Installation, Start-Up 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

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

⚠ CAUTION

Use care in handling, rigging, and setting bulky equipment. Personal injury could result.

⚠ DANGER

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 un-sweat 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

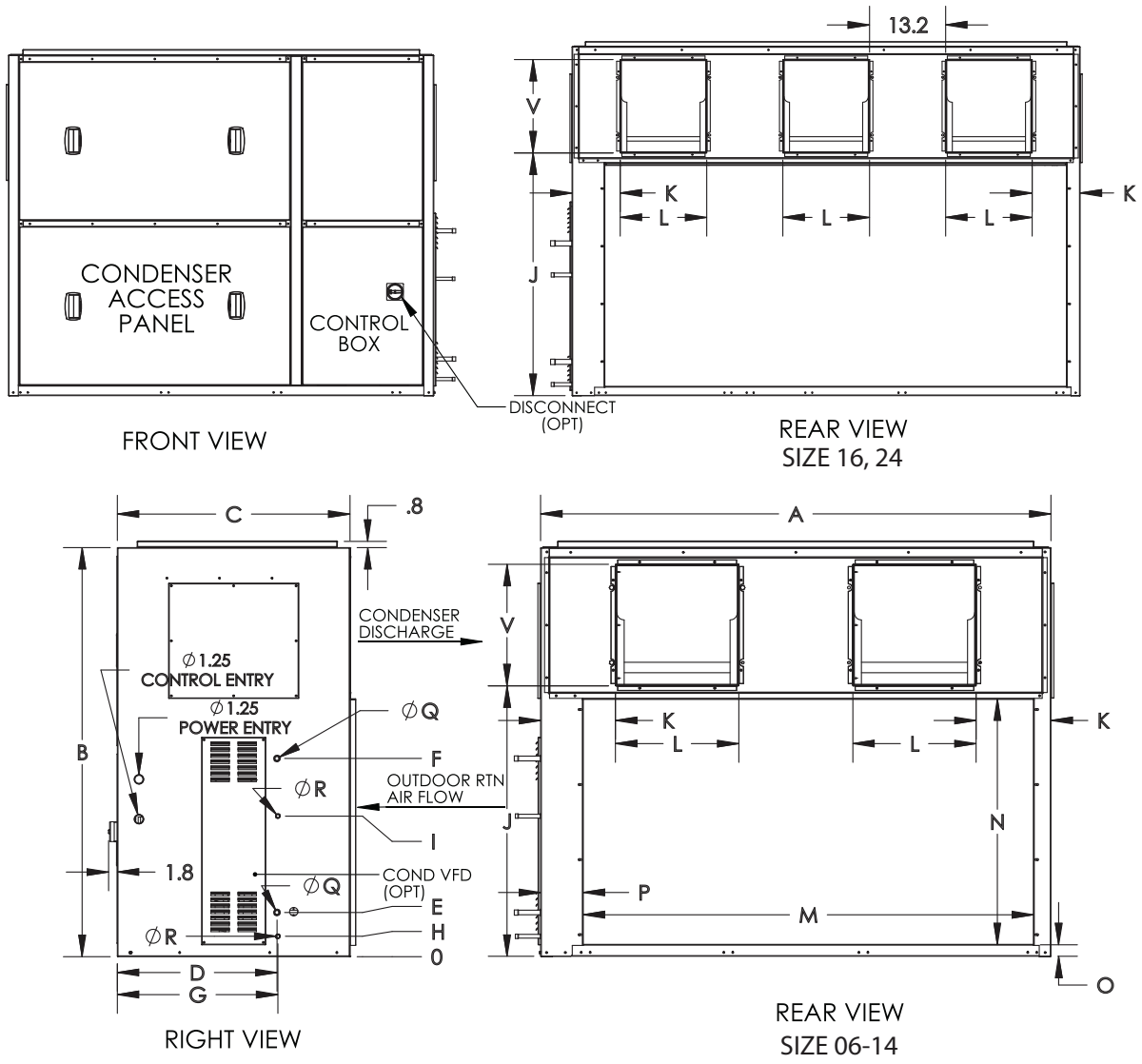
The 09XC remote air-cooled condenser is designed to be used with the 50XCR vertical packaged units. See Table 1. Airflow is horizontal, both into and out from the same face of the unit. The unit is designed to be mounted indoors in a window or through the wall in high-rise buildings. See Fig. 1 for unit dimensions. See Fig. 2 for typical applications. Ductwork is not needed, but may be added easily if required by the application. Airflow is provided by centrifugal fans with an adjustable belt drive to meet varying static requirements.

Check space requirements, service clearances, floor strength, location of piping, size of power supply, and location of ductwork (if used) before installing. See Table 2 for unit operating weights.

Table 1 — Condenser Usage

UNIT 50XCR	CONDENSER QUANTITY					
	09XC SIZE					
	06	08	12	14	16	24
06	1					
08		1				
12			1			
14				1		
16					1	
24						1

NOTE: Where there are no quantities of condensers listed, the combination is not recommended. See Application Data literature for more information on condenser combinations.



UNIT 09XC	WIDTH	HEIGHT	DEPTH	CONDENSER INLET			LIQUID OUTLET			CONDENSER DISCHARGE DUCT (BLOWER OPENING)				COND RETURN DUCT				COND INLET DIAMETER (OD)	LIQUID OUTLET DIAMETER (OD)
	A	B	C	D	E	F	G	H	I	J	K	L	V	M	N	O	P	Q	R
06	53.1	46.6	29.0	16.9	5.9	—	16.8	2.7	—	32.1	7.6	13.4	12.8	46.0	29.5	0.8	4.8	0.625	0.500
08	53.1	46.6	29.0	16.9	5.9	—	16.8	2.7	—	32.1	7.6	13.4	12.8	46.0	29.5	0.8	4.8	0.625	0.500
12	68.0	54.5	31.2	21.3	—	26.4	21.4	—	18.7	36.0	10.0	16.4	16.2	60.0	32.8	1.5	5.7	0.875	0.625
14	88.0	54.5	31.2	21.4	—	26.4	21.4	—	18.7	36.0	16.2	18.9	16.2	80.0	34.3	1.5	5.7	0.875	0.625
16	88.0	54.5	31.2	21.4	—	31.0	21.4	—	22.6	42.0	8.3	15.0	16.2	80.0	34.3	1.5	5.7	1.125	0.625
24	88.0	60.5	31.2	20.9	—	31.7	21.3	—	20.9	42.0	8.3	15.0	16.2	80.0	38.8	1.5	5.7	1.125	0.625

NOTE: Dimensions are in inches.

Fig. 1 — Base Unit Dimensions — 09XC06-24

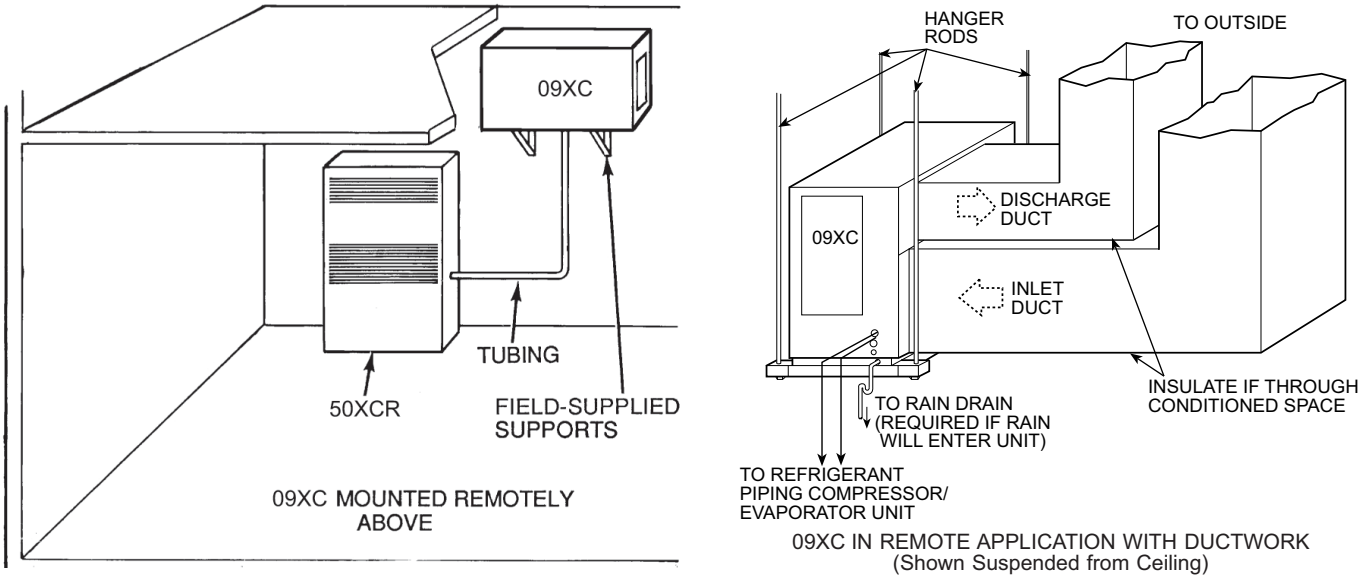


Fig. 2 — Mounting Applications

Table 2 — Physical Data

UNIT 09XC	06	08	12	14	16	24
NOMINAL CAPACITY (tons)	5	7.5	10	12	15	20
BASE UNIT OPERATING WEIGHT (lb)	823	1153	1352	1380	1645	2041
CONDENSER FAN	Adjustable, Belt-Drive, Centrifugal					
Nominal Cfm	3400	4000	6000	8000	8000	10300
Cfm Range	2625-4300	2625 - 4300	4625-7375	6000 - 9500	6000 - 9500	9000-11300
Available Static (in. wg)	0 - 1.0	0 - 1.0	0 - 1.0	0 - 1.0	0 - 1.0	0 - 1.0
Condenser Fan Size	110-10R	110-10R	150-12R	150-15R	150-15R	150-11R
Number of Condenser Fans	2	2	2	2	3	3
Standard Speed Range (Rpm)	656 - 875	712 - 949	500-979	447-800	614-886	820 - 1041
Max. Allowable Rpm	1700	1700	1700	1600	1700	1700
Belt (Type)	BX66	BX65	BX75	BX77	BX82	BX87
Fan Pulley (Type)	BK70	BK65	BK90	BK100	BK130	BK85
Motor Pulley (Type)	1VP44	1VP34	1VP34	1VP34	1VL34	1VP50
Std HP	1	1.5	2	2	3.0	5
HP Range	1 - 1.5	1.5 - 2	2 - 3	2 - 3	3 - 5	5 - 7.5
Fan Shaft Size (in.)	1	1	1	1.1875	1.4375	1.4375
Motor Shaft Size (in.)	0.875	0.875	0.875	0.875	1.125	1.125
Center Distance (in.)	27.1	27.1	29.8	29.8	29.8	35.1
CONDENSER COIL	$^3/_8$-in. OD, Enhanced Copper Tube, Aluminum Fins					
Quantity Rows ... Fin/in.	6...16W	6...16W	6...16W	6...16W	5...16	6...16
Fin Block Size (H x L) (in.)	30 x 46	30 x 46	32 x 60	34 x 80	34 x 80	40 x 80
Face Area (sq ft)	9.58	9.58	13.33	18.89	18.89	22.2
Refrigerant Gas Inlet Connection Size (in.)	0.625	0.625	0.875	0.875	1.125	(2).875
Refrigerant Liquid Connection Size (in.)	0.5	0.5	0.625	0.625	0.625	(2).625

INSTALLATION

Step 1 — Complete Pre-Installation Checks

Examine unit for damage incurred during shipment. File claim immediately with transit company if damage is found. Check the shipment for completeness. Verify that the nameplate electrical requirements match the available power supply.

Step 2 — Rig and Place Unit

Units are mounted on skids. Leave the unit on the skid until it is in the final position. While on the skid, the unit can be rolled, dragged or forklifted; *do not apply force to the unit.* Use a minimum of 3 rollers when rolling, and raise from above to remove the skid when unit is in the final position. See Fig. 3 for rigging details.

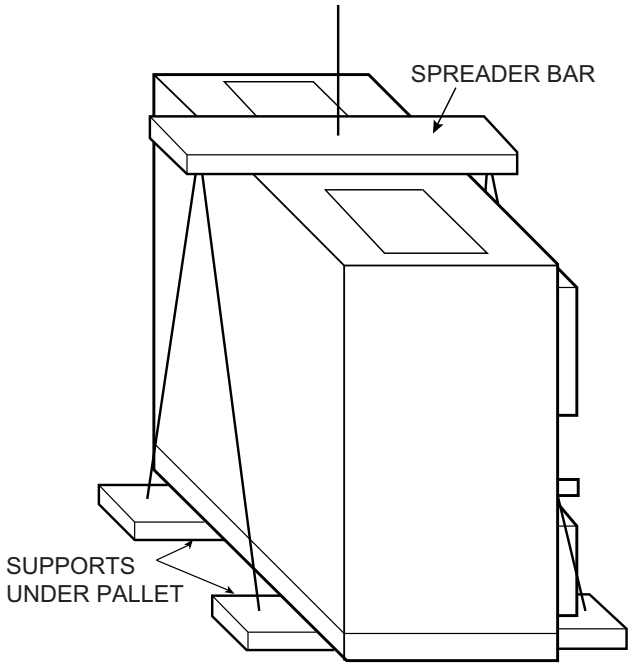
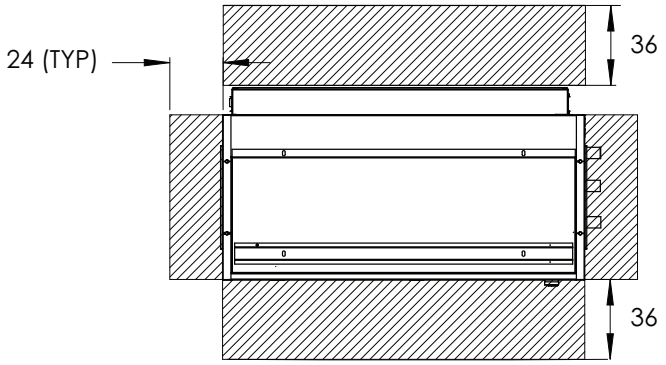


Fig. 3 — Rigging Details

PLACING THE UNIT

The selected unit location should not be adjacent to an acoustically sensitive space. The best locations for these units are mechanical rooms, near elevator shafts, near restrooms, near stairwells or other similar locations. Position the unit where large supply of outdoor air is available for the unit inlet. Be sure to leave enough space for the return air inlet access and access for cleaning and maintenance. Units located on the same floor should have a minimum of 6 ft of clearance between condenser air openings. Units located floor-to-floor should have a minimum of 10 ft between units to prevent recirculation of conditioned air. DO NOT locate units where they will recirculate conditioned air. This will cause increased head pressure which can cause units to trip on high pressure. See Fig. 4 for recommended unit clearances.



NOTE: Dimensions are in inches.

Fig. 4 — Unit Clearances

Either provide inlet filters to protect the coils, or locate the unit in an area free from airborne dirt or other foreign material which could clog the coils.

The units are designed to pass through most 36-in. door openings.

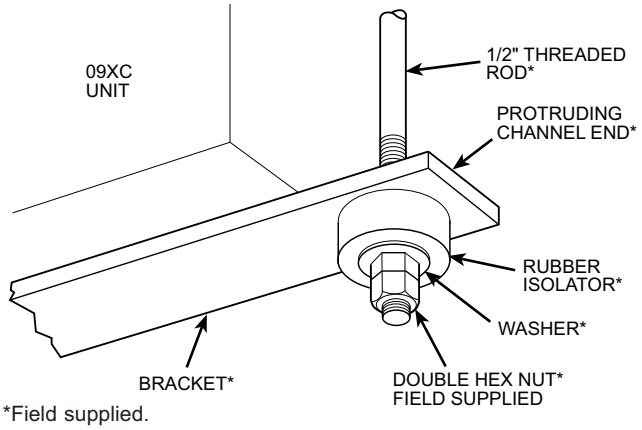
POSITIONING THE 09XC UNIT

Refer to Fig. 4 for typical service clearances. To suspend the unit, use 4, field-supplied, ½-in. diameter (or larger) threaded rods. Mount 2 heavy channels under the entire width of the unit, allowing them to protrude beyond the width of the unit so that supporting rods can be installed on the channel ends. Attach minimum ½-in. threaded supporting rods (field-supplied) to channels through a rubber or spring isolator. See Fig. 5.

DO NOT use rods smaller than ½-in. diameter. Smaller rods may not be strong enough to support the unit. Rods must be securely anchored in ceiling joists.

Use a double hex nut when attaching hanger rods to brackets. A single nut could loosen from vibration of the unit.

Before sliding unit into final position, check for clearance to access panels and service area to install piping.



*Field supplied.

Fig. 5 — Threaded Rod Installed in Bracket

Step 3 — Complete Refrigerant Piping

GENERAL

All field leak and pressure testing should be done in accordance with local code requirements. If a local code does not exist, use ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Standard 15, Safety Code for Mechanical Refrigeration.

For leak testing procedures, refer to the Carrier "Refrigerant Service Techniques" book, Form SFT-01.

For any parts that need to be removed, use a mini tubing cutter. Perform phos-copper brazing on all field-made connections while protecting adjacent joints from heat.

REFRIGERANT LINE SIZING

Sizing depends on length of lines between various sections of the refrigerant system. Consider the amount of liquid lift and drop in the system as well as proper compressor oil return. Consult Carrier System Design Manual, Part 3 for proper piping sizes and design.

PRESSURE RELIEF

The ASHRAE Standard 15, Safety Code for Mechanical Refrigeration states: "Every refrigerating system shall be protected by a pressure relief device or some other means designed to safely relieve pressure due to fire or other abnormal conditions." Since 09XC condensers do not have pressure relief devices, one must be field supplied and installed either before the liquid line service valve or inside the 09XC unit. Each circuit must have its own pressure relief.

If desired, the pressure relief requirement can also be satisfied by installing a fusible plug in the liquid line. To do so, install a tee in the liquid line with a ¼-in. NPT fitting on the tee side, and install a fusible plug (part no. EK02KK105 or similar). The temperature rating of the fusible plug should be between 205°F and 220°F (96°C and 104°C). If a service valve is used on the liquid line, be sure that both the piping system and the condenser are protected for relief if all service valves are closed. Note that if the condenser is located indoors, requirements for venting the fusible plug to the outdoors may apply. Consult local code requirements.

REFRIGERANT RECEIVER

A refrigerant receiver is not furnished with 09XC condensers and is not recommended for normal applications as its use is detrimental to adequate refrigerant storage volume and desired effects of subcooling.

COIL CONNECTIONS

See Table 2 for the necessary connections.

LIQUID LIFT

Amount of liquid lift available before refrigerant flashing occurs depends on amount of liquid subcooling in the system.

All 09XC condensers have positive subcooling when applied with optimum charge. With subcooling, it is possible to overcome an appreciable pressure drop and/or static head pressure (due to elevation of the liquid metering device above the condenser when condenser is below evaporator coil).

When 09XC condensers are applied with minimum charge, they do not provide positive subcooling. If subcooling is required, it must be obtained by external means such as a liquid suction interchanger.

It is recommended that the evaporator be either at the same level as the condenser or lower than the condenser when minimum charge is used.

SWEAT CONNECTIONS

Connections are made outside the unit, and piping enters from the right side. For ease in brazing, it is recommended that all internal solder joints be made before unit is placed in its final position. See 50XCR (or other compressor-bearing unit) base unit installation instructions for proper line sizing and piping procedures.

FIELD PIPING

For 09XC remote installation, select pipe sizes according to length from Table 3. Use refrigerant grade piping. If tubing size is other than unit connection sizes, use adapter fittings.

Refer to 50XCR (or other compressor-bearing unit) base unit installation instructions to determine refrigerant charge adjustment for remote and special piping applications.

NOTE: When installing 09XC units in systems, add charge for other components (i.e., filter drier, moisture indicator, etc.) to determine system charge quantity. Record charge.

CHECK VALVE

When the 09XC condenser is installed with the condenser located above the compressor evaporator, it is recommended that a field-supplied check valve be installed on the hot gas discharge line. This prevents refrigerant which condenses in the discharge line during the off cycle from draining back into the compressor. Install the check valve at the compressor line before the line goes up to the condenser. Check valve part no. EC37BP183 or similar may be used.

Step 4 — Install Ductwork

The 09XC unit is designed for use either with or without ductwork. If ductwork is used, care must be taken to eliminate air recirculation. Recirculation can be minimized by discharging through an extension elbow. When properly designed, single deflection discharge louvers can be applied to ductwork and to the condenser air discharge. Fixed rain louvers over discharge outlets can cause excessive recirculation and nuisance high pressure switch cutouts. Obstructions closer than 10 ft to the discharge air pattern can also cause significant recirculation. See Fig. 6 for ductwork installation to prevent recirculation of air.

CONDENSER AIR DUCT

The condenser supply and discharge air duct should be as short as possible. The cross section area of the duct should be the same as the face area of the unit openings. For units with multiple fans, "a pair of pants" duct configuration should be used in accordance with the System Design Manual and ASHRAE guidelines; in some instances, settling media may be required to ensure uniform airflow. Ductwork should be insulated to prevent moisture condensation on the unit panels during cold weather.

Insulate as follows:

1. If metal ductwork is used, insulation may be applied on the inside of the duct. This installation should be extended to cover the inside of the duct flanges. It is necessary to insulate the inside of the ducts at the duct flanges to reduce heat loss from the metal cabinet by conduction through the duct flanges and into the cold duct. Interior insulation allows the metal duct to approach room temperature. It also prevents condensation from forming and collecting under the insulation which will occur with exterior duct insulation.

NOTE: Fiberglass duct board may also be used if permitted by local codes.

2. If insulation is applied to the outside of the metal duct, the inside must be insulated for a length of 10 in. from the unit (including the duct flanges) or up to the flexible duct vapor barrier on the outside, which must be tightly sealed to prevent condensation under the insulation.

Step 5 — Insulate the Unit

The 09XC units are not insulated. If the unit will be operated during cold weather and the equipment room is not at outdoor temperatures, the unit cabinet should be insulated to prevent condensation. Insulate the unit in the same manner as the ductwork insulation described in Condenser Air Duct section above.

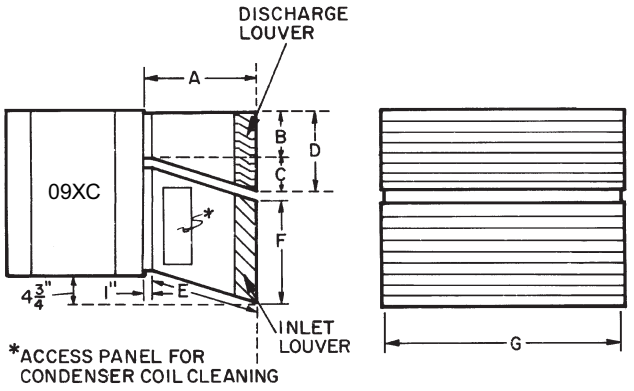
Table 3 — Minimum Refrigerant Line Size Data (in.)

09XC UNIT SIZE	CIRCUIT QUANTITY	LENGTH OF PIPING RUN (FT)									
		0 TO 15		16 TO 25		26 TO 50		51 TO 75		76 TO 100	
		HG	LIQ	HG	LIQ	HG	LIQ	HG	LIQ	HG	LIQ
06	**1**	5/8	1/2	7/8	1/2	7/8	1/2	7/8	5/8	7/8	5/8
08	**1**	5/8	1/2	7/8	1/2	7/8	1/2	7/8	5/8	7/8	5/8
12	**1**	7/8	5/8	7/8	5/8	1 1/8	5/8	1 1/8	5/8	1 1/8	5/8
14	**1**	7/8	5/8	7/8	5/8	1 1/8	5/8	1 1/8	5/8	1 1/8	5/8
16	**1**	1 1/8	5/8	1 1/8	5/8	1 1/8	5/8	1 3/8	7/8	1 3/8	7/8
24	**1**	1 1/8	5/8	1 1/8	5/8	1 3/8	7/8	1 3/8	7/8	1 3/8	7/8

LEGEND

HG — Hot Gas (Refrigerant Discharge)
LIQ — Liquid

NOTES:
1. A standard number of elbows and fittings have been considered in sizing piping (approximately 20% loss). Special applications may require different minimum refrigerant line sizes. Contact your local representative for assistance as required.
2. Line sizes are in inches.
3. A hot gas line check valve is recommended when the 09XC condenser is installed above the compressor. Pressure loss through recommended hot gas line check valve has been included in 16 to 100 ft length applications.



DIMENSIONS (in.)

UNIT 09XC	A	B	C	D	F	G
06/08	41 1/2	12 3/4	4	16 3/4	29 3/8	46
12/14	50 1/2	16 1/4	4	20 1/4	32 3/4	60
16/24	58 1/2	16 1/4	4	20 1/4	38 1/2	80

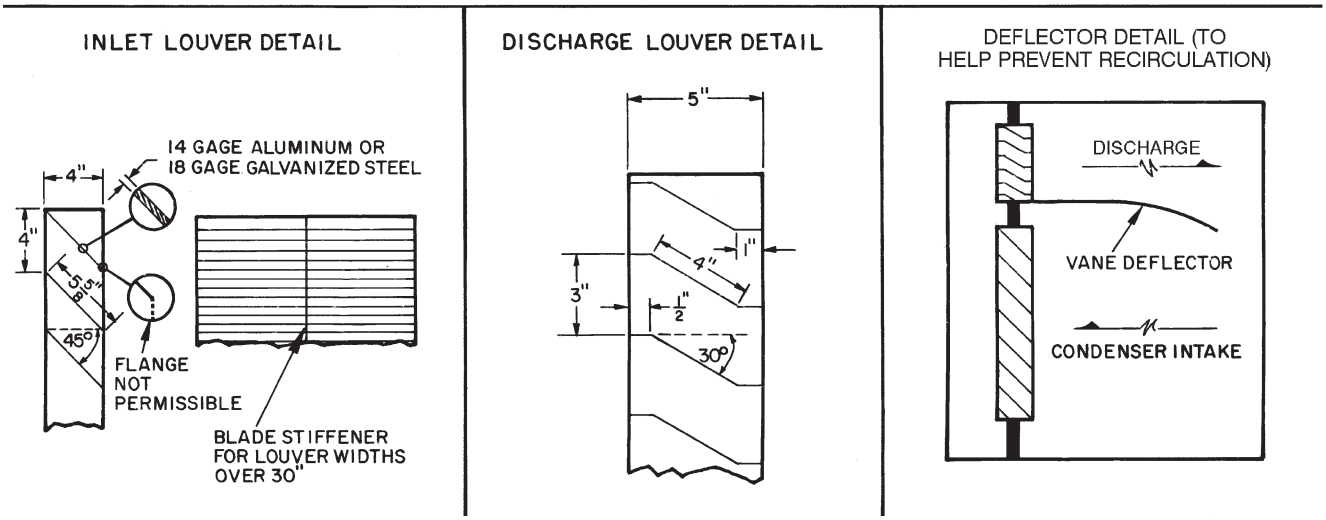


Fig. 6 — Condenser Ductwork Details

Step 6 — Complete Electrical Connections

GENERAL

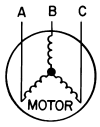
Verify that nameplate electrical requirements match available power supply. Voltage at condenser must be within the minimum and maximum shown in Table 4 and phases must be balanced within 2%. Contact local power company for line voltage corrections. Never operate a motor where a phase imbalance in supply voltage is greater than 2%.

UNBALANCED 3-PHASE SUPPLY VOLTAGE

Use the following formula to determine the percent of voltage imbalance.

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

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.

POWER WIRING

The units must have adequate overcurrent protection, fuses, or HACR (Heating, Air-Conditioning and Refrigeration) breakers, according to the national and applicable local codes.

For field power connections, all main power wiring enters the unit through a factory-punched access hole on the right side of the unit. See Fig. 1. Attach power wires to the power connections on the main power terminal block in the unit control box. Be sure to install a ground wire.

CONTROL WIRING

Connect 24-v control wires to the 2 low-voltage connections at the compressor contactor. Use field-supplied wire nuts to make the connections to the terminal strip in the control box. For field control connections, all wiring enters the unit through a factory-punched access hole on the right side of the unit. See Fig. 1.

Table 4 — Fan Electrical Data

MOTOR CODE	HP	V-PH-HZ	VOLTAGE RANGE		FLA	MCA	MOPD	DISC
			MIN	MAX				
D	1.00	208/230-3-60	187	253	3.2/3.2	4.0/4.0	15/15	30
		460-3-60	414	506	1.6	2.0	15	30
		575-3-60	518	632	1.1	1.4	15	30
E	1.50	208/230-3-60	187	253	4.6/4.8	5.8/6.0	15/15	30
		460-3-60	414	506	2.4	3.0	15	30
		575-3-60	518	632	1.6	1.9	15	30
F	2.00	208/230-3-60	187	253	6.0/5.8	7.5/7.2	15/15	30
		460-3-60	414	506	2.9	3.6	15	30
		575-3-60	518	632	2.1	2.6	15	30
G	3.00	208/230-3-60	187	253	9.2/8.6	11.5/10.8	20/15	30
		460-3-60	414	506	4.3	5.4	15	30
		575-3-60	518	632	3.4	4.2	15	30
H	5.00	208/230-3-60	187	253	14.5/13.6	18.1/17.0	30/30	30
		460-3-60	414	506	6.8	8.5	15	30
		575-3-60	518	632	5.4	6.8	15	30
J	7.50	208/230-3-60	187	253	21.5/19.4	26.9/24.2	45/40	30
		460-3-60	414	506	9.7	12.1	20	30
		575-3-60	518	632	7.5	9.4	15	30

LEGEND

FLA — Full Load Amps
DISC — Disconnect
MCA — Minimum Circuit Amps
MOPD — Minimum Overcurrent Protection Device
NEC — National Electrical Code
RLA — Rated Load Amps

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR circuit breaker. Canadian units may be fuse or circuit breaker.
2. Wire sizing amps are a sum of 125% of the compressor RLA plus 100% of indoor fan motor FLA.
3. Motors are protected against primary single phasing condition.
4. Indoor-fan motors are 3-phase motors of same voltage as unit.

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START-UP

⚠ CAUTION

To prevent injury, ensure that ducting or wire fan guards are installed on the condenser fan before starting the unit.

General

Complete the start-up checklist on pages CL-1 and CL-2 before attempting system start-up.

System Evacuation and Dehydration

Refer to GTAC II, Module 4, "Dehydration for Proper Evacuation and Dehydration Techniques."

Charging Procedure

Before charging the system, install or replace the filter drier(s) connected to the liquid line in the indoor unit to prevent contamination within the system. Refer to GTAC II, Module 5 "Charging, Recovery, Recycling, and Reclamation" for proper charging techniques.

Low Ambient Operation (Factory Installed)

Refrigerant pressure controlled VFD (variable frequency drive) adjusts fan speed to control head pressure. This fan speed control permits unit to operate in cooling even in winter, when outdoor-air temperature is down to 0°F.

The refrigerant pressure is measures by a discharge pressure transducer that is factory-installed.

Configuration of Low Ambient Kit (Field Installation)

The original unit should have the wiring diagrams as shown in the typical wiring schematic in Troubleshooting section. The motor start and wiring should be replaced with a 24-v relay and the VFD, with the wiring shown in either the typical wiring schematic for low ambient option (09XC06,08 units) or typical wiring schematic for low ambient option (09XC12-24 units). Wiring diagrams are provided in Troubleshooting section.

Be sure the VFD jumper wires are set as shown in the wiring diagram and the two DIP switches are set to the "0" position for voltage control.

The parameters shown in Table 5 must be set for low ambient operation. Use actual nameplate motor FLA value since this value is subject to change.

When the drive is installed and wired, it will be necessary to configure the drive for this application, as follows:

1. When the drive first starts, system will prompt to run the Carrier Configuration Assistant. Exit this option.
2. Configure the drive parameters by pressing the menu button and using the arrow keys to select "Parameters", then press the enter key.
3. Move to the appropriate sub-group using the arrow keys (first two digits of the parameter to be changed), then press <SEL>.
4. Select the parameter to view or change using the arrow keys. Change a parameter by scrolling to that parameter and pressing <EDIT>.
5. Select the New Value, then press <SAVE>.

Table 5 — Low Ambient Operation Parameters

PARAMETER INDEX	PARAMETER FUNCTION	SELECTION
9902	Application Macro	1 (HVAC Default)
9906	Motor Nominal Voltage	Unit Voltage (use value on nameplate)
9907	Motor Nominal Current	Motor FLA (use value on nameplate)
9908	Motor Nominal Speed	1750
9909	Motor Nominal Power	Motor HP (use value on nameplate)
1102	EXT 1 - EXT 2 SEL	EXT 2
1301	AI-1 Minimum	5%
1302	AI-1 Maximum	45%
1304	AI-2 Minimum	5%
1305	AI-2 Maximum	45%
1501	AO1 Content	122 (RO1-3 Status)
2007	FREQUENCY MIN	30.0 HZ
2202	Acceleration Time	10 s
2203	Decel Time	11 s
3404	OUTPUT 1 DISPLAY FORM	Direct
3408	OUTPUT 2 PARAMETER	PID 1 SETPOINT
3409	SIGNAL 2 MIN	0.0 PSI
3410	SIGNAL 2 MAX	667.0
3412	OUTPUT 2 UNITS	PSI
3413	OUTPUT 2 MIN	0.0 PSI
3414	OUTPUT 2 MAX	667.0
3415	OUTPUT 3 PARAMETER	PID 1 FEEDBACK
3416	SIGNAL 3 MIN	0.0 PSI
3417	SIGNAL 3 MAX	667 PSI
3419	OUTPUT 3 UNITS	PSI
3420	OUTPUT 3 MIN	0.0 PSI
3421	OUTPUT 3 MAX	667 PSI
4001	PID GAIN	0.7
4002	PID INTEGRATE	5 s
4003	DERIVATION TIME	DISABLE
4005	ERROR VALUE INVERTED	YES
4006	UNITS	PSI
4008	0% VALUE	0.0 PSI
4009	100 % VALUE	667 PSI
4010	SET POINT SELECT	INTERNAL
4011	INTERNALSET POINT	300.0
4014	Feedback Select	7 [Max(A1, A2)]
4017	ACT-2 Input	1 (AI1)

Check Operation of Condenser Fan Motor Controls and Rotation of Fans

Rotation should be clockwise as viewed from belt access panel.

IMPORTANT: Check for proper fan rotation. If rotation needs to be reversed, disconnect main power supply and switch any 2 leads at the load side of the disconnect switch.

Adjust Fan Speed

The 09XC units are belt-driven condenser units and allow for a wide range of inlet static and condenser airflow requirements. It may be necessary to adjust the condenser airflow to account for these inlet conditions. Inadequate airflow will result in poor unit performance and possible nuisance tripping of high-pressure switches.

If an airflow is not specified, use the nominal airflow from Table 2 and adjust the fan speed to compensate for actual job conditions. Use Tables 6-11 to determine proper fan speed. If the unit trips on high pressure due to high condensing temperature, then it may be necessary to increase the fan speed and condenser airflow.

Table 6 — Condenser Fan Performance — 09XC06 Units

CFM	ESP (in. wg)																			
	0.00		0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2100	466	0.21	548	0.30	623	0.40	692	0.51	757	0.63	818	0.76	876	0.90	931	1.05	984	1.20	1035	1.37
2200	488	0.24	567	0.34	639	0.44	706	0.55	769	0.68	829	0.81	885	0.95	940	1.10	992	1.26	1042	1.42
2300	511	0.28	586	0.37	656	0.48	721	0.60	782	0.72	840	0.86	896	1.00	949	1.15	1000	1.31	1049	1.48
2400	533	0.31	605	0.41	673	0.53	736	0.64	796	0.77	852	0.91	907	1.06	959	1.21	1009	1.37	1057	1.54
2500	555	0.36	625	0.46	690	0.57	751	0.70	810	0.83	865	0.97	918	1.12	969	1.27	1018	1.43	1066	1.60
2600	577	0.40	644	0.51	708	0.62	767	0.75	824	0.89	878	1.03	930	1.18	980	1.34	1029	1.50	1075	1.67
2700	599	0.45	664	0.56	725	0.68	783	0.81	839	0.95	892	1.09	943	1.25	992	1.41	1039	1.57	1085	1.75
2800	621	0.50	684	0.61	744	0.74	800	0.87	854	1.01	906	1.16	956	1.32	1004	1.48	1050	1.65	1095	1.83
2900	644	0.56	704	0.67	762	0.80	817	0.94	870	1.08	920	1.23	969	1.39	1016	1.56	1062	1.73	1106	1.91
3000	666	0.61	725	0.74	781	0.87	834	1.01	886	1.15	935	1.31	983	1.47	1029	1.64	1074	1.81	1117	1.99
3100	688	0.68	745	0.80	799	0.94	852	1.08	902	1.23	950	1.39	997	1.55	1042	1.72	1086	1.90	—	—
3200	710	0.75	766	0.88	818	1.01	869	1.16	918	1.31	966	1.47	1011	1.64	1056	1.81	1099	1.99	—	—
3300	732	0.82	786	0.95	838	1.09	887	1.24	935	1.40	981	1.56	1026	1.73	1070	1.91	—	—	—	—
3400	755	0.89	807	1.03	857	1.18	905	1.33	952	1.49	997	1.66	1041	1.83	—	—	—	—	—	—
3500	777	0.98	828	1.12	876	1.27	924	1.42	969	1.59	1014	1.76	1057	1.93	—	—	—	—	—	—

CFM	ESP (in. wg)																			
	1.00		1.10		1.20		1.30		1.40		1.50		1.60		1.70		1.80		1.90	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2100	1084	1.54	1131	1.71	1177	1.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2200	1090	1.59	1136	1.77	1182	1.96	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2300	1097	1.65	1142	1.83	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2400	1104	1.71	1149	1.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2500	1112	1.78	1156	1.97	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2600	1120	1.85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2700	1130	1.93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

Table 7 — Condenser Fan Performance — 09XC08 Units

CFM	ESP (in. wg)															
	0.00		0.10		0.20		0.30		0.40		0.50		0.60		0.70	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2500	555	0.36	625	0.46	690	0.57	751	0.70	810	0.83	865	0.97	918	1.12	969	1.27
2650	588	0.42	654	0.53	716	0.65	775	0.78	831	0.92	885	1.06	936	1.21	986	1.37
2800	621	0.50	684	0.61	744	0.74	800	0.87	854	1.01	906	1.16	956	1.32	1004	1.48
2950	655	0.58	714	0.71	771	0.83	826	0.97	878	1.12	928	1.27	976	1.43	1023	1.60
3100	688	0.68	745	0.80	799	0.94	852	1.08	902	1.23	950	1.39	997	1.55	1042	1.72
3250	721	0.78	776	0.91	828	1.05	878	1.20	927	1.36	973	1.52	1019	1.69	1063	1.86
3400	755	0.89	807	1.03	857	1.18	905	1.33	952	1.49	997	1.66	1041	1.83	—	—
3550	788	1.02	838	1.16	886	1.31	933	1.47	978	1.64	1022	1.81	1065	1.98	—	—
3700	821	1.15	869	1.30	916	1.46	961	1.62	1005	1.79	1047	1.97	—	—	—	—
3850	855	1.30	901	1.45	946	1.62	989	1.78	1032	1.96	—	—	—	—	—	—
4000	888	1.46	932	1.62	976	1.79	1018	1.96	—	—	—	—	—	—	—	—
4150	921	1.63	964	1.79	1006	1.97	—	—	—	—	—	—	—	—	—	—
4300	954	1.81	996	1.98	—	—	—	—	—	—	—	—	—	—	—	—
4450	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

CFM	ESP (in. wg)													
	0.80		0.90		1.00		1.10		1.20		1.30		1.40	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2500	1018	1.43	1066	1.60	1112	1.78	1156	1.97	—	—	—	—	—	—
2650	1034	1.54	1080	1.71	1125	1.89	—	—	—	—	—	—	—	—
2800	1050	1.65	1095	1.83	—	—	—	—	—	—	—	—	—	—
2950	1068	1.77	1112	1.95	—	—	—	—	—	—	—	—	—	—
3100	1086	1.90	—	—	—	—	—	—	—	—	—	—	—	—
3250	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3550	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3850	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4150	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4450	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

Table 8 — Condenser Fan Performance — 09XC12 Units

CFM	ESP (in. wg)															
	0.00		0.10		0.20		0.30		0.40		0.50		0.60		0.70	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4100	389	0.41	451	0.53	506	0.66	557	0.80	605	0.94	651	1.10	695	1.26	737	1.43
4300	408	0.47	467	0.60	520	0.73	569	0.87	616	1.02	661	1.18	704	1.35	745	1.53
4500	427	0.54	484	0.67	535	0.81	583	0.96	628	1.11	672	1.28	714	1.45	754	1.63
4700	446	0.62	501	0.76	550	0.90	596	1.05	641	1.21	683	1.37	724	1.55	763	1.73
4900	465	0.70	518	0.84	566	0.99	611	1.15	653	1.31	694	1.48	734	1.66	773	1.85
5100	484	0.79	535	0.94	581	1.09	625	1.25	666	1.42	706	1.59	745	1.78	783	1.97
5300	503	0.88	552	1.04	597	1.20	640	1.37	680	1.54	719	1.72	757	1.90	793	2.10
5500	522	0.99	569	1.15	613	1.32	654	1.49	694	1.66	732	1.85	769	2.04	804	2.23
5700	541	1.10	587	1.27	629	1.44	670	1.62	708	1.80	745	1.98	781	2.18	816	2.38
5900	560	1.22	604	1.39	646	1.57	685	1.75	722	1.94	758	2.13	794	2.33	828	2.53
6100	578	1.35	622	1.53	662	1.71	700	1.90	737	2.09	772	2.29	807	2.49	840	2.70
6300	597	1.48	639	1.67	679	1.86	716	2.05	752	2.25	786	2.45	820	2.66	852	2.87
6500	616	1.63	657	1.82	696	2.02	732	2.21	767	2.42	801	2.62	833	2.83	—	—
6700	635	1.78	675	1.98	712	2.18	748	2.39	782	2.59	815	2.81	—	—	—	—
6900	654	1.95	693	2.15	729	2.36	764	2.57	798	2.78	830	3.00	—	—	—	—

CFM	ESP (in. wg)													
	0.80		0.90		1.00		1.10		1.20		1.30		1.40	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4100	777	1.61	815	1.79	851	1.98	885	2.17	917	2.36	948	2.55	977	2.75
4300	785	1.71	822	1.90	858	2.09	892	2.28	925	2.48	956	2.68	985	2.89
4500	793	1.81	830	2.01	866	2.20	900	2.40	932	2.61	964	2.82	—	—
4700	801	1.92	838	2.12	873	2.32	907	2.53	940	2.74	971	2.95	—	—
4900	810	2.04	846	2.24	881	2.45	915	2.66	947	2.87	—	—	—	—
5100	819	2.16	855	2.37	889	2.58	923	2.80	—	—	—	—	—	—
5300	829	2.30	864	2.51	898	2.72	931	2.94	—	—	—	—	—	—
5500	839	2.44	874	2.65	907	2.87	—	—	—	—	—	—	—	—
5700	850	2.59	884	2.80	—	—	—	—	—	—	—	—	—	—
5900	861	2.74	894	2.96	—	—	—	—	—	—	—	—	—	—
6100	873	2.91	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6500	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6700	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

Table 9 — Condenser Fan Performance — 09XC14 Units

CFM	ESP (IN. WG)															
	0.0		0.1		0.2		0.3		0.4		0.5		0.6		0.7	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	496	1.03	533	1.17	570	1.36	608	1.58	646	1.82	683	2.06	719	2.31	755	2.56
6250	517	1.17	552	1.31	588	1.50	624	1.72	660	1.97	696	2.22	732	2.48	766	2.74
6500	537	1.31	571	1.46	605	1.65	640	1.88	675	2.13	710	2.39	744	2.66	778	2.93
6750	558	1.47	590	1.62	623	1.81	657	2.05	691	2.30	724	2.57	757	2.85	—	—
7000	579	1.64	610	1.79	642	1.99	674	2.23	707	2.49	739	2.76	—	—	—	—
7250	599	1.82	629	1.98	660	2.18	691	2.42	723	2.68	754	2.96	—	—	—	—
7500	620	2.02	649	2.18	679	2.38	709	2.62	739	2.89	—	—	—	—	—	—
7750	641	2.23	669	2.39	697	2.59	726	2.84	—	—	—	—	—	—	—	—
8000	661	2.45	688	2.61	716	2.82	—	—	—	—	—	—	—	—	—	—
8250	682	2.69	708	2.85	—	—	—	—	—	—	—	—	—	—	—	—
8500	703	2.94	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

CFM	ESP (in. wg)									
	0.80		0.90		1.00		1.10		1.20	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
6000	789	2.81	—	—	—	—	—	—	—	—
6250	800	3.00	—	—	—	—	—	—	—	—
6500	—	—	—	—	—	—	—	—	—	—
6750	—	—	—	—	—	—	—	—	—	—
7000	—	—	—	—	—	—	—	—	—	—
7250	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—
7750	—	—	—	—	—	—	—	—	—	—
8000	—	—	—	—	—	—	—	—	—	—
8250	—	—	—	—	—	—	—	—	—	—
8500	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—
9250	—	—	—	—	—	—	—	—	—	—
9500	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

Table 10 — Condenser Fan Performance — 09XC16 Units

CFM	ESP (in. wg)																			
	0.00		0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
6250	474	1.16	524	1.37	570	1.58	612	1.79	653	2.01	691	2.23	727	2.45	762	2.67	795	2.90	827	3.13
6500	493	1.28	541	1.49	585	1.70	627	1.92	666	2.14	704	2.37	739	2.59	773	2.82	806	3.05	838	3.28
6750	512	1.41	558	1.62	601	1.84	642	2.06	680	2.28	717	2.51	752	2.74	785	2.97	817	3.20	849	3.44
7000	531	1.54	576	1.76	618	1.98	657	2.20	695	2.43	730	2.66	764	2.89	797	3.13	829	3.36	860	3.60
7250	550	1.68	593	1.90	634	2.13	672	2.36	709	2.59	744	2.82	778	3.06	810	3.29	841	3.53	871	3.77
7500	569	1.83	611	2.06	650	2.28	688	2.52	724	2.75	758	2.99	791	3.22	823	3.46	853	3.71	883	3.95
7750	588	1.99	629	2.22	667	2.45	704	2.68	739	2.92	772	3.16	804	3.40	836	3.64	866	3.89	895	4.14
8000	607	2.15	646	2.38	684	2.62	720	2.86	754	3.10	787	3.34	818	3.59	849	3.83	878	4.08	907	4.33
8250	626	2.32	664	2.56	701	2.80	736	3.04	769	3.28	801	3.53	832	3.78	862	4.03	891	4.28	920	4.53
8500	645	2.50	682	2.74	718	2.98	752	3.23	784	3.48	816	3.73	846	3.98	876	4.23	905	4.48	933	4.74
8750	664	2.69	700	2.93	735	3.18	768	3.43	800	3.68	831	3.93	861	4.18	890	4.44	918	4.70	945	4.96
9000	683	2.88	718	3.13	752	3.38	784	3.63	816	3.89	846	4.14	875	4.40	904	4.66	932	4.92	—	—
9250	702	3.09	736	3.34	769	3.59	801	3.85	832	4.10	861	4.36	890	4.62	918	4.88	—	—	—	—
9500	721	3.30	754	3.56	787	3.81	818	4.07	848	4.33	877	4.59	905	4.85	—	—	—	—	—	—
9750	740	3.52	772	3.78	804	4.04	834	4.30	864	4.56	892	4.83	—	—	—	—	—	—	—	—

CFM	ESP (in. wg)																			
	1.00		1.10		1.20		1.30		1.40		1.50		1.60		1.70		1.80		1.90	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
6250	858	3.37	888	3.60	917	3.84	945	4.08	973	4.32	1000	4.56	1026	4.81	—	—	—	—	—	—
6500	868	3.52	898	3.76	926	4.00	954	4.24	982	4.48	1008	4.73	1034	4.98	—	—	—	—	—	—
6750	879	3.68	908	3.92	936	4.16	964	4.41	991	4.65	1017	4.90	—	—	—	—	—	—	—	—
7000	889	3.84	918	4.09	946	4.33	973	4.58	1000	4.83	—	—	—	—	—	—	—	—	—	—
7250	900	4.02	929	4.26	956	4.51	983	4.76	—	—	—	—	—	—	—	—	—	—	—	—
7500	912	4.20	940	4.45	967	4.70	994	4.95	—	—	—	—	—	—	—	—	—	—	—	—
7750	923	4.39	951	4.64	978	4.89	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8000	935	4.58	962	4.84	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8250	947	4.79	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8500	960	5.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

Table 11 — Condenser Fan Performance — 09XC24 Units

CFM	ESP (in. wg)															
	0.00		0.10		0.20		0.30		0.40		0.50		0.60		0.70	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
8,500	613	2.20	657	2.54	698	2.87	737	3.22	773	3.56	808	3.91	841	4.27	873	4.63
8,800	634	2.45	677	2.79	717	3.14	755	3.49	790	3.85	824	4.21	857	4.58	889	4.95
9,100	656	2.70	697	3.06	736	3.42	773	3.78	808	4.15	841	4.53	873	4.91	904	5.29
9,400	678	2.98	718	3.35	756	3.72	791	4.09	826	4.47	858	4.86	890	5.25	920	5.64
9,700	699	3.28	738	3.65	775	4.04	810	4.42	844	4.81	876	5.21	907	5.61	936	6.02
10,000	721	3.59	759	3.98	795	4.37	829	4.77	862	5.17	893	5.58	923	5.99	953	6.41
10,300	742	3.92	779	4.32	814	4.73	848	5.14	880	5.55	911	5.97	940	6.39	969	6.82
10,600	764	4.27	800	4.69	834	5.10	867	5.53	898	5.95	928	6.38	958	6.81	986	7.25
10,900	786	4.65	821	5.07	854	5.50	886	5.93	917	6.37	946	6.81	975	7.25	—	—
11,200	807	5.04	841	5.48	874	5.92	905	6.36	935	6.81	964	7.26	—	—	—	—
11,500	829	5.46	862	5.91	894	6.36	925	6.81	954	7.27	—	—	—	—	—	—
11,800	850	5.90	883	6.36	914	6.82	944	7.29	—	—	—	—	—	—	—	—
12,100	872	6.36	904	6.83	934	7.30	—	—	—	—	—	—	—	—	—	—
12,400	894	6.84	925	7.32	—	—	—	—	—	—	—	—	—	—	—	—
12,700	915	7.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—

CFM	ESP (in. wg)													
	0.80		0.90		1.00		1.10		1.20		1.30		1.40	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8,500	904	5.00	933	5.37	962	5.75	990	6.13	1017	6.52	1043	6.91	1069	7.30
8,800	919	5.33	948	5.71	976	6.10	1004	6.49	1030	6.89	1056	7.29	—	—
9,100	934	5.68	963	6.07	991	6.47	1018	6.87	1044	7.27	—	—	—	—
9,400	949	6.04	978	6.44	1005	6.85	1032	7.26	—	—	—	—	—	—
9,700	965	6.42	993	6.84	1020	7.26	—	—	—	—	—	—	—	—
10,000	981	6.83	1009	7.25	—	—	—	—	—	—	—	—	—	—
10,300	997	7.25	—	—	—	—	—	—	—	—	—	—	—	—
10,600	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,200	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,800	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,100	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,700	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure

NOTES:
1. Units are available with several motor hp options. Refer to Table 2.
2. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
3. Interpolation is permitted; extrapolation is not.
4. Fan performance is based on unit casing, and dry DX (direct expansion) coil losses at sea level.

SERVICE

Cleaning Condenser Coils

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.

Take care not to get water in the system ducts or unit insulation.

Lubrication

Fan motors have permanently lubricated bearings.

Condenser Fan Adjustment

To prevent personal injury, be sure wire fan guards are secured in place over each fan discharge (or that fans are ducted) before starting the unit.

TO CHANGE FAN SPEED

1. Shut off unit power supply. Lock out power supply and tag disconnect locations.
2. Loosen fan belt by loosening fan motor from mounting bracket. Do not loosen fan motor mounting bracket from unit.
3. Loosen movable pulley flange setscrew (Fig. 7).

4. Screw movable flange toward fixed flange to increase fan speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum allowable fan speed or motor full load amps indicated on motor nameplate and in Table 4.
5. Set movable flange setscrew at nearest flat of pulley hub and tighten setscrew.
6. Check pulley alignment and belt tension adjustment as described below.
7. Check fan operation. Repeat above procedure as required.

Pulley Alignment

Shut off unit power supply. Lock out power supply and tag disconnect locations. Loosen fan motor pulley setscrews and slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting bracket (see Fig. 7). Check alignment with a straightedge.

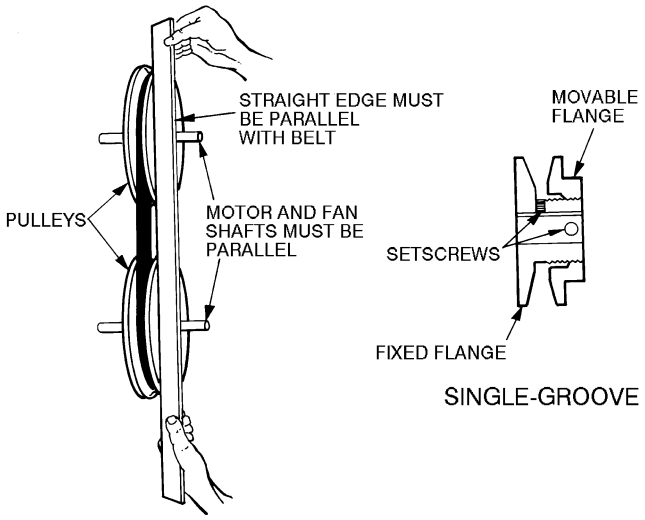


Fig. 7 — Fan Pulley Adjustments

Belt Tension Adjustment

Shut off unit power supply. Lock out power supply and tag disconnect locations. Loosen fan motor mounting plate bolts. Do not loosen motor mounting bracket from unit. Move fan motor mounting plate until proper belt tension is achieved (approximately $^1/_2$-in. deflection with 8-lb tension at midpoint of belt span).

Changing Fan Wheel

If a fan wheel should fail, it may be replaced as follows:

1. Shut off unit power supply. Lock out power supply and tag disconnect locations.
2. Remove belts from fan pulley.
3. Loosen locking collars on the fan bearings and set screws on the fan wheels.
4. Remove the shaft through the access panel on either side of the unit.
5. Remove the fan cut-off plate in the fan discharge.
6. Remove the fan wheel through the fan discharge opening.
7. Replace the wheel, and reverse Steps 1-5 above.

Fan Bearing Replacement

If a fan bearing fails, replace it as follows:

1. Shut off unit power supply. Lock out power supply and tag disconnect locations.
2. Remove belts from the fan pulley.
3. Support fan shaft.
4. Loosen locking collar on fan bearing.
5. Remove bearing from the shaft.
6. Install new bearing onto the shaft, and reverse Steps 1-4 above.

Concentric Alignment

Shaft and wheels must be concentrically centered with the venturi or air inlet of the fan housing (see Fig. 8).

Shaft bearings are supported by bearing supports (Fig. 9). If shaft and wheels are concentrically misaligned from shipping shock, replace the bearing support if it has extensive damage.

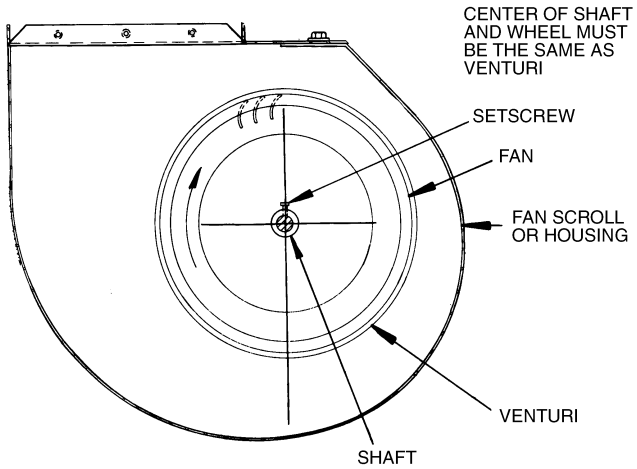


Fig. 8 — Concentric Alignment

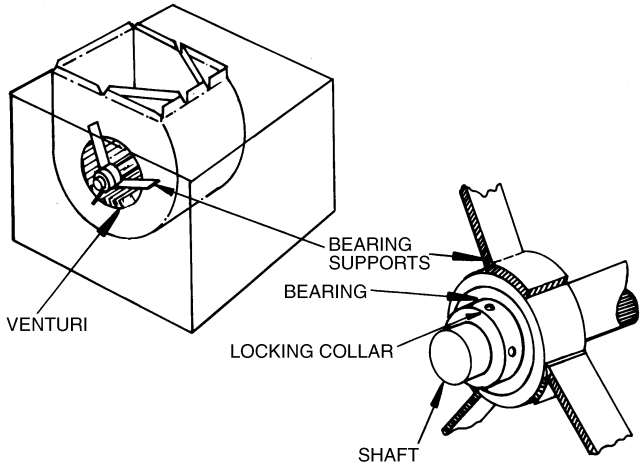


Fig. 9 — Fan Shaft Bearings

Condenser Motor Starter Setting (after Lockout/Tagout)

Motor starter is factory set. If starter is replaced in the field, use the following procedure to set:

1. On the starter, adjust the Motor Overload to match the **FLA Rating** of the installed motor by turning the Overload Setpoint wheel to the appropriate value. See Fig. 10. Condenser motor FLA ratings are listed in Table 12.
2. On the starter, turn the Motor Overload Reset wheel to **M-O** (referred to as Manual Reset).
3. On the starter, depress the Motor Overload Reset wheel (the wheel also acts as reset button).
4. Turn the Power Switch/Disconnect Switch of the Start/Stop Station to the **ON** Position.

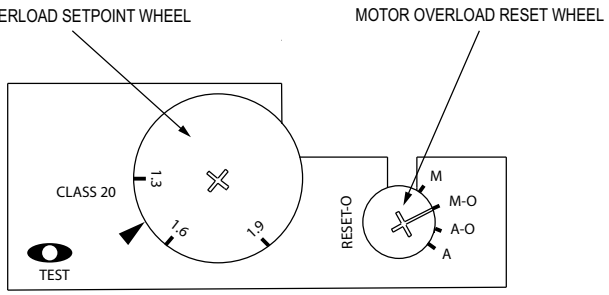


Fig. 10 — Motor Starter Setting

MAINTENANCE

Cleaning

The unit should be thoroughly cleaned inside and out. Frequency of cleaning will depend on unit location and area conditions. Drains must be kept free of dirt and trash. Coils can be cleaned with a stiff brush, vacuum cleaner, or compressed air. Coil can be reached through access panels.

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, proper refrigerant charge, and refrigerant piping leaks.

Air Filters

Air filters may be installed on the condenser air inlet. Air filters should be replaced or cleaned on a regular basis depending on how dirty the operating environment is. Failure to clean air filters regularly will result in loss of unit performance and possible nuisance tripping of the high-pressure switch.

TROUBLESHOOTING

Refer to Table 13 to determine the possible cause of the problem and the associated procedure necessary to correct it.

For the low ambient option on the 09XC06,08 units, see Fig. 11 and for the 09XC12-24 units see Fig. 12.

Table 12 — Condenser Motor Starter Settings

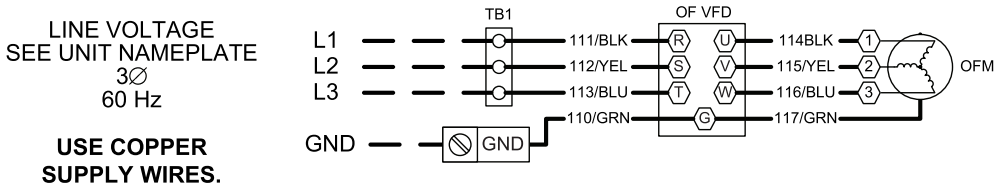
HP	208-230 V		460 V	575 V
	FLA		FLA	FLA
	208V	230V		
0.50	1.8	2.2	1.1	0.9
0.75	2.5	2.6	1.3	1.0
1.00	3.4	3.0	1.5	1.1
1.50	4.6	4.2	2.1	1.6
2.00	6.0	5.6	2.8	2.1
3.00	9.2	8.6	4.3	3.4
5.00	14.5	13.6	6.8	5.4
7.50	21.5	19.4	9.7	7.5
10.00	28.0	—	12.6	10.1

Table 13 — Troubleshooting Procedure

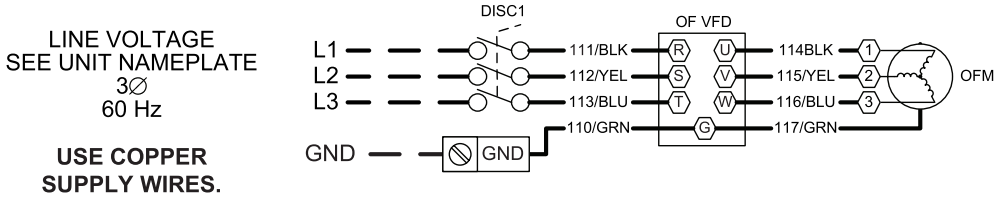
PROBLEM	POSSIBLE CAUSE	CORRECTION PROCEDURE
Unit will not Start	Loss of unit power	Check power source. Check fuses, circuit breakers, disconnect switch. Check electrical contacts.
	Unit voltage not correct	Check and correct.
	Open fuse	Check for short circuit in unit.
	Open protection device	Check relays, 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.
	Motor defective	Test and replace if necessary.
	Broken belt	Replace belt.
	Loose electrical contact	Tighten contact.
Compressor is Noisy, but will 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 not properly charged	Check and correct any leaks. Adjust refrigerant charge.
	Unit is oversized	Check heat 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. Check internal noise.
	Tube vibration	Check and correct.
	Unit panel or part vibrating	Check and tighten appropriate part.

LEGEND

TXV — Thermostatic Expansion Valve



WITHOUT FACTORY INSTALLED DISCONNECT SWITCH



FACTORY INSTALLED DISCONNECT SWITCH OPTION

LOW VOLTAGE CONTROLS

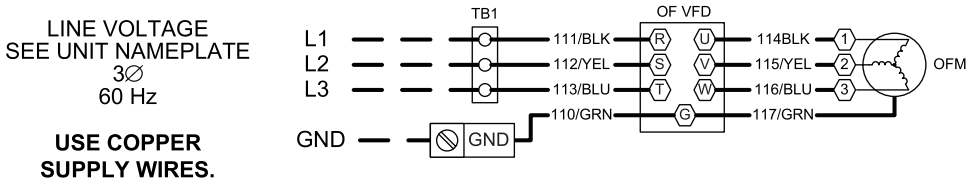
LEGEND

C	—	Compressor Contactor
DISC	—	Disconnect
GND	—	Ground
OFM	—	Outdoor-Fan Motor
OFR	—	Outdoor-Fan Relay
PRES	—	Pressure Transducer
TB	—	Terminal Block
VFD	—	Variable Frequency Drive

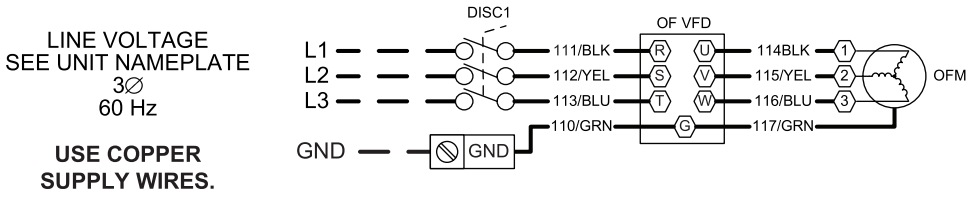
Terminal Block Connection
Marked Terminal
Unmarked Terminal
Splice
Factory Wiring
Field Power Wiring

NOTES:
1. Fan motors are inherently thermally protected.
2. Three-phase motors are protected under primary single phase conditions.
3. Use conductors suitable for at least 194°F (90°C) when replacing factory wiring.
4. Use copper conductors only.
5. Wiring for field power supply must be rated at 165°F (75°C) minimum.

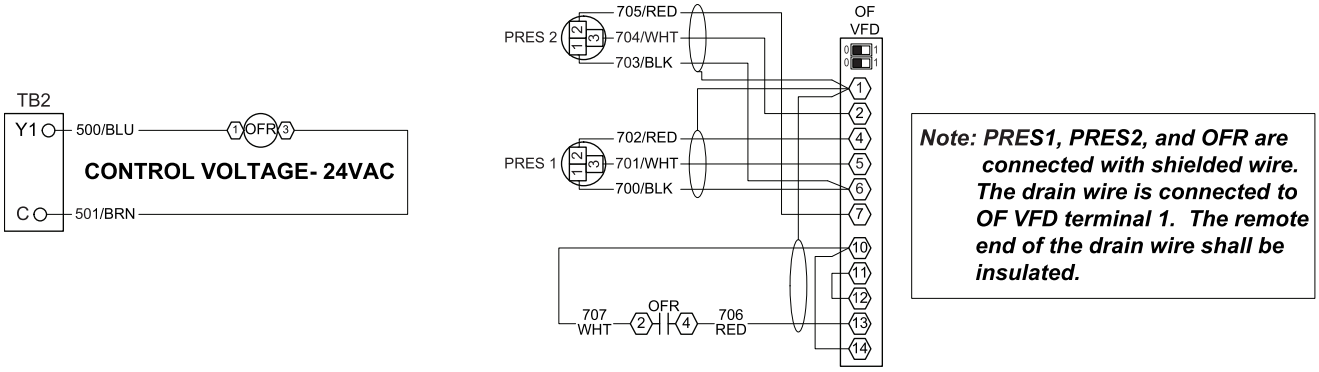
Fig. 11 — Typical Wiring Schematic for Low Ambient Option (09XC06,08 Units)



WITHOUT FACTORY INSTALLED DISCONNECT SWITCH



FACTORY INSTALLED DISCONNECT SWITCH OPTION



LOW VOLTAGE CONTROLS

LEGEND

C	—	Compressor Contactor
DISC	—	Disconnect
GND	—	Ground
OFM	—	Outdoor-Fan Motor
OFR	—	Outdoor-Fan Relay
PRES	—	Pressure Transducer
TB	—	Terminal Block
VFD	—	Variable Frequency Drive

□	Terminal Block Connection
⬡	Marked Terminal
○	Unmarked Terminal
●	Splice
———	Factory Wiring
– – – –	Field Power Wiring

NOTES:
1. Fan motors are inherently thermally protected.
2. Three-phase motors are protected under primary single phase conditions.
3. Use conductors suitable for at least 194°F (90°C) when replacing factory wiring.
4. Use copper conductors only.
5. Wiring for field power supply must be rated at 165°F (75°C) minimum.

Fig. 12 — Typical Wiring Schematic for Low Ambient Option (09XC12-24 Units)

START-UP CHECKLIST

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

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

I. PRELIMINARY INFORMATION

09XC 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) _____

HAVE CONDENSER FAN AND MOTOR PULLEYS BEEN CHECKED FOR PROPER ALIGNMENT AND DO THE FAN BELTS HAVE PROPER TENSION? (Y/N) _____

HAS CORRECT FAN ROTATION ON CONDENSER BEEN CONFIRMED? (Y/N) _____

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

VERIFY UNIT IS INSTALLED WITHIN LEVELING TOLERANCES (Y/N) _____

CONTROLS

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

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (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) _____

LOCATE, REPAIR, AND REPORT ANY LEAKS

HAVE ALL COMPRESSOR SERVICE VALVES BEEN FULLY OPENED (BACKSEATED)? (Y/N) _____

HAVE LIQUID LINE SERVICE VALVES BEEN OPENED? (Y/N) _____

IS THE OIL LEVEL IN THE COMPRESSOR CRANKCASE ON THE UNIT IN VIEW IN THE COMPRESSOR SIGHT GLASS (IF APPROPRIATE)? (Y/N) _____

HAS CONDENSER PRESSURE RELIEF BEEN PROVIDED? (Y/N) _____

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 INDOOR (EVAPORATOR) FAN SPEED AND RECORD _____

CHECK OUTDOOR (CONDENSER) FAN SPEED AND RECORD _____

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

	CIRCUIT 1	CIRCUIT 2 (If Applicable)	CIRCUIT 3 (If Applicable)
SUCTION PRESSURE			
SUCTION LINE TEMP			
DISCHARGE PRESSURE			
DISCHARGE LINE TEMP			
SATURATED SUCTION TEMP			
SATURATED CONDENSING			
SUPERHEAT DEGREES			
SUBCOOLING DEGREES			
ENTERING CONDENSER-AIR TEMP			
LEAVING CONDENSER-AIR 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			

CONDENSER FAN AMPS: _____

SUPPLY FAN AMPS: _____

NOTES: _____

_____

_____

_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE