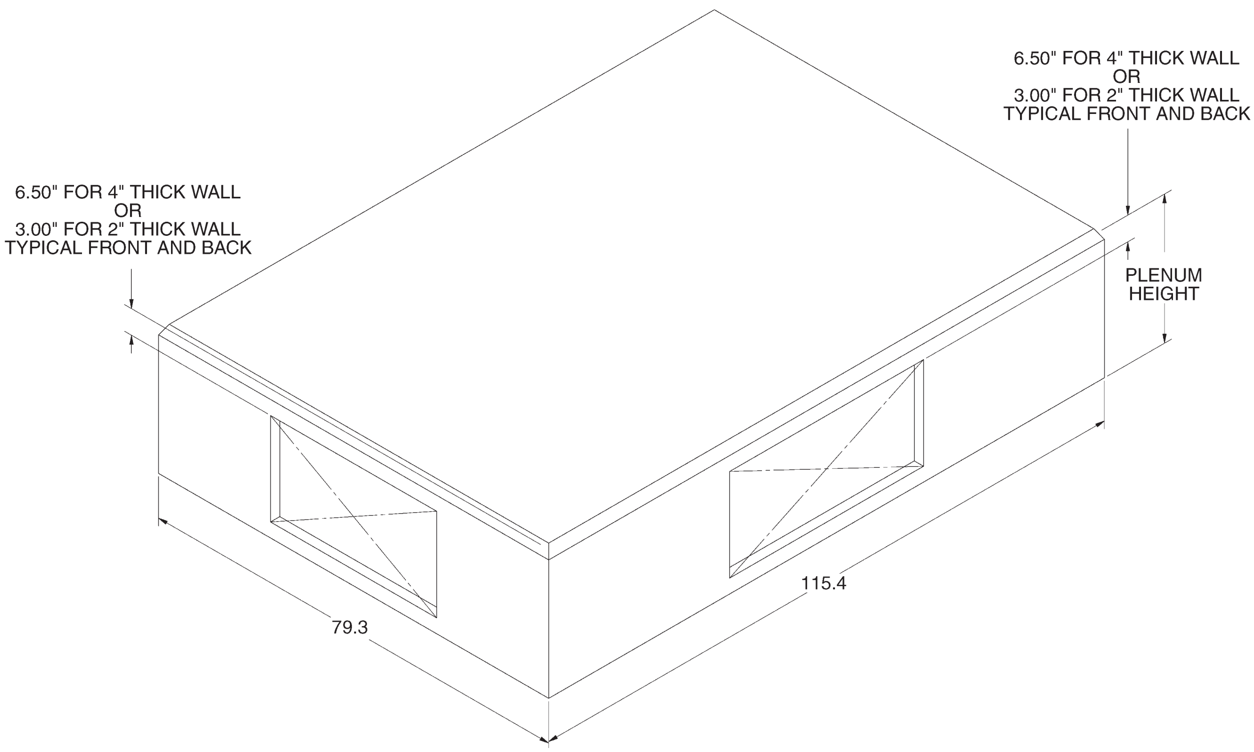


Fig. 5 — Accessory Discharge Plenum Dimensions

Table 1 — Base Unit and Condenser Water Weight

50XJ UNIT	BASE UNIT WEIGHT (lb)	CONDENSER WATER WEIGHT (lb)
B050	4673	113
D050	4682	113
C064	5388	150
E064	5408	150
F064	5428	150
D074	5478	150
E074	5528	150
F074	5724	150
A084	5434	150
B084	5484	150
C084	5534	150
D084	5700	167
E084	5750	167
F084	5896	167
A094	5853	150
B094	6019	167
C094	6069	167
D094	6215	167
F094	6265	167
B104	6238	167
D104	6288	167
E104	6700	187
F104	7092	187

NOTES:
1. Base unit weight includes refrigerant, controls and 150 psig condensers.
2. Add 205 lb to the base unit weight for approximate shipping weight.

Table 2 — Motor Weight (208/230 and 460 VAC)

MOTOR HP	ODP PREMIUM EFFICIENCY WEIGHT (lb)
10	126
15	204
20	250
25	290
30	300
40	415
50*	430

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HP — Horsepower
ODP — Open Drip Proof

*50 HP motor only available in 460 VAC.

Table 3 — VFD Weight (208/203/460 VAC)

MOTOR HP	EQUAL SIZE WEIGHT (lb)	OVERSIZED WEIGHT (lb)
10	22	30
15	30	30
20	30	55
25	55	58
30	58	72
40	72	75
50*	72	183

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VFD — Variable Frequency Drive
EQUAL SIZE — Horsepower rating of VFD equal to horsepower rating of supply fan motor
OVERSIZED — Horsepower rating of VFD increased to next frame size higher than horsepower rating of supply fan motor

*50 HP motor only available in 460 VAC.

Table 4 — Filter Weight

SIZE (in.)	EFFICIENCY (%)	TOTAL WEIGHT (lb)
2	30	15
4	30	28
	65	69
	85	69

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SIZE — Filter Thickness

Table 5 — Economizer Coil and Valve Weights

50XJ UNIT	MECHANICALLY CLEANABLE ECONOMIZER COIL WEIGHT (lb)	CHEMICALLY CLEANABLE ECONOMIZER COIL WEIGHT (lb)	STOP VALVE WEIGHT (lb)	REGULATING VALVE WEIGHT (lb)	WATER WEIGHT (lb)
B050	661	632	7	13	244
D050	661	632	7	13	244
C064	661	632	7	13	244
E064	661	632	7	13	244
F064	661	632	7	13	244
D074	661	632	7	13	244
E074	661	632	7	13	244
F074	661	632	7	13	244
A084	661	632	7	13	244
B084	661	632	7	13	244
C084	661	632	7	13	244
D084	661	632	7	13	244
E084	661	632	7	13	244
F084	661	632	7	13	244
A094	748	714	7	13	274
B094	748	714	7	13	274
C094	748	714	7	13	274
D094	748	714	7	13	274
F094	748	714	7	13	274
B104	748	714	7	13	274
D104	748	714	7	13	274
E104	748	714	7	13	274
F104	748	714	7	13	274

Table 6 — Condenser Weight

PRESSURE RATING (psig)	WEIGHT (lb)
150	Incl.
400	100

Table 7 — Optional Service Valve Weight

SERVICE VALVES (All Units)	32 lb

Table 8 — Heating Coil Weights

50XJ UNIT	HOT WATER COIL WEIGHT (lb)	STEAM COIL WEIGHT (lb)	WATER WEIGHT (lb)
B050	310	354	106
D050	310	354	106
C064	310	354	106
E064	310	354	106
F064	310	354	106
D074	310	354	106
E074	310	354	106
F074	310	354	106
A084	310	354	106
B084	310	354	106
C084	310	354	106
D084	310	354	106
E084	310	354	106
F084	310	354	106
A094	351	400	122
B094	351	400	122
C094	351	400	122
D094	351	400	122
F094	351	400	122
B104	351	400	122
D104	351	400	122
E104	351	400	122
F104	351	400	122

Table 9 — Plenum Weight

WALL THICKNESS (in.)	HEIGHT (in.)	WEIGHT (lb)
2	22	927
	24	967
	28	1047
	34	1167
	40	1283
	46	1410
4	22	1290
	24	1346
	28	1455
	34	1620
	40	1785
	46	1949

Table 10 — 50XJ Physical Data

UNIT 50XJ	050		064			074		
COMPRESSOR OPTION	B	D	C	E	F	D	E	F
NOMINAL UNIT CFM	15,000		18,000			20,000		
REFRIGERANT	R-410A							
CABINET								
Length (ft-in.)	10-0 1/4							
Width (ft-in.)	7-0 1/4							
Height (ft-in.)	7-3 3/4							
OPERATING WEIGHT (lb)	See Tables 1-9							
OPERATING CHARGE (lb)								
Circuit No. 1 and 4	23		25			25		
Circuit No. 2 and 3	23		25			25		
COMPRESSORS	Copeland Scroll							
Circuit No. 1 and 4 Model / Size	–13	–13	–10	–10	–13	–13	–15	–13
Circuit No. 2 and 3 Model / Size	–13	–13	–10	–13	–13	–15	–15	–20
Circuit No. 1 and 4 Oil Charge (oz)	140	140	140	140	140	140	140	140
Circuit No. 2 and 3 Oil Charge (oz)	140	140	140	140	140	140	140	140
Number of Capacity Steps	3	3	4	4	4	4	4	4
Number of Circuits	3	3	4	4	4	4	4	4
CONDENSER	Shell and Tube Type with Removable Heads							
Quantity	3	3	4	4	4	4	4	4
Nominal Gpm	150	173	150	173	195	210	225	248
Gpm Range	90-150	100-175	110-175	110-210	110-210	120-245	150-280	150-280
Max. Water-Side Pressure Std. (psig)	150	150	150	150	150	150	150	150
Max. Water-Side Pressure Option (psig)	400	400	400	400	400	400	400	400
Min. Entering Water without Head Pressure Control (F)	55	55	55	55	55	55	55	55
Min. Entering Water with Head Pressure Control (F)	35	36	35	35	35	35	35	35
Max. Entering Water Temperature (F)	115	115	115	115	115	115	115	15
Water Volume (gal) Total	14	14	18	18	18	18	18	18
INDOOR DIRECT EXPANSION (DX) COIL	1/2-in. OD, Copper Tube, Aluminum Fin							
Face Area (sq ft)	48.4		48.4					
Number of Rows...Fins/in.	4...12		6...12					
WATER-SIDE ECONOMIZER COIL	5/8-in. OD, Copper Tube, Aluminum Fin							
Face Area (sq ft)	48.4		48.4					
Number of Rows...Fins/in.	4...10		4...10					
Number of Rows...Fins/in. (optional)	2...10		2...10					
Water Volume (gal)	22.1		29.4					
HOT WATER HEATING COIL	5/8-in. OD, Copper Tube, Aluminum Fin							
Face Area (sq ft)	44.2							
Number of Rows...Fins/in.	2...10							
Water Volume (gal)	12.8							
STEAM HEATING COIL	1-in. OD, Copper Tube, Aluminum Fin							
Face Area (sq ft)	46.5							
Number of Rows...Fins/in.	1...8							
INDOOR FAN	Spring Isolated, Forward Curve							
Nominal Cfm	15,000		19,000			19,000		
Quantity	1		1			1		
Size (in.)	22 x 20		25 x 20			25 x 20		
Minimum Hp Range	7 1/2		7 1/2			7 1/2		
Maximum Hp Range	30		40			40		
Minimum Design Cfm	12,000		15,240			15,240		
Maximum Design Cfm	18,000		22,860			22,860		
Maximum Allowable Rpm	1050		1032			1032		
Fan Shaft Diameter (in.)	2 7/16		2 7/16			2 7/16		
INDOOR FAN MOTOR OPTIONS								
Hp Range	7 1/2-30		7 1/2-40			10-40		
Motor Rpm	1800		1800			1800		
Fan Pulley Diameter (in.)	12.5		12.5-15.5			12.5-15.5		
Center Distance (in.)	16.6-18.3		19.9-21.9			19.9-21.9		
RETURN AIR FILTERS TYPE	4-in. 30% Disposable (MERV 6)							
Filter Face Area (sq ft)	58.3							
(Qty) Size (in.)	(6) 20 X 20 (12) 20 x 25							
Options	2 in. -30%, 4 in.-65%, 4 in.-85%							
CONNECTIONS								
Water Inlet (in.), Type	3 1/8 Sweat							
Water Outlet (in.), Type	3 1/8 Sweat							
Condensate Drain (in.), Type	1 MPT							
CONTROLS	Stand-Alone Microprocessor							
Network Interface	Native BACnet, LON (with adapter), N2, or MODBUS							
Building Pressure Switch								
Range	0.17 to 5 (± 0.05) in. wg							
Vendor Setting	0.6 ± 0.06 in. wg							
Duct High Pressure Switch								
Range	0.17 to 5 (± 0.05) in. wg							
Vendor Setting	3.0 ± 0.30 in. wg							
R-410A Refrigerant High Pressure Switch Open (psig)	575							
R-410A Refrigerant Low Pressure Switch Open (psig)	53							

LEGEND

DX — Direct Expansion

*Sponsored by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers).
†Registered trademark of Echelon Corporation.
**Registered trademark of Schneider Electric.

Table 10 — 50XJ Physical Data (cont)

UNIT 50XJ	084						094				
COMPRESSOR OPTION	A	B	C	D	E	F	A	B	C	D	F
NOMINAL UNIT CFM	24,000						26,000				
REFRIGERANT	R-410A										
CABINET											
Length (ft-in.)	10-0 1/4						10-0 1/4				
Width (ft-in.)	7-0 1/4						7-0 1/4				
Height (ft-in.)	7-3 3/4						7-11 3/4				
OPERATING WEIGHT (lb)	See Tables 1-9										
OPERATING CHARGE (lb)											
Circuit No. 1 and 4	27						28				
Circuit No. 2 and 3	27						28				
COMPRESSORS	Copeland Scroll										
Circuit No. 1 and 4 Model / Size	–13	–13	–15	–13	–15	–13	–15	–13	–15	–13	–13
Circuit No. 2 and 3 Model / Size	–13	–15	–15	–20	–20	–25	–15	–20	–20	–25	–25
Circuit No. 1 and 4 Oil Charge (oz)	140	140	140	140	140	140	140	140	140	140	140
Circuit No. 2 and 3 Oil Charge (oz)	140	140	140	158	158	200	140	158	158	200	200
Number of Capacity Steps	4	4	4	4	4	4	4	4	4	4	4
Number of Circuits	4	4	4	4	4	4	4	4	4	4	4
CONDENSER	Shell and Tube Type with Removable Heads										
Quantity	4	4	4	4	4	4	4	4	4	4	4
Nominal Gpm	195	210	225	248	263	285	225	248	263	285	300
Gpm Range	130-228	140-245	150-263	165-289	175-306	190-333	150-263	165-289	175-306	190-333	200-350
Max. Water-Side Pressure Std. (psig)	150	150	150	150	150	150	150	150	150	150	150
Max. Water-Side Pressure Option (psig)	400	400	400	400	400	400	400	400	400	400	400
Min. Entering Water without Head Pressure Control (F)	55	55	55	55	55	55	55	55	55	55	55
Min. Entering Water with Head Pressure Control (F)	35	35	35	35	35	35	35	35	35	35	35
Max. Entering Water Temperature (F)	115	115	115	115	115	115	115	115	115	115	115
Water Volume (gal) Total	18	18	18	20.1	20.1	20.1	18	20.1	20.1	20.1	20.1
INDOOR DIRECT EXPANSION (DX) COIL	1/2-in. OD, Copper Tube, Aluminum Fin										
Face Area (sq ft)	48.3						51				
Number of Rows...Fins/in.	6...12						6...12				
WATER-SIDE ECONOMIZER COIL	5/8-in. OD, Copper Tube, Aluminum Fin										
Face Area (sq ft)	47.8						55.8				
Number of Rows...Fins/in.	4...10						4...10				
Water Volume (gal)	29.4						33				
HOT WATER HEATING COIL	5/8-in. OD, Copper Tube, Aluminum Fin										
Face Area (sq ft)	44.2						51.5				
Number of Rows...Fins/in.	2...10						2...10				
Water Volume (gal)	12.8						14.7				
STEAM HEATING COIL	1-in. OD, Copper Tube, Aluminum Fin										
Face Area (sq ft)	46.4						53				
Number of Rows...Fins/in.	1...8						1...8				
INDOOR FAN	Spring Isolated, Forward Curve										
Nominal Cfm	24,000						26,000				
Quantity	1						1				
Size (in.)	25 x 20						27 x 25				
Minimum Hp Range	10						15				
Maximum Hp Range	40						50				
Minimum Design Cfm	19,320						20,400				
Maximum Design Cfm	28,980						30,600				
Maximum Allowable Rpm	1,032						910				
Fan Shaft Diameter (in.)	2 7/16						2 7/16				
INDOOR FAN MOTOR OPTIONS											
Hp Range	10	15	20	25	30	40	15	20	25	30	40
Frame Size	215T	254T	256T	284T	286T	324T	254T	256T	284T	286T	342T
Motor Efficiency % Premium	91.7	93.0	93.6	93.6	93.6	94.5	93.0	93.6	93.6	93.6	94.5
Fan Rpm	602	742	854	896	910	938	648	686	742	798	826
Fan Pulley Diameter (in.)	12.5						12.5	12.5	12.5	12.5	12.5
Motor Shaft Diameter (in.)	1 3/8	1 5/8	1 5/8	1 7/8	1 7/8	2 1/8	1 5/8	1 5/8	1 7/8	1 7/8	2 1/8
Number of 5V Belts	2	2	2	3	3	3	3	3	3	3	4
Motor Pulley Diameter (in.)	4.3	5.3	6.1	6.3	6.5	6.7	4.5	4.9	5.3	5.7	5.9
Center Distance (in.)	21 7/8	21 1/8	20 1/8	21 5/8	21 5/8	19 7/8	23 1/4	23 1/4	22 5/8	22 5/8	21 7/8
RETURN AIR FILTERS TYPE	4-in. 30% Disposable (MERV 6)						4-in. 30% Disposable (MERV 6)				
Filter Face Area (sq ft)	58.3						66.7				
(Qty) Size (in.)	(6) 20 X 20 (12) 20 x 25						(24) 20 X 20				
Options	2 in.-30%, 4 in.-65%, 4 in.-85%						2 in.-30%, 4 in.-65%, 4 in.-85%				
CONNECTIONS											
Water Inlet (in.), Type	3 1/8 Sweat										
Water Outlet (in.), Type	3 1/8 Sweat										
Condensate Drain (in.), Type	1 MPT										
CONTROLS	Stand-Alone Microprocessor										
Network Interface	Native BACnet, LON (with adapter), N2, or MODBUS										
Building Pressure Switch											
Range	0.17 to 5 (± 0.05) in. wg										
Vendor Setting	0.6 ± 0.06 in. wg										
Duct High Pressure Switch											
Range	0.17 to 5 (± 0.05) in. wg										
Vendor Setting	3.0 ± 0.30 in. wg										
R-410A Refrigerant High Pressure Switch Open (psig)	575										
R-410A Refrigerant Low Pressure Switch Open (psig)	53										

LEGEND

DX — Direct Expansion

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†Registered trademark of Echelon Corporation.
**Registered trademark of Schneider Electric.

Table 10 — 50XJ Physical Data (cont)

UNIT 50XJ	104			
COMPRESSOR OPTION	B	D	E	F
NOMINAL UNIT CFM	28,000			
REFRIGERANT	R-410A			
CABINET				
Length (ft-in.)	10-0$^1/_4$			
Width (ft-in.)	7-0$^1/_4$			
Height (ft-in.)	7-11$^3/_4$			
OPERATING WEIGHT (lb)	See Tables 1-9			
OPERATING CHARGE (lb)				
Circuit No. 1 and 4	29			
Circuit No. 2 and 3	29			
COMPRESSORS				
Circuit No. 1 and 4 Model / Size	–15	–13	–15	–20
Circuit No. 2 and 3 Model / Size	–20	–25	–25	–25
Circuit No. 1 and 4 Oil Charge (oz)	140	140	140	158
Circuit No. 2 and 3 Oil Charge (oz)	158	200	200	200
Number of Capacity Steps	4	4	4	4
Number of Circuits	4	4	4	4
CONDENSER				
Quantity	4	4	4	4
Nominal Gpm	263	285	300	338
Gpm Range	175-306	190-333	200-350	225-394
Max. Water-Side Pressure Std. (psig)	150	150	150	150
Max. Water-Side Pressure Option (psig)	400	400	400	400
Min. Entering Water without Head Pressure Control (F)	55	55	55	55
Min. Entering Water with Head Pressure Control (F)	35	35	35	35
Max. Entering Water Temperature (F)	115	115	115	115
Water Volume (gal) Total	20.1	20.1	20.1	22.2
INDOOR DIRECT EXPANSION (DX) COIL	$^1/_2$-in. OD, Copper Tube, Aluminum Fin			
Face Area (sq ft)	55.8			
Number of Rows...Fins/in.	6...12			
WATER-SIDE ECONOMIZER COIL	$^5/_8$-in. OD, Copper Tube, Aluminum Fin			
Face Area (sq ft)	55.8			
Number of Rows...Fins/in.	4...10			
Water Volume (gal)	33			
HOT WATER HEATING COIL	$^5/_8$-in. OD, Copper Tube, Aluminum Fin			
Face Area (sq ft)	51.5			
Number of Rows...Fins/in.	2...10			
Water Volume (gal)	14.7			
STEAM HEATING COIL	1-in. OD, Copper Tube, Aluminum Fin			
Face Area (sq ft)	53			
Number of Rows...Fins/in.	1...8			
INDOOR FAN	Spring Isolated, Forward Curve			
Nominal Cfm	28,000			
Quantity	1			
Size (in.)	27 x 25			
Minimum Hp Range	15			
Maximum Hp Range	50			
Minimum Design Cfm	22,320			
Maximum Design Cfm	33,480			
Maximum Allowable Rpm	910			
Fan Shaft Diameter (in.)	2$^7/_{16}$			

UNIT 50XJ	B	D		E		F
INDOOR FAN MOTOR OPTIONS						
Hp Range	15	20	25	30	40	50
Frame Size	254T	256T	284T	286T	324T	326T
Motor Efficiency % Premium	93.0	93.6	93.6	93.6	94.5	94.5
Fan Rpm	648	686	742	798	826	830
Fan Pulley Diameter (in.)	12.5	12.5	12.5	12.5	12.5	13.7
Motor Shaft Diameter (in.)	1$^5/_8$	1$^5/_8$	1$^7/_8$	1$^7/_8$	2$^1/_8$	2$^1/_8$
Number of 5V Belts	3	3	3	3	4	4
Motor Pulley Diameter (in.)	4.5	4.9	5.3	5.7	5.9	6.5
Center Distance (in.)	23$^1/_4$	23$^1/_4$	22$^5/_8$	22$^5/_8$	21$^7/_8$	21$^7/_8$

UNIT 50XJ	104
RETURN AIR FILTERS TYPE	4-in. 30% Disposable (MERV 6)
Filter Face Area (sq ft)	66.7
(Qty) Size (in.)	(24) 20 X 20
Options	2 in.-30%, 4 in.-65%, 4 in.-85%
CONNECTIONS	
Water Inlet (in.), Type	3$^1/_8$ Sweat
Water Outlet (in.), Type	3$^1/_8$ Sweat
Condensate Drain (in.), Type	1 MPT
CONTROLS	Stand-Alone Microprocessor
Network Interface	Native BACnet, LON (with adapter), N2, or MODBUS
Building Pressure Switch	
Range	0.17 to 5 ($\pm$ 0.05) in. wg
Vendor Setting	0.6 $\pm$ 0.06 in. wg
Duct High Pressure Switch	
Range	0.17 to 5 ($\pm$ 0.05) in. wg
Vendor Setting	3.0 $\pm$ 0.30 in. wg
R-410A Refrigerant High Pressure Switch Open (psig)	575
R-410A Refrigerant Low Pressure Switch Open (psig)	53

LEGEND

DX — Direct Expansion

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†Registered trademark of Echelon Corporation.
**Registered trademark of Schneider Electric.

VIBRATION ISOLATION — Unit vibration pads are shipped with each unit. Install these pads under the corners and middle of the front and rear base rails. Pad size and quantity are selected based on total unit weight, approximately 180 lb per 2x2-in. square. If alternate unit spring isolation is required, contact a Carrier sales engineer for corner weight design information.

Fan sled mounting springs and a fan outlet flexible collar provide fan isolation. Flexible mounting grommets provide compressor isolation. No adjustments are necessary.

REMOVE PACKAGING — Remove all protective plastic, remove and discard unit top cover protector, filter cover, controller display protector and water piping connection packaging.

The unit fan sled assembly is shipped complete with four tiedown brackets located over isolation springs. These brackets hold the sled assembly firmly for shipping and must be removed prior to unit operation. To remove the tiedown brackets follow these steps and refer to Fig. 6:

1. Enter unit through left and right side access.
2. Loosen $^{1}/_{4}$ x $1^{1}/_{2}$ hex head bolts (total four per bracket) on all four tiedown brackets.
3. Remove bolts and tiedown brackets and discard.

Check that the fan sled is level and adjust isolation spring height as described below.

1. Using a wrench, hold the lower retaining nut (under fan sled rail) while loosening the upper retaining nut. Refer to Fig. 6.
2. Hold the center threaded rod with a screwdriver and rotate the lower retaining nut clockwise to raise the fan sled, or counterclockwise to lower the fan sled.
3. When fan sled is level, tighten the top retaining nut.

Step 3 — Install Accessories — Most product options are factory installed. Accessories and options that require field installation or and/or adjustment are described below. For additional details, refer to the installation instructions shipped with each accessory.

SPACE TEMPERATURE SENSOR — The 33ZCT55SPT space temperature sensor (SPT) with timed override button is used to measure the building interior temperature. Locate the sensor on an interior building wall. The sensor wall plate accommodates the NEMA (National Electric Manufacturers Association) standard 2 x 4-in. junction box. The sensor can be mounted directly on the wall surface if acceptable by local codes.

Do not mount the sensor in drafty locations such as near air conditioning or heating ducts, over heat sources such as baseboard heaters, radiators, or directly above wall-mounted lighting dimmers. Do not mount the sensor near a window which may be opened, near a wall corner, or a door. Sensors mounted in these areas will have inaccurate and erratic sensor readings.

The sensor should be mounted approximately 5 ft from the floor, in an area representing the average temperature in the space. Allow at least 4 ft between the sensor and any corner and mount the sensor at least 2 ft from an open doorway. The SPT sensor wires will be connected to terminals on the unit main control board, Main Controller (located in the control panel).

Install the sensor as follows:

1. Locate the two Allen type screws at the bottom of the space temperature sensor.
2. Turn the two screws clockwise to release the cover from the sensor wall mounting plate.
3. Lift the cover from the bottom and then release it from the top fasteners.
4. Feed the wires from the electrical box through the opening in the center of the sensor mounting plate.
5. Using two no. 6-32 x 1 mounting screws (provided with the sensor), secure the sensor to the electrical box.

   NOTE: Sensor may also be mounted directly on the wall using 2 plastic anchors and 2 sheet metal screws (field supplied).
6. Use 20 gage wire to connect the sensor to the controller. This wire is suitable for distances of up to 500 ft. Use a two-conductor shielded cable for the sensor.
7. Replace the cover by inserting the cover at the top of the mounting plate first, then swing the cover down over the lower portion. Rotate the two Allen head screws counterclockwise until the cover is secured to the mounting plate and locked in position.

   See Table 11 for thermistor resistance vs. temperature values.

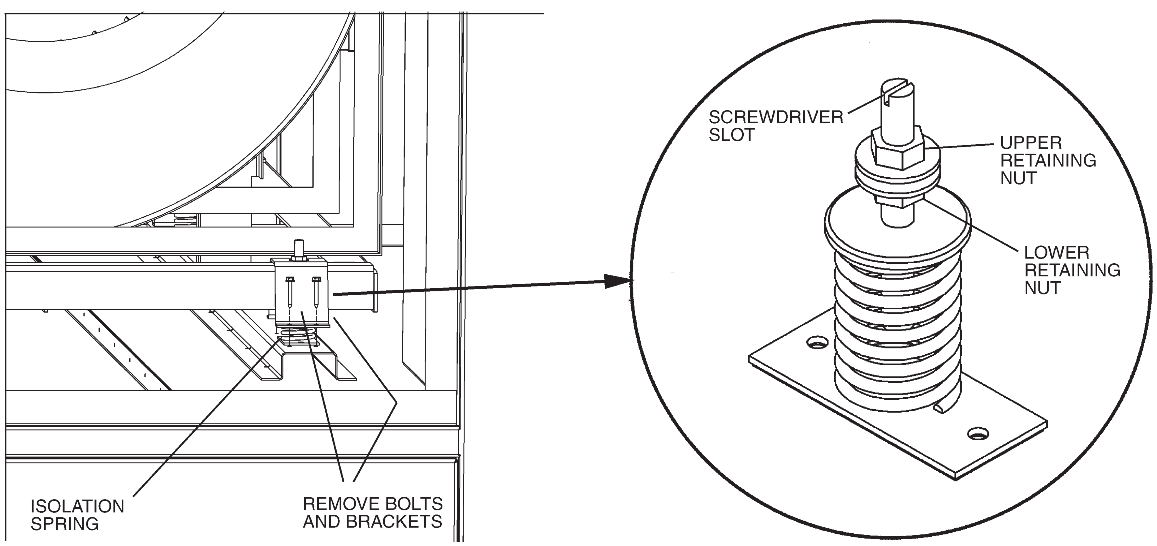


Fig. 6 — Remove Fan Sled Tiedown Brackets

Table 11 — Thermistor Resistance vs Temperature Values for Space Temperature Sensor (33ZCT55SPT), Supply Air Temperature Sensor, Outdoor Air Temperature Sensor, and Return Air/Mixed Air Temperature Sensor

TEMP (C)	TEMP (F)	RESISTANCE (Ohms)
–40	–40	335,651
–35	–31	242,195
–30	–22	176,683
–25	–13	130,243
–20	–4	96,974
–15	5	72,895
–10	14	55,298
–5	23	42,315
0	32	32,651
5	41	25,395
10	50	19,903
15	59	15,714
20	68	12,494
25	77	10,000
30	86	8,056
35	95	6,530
40	104	5,325
45	113	4,367
50	122	3,601
55	131	2,985
60	140	2,487
65	149	2,082
70	158	1,752

Step 4 — Install Ductwork

If the installation requires a single supply duct (installing multiple units to a single/common supply duct is not recommended), the preferred orientation is with the supply duct turning toward the front of the unit, matching the standard fan rotation direction. If the supply duct turns toward the back of the unit (opposite of the fan rotation direction), additional noise and pressure drop will occur. Refer to the Carrier System Design Manual or ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) standards for recommended duct design.

EVAPORATOR DUCTWORK — The supply duct should be properly supported and the aspect ratio as close to square as possible. Size the duct for a maximum of 2000 ft per minute velocity in areas outside the equipment room. Line the duct with acoustical insulation for a minimum of 15 ft beyond the equipment room. Use a flexible duct connection on the unit end to prevent transmission of any unit vibrations into the duct.

A return duct may be attached to the unit, but is not necessary. The return to the unit should prevent line of sight visibility to the space; straight ducting from the space will transmit noise. Insulated return duct is also recommended for acoustically sensitive spaces. Maximum velocity should not exceed 1000 ft per minute over occupied spaces. Adequate return area is essential for proper operation.

DUCT STATIC PRESSURE PROBE AND TUBING — Select a location in the ductwork where the static pressure will be representative of the static pressure to be monitored and maintained (typically $^2/_3$ of the distance from the supply fan to the most remote terminal). Install the factory-supplied probe with the tip facing the airflow. See Fig. 7.

Use $^1/_4$ in. OD approved polyethylene tubing for up to 50 ft ($^3/_8$ in. OD for 50 to 100 ft) to connect the probe to the bulkhead fitting mounted on the right corner post (Fig. 8). Route the tubing from the probe back to this bulkhead fitting.

> IMPORTANT: Use tubing that complies with local codes. Improper location or installation of the supply duct pressure tubing will result in unsatisfactory unit operation and poor performance.

NOTE: If the probe is more than 100 ft from the control box, the static pressure transducer should be moved out of the control box and mounted remotely. The sensor should be mounted closer to the probe and then rewired to the original connections in the control box using 18 AWG (American Wire Gage) 2-conductor cable.

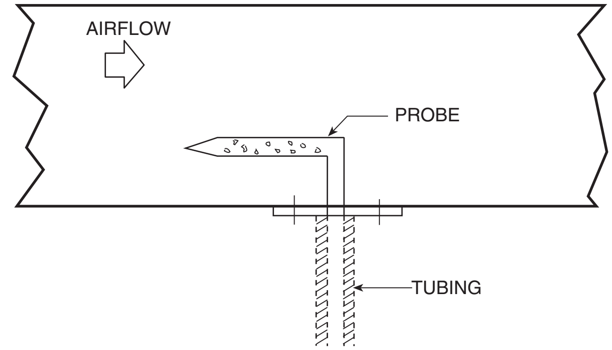


Fig. 7 — Duct Static Pressure Probe (SPP)

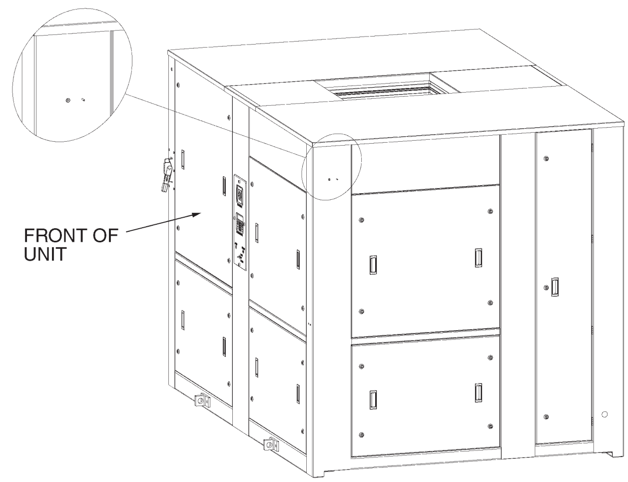


Fig. 8 — Bulkhead Fitting for Duct Static Pressure Probe Tubing Connection

Step 5 — Make Piping Connections

CONDENSER WATER SUPPLY AND RETURN — The inlet fluid connection is always the lower of the 2 condenser connections. Install a screen strainer with a minimum of 20 mesh ahead of the condenser inlet to prevent debris from damaging the internal condenser tubes.

Provide openings in water piping for pressure gages and thermometers (if used). These openings should be 5 to 10 pipe diameters from the unit water connections. For thorough mixing and temperature stabilization, wells in the leaving water pipe should extend at least 2 in. (50 mm) into the pipe.

The outlet water connection is the upper of the 2 connections. The condensers have 3$^1/_8$ in. copper sweat connections. Plan the piping arrangement in accordance with good piping practices and so that the piping does not cross in front of the access panels. Use flexible connections on the condenser piping to reduce vibration transmission. Install pipe hangers where needed. Make sure no weight or stress is placed on the water connection.

NOTE: Remove shipping protector from piping connections, cut caps off with a tubing cutter or hacksaw (or unsweat). Braze on a fitting consistent with field piping.

Although the condenser has an air vent inside the fan compartment (Fig. 9), it is best to install a field-supplied air vent in the system to facilitate servicing. Field-supplied shut-off and balancing valves should also be installed to facilitate servicing and flow balancing.

Locate valves in inlet and outlet lines as close to the unit as possible. Locate air vents at the highest point of the system loop.

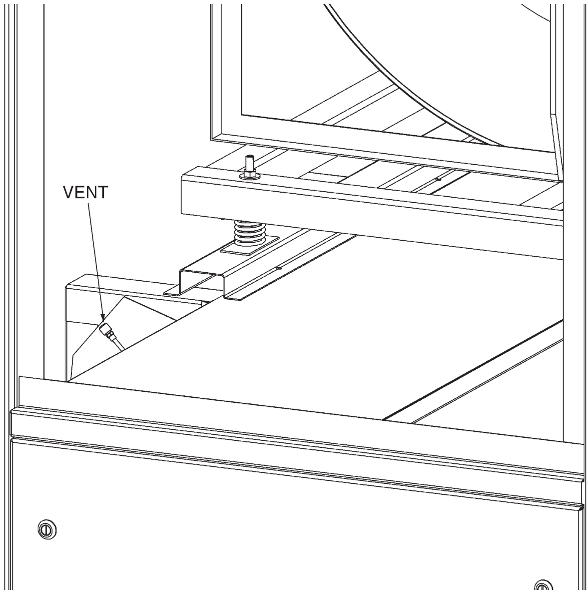


Fig. 9 — Condenser Air Vent

CONDENSER WATER DRAIN — Provide drain connections at all low points in the loop to permit complete system drainage.

For units with a water-side economizer coil, there is $^{1}/_{2}$ in. ball valve located in the left rear corner post for a drain.

EVAPORATOR CONDENSATE DRAIN — The internal piping for the evaporator condensate drain is done at the factory. The outlet for the condensate drain is located above the condenser water locations as shown in Fig. 4.

NOTE: On the opposite side of the unit there is a hole and a cap in case the condensate drain must be routed to this side. Changing the location of the evaporator condensate drain requires rerouting the internal piping.

HOT WATER COIL (OPTION) SUPPLY AND RETURN — Piping should be in accordance with accepted industry standards and all components rated for the system pressure expected. Pipe the coil so that they will drain and provide a drain and vent.

Always connect the supply to the top of the coil, and the return to the bottom. Refer to Fig. 4 for hot water supply and return piping locations.

Water coils should not be subjected to entering-air temperatures below 38 F to prevent coil freeze-up. If temperatures over the coil are below this, use a glycol or brine solution. Use a solution with the lowest concentration which meets the coldest air expected. Excess concentration will greatly reduce coil capacity.

The return air duct system should be carefully designed to get adequate mixing of the return air and outdoor airstreams to prevent cold spots on the coil that could freeze.

A two or three-position, field-supplied modulating control valve may be used to control water flow. Select the valve based on the control valve manufacturer's recommendations for size and temperature rating. Select the control valve C_V (valve flow coefficient) based on pressure drop and flow rate through the coil.

Pipe sizes should be selected on the head pressure available from the pump. The velocity should not exceed 8 ft per second. Design the piping system for approximately a 3-ft of loss per 100 equivalent ft of pipe. The piping system should allow for expansion and minimize vibration between the unit and piping system.

STEAM COIL (OPTION) SUPPLY AND RETURN — The following piping guidelines will contribute to efficient coil operation and long coil life:

1. Use full size coil outlets and return piping to the steam trap. Do not bush the return outlet to the coil; run full size to the trap, then reduce at the trap.
2. Use float and thermostatic traps only for condensate removal. Base the trap size selection on the difference in pressure between the steam supply main and the condensate return main. Select a trap with 3 times the condensate rating of the coil to which it is connected.
3. Use thermostatic traps for venting only.
4. Use only $^{1}/_{2}$-in., 15-degree swing check valves. Install them horizontally, pipe them open to the atmosphere, and place them at least 12 in. above the condensate outlet. Do not use 45-degree, vertical lift and ring check valves.
5. Size the supply valve for the maximum anticipated steam load.
6. Do not drip steam mains into the coil sections. Drip them on the pressure side of the control valve and trap them into the return main beyond the coil trap.
7. Do not use a single trap for two or more coils installed in series. Where two or more coils are installed in a single bank, in parallel, the use of a single trap is permissible only if the load on each coil is equal. Where loads in the same coil bank vary, use a separate trap for each coil. Variation in load on different coils in the same bank may be caused by several factors, two of which are uneven airflow distribution across the coil and stratification of inlet air across the coil.
8. Do not try to lift condensate above the coil return into an overhead main, or drain into a main under pressure with a modulating or on/off steam control valves. A pump and receiver should be installed between the coil condensate traps and overhead mains and return mains under pressure.
9. Use a strainer ($^{3}/_{32}$-in. mesh) on steam supply side, as shown in the piping diagrams, to avoid collection of scale or other foreign matter in inner tube distributing orifices.

Refer to Fig. 10 for typical steam coil piping.

RELIEF DEVICES — When optional service valves are ordered, fusible plugs are located in each circuit between the compressor and discharge shutoff valve.

REFRIGERANT RELIEF VALVE — Valves are installed in each circuit and are located on all condensers. These valves are designed to relieve if an abnormal pressure condition arises. Relief valves on all condensers relieve at 400 psig. Valves should not be capped. If a valve relieves, replace it. If the valve is not replaced, it may relieve at a lower pressure, or leak due to trapped dirt from the system which may prevent resealing.

WATER-SIDE ECONOMIZER — The optional water-side economizer is factory installed and piped internally to the condenser water. Once field piping for the condensers has been completed (see Condenser Water Supply and Return above), the water-side economizer piping is also complete.

WATER FILL AND AIR PURGE — If present, water and steam valves should be opened to fill the unit piping and heat exchangers. Controlled valves may require a manual override of control actuators or manual override of the control signal outputs from the unit control panel or building management system. Refer to the 50XJ Operation and Troubleshooting manual for more information.

To remove air from the internal piping and heat exchangers, use the plug ports provided. On the condensers, use the condenser air vent (bleed valve) in the left side of the fan compartment (Fig. 9). On the water-side economizer coil (if present), the plug is on top of the supply header and return header, at the same end as the water connections. On the hot water coil (if present), the plug is on the top of the return header at the opposite end as the water connections. On the steam coil (if present), the plug is on the top of the supply header at the same end as the steam connections.

NOTE: Failure to remove air trapped in the heat exchangers will result in reduced capacity and/or may initiate system protection devices.

⚠ CAUTION

Avoid subjecting the condensers to thermal shock, excessive pressures and temperatures. These conditions can impose stress on the condenser, resulting in premature failure of the heat exchanger as well as other system components. DO NOT add hot fluid to the unit when it is cold, or cold fluid when the unit is hot.

Step 6 — Complete Electrical Connections

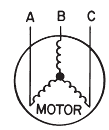
GENERAL — Verify that electrical requirements listed on the unit nameplate match available power supply. The unit voltage must be within the range shown in Table 12 and phases must be balanced within 2%. Contact local power company for line voltage corrections. Never operate a motor where a phase imbalance in supply voltage is greater than 2%.

UNBALANCED 3-PHASE SUPPLY VOLTAGE — Use the following formula to determine the percent of voltage imbalance.

Percent Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 V
BC = 464 V
AC = 455 V

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3} = \frac{1371}{3} = 457$$

Determine maximum deviation from average voltage:

(AB) 457 – 452 = 5 V
(BC) 464 – 457 = 7 V
(AC) 457 – 455 = 2 V

Maximum deviation is 7 V.

Determine percent of voltage imbalance:

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Unit operation on improper line voltage or excessive phase imbalance may be considered abuse and any resulting damage may not be covered by Carrier warranty.

All wiring must be in accordance with local or NEC (National Electrical Code) regulations.

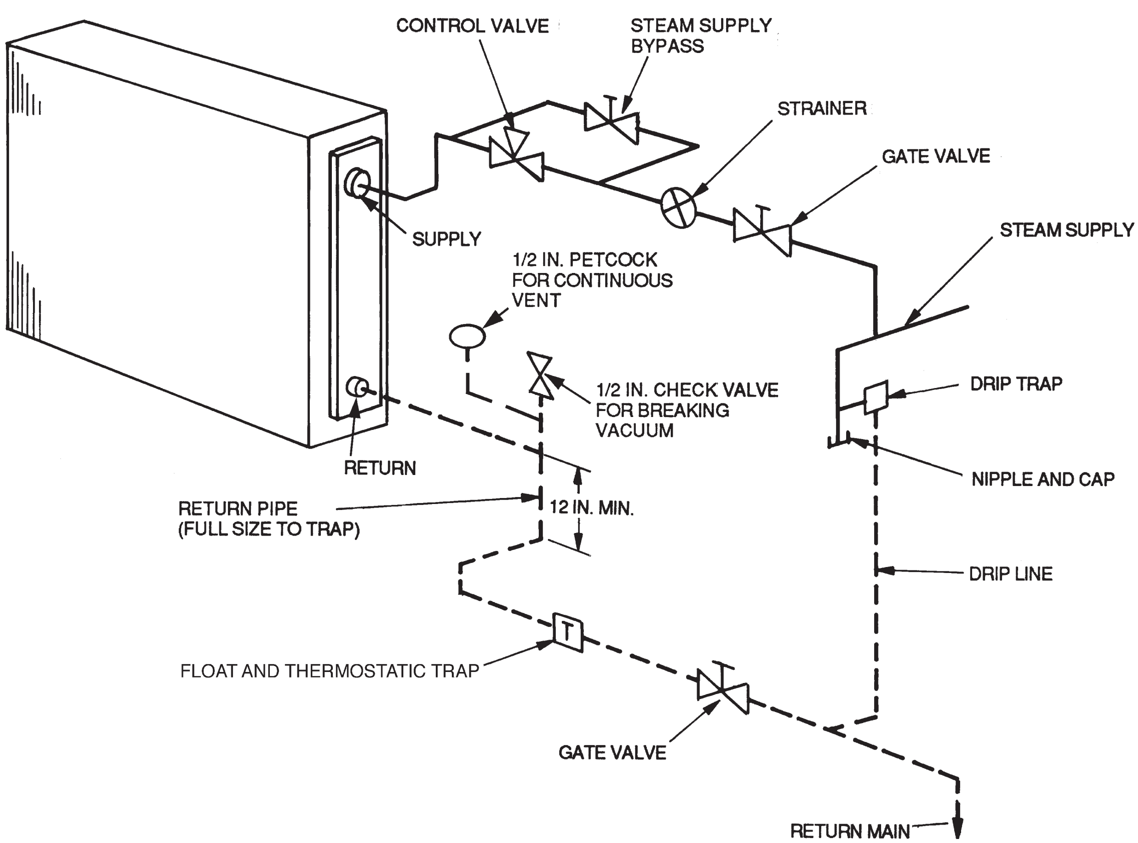


Fig. 10 — Typical Steam Coil Piping

ELECTRICAL CALCULATIONS — To determine minimum circuit amps (MCA) and maximum overcurrent protection (MOCP) for unit power supply:

1. From Table 12, use the first eight digits of the unit model number to look up the rated load amps (RLA) corresponding to the nominal voltage for compressor no. 1 through 4.
2. Use Table 13 to determine the full load amps (FLA) of the indoor-fan motor. The motor code is given in the tenth digit of the unit model number. Use the motor code and the correct nominal voltage to look up the correct value of FLA.
3. From the RLA and FLA values determined in Steps 1 and 2, determine the largest of these values. Then calculate MCA and MOCP using the following formulas:

   MCA = 1.25 x (largest RLA or FLA from Step 3) + (sum of the remaining RLA or FLA values from Steps 1 and 2) + Misc. Load. (Misc. Load = 4.0 A for 208/230 V units and 2.0 A for 460-575 V units)

   MOCP = 2.25 x (largest RLA or FLA from Step 3) + (sum of the remaining RLA or FLA values from Steps 1 and 2) + Misc. Load. (Misc. Load = 4.0 A for 208/230 V units and 2.0 A for 460-575 V units)

   After calculating MOCP using the above formula, determine final value for maximum overcurrent protection by selecting the closest standard fuse size that is lower than the number calculated. Use Table 14 for standard fuse sizes.

To determine MCA and MOCP for unit power supply:

EXAMPLE:

Given: 50XJD084 with a 460-3-60 power supply, 30 hp ODP high-efficiency indoor-fan motor (motor code 'U')

Solution:

1. From Table 12, compressor RLA values are: 51.3, 73.9, 73.9, 51.3.
2. From Table 13, indoor fan motor FLA value is: 59.0
3. The largest RLA or FLA value is 59.0.
4. Calculate MCA.

   MCA = (1.25 x 59.0) + (51.3 + 73.9 + 73.9 + 51.3) + 4.0
   = 73.75 + 250.4 + 4.0
   = 328.15
5. Calculate MOCP:

   MOCP = (2.25 x 59.0) + (51.3 + 73.9 + 73.9 +51.3) + 4.0
   = 132.75 + 250.4 + 4.0
   = 387.15
6. From Table 14, the closest standard fuse size that is smaller then the calculated value is 400 amps. Therefore, maximum overcurrent protection (MOCP) for this unit is 400 amps.

UNIT DISCONNECT — The optional, factory-supplied disconnect requires some field installation.

> IMPORTANT: Install the unit remote disconnect handle using the supplied screws (in bag attached to the handle) **before power is connected to the unit.**

1. Make sure unit power is off.
2. Remove the unit service panel and locate the disconnect handle mechanism in the front, left hand side of the unit.
3. Remove protective shipping material and wire ties.
4. Remove the six 1/4 x 14 pan head screws from the plastic bag. From the inside of the unit, install the disconnect handle through the hole in the unit exterior (on the front left corner post). See Fig. 11.
5. Install and tighten the screws to secure the handle in place. When properly installed, the disconnect handle will look like Fig. 12.

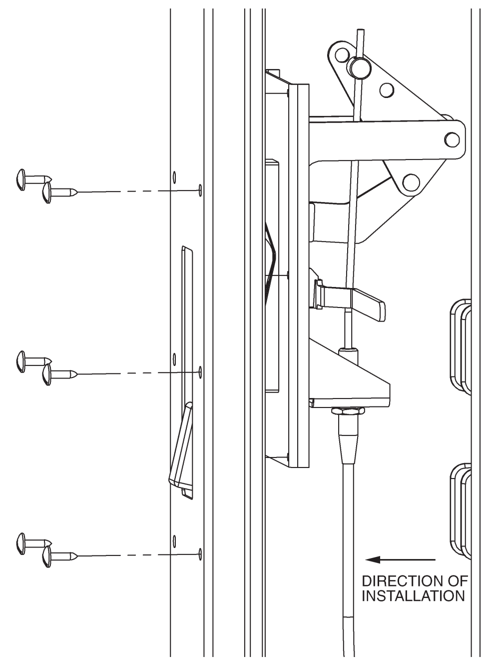


Fig. 11 — Install Disconnect Handle into Holes

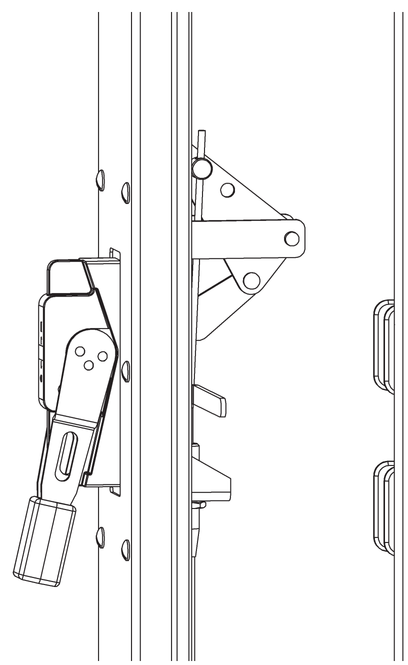


Fig. 12 — Disconnect Handle Installed

Table 12 — Compressor Electrical Data

50XJ UNIT SIZE	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR							
		Min	Max	No. 1		No. 2		No. 3		No. 4	
				RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
50XJB050	208/230	187	252	51.3	300	51.3	300	51.3	300	—	—
	460	432	504	25.7	150	25.7	150	25.7	150	—	—
	575	540	630	19.9	109	19.9	109	19.9	109	—	—
50XJC064	208/230	187	252	33.3	239	33.3	239	33.3	239	33.3	239
	460	432	504	20.0	125	20.0	125	20.0	125	20.0	125
	575	540	630	12.8	80	12.8	80	12.8	80	12.8	80
50XJD050	208/230	187	252	55.8	340	55.8	340	55.8	340	—	—
	460	432	504	29.3	179	29.3	179	29.3	179	—	—
	575	540	630	23.7	132	23.7	132	23.7	132	—	—
50XJE064	208/230	187	252	33.3	239	51.3	300	51.3	300	33.3	239
	460	432	504	20.0	125	25.7	150	25.7	150	20.0	125
	575	540	630	12.8	80	19.9	109	19.9	109	12.8	80
50XJF064	208/230	187	252	51.3	300	51.3	300	51.3	300	51.3	300
	460	432	504	25.7	150	25.7	150	25.7	150	25.7	150
	575	540	630	19.9	109	19.9	109	19.9	109	19.9	109
50XJD074	208/230	187	252	51.3	300	55.8	340	55.8	340	51.3	300
	460	432	504	25.7	150	29.3	179	29.3	179	25.7	150
	575	540	630	19.9	109	23.7	132	23.7	132	19.9	109
50XJE074	208/230	187	252	55.8	340	55.8	340	55.8	340	55.8	340
	460	432	504	29.3	179	29.3	179	29.3	179	29.3	179
	575	540	630	23.7	132	23.7	132	23.7	132	23.7	132
50XJF074	208/230	187	252	55.8	340	55.8	340	55.8	340	55.8	340
	460	432	504	29.3	179	29.3	179	29.3	179	29.3	179
	575	540	630	23.7	132	23.7	132	23.7	132	23.7	132
50XJA084	208/230	187	252	51.3	300	51.3	300	51.3	300	51.3	300
	460	432	504	25.7	150	25.7	150	25.7	150	25.7	150
	575	540	630	19.9	109	19.9	109	19.9	109	19.9	109
50XJB084	208/230	187	252	51.3	300	55.8	340	55.8	340	51.3	300
	460	432	504	25.7	150	29.3	179	29.3	179	25.7	150
	575	540	630	19.9	109	23.7	132	23.7	132	19.9	109
50XJC084	208/230	187	252	55.8	340	55.8	340	55.8	340	55.8	340
	460	432	504	29.3	179	29.3	179	29.3	179	29.3	179
	575	540	630	23.7	132	23.7	132	23.7	132	23.7	132
50XJD084	208/230	187	252	51.3	300	73.9	505	73.9	505	51.3	300
	460	432	504	25.7	150	33.9	225	33.9	225	25.7	150
	575	540	630	19.9	109	24.6	180	24.6	180	19.9	109
50XJE084	208/230	187	252	55.8	340	73.9	505	73.9	505	55.8	340
	460	432	504	29.3	179	33.9	225	33.9	225	29.3	179
	575	540	630	23.7	132	24.6	180	24.6	180	23.7	132
50XJF084	208/230	187	252	51.3	300	85.3	605	85.3	605	51.3	300
	460	432	504	25.7	150	46.7	272	46.7	272	25.7	150
	575	540	630	19.9	109	24.7	238	24.7	238	19.9	109
50XJA094	460	432	504	29.3	179	29.3	179	29.3	179	29.3	179
	575	540	630	23.7	132	23.7	132	23.7	132	23.7	132
50XJB094	460	432	504	25.7	150	33.9	225	33.9	225	25.7	150
	575	540	630	19.9	109	24.6	180	24.6	180	19.9	109
50XJC094	460	432	504	29.3	179	33.9	225	33.9	225	29.3	179
	575	540	630	23.7	132	24.6	180	24.6	180	23.7	132
50XJD094	460	432	504	25.7	150	46.7	272	46.7	272	25.7	150
	575	540	630	19.9	109	24.7	238	24.7	238	19.9	109
50XJF094	460	432	504	29.3	179	46.7	272	46.7	272	29.3	179
	575	540	630	23.7	132	24.7	238	24.7	238	23.7	132
50XJB104	460	432	504	25.7	150	46.7	272	46.7	272	25.7	150
	575	540	630	19.9	109	24.7	238	24.7	238	19.9	109
50XJD104	460	432	504	29.3	179	46.7	272	46.7	272	29.3	179
	575	540	630	23.7	132	24.7	238	24.7	238	23.7	132
50XJE104	460	432	504	33.9	225	46.7	272	46.7	272	33.9	225
	575	540	630	24.6	180	24.7	238	24.7	238	24.6	180
50XJF104	460	432	504	46.7	272	46.7	272	46.7	272	46.7	272
	575	540	630	24.7	238	24.7	238	24.7	238	24.7	238

LEGEND

LRA — Locked Rotor Amps
RLA — Rated Load Amps

NOTE: For indoor fan motor data, see Table 13.

Table 13 — Fan Electrical Data

MOTOR TYPE	MOTOR CODE	HP	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		FLA
				Min	Max	
Open Drip-Proof (ODP) Premium Efficiency	N	10.0	208/230 460	187 432	252 504	28.0/25.2 12.6
	P	15.0	208/230 460	187 432	252 504	42.5/37.8 18.9
	Q	20.0	208/230 460	187 432	252 504	56.0/49.0 24.5
	R	25.0	208/230 460	187 432	252 504	69.5/61.0 30.5
	S	30.0	208/230 460	187 432	252 504	82.5/72.4 36.2
	T	40.0	208/230 460	187 432	252 504	107.0/95.0 47.5
	U	50.0	460	432	504	59.0

LEGEND

FLA — Full Load Amps

Table 14 — Standard Amperage Ratings for Overcurrent Protection Devices

AMPS	AMPS
80	200
90	225
100	250
110	300
125	350
150	400
175	450

POWER WIRING — The 50XJ unit must have adequate overcurrent protection, fuses, or HACR (Heating, Air-Conditioning and Refrigeration) breakers, according to the National Electrical Code (NEC) and all applicable local codes.

For field power connections, all main power wiring enters the unit through a factory-punched access hole in the corner panel. Refer to Fig. 4. All units have a single location for power entry to simplify field power wiring. Attach power wires to the power connections on the main power terminal block (TB1) or optional disconnect switch in the unit control box. Be sure to install a ground wire.

CONTROL WIRING — All units are designed to operate either with a building management system or stand-alone (local control).

SERVICE

Compressor Rotation — To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up. If the suction pressure does not drop and the discharge pressure does not rise to normal levels:
   a. Turn off power to the unit and tag disconnect.
   b. Reverse any two of the unit power leads. Reapply power to the unit. The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

Fan Motor Replacement — If required, replace the fan motor with an equal or better type and efficiency motor with equal horsepower. The motor must be rated for a variable frequency drive (VFD), or inverter, application. Do not change the horsepower unless there is a system design requirement change and VFD size analysis.

CHECK/CHANGE VFD OUTPUT CURRENT LIMIT — The variable frequency drive (VFD) provides additional fan motor protection by limiting the output current to a programmed value. This value has been factory set according to the factory-installed motor and VFD sizing options.

If the VFD and/or motor is replaced, the VFD setup mode parameter “tHr1” should be reprogrammed to the following calculated values for optimum motor protection and operating range:

For VFD size about equal to motor:
tHr1 = 100 * motor nameplate Amps/VFD rated output Amps

For VFD oversized to motor:
tHrl = 100 * motor nameplate Amps * Service Factor/VFD rated output Amps

Standard Diagnostic Features, Alarms and Alarm Light — Unit reset of alarm or failure operation is automatic when the fault is cleared, except as noted.

SUPPLY AIR TEMPERATURE ALARM — If the supply air temperature input falls outside the range of 25 to 150 F, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "sat_alarm" will be generated, but the unit will operate normally.

SUPPLY AIR TEMPERATURE SENSOR FAILURE — If the supply-air temperature sensor fails the system will display a supply-air temperature of 0.00° F, the compressor outputs will be disabled, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "sat_sen_alarm" will be generated.

DUCT STATIC PRESSURE ALARM — If the duct static pressure input exceeds 5.45 in. water column, the alarm output will close and the red alarm light will be lit. If the duct pressure input exceeds the supply fan proof level without a call for fan operation, the alarm output will close and the red alarm light will be lit after a 2-minute delay. An alarm with an ID of "dsp_alarm" will be generated, but the unit will operate normally.

DUCT STATIC PRESSURE SENSOR FAILURE — If the duct static pressure sensor fails, the system will display 0.00 in. water column, the controller outputs will be forced off, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "dsp_sens_alarm" will be generated.

DUCT HIGH STATIC INPUT (DHS) — This factory-installed air switch provides over pressurization protection for the ductwork. The switch is a normally open switch, with adjustable manual setting (range is 1 to 5 in. wg with a default of 3.0 in. wg). Upon switch closure, the controller outputs will be forced off, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "dhs_alarm" will be generated.

FIRE/SHUTDOWN INPUT (FSD) — This is a normally closed input, which when opened, all control outputs including the fan are immediately turned off, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "fire_alarm" will be generated.

CONDENSER WATER FLOW (CDWF) — This is an optional switch that can be used with the Omnizone™ controller. A thermal dispersion flow switch detects water flowing past the sensor element and closes normally open contacts that energize a relay with normally open contacts to the unit controller. A configuration set point is used to indicate if this switch is installed and disable alarms from the flow switch. When the flow switch is installed, the controller will check for water flow when flow is requested for unit operation and if flow is not detected, compressor operation will be disabled. The controller will also test or to see if there is water flow when the unit is not operating. If there is no flow when the unit is operating or if there is flow when the unit is not operating, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "cdwf_alrm" will be generated.

DIRTY FILTERS SWITCH INPUT (DFS) — This optional air pressure switch may be factory installed to detect the pressure differential pressure across the return air filters. This switch is normally open, with manually adjustable setting at the switch between 0.5 and 1.5 in. wg. Upon closure, controller should wait to assure closure for a minimum of 1 minute, and then the alarm output will close and the red alarm light will be lit. An alarm with an ID of "flts_alarm" will be generated. However, all other unit operation should remain normal

PHASE LOSS/REVERSAL INPUT (PRM) — A power monitor may be installed in the unit to detect over-voltage, under-voltage conditions, phase loss and/or phase reversal. Upon switch closure a pilot relay is engaged and the input to the controller is closed. In adverse power conditions, all controller outputs will be forced off, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "prm_alarm" will be generated.

ECONOMIZER COIL FREEZE PROTECTION — This input can be either a dry contact input or an averaging thermistor sensor. This protection is installed when the economizer coil is provided. In the event the freeze protection switch contacts open or the sensed economizer temperature falls below 37 F, or the sensed economizer temperature sensor fails, the ventilation request output will be closed, the pump output will be closed, the compressor outputs will be opened, the alarm output will close, the water-side economizer valve will open to 100%, and the red alarm light will be lit. This will maintain condenser water flow through the coil to prevent freezing the coil while stopping all other operations that could have contributed or will be affected by the freeze condition. An alarm with an ID of "eco_freeze" will be generated.

If the freeze condition is maintained for 15 minutes, the supply fan will be stopped. The optional factory-installed switch is a manual reset device. The optional factory-installed thermistor will automatically reset when the return-air temperature exceeds 42 F.

COMPRESSOR STATUS — Compressor status is determined from the compressor relay (CRx) inputs to the controller. If a compressor input is OFF for several seconds while that compressor is commanded ON, the compressor output will be shut down. After 5 minutes, the controller will attempt to restart the compressor, provided there is a call for cooling. If the compressor fails again, the controller will shut down the compressor and attempt to restart it 10 minutes later. If the compressor fails again, the controller will shut down the compressor and attempt to restart it 15 minutes later, assuming there is still a call for cooling. On a third failed attempt to run the compressor, the compressor will be locked out pending a power reset or the end of the cooling cycle (no cooling demand).

When a compressor is locked out or the controller detects compressor operation with no call for that compressor, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "dx#_alarm" will be generated, where "#" designates which compressor (no. 1 through 4) is locked out. This alarm is only maintained while the controller is calling for a compressor and compressor operation is not detected or while compressor operation is detected and the controller is not calling for operation.

An alarm with ID of "dx#_lockout" is generated when it becomes locked out after three run attempts.

SUPPLY FAN STATUS — Supply fan status is determined by the duct static pressure sensor. If the fan is operating and a fan speed signal is sent to the variable frequency drive, the duct static pressure must become greater than the supply fan proof level (minsps_sp) for the supply fan status software point to turn on. When the duct static pressure becomes lower than the supply fan status low set point, the supply fan status will indicate OFF.

SUPPLY FAN FAILURE (OFF) — If the supply fan status is OFF for 4 minutes while the fan output is ON, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "sf_fail" will be generated. This alarm does not directly affect unit operation; however, the cooling, heating and other outputs require the fan status to be ON before they can be engaged.

SUPPLY FAN FAILURE (ON) — If the supply fan status is ON for 4 minutes while the fan output is OFF, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "sfs_alarm" will be generated. This error does not affect unit operation.

REFRIGERANT PRESSURE TRANSDUCER (PRES) — If the optional head pressure control option is enabled and the pressure transducer input exceeds 420 psig or falls below −6.7 psig, head pressure control will be disabled, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "ref_pres_alarm" will be generated

INDOOR AIR QUALITY SENSOR ALARM (IAQ) — If an indoor air quality sensor is field installed and configured, the controller will consider the IAQ input invalid if the level falls below 0 ppm or exceeds 2000 ppm, then the alarm output will close and the red alarm light will be lit. An alarm with an ID of "iaq_sns_alarm" will be generated and the control point will show 0 ppm. This error disables demand ventilation, but has no other effect on unit operation.

INDOOR RELATIVE HUMIDITY SENSOR ALARM (IRH) — If an indoor relative humidity sensor is field installed and configured, the controller will consider the IRH input invalid if the level falls below 0 or exceeds 100%, then the alarm output will close and the red alarm light will be lit. An alarm with an ID of "irh_sns_alarm" will be generated and the control point will show 0% rh. This error disables humidity control, but has no other effect on unit operation.

SPACE STATIC PRESSURE ALARM (BLDG PRESSURE) — If a building pressure sensor is field installed and configured, the controller will consider the pressure input invalid if the level falls below the configured low range set point or exceeds the low range set point plus the sensor range. In this case, the alarm output will close and the red alarm light will be lit. An alarm with an ID of "spstatic" will be generated and the control point will show 0 in. water column. This error disables space (building) static pressure control, but has no other effect on unit operation.

SPACE TEMPERATURE SENSOR FAILURE (SPT) — If a space temperature sensor (SPT) is field installed and configured, the controller will consider the SPT input invalid if the input temperature falls below 2 F or exceeds 180 F for a continuous 10 seconds, then the alarm output will close and the red alarm light will be lit. An alarm with an ID of "spt_alarm" will be generated. This error disables tenant (unoccupied) override by the SPT sensor and prevents use of this sensor value in the cooling/heating mode determination and the supply air reset calculation.

ENTERING WATER TEMPERATURE ALARM (EWT) — If an entering water temperature sensor is installed or the unit is configured for supply air temperature reset by the entering water temperature input, an alarm with an ID of "ewt_alarm" will be generated if the temperature input exceeds 115 F or falls below 35 F. The alarm output will close and the red alarm light will be lit; however, this alarm does not affect unit operation.

ENTERING WATER TEMPERATURE SENSOR FAILURE (EWT) — If an entering water temperature sensor is installed or the unit is configured for supply air temperature reset by the entering water temperature input, an alarm with an ID of "ewt_sen_alarm" will be generated if the temperature input exceeds 200 F or falls below –45 F. The alarm output will close and the red alarm light will be lit. The EWT output will show 0° F and this sensor shall not be used in the cooling/heating mode determination or the supply air reset calculation (if enabled). This alarm will also disable water-side economizer operation and head pressure control.

MIXED OR RETURN AIR TEMPERATURE ALARM (MA_RA) — If a mixed or return air temperature sensor is installed, an alarm with an ID of "mara_alarm" will be generated if the temperature input exceeds 120 F or falls below 35 F. The alarm output will close and the red alarm light will be lit; however, this alarm does not affect unit operation.

MIXED OR RETURN AIR TEMPERATURE SENSOR FAILURE (MA_RA) — If a mixed or return air temperature sensor is installed, an alarm with an ID of "mara_sen_alarm" will be generated if the temperature input exceeds 200 F or falls below –45 F. The alarm output will close and the red alarm light will be lit and the unit will output a value of 0 ° F for this point. This invalid input is not used for the supply air reset calculation, cooling/heating mode determination, or for control of an air economizer.

OUTDOOR AIR TEMPERATURE ALARM (OAT) — If an outdoor air temperature sensor is installed and configured, an alarm with an ID of "oat_alarm" will be generated if the temperature input exceeds 120 F or falls below 35 F. The alarm output will close and the red alarm light will be lit; however, this alarm does not affect unit operation.

OUTDOOR AIR TEMPERATURE SENSOR FAILURE (OAT) — If an outdoor air temperature sensor is installed and configured, an alarm with an ID of "oat_alarm" will be generated if the temperature input exceeds 200 F or falls below –45 F. The alarm output will close and the red alarm light will be lit. The outside air temperature output will show 0° F and the program will use a value of (economizer set point + 2 F) for the outside air temperature in the optional airside economizer routine.

COMPRESSOR RUNTIME ALARM — There is a set point to define a maximum compressor runtime in hours for each compressor. If a non-zero value is entered, the unit will generate an alarm with an ID of "dx#_rntm" when the compressor runtime exceeds the set point. The "#" designates the compressor number. This alarm will cause the red alarm light to be lit, but since it is only a status alarm, unit operation is not affected and this does not close the alarm output.

SUPPLY FAN RUNTIME ALARM — There is a set point to define a maximum supply fan run time. If a non-zero value is entered, the unit will generate an alarm with an ID of "sf_rntm" when the runtime exceeds the set point. This alarm will cause the red alarm light to be lit, but since it is only a status alarm, unit operation is not affected and this does not close the alarm output.

SELF-TEST ALARM — When the user starts a self-test sequence, an alarm with an ID of "selftest_alarm" will be generated and the red alarm light will be lit. This alarm is maintained for 4 minutes after the last self-test sequence has run. This alarm stops normal unit operation, but the unit returns to normal operation when the alarm is cleared. The alarm output is closed to designate each step of multi-step self-test routines (see the self-test section in Controls, Operating, Start-Up, and Troubleshooting book for details).

MAINTENANCE

Cleaning Unit Interior and Exterior — Unit interior and exterior panels should be wiped down using a damp soft cloth or sponge with a mixture of warm water and a mild detergent. Avoid using an abrasive cleaner, as damage to the paint could occur resulting in rust and corrosion. Chemicals such as paint thinners can damage the painted panels and should be avoided.

⚠ CAUTION

Avoid washing unit electrical devices such as motors, starters, electric heater control boxes, damper/valve actuators, sensors, switches, relays, etc. as serious personal injury or damage to the device could result.

Coil Cleaning — Hot water, steam, and direct expansion coils must be cleaned at least once a year to maintain peak performance. Dirty coils can contribute to decreased heating or cooling capacity and efficiency, increased operating costs, and compressor problems on direct expansion systems. Dirt, grease, and other oils can also reduce the wettability of the coil surfaces, which can result in moisture blow-off from cooling coils and resulting water leakage problems. If the grime on the surface of the coils becomes wet, which commonly occurs with cooling coils, microbial growth (mold) can result, causing foul odors and health related indoor air quality problems.

Coils can become dirty over a period of time, especially if air filter maintenance is neglected. Coils should be inspected regularly and cleaned when necessary. Do not use high-pressure water or air. Damage to fins may result. Clean coils with a vacuum cleaner, fresh water, compressed air, or a bristle brush (not wire). Backflush coil to remove debris. Commercial coil cleaners may also be used to help remove grease and dirt. Steam cleaning is NOT recommended.

Units installed in corrosive environments should be cleaned as part of a planned maintenance schedule. In this type of application, all accumulations of dirt should be cleaned off the coil.

Inspection — Check coil baffles for tight fit to prevent air from bypassing the coil. Check panels for air leakage, particularly those sealing the fan and coil compartments. Check for loose electrical connections, compressor oil levels, proper refrigerant charge, and refrigerant piping leaks. Before start-up, be sure all optional service valves are open (backseated).

Air Filters — The 50XJ units come with 4-in. filters, with optional 2-in. filters available. The standard 4-in. filters provide lower pressure drop and/or longer filter service intervals. If the unit is ordered with optional 2-in. filters, track channels will be provided. Changing 2-in. filters to 4-in. filters requires removal of the track channels.

Inspect air filters every 30 days and when the unit warning light (yellow) is on and diagnostic message indicates that the dirty filter switch (FLTS) has closed. Replace filters as necessary.

Replacement filters should have a minimum efficiency rating of MERV 6 per ASHRAE rating procedures and be rated for up to 625 fpm velocity. Job requirements or local codes may specify higher minimum ratings.

Condensers — Since this water circuit is usually an open-type system, the tubes may be subject to contamination and scale. Clean the condenser tubes with a rotary tube cleaning system at regular intervals (at least once a year), and more often if the water is contaminated. Inspect the entering and leaving condenser water thermistors (if installed) for signs of corrosion or scale. Replace the sensor if corroded or remove any scale if found.

Higher than normal condenser pressures, together with inability to reach full refrigeration load, usually indicate dirty tubes or air in the machine. If the refrigeration log indicates a rise above normal condenser pressures, check the condenser refrigerant temperature against the leaving condenser water temperature. If trends show excessive increase in LTD (leaving temperature difference) over time, or if the discharge pressure is greater than 245 psig with 85 F entering condenser water and 95 F leaving condenser water, then the condenser tubes may be dirty, or water flow may be incorrect.

During the tube cleaning process, use a $^5/_8$-in. brush specially designed to avoid scraping and scratching the tube wall. Contact your Carrier representative to obtain these brushes. Do not use wire brushes.

If cleaning the tubes with a brush does not eliminate buildup, there may be sludge or scale present. A slight sludge or scale coating on the tube greatly reduces the heat transfer efficiency and may require chemical cleaning. The method selected depends upon the type of deposits and the facilities available. The following methods are suggested:

- For water-soluble deposits: Flush with warm water.
- For softer, water-insoluble deposits: Circulate hot wash oil or light distillate through the tube and shell at a high velocity, followed by thorough rinsing.
- For sludges or cokes: If neither method above works, try chemical cleaning solution such as Oakite.
- For hard scale: If the scale does not come off with chemical cleaning (as above), the scales should undergo chemical analysis. The analysis may indicate that careful washing with a dilute mineral acid and inhibitor is required.

⚠ CAUTION

- Be careful to avoid damaging tubes when mechanically cleaning them. Do not use a wire brush.
- Cleaning compounds must be compatible with the exchanger's metallurgy.
- DO NOT introduce steam into an individual tube.
- DO NOT introduce air into units handling flammable or volatile fluids.

Chemical cleaners can be hazardous! Follow all local, state and federal ordinances for the removal and disposal of these substances.

Once the cleaning method has been determined:

1. Make sure that the condenser pumps are not running.
2. Lock out and tag the electrical service (per local electric code) to the condenser pumps to prevent accidental start-up.
3. Isolate supply and return condenser water valves.
4. Remove pressure from the system through either the condenser air vent in the fan compartment or a drain valve connection.
5. Remove the condenser drain plug (or open valve).
6. Drain the water from the condensers.
7. Before removing heads, mark each head and tube sheet, so that the proper orientation of connections will be maintained when the heads and gaskets are replaced.
8. Remove bolts holding down condenser heads. Remove heads.
9. Remove gaskets and clean (see Gaskets section).
10. Clean condenser tubes using appropriate method determined above.
11. Replace gaskets as described below (see Gaskets section).
12. Replace heads and bolts according to External Bolted Joints description below.

GASKETS — Gasketed surfaces should be thoroughly cleaned and should be free of scratches and other defects. **If a heat exchanger is dismantled for any reason, reassemble it with new gaskets to prevent future leaks and/or damage to the gasket seating surfaces.** Be sure to position new gaskets properly before attempting to retighten bolts. Composition gaskets get dry and brittle and do not provide an effective seal when reused. When replacing gaskets, use the type specified or a compatible replacement. Spare or replacement gaskets can be ordered directly from Carrier or the condenser supplier.

Do not allow any gasket leakage to persist because it may damage the gasket surfaces.

EXTERNAL BOLTED JOINTS — Bolted joints may require retightening in a crisscross pattern (Fig. 13). Although equipment is pressure tested before shipped, gasketing joints may relax slightly during the time between factory testing and unit start-up.

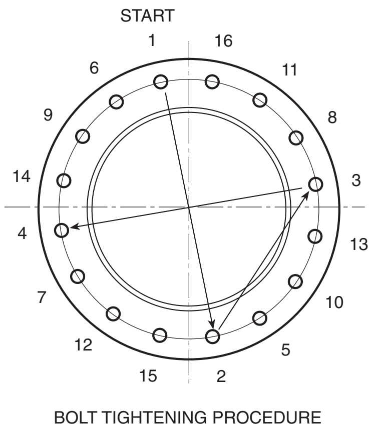
TUBE SIDE LEAKS — If preliminary checks have definitely established the presence of leaking tubes, these recommended steps should be followed:

1. Remove water and refrigerant from the condenser.
2. Remove refrigerant lines and water lines. Remove condenser heads.
3. Locate individual tube leaks following this procedure:
   a. Seal shell connections and install a fitting to permit connections to refrigerant side or shell side of the condenser.
   b. Using dry air, nitrogen, carbon dioxide, or other suitable noncondensable and non-combustible gas, fully pressurized the shell side to not more than 100 psig test pressure.
   c. With soap solution and brush, cover the face of both tube sheets. Leaks will appear in the form of bubbles, or as a fine foam, with small leaks. Mark location of all leaks with chalk or crayon.
4. After locating and marking the leaking tubes, gradually remove all pressure from the vessel.
5. Re-roll suspected leaking tubes at both ends and retest.
6. If no leaks appear in the form of bubbles when the shell side is pressurized, and pressure is still being lost, an internal tube leak or rupture has probably occurred, and it will be necessary to plug the tube or tubes or replace them, in accordance with procedures to follow.

PLUGGING TUBES WITHOUT REMOVING TUBES — If a leak occurs at the tube to tube sheet joint, it may be possible to re-roll and make a seal, following the re-rolling procedures outlined in these instructions. If the leak persists, it may be possible to obtain a seal by driving a tapered brass plug into the tube.

If there is an internal tube leak, it is possible to plug the tube at both ends with tapered brass plugs. If no more than 5% of the tubes in any pass are plugged, very little capacity reduction will be observed.

When brass plugs are used, cut the excess portion of the plug extending beyond the outside face of the tube sheet, and grind or file flat with the tube sheet surface.



Torque Values for Compressed Fiber Gaskets*

BOLT SIZE	TORQUE (ft lb)	TORQUE STEPS
1/4-20	8	1
5/16-18	16	1
3/8-16	24	2
1/2-13	60	2
5/8-11	120	2
3/4-10	200	3
1-8	490	3
1 1/8-8	710	3
1 1/4-8	1000	3
1 1/2-8	1600	3
1 3/4-8	3000	4
2-8	4400	4

*Contact factory for other types of gaskets. (See drawings or parts list for gasket information.)

Fig. 13 — Bolt Tightening Procedure

Water Economizer Cleaning — The optional mechanically cleanable water economizer should be cleaned once a year during annual maintenance.

1. Shut off power and lock and tag out (by local electrical code) the power supply to the condenser water pumps.
2. Isolate supply and return valves to the unit in the condenser water piping.
3. Relieve pressure in the system by opening vent line or drain connection (Fig. 14).
4. Open the 1/2-in. ball valve located in the unit's left rear corner post to empty the coil of fluid.
5. Remove 1/2-in. brass pipe plugs in coil end turns and clean tubes with 5/8-in. tube brush (Fig. 15).

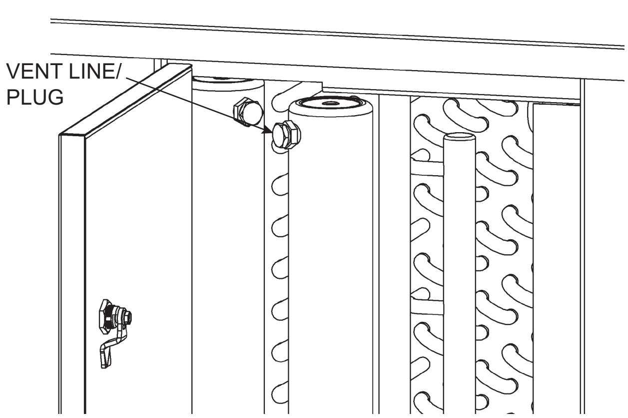


Fig. 14 — Vent Plug for Waterside Economizer

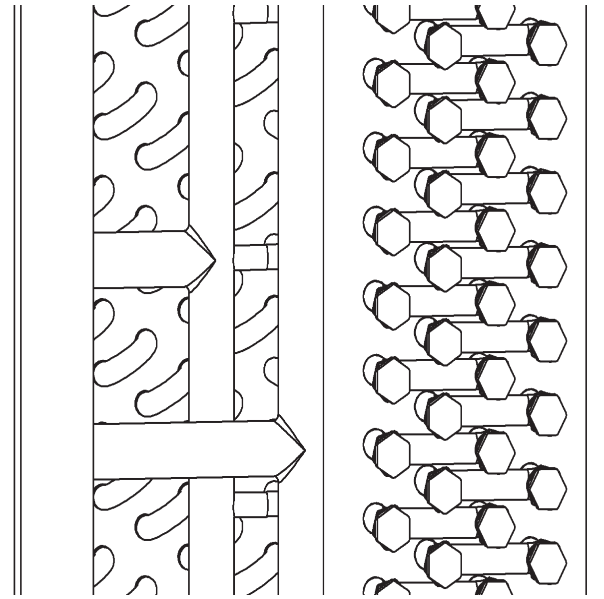


Fig. 15 — Waterside Economizer Coil Plugs

6. Reinstall pipe plugs.
7. Open supply or return isolation valve in condenser water piping.
8. Open vent line in economizer coil to release air. Close vent line when coil is full of fluid.
9. Open remaining isolation valves in condenser water piping.
10. Unlock condenser pump power supply and place back into service.

Fan Motor Lubrication — The fan motor was properly lubricated at the time of manufacture. Lubricate the fan motor according to the motor manufacturer's instructions.

Fan Bearing Lubrication — Inspect the fan bearings for proper lubrication every 2 to 8 weeks. Standard units have grease fittings on the fan shaft bearings, located on each side of the blower wheel. If extended grease lines (option) were installed at the factory, grease fittings may be located on the unit's exterior on the front right corner post. Lubricate bearings with a lithium based grease (NLGI Grade 2).

Fan Sheaves — Factory-supplied drives are pre-aligned and tensioned, however, Carrier recommends checking the belt tension and alignment before starting the unit. Always check the drive alignment after adjusting belt tension.

To install sheaves on the fan or motor shaft:

1. Isolate power to the unit
2. Remove right side unit access panel.
3. Remove any rust-preventive coating on the fan shaft.
4. Make sure the shaft is clean and free of burrs. Add grease or lubricant to bore of sheave before installing.
5. Mount sheave on the shaft; to prevent bearing damage, do not use excessive force.

   NOTE: Adjustable sheaves are NOT recommended.

Each factory-assembled fan, shaft, and drive sheave assembly is precision aligned and balanced. If excessive unit vibration occurs after field replacement of sheaves, the unit should be rebalanced. To change the drive ratio, reselect and replace the motor sheave, not the fan sheave.

After 1 to 3 minutes of operation, check the belt tension. Also check tension frequently during the first 24 hours of operation and adjust if necessary. Periodically check belt tension throughout the run-in period, which is normally the initial 72 hours of operation.

ALIGNMENT — Make sure that fan shafts and motor shafts are parallel and level. The most common causes of misalignment are nonparallel shafts and improperly located sheaves. Where shafts are not parallel, belts on one side are drawn tighter and pull more than their share of the load. As a result, these belts wear out faster, requiring the entire set to be replaced before it has given maximum service. If misalignment is in the sheave, belts enter and leave the grooves at an angle, causing excessive belt and sheave wear.

1. Check shaft alignment by measuring the distance between the shafts at 3 or more locations. If the distances are equal, then the shafts are parallel.
2. Sheave Alignment: To check the location of the fixed sheaves on the shafts, use a straightedge or a piece of string. If the sheaves are properly aligned, the string will touch them at the points indicated by the arrows in Fig. 16. Rotate each sheave a half revolution to determine whether the sheave is wobbly or the drive shaft is bent. Correct any misalignment.
3. With sheaves aligned, tighten cap screws evenly and progressively.

   NOTE: There should be a $^{1}/_{8}$-in. to $^{1}/_{4}$-in. gap between the mating part hub and the bushing flange. If the gap is closed, the bushing is probably the wrong size.
4. With taper-lock bushed hubs, be sure the bushing bolts are tightened evenly to prevent side-to-side pulley wobble. Check by rotating sheaves and rechecking sheave alignment. When substituting field-supplied sheaves for factory-supplied sheaves, only the motor sheave should be changed.

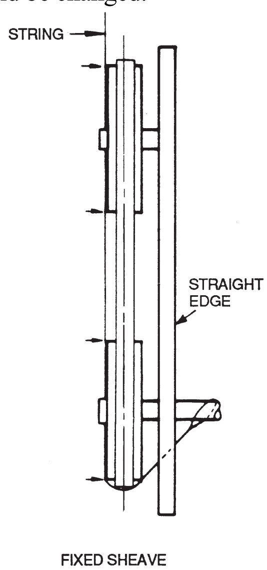


Fig. 16 — Sheave Alignment

V-Belts — When installing or replacing belts, always use a complete matched set of new belts. Mixing old and new belts will result in premature wear or breakage of the newer belts.

Always adjust the motor position so that V-belts can be installed without stretching over grooves. Forcing belts can result in uneven stretching and a mismatched set of belts.

To adjust belts:

1. **Do not allow the belt to bottom out in the sheave**.
2. Loosen the four bolts that secure the motor base to the fan sled.
3. Tighten the belts by turning the motor-adjusting jack-screws. Turn each jackscrew an equal number of turns.
4. Equalize belt slack so that it is on the same side for all belts. Failure to do so may result in uneven belt stretching.
5. Tension new belts according at the maximum deflection force recommended in Fig. 17.

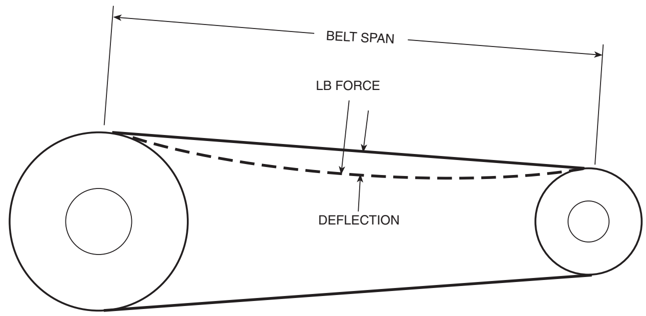
   NOTE: Belts are considered to be new from initial installation through the first 3 minutes of operation. At all other times, the belt is considered used and should be maintained at the minimum values.

   EXAMPLE:
   Given: New belt
   Unit Size 084
   Belt Span 20 $^{5}/_{8}$-in.
   Belt Cross-Section 5V, Notch Belt
   Motor Sheave PD 6.1 in.
   Deflection = Belt Span/64 (ratio of deflection to belt span is 1:64)

   Solution:

   a. From Fig. 17 find that deflection force for type 5V, notch belt with 6.1-in. motor sheave PD is $7^{1}/_{4}$ to $11^{1}/_{16}$ lb.
   b. Deflection = $^{5}/_{16}$-in.
   c. Increase or decrease belt tension until force required for $^{5}/_{16}$-in. deflection is $11^{1}/_{16}$ lb.

Check belt tension at least twice during the first operating day. Readjust as required to maintain belt tension within the recommended range.



50XJ050-084

BELT CROSS SECTION	MOTOR HP	MOTOR SHEAVE PD (in.)	FAN SHEAVE PD (in.)	DEFLECTION FORCE (lb) Min	DEFLECTION FORCE (lb) Max	DEFLECTION (in.)
5V	7.5	3.7	12.5	$5^{1}/_{8}$	$7^{11}/_{16}$	$^{5}/_{16}$
	10	4.3	12.5	$5^{1}/_{2}$	$8^{3}/_{16}$	$^{5}/_{16}$
	15	5.3	12.5	$6^{1}/_{2}$	$9^{3}/_{4}$	$^{5}/_{16}$
	20	6.1	12.5	$7^{1}/_{4}$	$11^{1}/_{16}$	$^{5}/_{16}$
	25	6.3	12.5	$6^{1}/_{4}$	$9^{3}/_{8}$	$^{5}/_{16}$
	30	6.5	12.5	$7^{1}/_{16}$	$10^{9}/_{16}$	$^{5}/_{16}$
	40	6.7	12.5	$8^{3}/_{4}$	$13^{1}/_{8}$	$^{5}/_{16}$

50XJ094,104

BELT CROSS SECTION	MOTOR HP	MOTOR SHEAVE PD (in.)	FAN SHEAVE PD (in.)	DEFLECTION FORCE (lb) Min	DEFLECTION FORCE (lb) Max	DEFLECTION (in.)
5V	15	4.5	12.5	$5^{5}/_{16}$	8	$^{3}/_{8}$
	20	4.9	12.5	$6^{1}/_{4}$	$9^{1}/_{4}$	$^{5}/_{16}$
	25	5.3	12.5	7	$10^{1}/_{2}$	$^{3}/_{8}$
	30	5.7	12.5	$7^{3}/_{4}$	$11^{9}/_{16}$	$^{5}/_{16}$
	40	9.5	20.1	$10^{3}/_{16}$	$15^{5}/_{16}$	$^{5}/_{16}$
	50	11.1	23.5	$11^{1}/_{4}$	$17^{1}/_{16}$	$^{5}/_{16}$

LEGEND
PD — Pitch Diameter

Fig. 17 — Fan Belt Tension Data

Checking System Charge — The 50XJ units are shipped fully charged. Before checking refrigerant, allow 15 minutes of steady state operation following start-up.

Perform a visual check of the liquid line sight glasses to make sure they are free of bubbles. Check liquid line temperature entering the TXV; it should be 7 (±3) F lower than the saturated discharge temperature. Add/remove charge as needed.

⚠ WARNING

To prevent personal injury, wear safety glasses and gloves when handling refrigerant. Do not overcharge system — this can cause compressor flooding.

NOTE: Do not vent or depressurize unit refrigerant to atmosphere. Remove and recover refrigerant following accepted practices.

Compressor Oil — All units are factory charged with oil. It is not necessary to add oil unless compressor(s) is removed from the unit. If necessary, oil can be removed/ charged via Schrader fitting. Operate the system at high evaporator temperature prior to oil recharge to assist oil return to the compressor(s) from other system components. If necessary, recharge the system with the following:

COMPRESSOR	OIL RECHARGE (oz.)	OIL TYPE	PART NUMBER
Copeland ZR12M3	137	3GS 150 viscosity yellow mineral oil	P903-0101
Copeland ZR16M3	137		
Copeland ZR19M3	137		
Copeland ZR250KC	148		
Copeland ZR300KC	190		

TROUBLESHOOTING

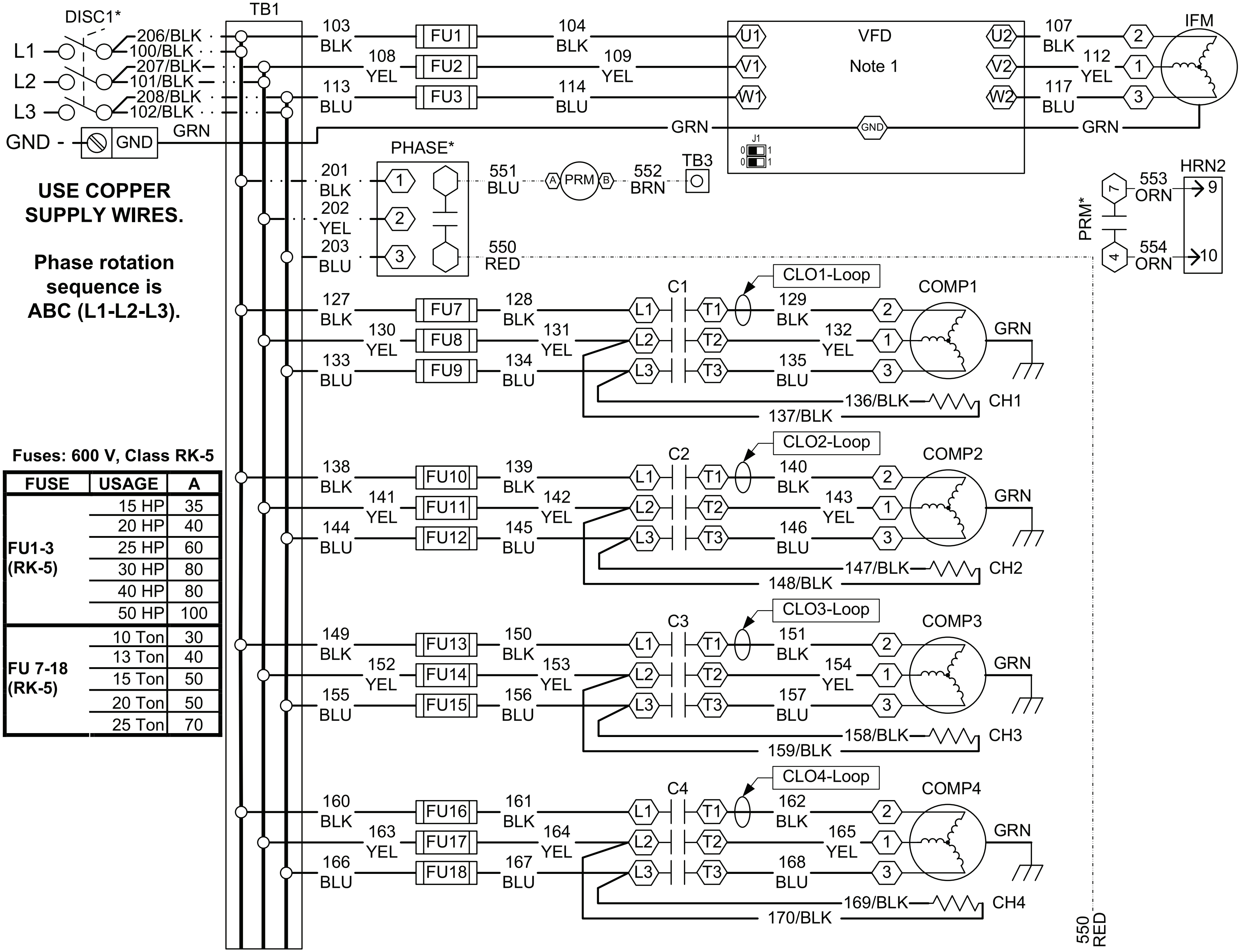
Refer to Tables 15 to determine the possible cause of the problem and the associated procedure necessary to correct it. See Fig. 19 and 20 for typical wiring.

Table 15 — Troubleshooting Procedure

PROBLEM	POSSIBLE CAUSE	CORRECTION PROCEDURE
Unit will not Start	Loss of unit power	Check power source. Check fuses, circuit breakers, disconnect switch. Check electrical contacts.
	Unit voltage not correct	Check and correct.
	Open fuse	Check for short circuit in unit.
	Open protection device	Check relays (phase monitor option), contacts, pressure switches.
	Unit or motor contactor out of order	Test and replace if necessary.
Fan does not Operate	Contactor or relay overload or out of order	Test and replace if necessary.
	VFD not running.	Perform VFD diagnostic test.
	Motor defective	Test and replace if necessary.
	Broken belt	Replace belt.
	Loose electrical contact	Tighten contact.
Compressor is Noisy, but will not Start	Under voltage	Check and correct.
	Defect in compressor motor	Replace compressor.
	Missing phase	Check and correct.
	Compressor seized	Check and replace if necessary.
Compressor Starts, but does not Continue to Run	Compressor or contact defect	Test and replace if necessary.
	Unit is under charged	Check and correct any leaks. Add refrigerant.
	Unit is too big	Check load calculation.
	Compressor is overloaded	Check protection device and replace. Check for missing phase. Check TXV. Check temperature in suction discharge line.
Unit is Noisy	Compressor noise	Check TXV and replace if necessary. Compressor rotation incorrect, check and correct. Check internal noise.
	Tube vibration or condenser water problem	Check and correct.
	Unit panel or part vibrating	Check and tighten appropriate part.
Unit Runs Continuously, but has Low Capacity	Unit is too small	Check load calculation.
	Low refrigerant or noncondensing gas present	Check for leaks and add refrigerant or gas as necessary.
	Compressor defect	Check pressure and amps. Replace if necessary.
	Insufficient flow of refrigerant in evaporator	Check filter drier and replace if necessary. Check TXV and adjust or replace if necessary. Check position of TXV bulb and equalizer.
	Oil in evaporator	Drain evaporator.
	Low airflow	Check filters, and clean or replace as necessary. Check coils, and clean as necessary. Check for restrictions in ductwork. Check fan rotation and adjust. Check fan motor. Check belts for wear.
High Discharge Pressure	Low water flow in condenser	Purge air.
	Dirty condenser tubes	Clean condenser.
	High temperature in condenser water	Check water tower fans and pumps.
	Overcharged	Check and recover excess charge. Adjust subcooling.
	Noncondensing gas present	Verify and correct.
Discharge Pressure too Low	Condenser temperature too low	Check condenser water flow rate.
	Condenser flow rate too high	Check and correct.
	Low charge	Check for and repair leaks and add refrigerant as necessary.
	Compressor fault	Check suction and discharge pressure.
Suction Pressure too Low	Discharge pressure is low	See Discharge Pressure Too Low section of this table above.
	Low thermal load	Check building load.
	Low refrigerant	Check for and repair leaks and add refrigerant as necessary.
	Low airflow in evaporator	Clean filter. Remove scale. Check for blockage in ducts. Check fan rotation. Check motor operation. Check belts.
	Low refrigerant flow in evaporator	Check for obstruction in filter drier. Check for obstruction in TXV. Check super heating. Check position of TXV bulb and equalizer.
Suction Pressure too High	High thermal load	Check design conditions.
	Compressor defect	Check pressures, and replace if necessary.
Condensate Water Leaks	Defective connection	Check and correct.
	Blocked drain	Clean drain pan.
	Drain lines incorrect	Check and correct.

LEGEND

TXV — Thermostatic Expansion Valve
VFD — Variable Frequency Drive



Fuses: 600 V, Class RK-5

FUSE	USAGE	A
FU1-3 (RK-5)	15 HP	35
	20 HP	40
	25 HP	60
	30 HP	80
	40 HP	80
	50 HP	100
FU 7-18 (RK-5)	10 Ton	30
	13 Ton	40
	15 Ton	50
	20 Ton	50
	25 Ton	70

Fig. 19 — Power Panel and Compressor Wiring

Fuses: 600 V, Class CC

FUSE	A
FU 19-20	1
FU21	10

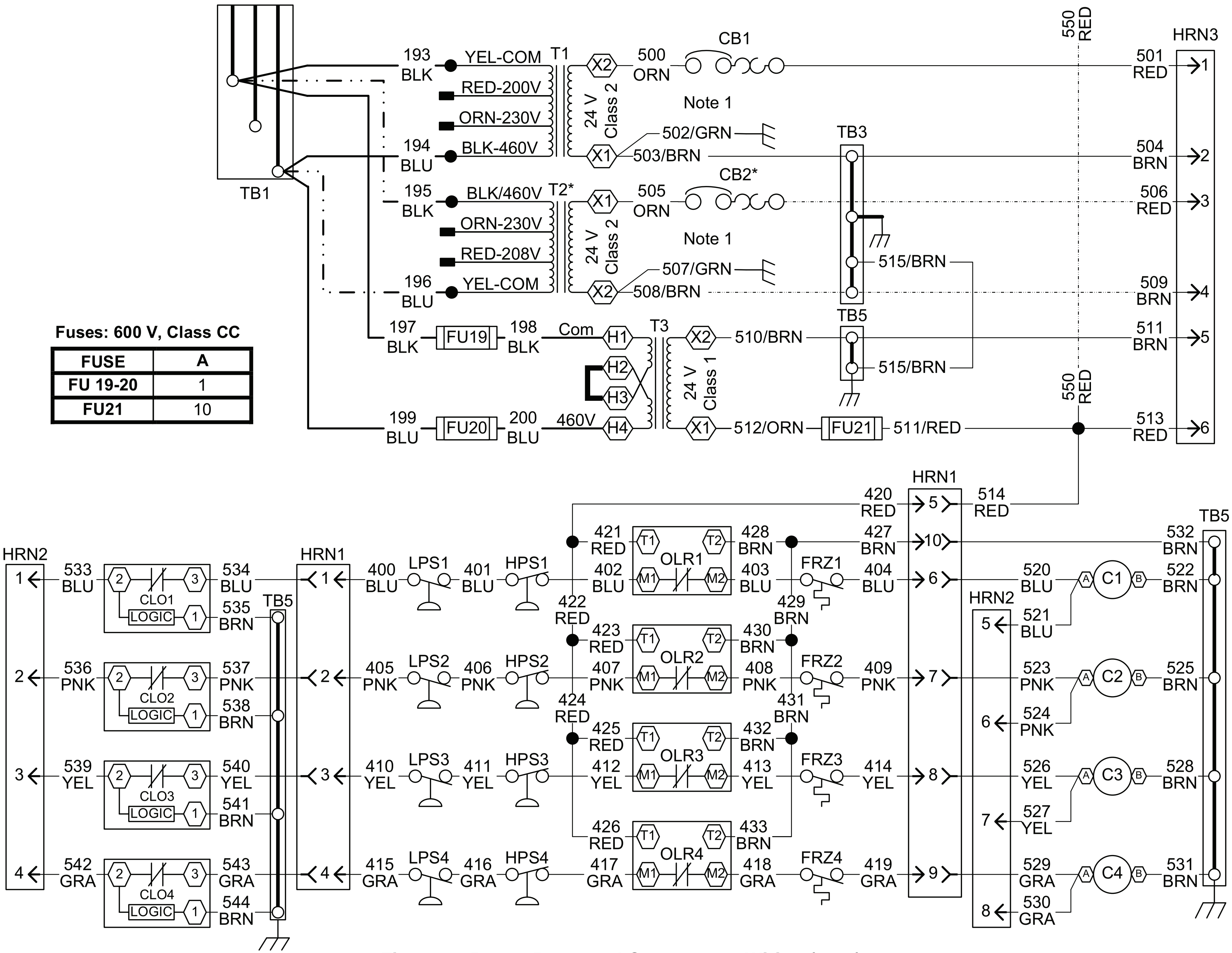


Fig. 19 — Power Panel and Compressor Wiring (cont)

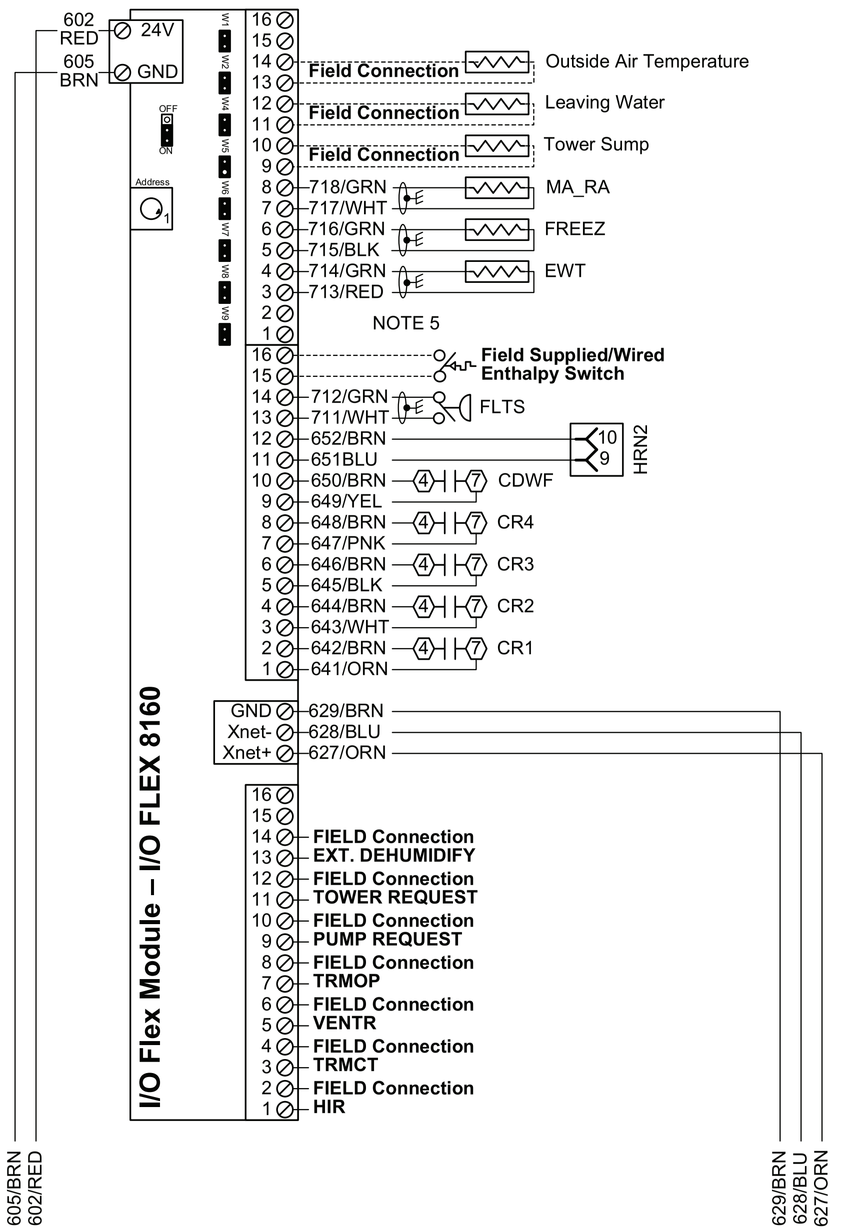


Fig. 20 — Low-Voltage Control Wiring

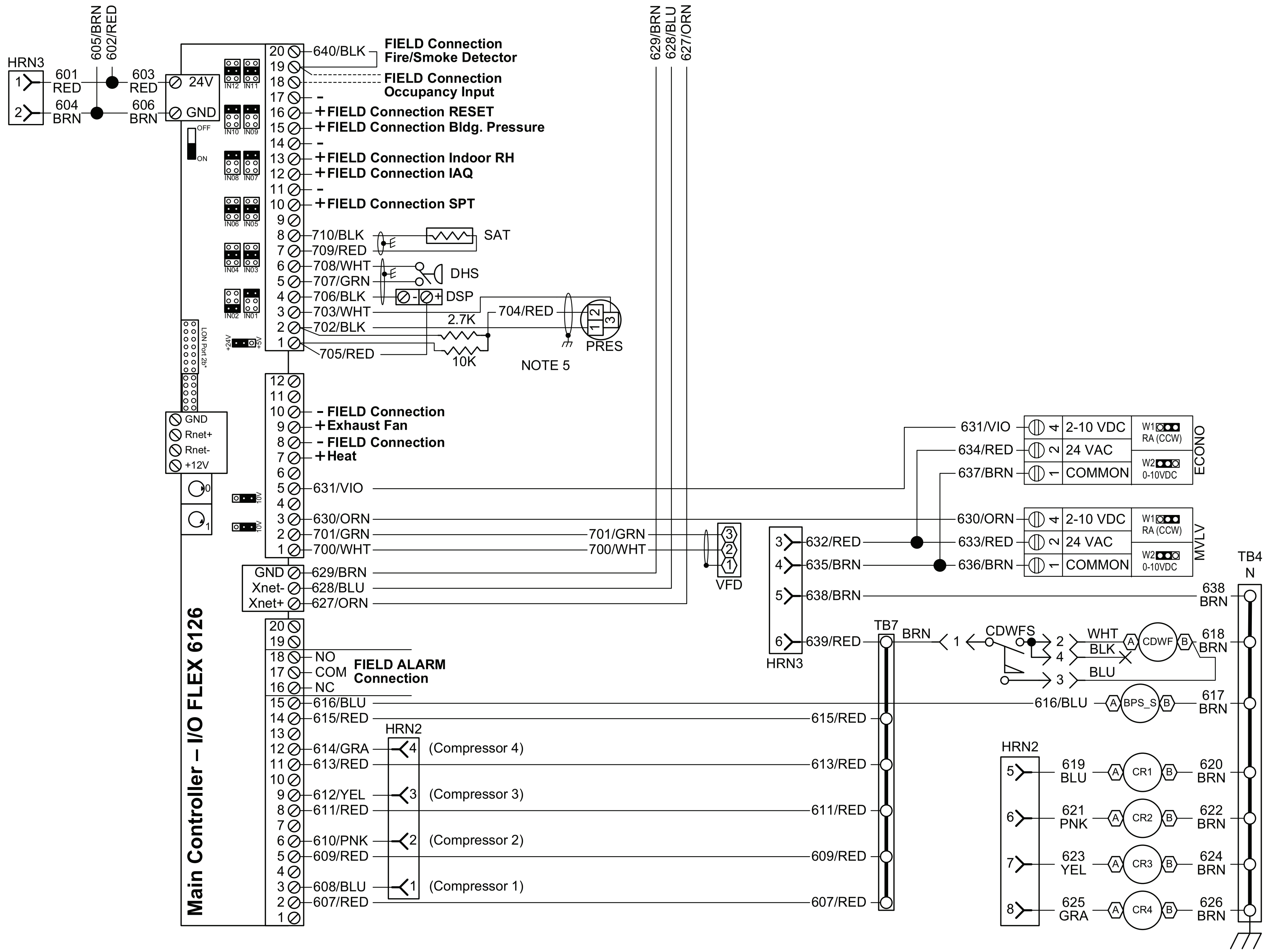


Fig. 20 — Low-Voltage Control Wiring (cont)

LEGEND AND NOTES FOR FIG. 19 and 20

LEGEND

ALARM — Unit Alarm Relay (Critical Fault)
ALM-CM — Alarm/Warning Relay Common
BPS_S — Fan Start/Stop Relay (VFD Bypass Mode)
C — Compressor Contactor
CB — Circuit Breaker
CDWF — Condenser Waterflow Relay
CDWFS — Condenser Waterflow Switch
CH — Crankcase Heater
CLO — Compressor Lockout Control
COMP — Compressor
CR — Compressor Relay
DHS — Duct High Static Limit Switch
DISC1 — Disconnect Switch
DSP — Duct Static Pressure Transducer
ECONO — Economizer Valve/Damper Control
EWT — Entering Water Temp. Sensor
FLTS — Filter Status Switch
FREEZ — Freeze Thermostat (Water-side Economizer)
FRZ — Freeze Thermostat (DX Circuit)
FU — Fuse
GND — Ground
HIR — Heat Interlock Relay
HPS — High Refrigerant Pressure Switch
HRN — Harness
IFM — Indoor Fan Motor
IAQ — Indoor Air Quality
LPS — Low Refrigerant Pressure Switch
MA_RA — Mixed/Return Air Temp. Sensor
MVLV — Modulating Valve (Econ)/ Heat Pres. Ctl.
OLR — Compressor Motor Protector
PHASE — Phase/Rotation Monitor
PRM — Power Monitor
PUMP — Water Pump Request
RH — Relative Humidity
SAT — Supply Air Temp. Sensor
SPT — Space/Zone Temperature Sensor
T — Transformer
TB1 — Power Distribution Terminal Block
TB3 — 120 V-Neutral Terminal Block
TB5-7 — Terminal Blocks for Field Connections
TOWER — Tower Request
TRMCT — VAV Terminals Control
TRMOP — VAV Terminals Open
VENTR — Ventilation Output
VFD — Variable Frequency Drive
— · · — Optional Wiring (Optional Items Noted With “*”)
— — Field Wiring

NOTES:
1. Partial wiring shown on both power and control diagrams.
2. All class 2 transformers are wired into separate circuits. Do not interconnect these transformers or circuits; circuit separation shall be maintained.
3. On 200/240 v units, the transformers are factory wired for 240 v. For 200 v applications, move the blue wire to the 200 v tap of each transformer.
4. Shielded wire shall have drain wire connected to VFD ground screw. The floating end of the drain wire shall be insulated.
5. Shielded wire shall have drain wire connected to the control panel, adjacent to the control board. The floating end of the drain wire shall be insulated.

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START-UP CHECKLIST

(Fill out this form on Start-Up and file in job folder)

I. PRELIMINARY INFORMATION:

50XJ UNIT: MODEL NO. ____________________ SERIAL NO. ____________________

FIELD-INSTALLED ACCESSORIES: ____

START-UP DATE: ______________________________________

II. PRE-START-UP:

VERIFY ALL SHIPPING MATERIALS HAVE BEEN REMOVED FROM THE UNIT

IS THERE ANY SHIPPING DAMAGE? ________________ IF SO, WHERE ________________

____

WILL THIS DAMAGE PREVENT UNIT START-UP? (Y/N) _______

CHECK POWER SUPPLY. DOES IT AGREE WITH UNIT? (Y/N) _______

HAS THE GROUND WIRE BEEN CONNECTED? (Y/N) _______

HAS THE CIRCUIT PROTECTION BEEN SIZED AND INSTALLED PROPERLY? (Y/N) _______

ARE THE POWER WIRES TO THE UNIT SIZED AND INSTALLED PROPERLY? (Y/N) _______

HAS THE CORRECT INPUT POWER PHASE SEQUENCE BEEN CONFIRMED WITH A METER? (Y/N) _______

HAS THE FAN AND MOTOR PULLEY BEEN CHECKED FOR PROPER ALIGNMENT AND DOES THE FAN BELT HAVE PROPER TENSION? (Y/N) _______

HAS WATER BEEN PLACED IN DRAIN PAN TO CONFIRM PROPER DRAINAGE? (Y/N) _______

ARE PROPER AIR FILTERS IN PLACE AND CLEAN? (Y/N) _______

VERIFY THAT THE UNIT IS INSTALLED WITHIN LEVELING TOLERANCES

CONTROLS

HAS THE DUCT STATIC PRESSURE PROBE BEEN INSTALLED? (Y/N) _______

HAVE CONTROL CONNECTIONS BEEN MADE AND CHECKED? (Y/N) _______

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (Y/N) _______

HAS AUTOMATIC RUN TEST BEEN COMPLETED? (Y/N) _______

HAS THE VFD CHECKOUT BEEN COMPLETED? (Y/N) _______

PIPING

HAVE LEAK CHECKS BEEN MADE AT COMPRESSOR, CONDENSER, EVAPORATOR, TXVs (Thermostatic Expansion Valves), SOLENOID VALVES, FILTER DRIERS, AND FUSIBLE PLUGS WITH A LEAK DETECTOR? (Y/N) _______

HAVE WATER AND STEAM VALVES BEEN OPENED (TO FILL PIPING AND HEAT EXCHANGERS)?(Y/N) _______

HAS AIR PURGE BEEN PERFORMED? (Y/N) _______

ELECTRICAL

CHECK VOLTAGE IMBALANCE

LINE-TO-LINE VOLTS: AB ______ V AC ______ V BC ______ V

(AB + AC + BC)/3 = AVERAGE VOLTAGE = __________ V

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = __________ V

VOLTAGE IMBALANCE = 100 X (MAX DEVIATION)/(AVERAGE VOLTAGE) = __________ % (IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM; CALL LOCAL POWER COMPANY FOR ASSISTANCE.)

III. START-UP:

CHECK FAN SPEED AND RECORD. ________

AFTER AT LEAST 15 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	CIRCUIT 4
SUCTION PRESSURE				
SATURATED SUCTION TEMP				
SUCTION LINE TEMP				
SUPERHEAT DEGREES				
DISCHARGE PRESSURE				
SATURATED CONDENSING				
LIQUID LINE TEMP				
SUBCOOLING DEGREES				
LIQUID SIGHT GLASS (CLEAR/BUBBLES)				
ENTERING CONDENSER-WATER TEMP				
LEAVING CONDENSER-WATER TEMP				
EVAP ENTERING-AIR DB (dry bulb) TEMP				
EVAP ENTERING-AIR WB (wet bulb) TEMP				
EVAP LEAVING-AIR DB TEMP				
EVAP LEAVING-AIR WB TEMP				

COMPRESSOR AMPS:

L1				
L2				
L3				

SUPPLY FAN AMPS:

L1	
L2	
L3	

NOTES: ____

____

____

____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE