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 and service. 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.

⚠ 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 gauge 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

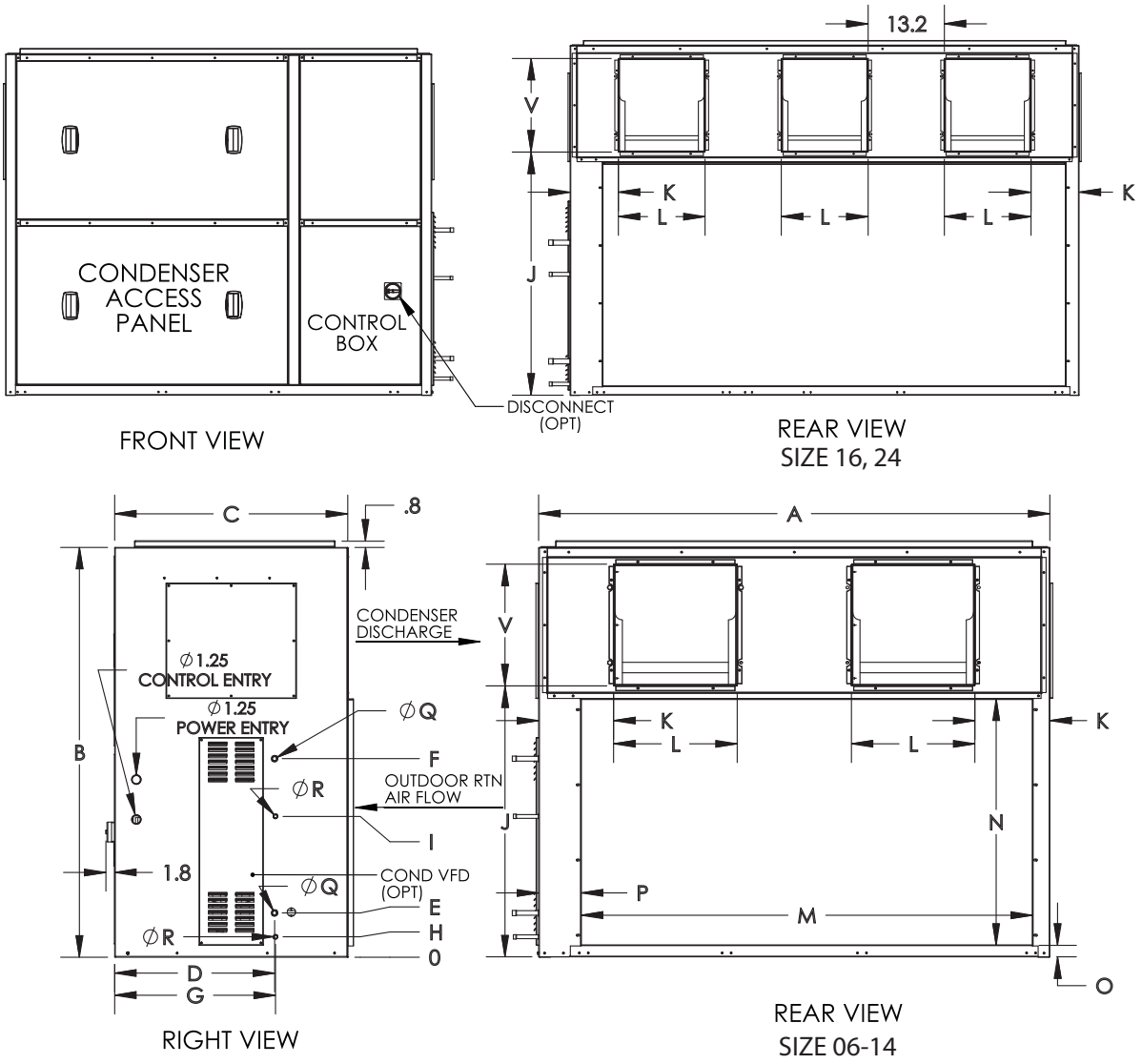
The 09XC remote air-cooled condenser is designed to be used with the 50XCR vertical packaged units. See Table 1. Airflow is horizontal, both into and out from the same face of the unit. The unit is designed to be mounted indoors in a window or through the wall in high-rise buildings. See Fig. 1 for unit 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	36.0	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

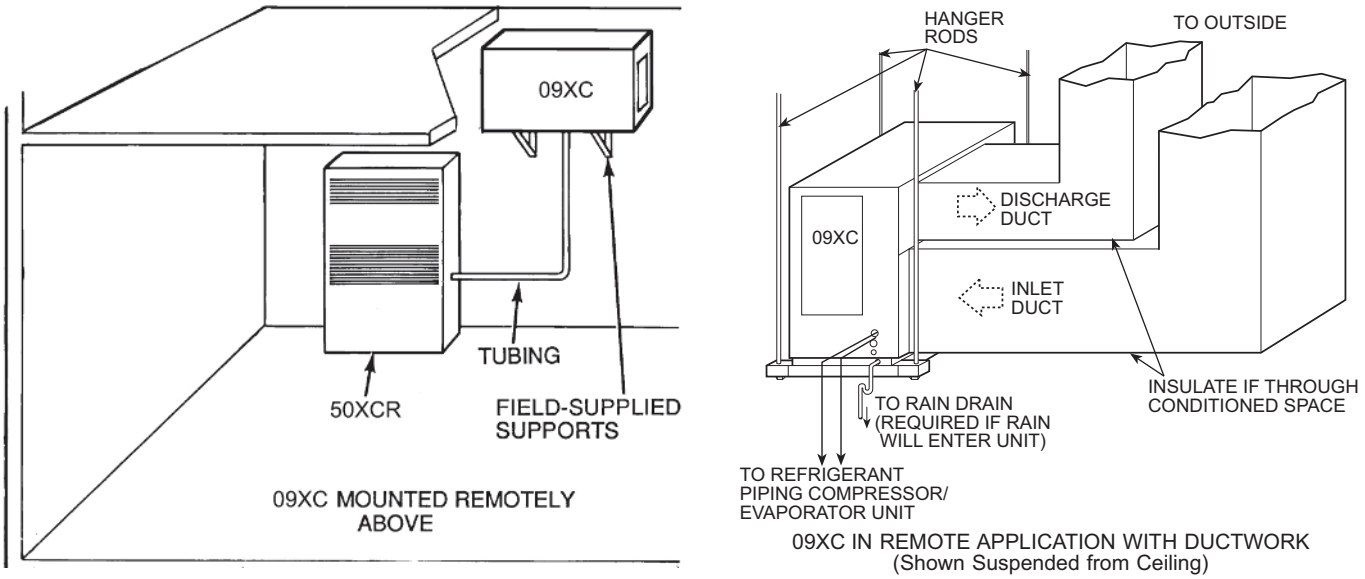


Fig. 2 — Mounting Applications

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)	**883**	**1153**	**1352**	**1380**	**1645**	**2041**
CONDENSER FAN	Adjustable, Belt Drive, Centrifugal Type					
Nominal cfm	3400	4000	6000	8000	8000	10300
Condenser Fan Size	110-10R	110-10R	150-12R	150-15R	150-11R	150-11R
Number of Condenser Fans	2	2	2	2	3	3
Max. Allowable rpm	1700	1700	1700	1600	1700	1700
Std hp	1.0	1.5	2.0	2.0	3.0	5.0
Hp Range	1 - 1.5	1.5 - 2	2 - 3	2 - 3	3 - 5	5 - 7.5
Fan Shaft Size (in.)	1	1	1	1-3/16	1-7/16	1-7/16
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...16W	5...16W
Fin Block Size (H x L) (in.)	30 x 46	30 x 46	32 x 60	34 x 80	34x80	40x80
Face Area (sq ft)	9.58	9.58	13.33	18.89	18.89	22.2
Refrigerant Gas Inlet Connection Size (in.)	5/8	5/8	7/8	7/8	1-1/8	1-1/8
Refrigerant Gas Outlet Connection Size (in.)	1/2	1/2	5/8	5/8	5/8	5/8

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.

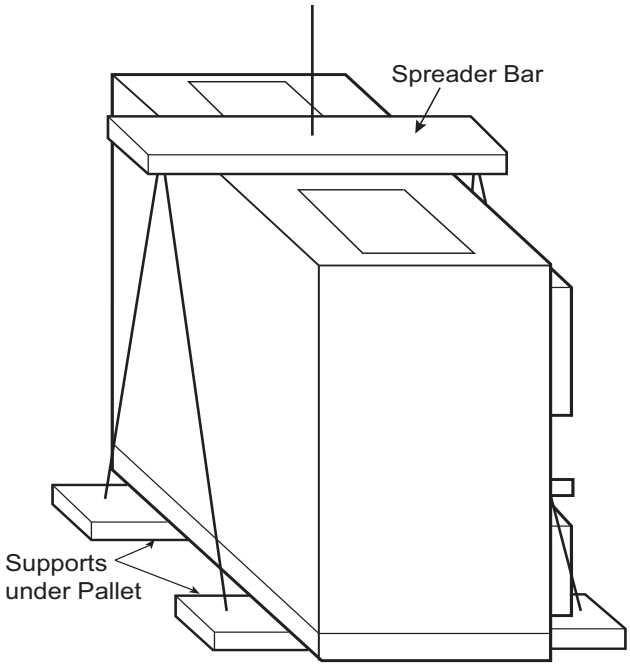
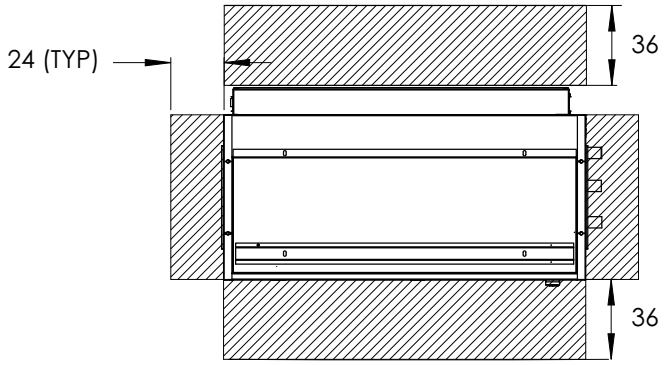


Fig. 3 — Rigging Details

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.

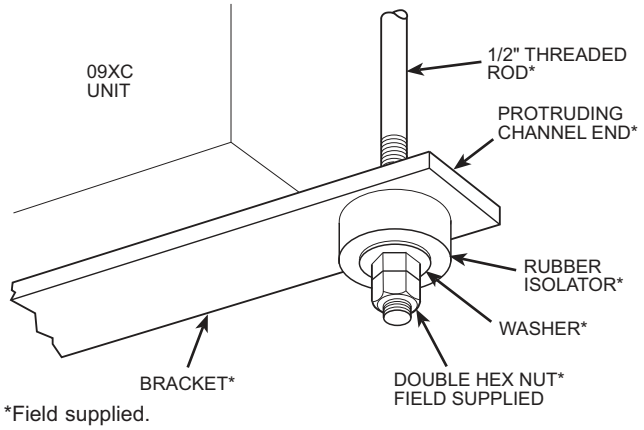
POSITIONING THE 09XC UNIT

Refer to Fig. 4 for typical service clearances. To suspend the unit, use 4, field-supplied, 1/2 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 1/2 in. threaded supporting rods (field-supplied) to channels through a rubber or spring isolator. See Fig. 5.

DO NOT use rods smaller than 1/2 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 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.

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 1/4 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 different 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.

Table 3 — Minimum Refrigerant Line Size Data (in.)[a,b,c]

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

NOTE(S):

a. 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.
b. Line sizes are in inches.
c. 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.

LEGEND

HG — Hot Gas (Refrigerant Discharge)
LIQ — Liquid

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

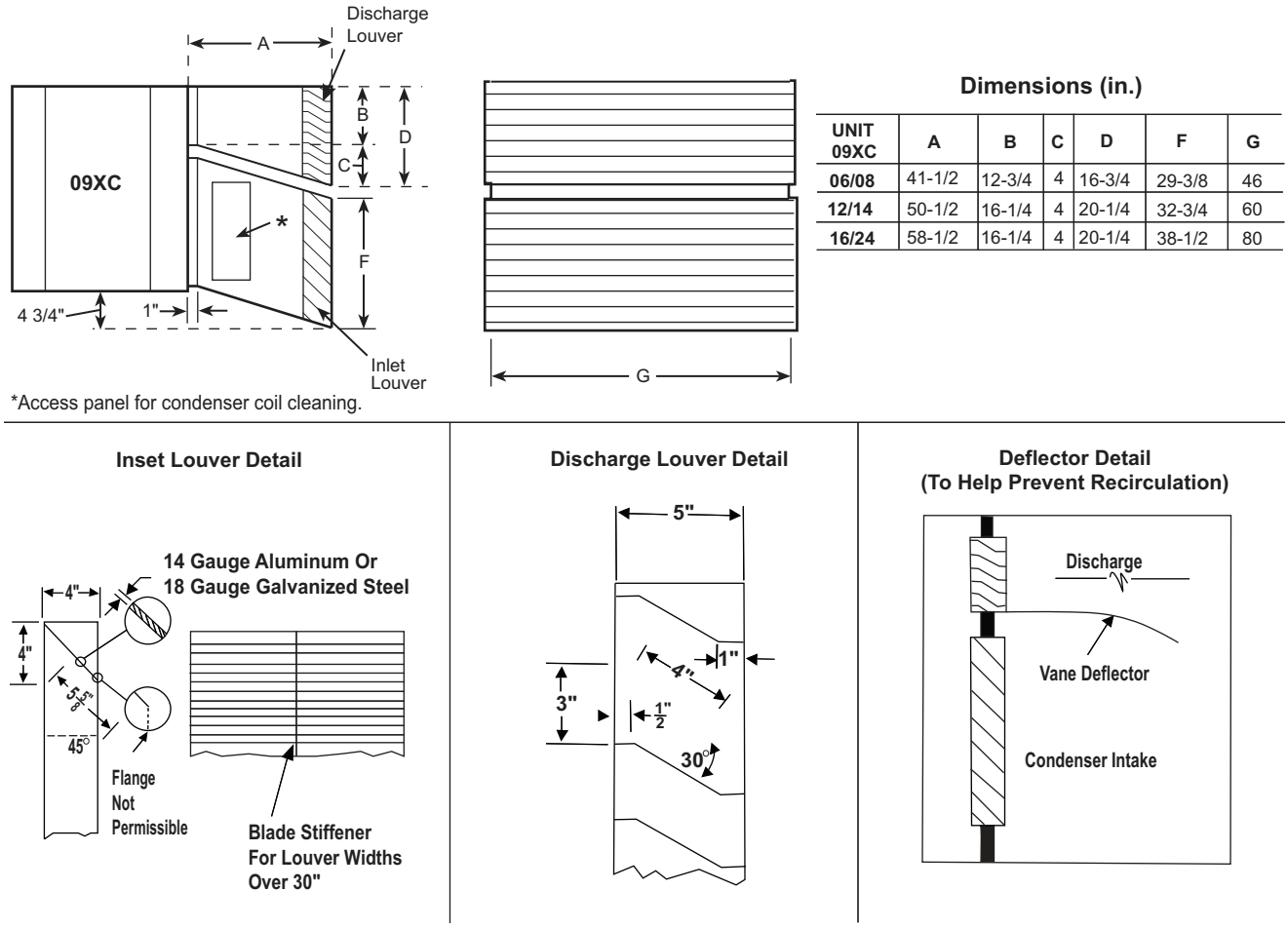
The condenser supply and discharge air duct should be as short as possible. The cross section area of the duct should be the same as the face area of the unit openings. For units with multiple fans, "a pair of pants" duct configuration should be used in accordance with the ASHRAE guidelines; in some 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.



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 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.

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%.

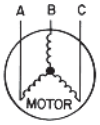
UNBALANCED 3-PHASE SUPPLY VOLTAGE

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

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[a,b,c,d]

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

NOTE(S):

a. 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.
b. Wire sizing amps are a sum of 125% of the compressor RLA plus 100% of indoor fan motor FLA.
c. Motors are protected against primary single phasing condition.
d. Indoor-fan motors are 3-phase motors of same voltage as unit.

LEGEND

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

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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" 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 measured 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 in ACH550 VFD 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 — ACH550 Low Ambient Operation Parameters

PARAMETER INDEX	PARAMETER FUNCTION	SELECTION
9902	Application Macro	1 (HVAC Default)
9906	Motor Nominal Current	Motor FLA (use value on motor nameplate)
9907	Motor Nominal Frequency	Frequency 60/50 Hz (use value on motor 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)

ACH580 Low Ambient Operation Parameters

The parameters shown in Table 6 must be set in ACH580 VFD for low ambient operation. Use the 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. At startup, the drive displays a system prompt to run the First Start 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 (press ⏎).
3. Using the arrow keys, move to the appropriate sub-group (first two digits of the parameter to be changed), then press <SEL> (press ⏎).
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> (press ⏎).

Table 6 is intended for Head Pressure parameters, two transducers. PID will operate and control the speed of the motor to maintain pressure when DI-1 is on; the fans will turn off when DI-1 turns off. To change the display, go to the PID parameters in 40 and then add the PID output and PID feedback to the view screen by selecting first View, then Add to View. Now the front panel can be changed and customized with the PID control information. The setpoint will be shown in the reference position in the upper right-hand corner.

Table 6 — ACH580 Low Ambient Operation Parameters

ACH580 PARAMETERS	PARAMETER FUNCTION	VALUES
96.04	Application Macro	1 (HVAC Default)
99.06	Motor Nominal Current	Motor FLA (use value on motor nameplate)
99.08	Motor Nominal Frequency	Frequency 60/50 Hz (use value on motor nameplate)
99.09	Motor Nominal Speed	Motor Nominal RPM
99.10	Motor Nominal Power	Motor HP (use value on nameplate)
30.17	MAX I	Max Current
21.19	Scalar Start Mode	Scaler Flystart
12.15	AI-1 Unit selection	V
12.17	AI-1 Minimum	0.5
12.18	AI-1 Maximum	4.5
12.19	AI-1 Scaled at AI-1 min	0
12.20	AI-1 Scaled at AI-1 max	667
12.25	AI-2 Unit selection	V
12.27	AI-2 Minimum	0.5
12.28	AI-2 Maximum	4.5
12.29	AI-2 Scaled at AI-2 min	0
12.30	AI-2 Scaled at AI-2 max	667
19.11	EXT1/EXT2 selection	EXT2
20.01	Ext1 commands	Not Selected
20.03	Ext1 in 1 source	Always Off
20.06	EXT2 commands	in1 start
20.08	Ext 2 in1 source	DI-1
22.18	EXT2 Speed reference	PID (16)
23.12	Acceleration time1	10 s
23.13	Deceleration time1	10 s
28.11	Ext1 frequency ref 1	zero
28.15	Ext2 frequency ref1	PID (16)
30.13	FREQUENCY MIN	20.0 Hz
40.07	Process PID operation mode	on when drive running
40.08	SET 1 feedback 1 source	AI-1 scaled
40.09	Set 1 feedback 2 source	AI-2 scaled
40.10	Feedback Select	7 [Max(A1, A2)]
40.14	Set1 setpoint scaling	667
40.16	Set 1 setpoint 1 source	INTERNAL Setpoint
40.17	Set 1 setpoint 2 source	Not Selected
40.18	Set 1 function	In1
40.21	INTERNAL SET POINT 1	325
40.27	Set1 setpoint max	500
40.31	ERROR VALUE INVERTED	YES
40.32	PID GAIN	1.2
40.33	PID INTEGRATE	3s
40.34	DERIVATION TIME	0
40.60	Set PID 1 Activation source	DI-1
40.79	UNITS	PSI

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 7-12 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 7 — Condenser Fan Performance — 09XC06 Units[a,b,c,d,e]

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	—	—
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	—	—
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	—	—	—	—
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	—	—	—	—
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	—	—	—	—
2800	***621***	***0.50***	684	0.61	744	0.74	800	0.87	854	1.01	906	1.16	956	1.32	—	—	—	—	—	—
2900	***644***	***0.56***	704	0.67	762	0.80	817	0.94	870	1.08	920	1.23	969	1.39	—	—	—	—	—	—
3000	666	0.61	725	0.74	781	0.87	834	1.01	886	1.15	935	1.31	—	—	—	—	—	—	—	—
3100	688	0.68	745	0.80	799	0.94	852	1.08	902	1.23	950	1.39	—	—	—	—	—	—	—	—
3200	710	0.75	766	0.88	818	1.01	869	1.16	918	1.31	—	—	—	—	—	—	—	—	—	—
3300	732	0.82	786	0.95	838	1.09	887	1.24	935	1.40	—	—	—	—	—	—	—	—	—	—
3400	755	0.89	807	1.03	857	1.18	905	1.33	—	—	—	—	—	—	—	—	—	—	—	—
3500	777	0.98	828	1.12	876	1.27	924	1.42	—	—	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND
bhp — Brake Horsepower
ESP — External Static Pressure

Table 8 — Condenser Fan Performance — 09XC08 Units[a,b,c,d,e]

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	—	—	—	—
3700	821	1.15	869	1.30	916	1.46	961	1.62	1005	1.79	—	—	—	—	—	—
3850	855	1.30	901	1.45	946	1.62	989	1.78	—	—	—	—	—	—	—	—
4000	888	1.46	932	1.62	976	1.79	—	—	—	—	—	—	—	—	—	—
4150	921	1.63	964	1.79	—	—	—	—	—	—	—	—	—	—	—	—
4300	954	1.81	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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	—	—	—	—	—	—	—	—
2650	1034	1.54	1080	1.71	1125	1.89	—	—	—	—	—	—	—	—
2800	1050	1.65	1095	1.83	—	—	—	—	—	—	—	—	—	—
2950	1068	1.77	—	—	—	—	—	—	—	—	—	—	—	—
3100	1086	1.90	—	—	—	—	—	—	—	—	—	—	—	—
3250	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3400	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3550	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3850	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4150	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4450	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND
bhp — Brake Horsepower
ESP — External Static Pressure

Table 9 — Condenser Fan Performance — 09XC12 Units[a,b,c,d,e]

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	—	—
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	—	—
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
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2650	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2800	793	1.81	—	—	—	—	—	—	—	—	—	—	—	—
2950	801	1.92	838	2.12	—	—	—	—	—	—	—	—	—	—
3100	810	2.04	846	2.24	—	—	—	—	—	—	—	—	—	—
3250	819	2.16	855	2.37	889	2.58	—	—	—	—	—	—	—	—
3400	829	2.30	864	2.51	898	2.72	—	—	—	—	—	—	—	—
3550	839	2.44	874	2.65	—	—	—	—	—	—	—	—	—	—
3700	850	2.59	884	2.80	—	—	—	—	—	—	—	—	—	—
3850	861	2.74	894	2.96	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4150	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4450	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND
bhp — Brake Horsepower
ESP — External Static Pressure

Table 10 — Condenser Fan Performance — 09XC14 Units[a,b,c,d,e]

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
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	—	—
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	—	—	—	—	—	—
7500	620	2.02	649	2.18	679	2.38	709	2.62	—	—	—	—	—	—	—	—
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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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	—	—	—	—	—	—	—	—	—	—
6500	—	—	—	—	—	—	—	—	—	—
6750	—	—	—	—	—	—	—	—	—	—
7000	—	—	—	—	—	—	—	—	—	—
7250	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—
7750	—	—	—	—	—	—	—	—	—	—
8000	—	—	—	—	—	—	—	—	—	—
8250	—	—	—	—	—	—	—	—	—	—
8500	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—
9250	—	—	—	—	—	—	—	—	—	—
9500	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND
bhp — Brake Horsepower
ESP — External Static Pressure

Table 11 — Condenser Fan Performance — 09XC16 Units[a,b,c,d,e]

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	—	—
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	—	—	—	—
9250	702	3.09	736	3.34	769	3.59	801	3.85	832	4.10	861	4.36	890	4.62	—	—	—	—	—	—
9500	721	3.30	754	3.56	787	3.81	818	4.07	848	4.33	877	4.59	—	—	—	—	—	—	—	—
9750	740	3.52	772	3.78	804	4.04	834	4.30	864	4.56	—	—	—	—	—	—	—	—	—	—

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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6500	868	3.52	898	3.76	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6750	879	3.68	908	3.92	936	4.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7000	889	3.84	918	4.09	946	4.33	973	4.58	—	—	—	—	—	—	—	—	—	—	—	—
7250	900	4.02	929	4.26	956	4.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	912	4.20	940	4.45	967	4.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7750	923	4.39	951	4.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8000	935	4.58	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND

bhp — Brake Horsepower
ESP — External Static Pressure

Table 12 — Condenser Fan Performance — 09XC24 Units[a,b,c,d,e]

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	—	—
10,900	786	4.65	821	5.07	854	5.50	886	5.93	917	6.37	946	6.81	—	—	—	—
11,200	807	5.04	841	5.48	874	5.92	905	6.36	935	6.81	—	—	—	—	—	—
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	—	—
8,800	919	5.33	948	5.71	976	6.10	1004	6.49	1030	6.89	—	—	—	—
9,100	934	5.68	963	6.07	991	6.47	1018	6.87	—	—	—	—	—	—
9,400	949	6.04	978	6.44	1005	6.85	—	—	—	—	—	—	—	—
9,700	965	6.42	993	6.84	—	—	—	—	—	—	—	—	—	—
10,000	981	6.83	—	—	—	—	—	—	—	—	—	—	—	—
10,300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,600	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,200	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11,800	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,100	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,400	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12,700	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE(S):

a. Units are available with several motor hp and drive package combinations.
b. Bold italics indicates field-supplied drive required.
c. Static pressure losses for any options or accessories must be applied to external static pressure before entering the fan performance table.
d. Interpolation is permitted; extrapolation is not.
e. Fan performance is based on 1 in. standard throwaway filter, unit casing, and wet DX (direct expansion) coil losses at sea level.

LEGEND
bhp — Brake Horsepower
ESP — External Static Pressure

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.

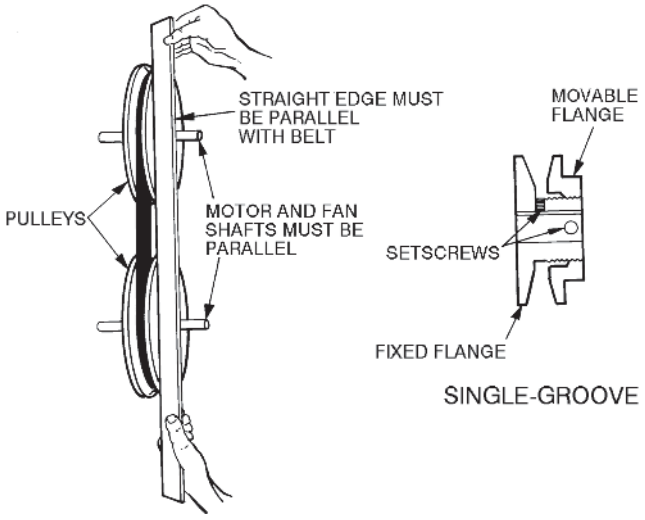


Fig. 7 — Fan Pulley Adjustments

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.

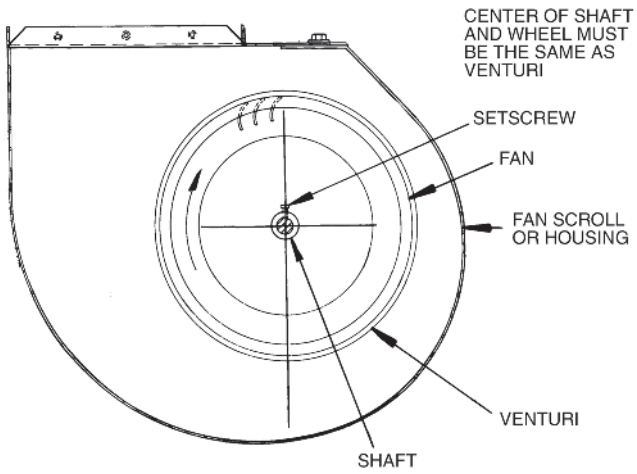


Fig. 8 — Concentric Alignment

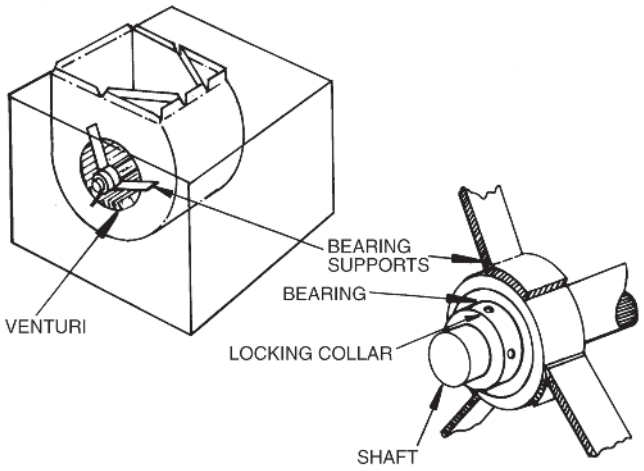


Fig. 9 — Fan Shaft Bearings

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 Set-point wheel to the appropriate value. See Fig. 10. Condenser motor FLA ratings are listed in Table 13.
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.

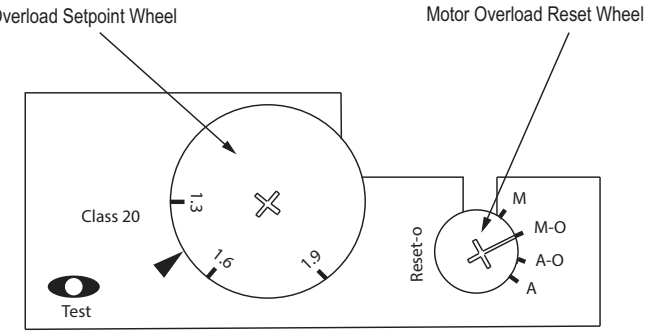


Fig. 10 — Motor Starter Setting

Table 13 — Condenser Motor Starter Settings

HP	208-230-v		460-v	575-v
	FLA		FLA	FLA
	208-v	230-v		
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

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 14 to determine the possible cause of the problem and the associated procedure necessary to correct it.

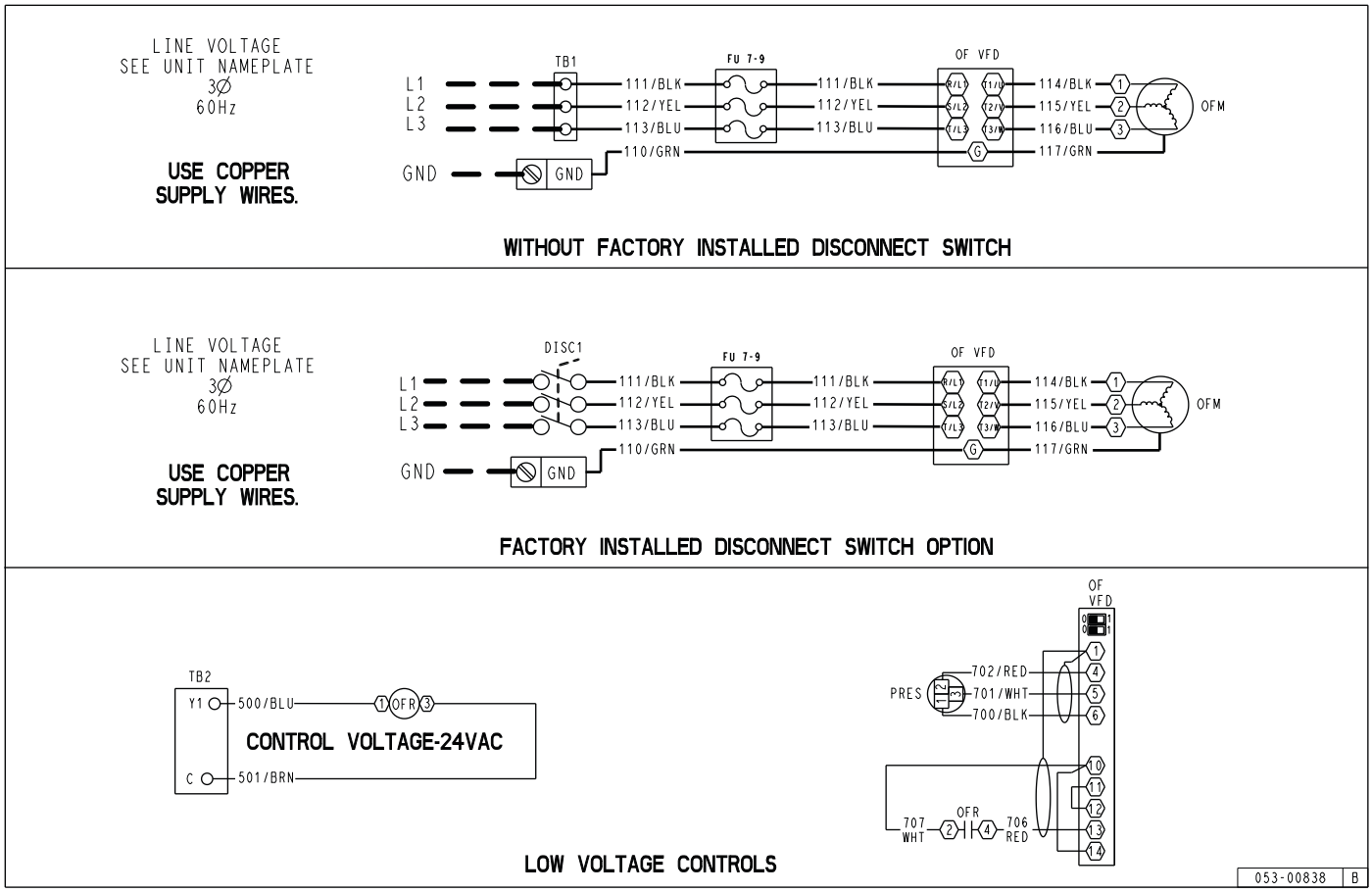
For the low ambient option on the 09XC06,08 units, see Fig. 11 and for the 09XC12-24 units see Fig. 12.

Table 14 — 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



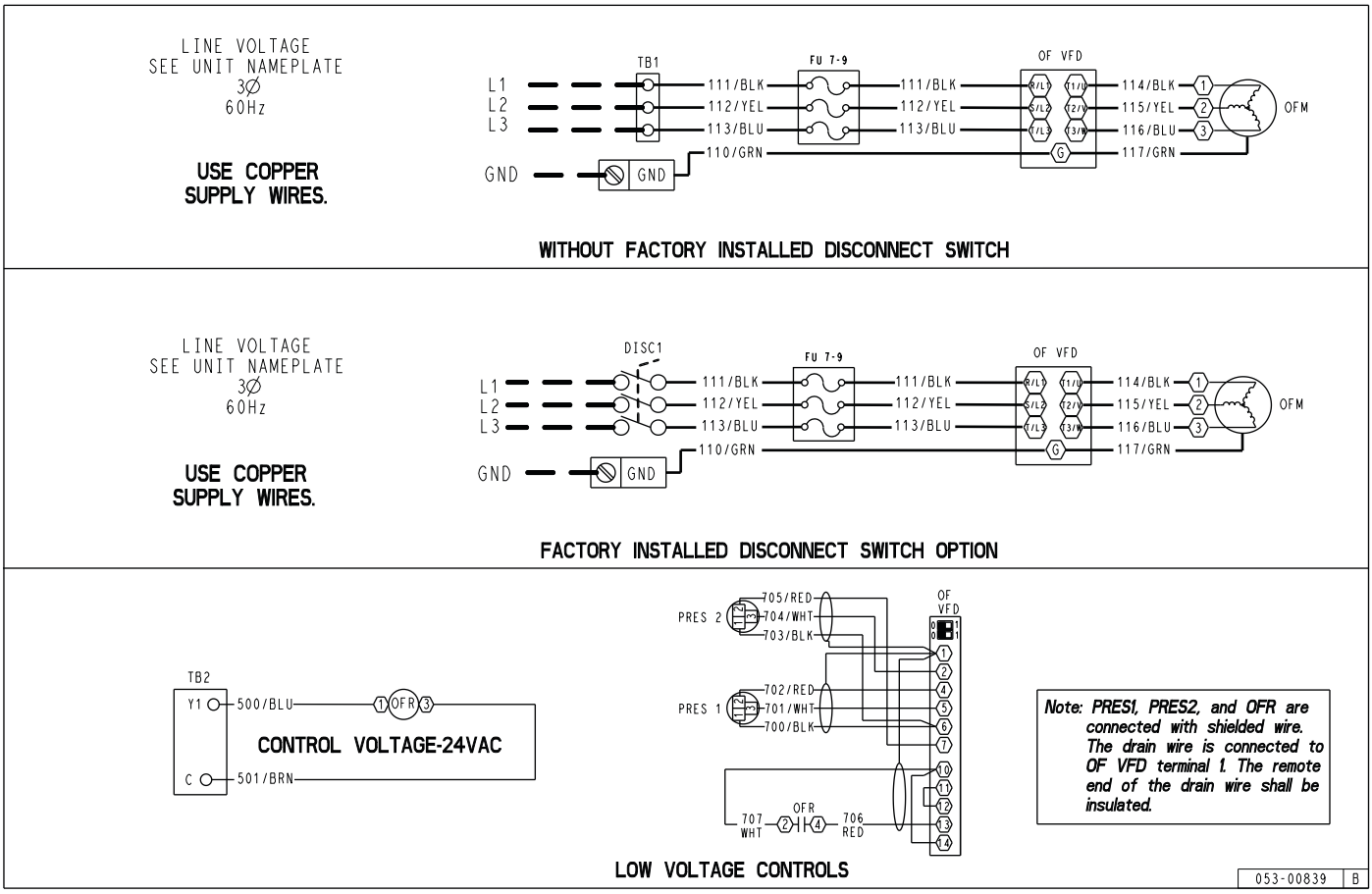
NOTES:
1. Fan motors are inherently thermally protected.
2. Three-phase motors are protected under primary single phase conditions.
3. Use conductors suitable for at least 194°F (90°C) when replacing factory wiring.
4. Use copper conductors only.
5. Wiring for field power supply must be rated at 165°F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

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

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



NOTES:
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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.

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

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

APPENDIX A — VFD INFORMATION

VFD OPERATION

The VFD keypad is shown in Fig. A-C. The functions of SOFT KEYS 1 and 2 change depending on what is displayed on the screen. The functions of ACH550/ACS320 SOFT KEYS (1 and 2) or ACH580 (and) change depending on what is displayed on the screen. The function of SOFT KEY 1 matches the word in the lower left-hand box on the display screen. The function of SOFT KEY 2 matches the word in the lower right-hand box on the display screen. If the box is empty, then the SOFT KEY does not have a function on that specific screen. The UP and DOWN keys (ACH550/320) or Arrow Keys (ACH580) are used to navigate through the menus. The OFF key is used to turn off the VFD. The AUTO key is used to change control of the drive to automatic control. The HAND key is used to change control of the drive to local (hand held) control. The HELP button is used to access the help screens.

For the VFD to operate on the units covered by this document, the drive must be set in AUTO mode. The word "AUTO" will appear in the upper left-hand corner of the VFD display. Press the AUTO button to set the drive in AUTO mode.

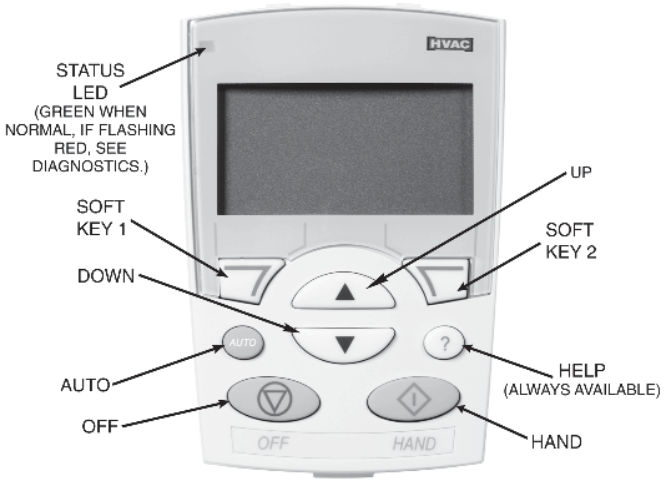

Fig. A — ACH550/ACS320 VFD Keypad

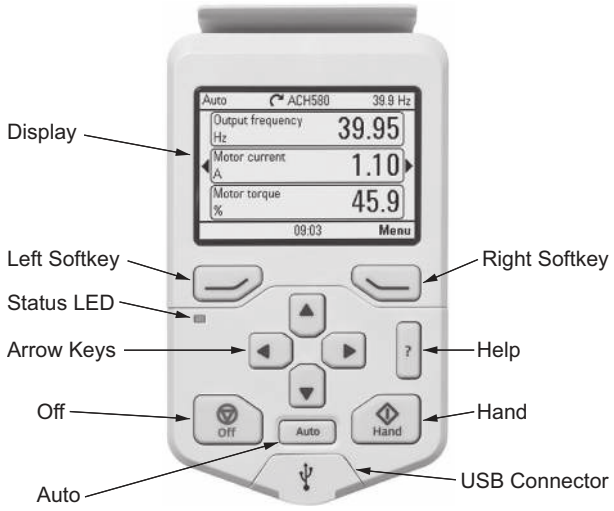

Fig. B — ACH580 VFD Keypad — Front

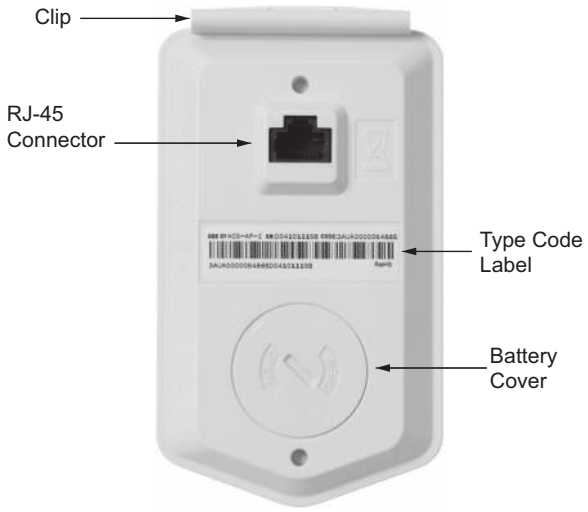

Fig. C — ACH580 VFD Keypad — Back

START UP BY CHANGING PARAMETERS INDIVIDUALLY

Initial start-up is performed at the factory. To start up the VFD by changing individual parameters, perform the following procedure:

1. For 320/550, select MENU (SOFT KEY 2).
   For 580, press .
   The Main menu will display.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen, then:
   For 320/550, press SEL (SOFT KEY 2).
   For 580, press .
3. Use the UP or DOWN keys to highlight the desired parameter group, then:
   For 320/550, press SEL (SOFT KEY 2).
   For 580, press .
4. Use the UP or DOWN keys to highlight the desired parameter, then:
   For 320/550, press EDIT (SOFT KEY 2).
   For 580, press .
5. Use the UP or DOWN keys to change the value of the parameter, then save or cancel the change. Any modifications that are not saved will not be changed.
   a. To save the change:
      For 320/550, press SAVE (SOFT KEY 2).
      For 580, press to store the modified value.
   b. To cancel the change:
      For 320/550, press CANCEL (SOFT KEY 1).
      For 580, press to keep the previous value.
6. Choose another parameter or return to parameter groups list :
   For 320/550, press EXIT/BACK (SOFT KEY 1).
   For 580, press to go back.
7. Continue until all the parameters have been configured, then:
   For 320/550, press EXIT/BACK (SOFT KEY 1).
   For 580, press to return to the main menu.

NOTE: The current parameter value appears above the highlighted parameter. To view the default parameter value, press the UP and DOWN keys simultaneously. To restore the default factory settings, select the application macro "HVAC Default" (ACH550/320 only).

VFD MODES

The VFD has several different modes for configuring, operating, and diagnosing the VFD.

The modes are:

- Standard Display mode — shows drive status information and operates the drive
- Parameters mode — edits parameter values individually
- Start-up Assistant mode — guides start-up and configuration
- Changed Parameters mode — shows all changed parameters
- Drive Parameter Backup mode — stores or uploads the parameters
- Clock Set mode — sets the time and date for the drive
- I/O Settings mode — checks and edits the I/O settings

ACH580 Standard Display Mode

Use the standard display mode to read information on the drive status and operate the drive. To reach the standard display mode, press BACK until the LCD display shows status information as described below. See Fig. D.

The top line of the LCD display shows basic status information of the drive. The HAND icon indicates that the drive control is local from the control panel. The AUTO icon indicates that the drive is in remote control mode, such as the basic I/O or field bus.

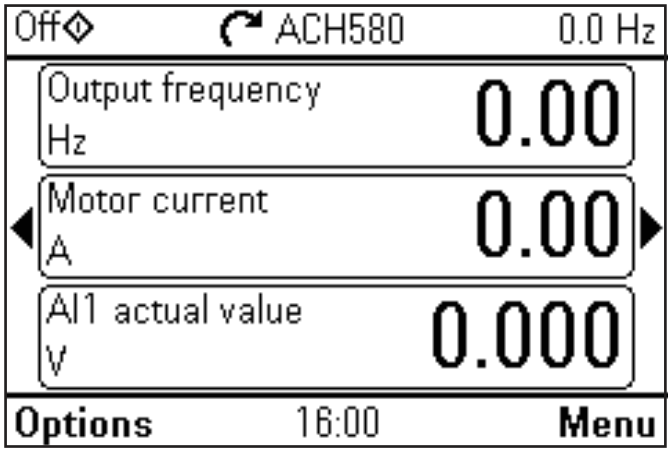

Fig. D — ACH580 Standard Display Example

The arrow icon indicates the drive and motor rotation status. A rotating arrow (clockwise or counterclockwise) indicates that the drive is running and at set point and the shaft direction is forward or reverse. A rotating blinking arrow indicates that the drive is running but not at set point. A stationary arrow indicates that the drive is stopped. For the units covered in this manual, the correct display rotation is clockwise.

The upper right corner shows the frequency set point that the drive will maintain. From Home view, press "Options" then "Edit Home View" to change the Home layout. The middle of the LCD display can be configured to display 3 parameter values, Graphs or digital indicators. The default display shows (OUTPUT FREQ) in percent speed, (CURRENT) in amperes, and (AI1) in voltage DC.

The bottom corners of the LCD display show the functions currently assigned to the two soft keys. The lower middle displays the current time (if configured to show the time).

The first time the drive is powered up, it is in the OFF mode. To switch to local hand-held control and control the drive using the control panel, press and hold the HAND button. Pressing the HAND button switches the drive to hand control while keeping the drive running. Press the AUTO button to switch to remote input control. To start the drive, press the HAND or AUTO buttons; to stop the drive, press the OFF button.

To adjust the speed in HAND mode, press the UP or DOWN buttons (the reference changes immediately). The reference can be modified in the local control (HAND) mode, and can be parameterized (using Group 11 reference select) to also allow modification in the remote control mode.

Parameters Mode

The Parameters mode is used to change the parameters on the drive. To change parameters, perform the following procedure:

1. Select MENU (press). The Main menu will display.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen and press Select (press).
3. Use the UP or DOWN keys to highlight the desired parameter group and press Select (press).
4. Use the UP or DOWN keys to highlight the desired parameter and press EDIT (press).
5. Use the UP or DOWN keys to change value of the parameter.
6. Press SAVE (press) to store the modified value. Press CANCEL (press) to keep the previous value. Any modifications that are not saved will not be changed.
7. Choose another parameter or press BACK (press) to return to the listing of parameter groups. Continue until all the parameters have been configured and then press EXIT (press) to return to the main menu.

Changed Parameters Mode

The Changed Parameters mode is used to view and edit recently changed parameters on the drive. To view the changed parameters, perform the following procedure:

1. Select MENU (press). The Main menu will display.
2. Use the UP or DOWN keys to highlight PARAMETERS on the display screen and press Select (press).
3. Use the UP or DOWN keys to highlight MODIFIED on the display screen and press Select (press). A list of the recently changed parameters will be displayed.
4. Use the UP or DOWN keys to highlight the desired parameter group and press EDIT (press) to change the parameter if desired.
5. Press BACK (press) to exit the Changed Parameters mode.

Drive Parameter Backup Mode

The drive parameter backup mode is used to export the parameters from one drive to another. The parameters can be uploaded from a VFD to the removable control panel. The control panel can then be transferred to another drive and the parameters downloaded into memory.

Depending on the motor and application, there are two options available. The first option is to download all parameters. This copies both application and motor parameters to the drive from the control panel. This is recommended when using the same application for drives of the same size. This can also be used to create a backup of the parameters group for the drive.

The second option downloads only the application parameters to the drive. This is recommended when using the same application for drives of different sizes. Parameters 99.07, 99.06, 99.08, 99.09, 99.10, and group 51 parameters and internal motor parameters are not copied.

UPLOAD ALL PARAMETERS

To upload and store parameters in the control panel from the VFD, insert the keypad in the VFD slot (Fig. E); animation will appear to show loading the VFD configuration.

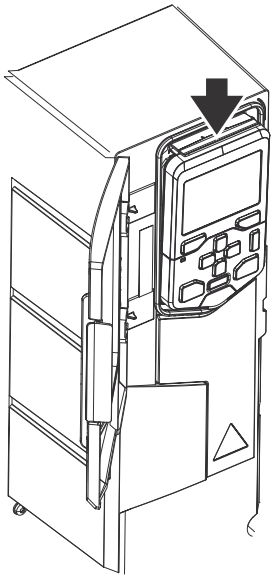

Fig. E — Insert Keypad in Slot

DOWNLOAD ALL PARAMETERS FROM BACKUP

To download all parameters from the control panel to the VFD, perform the following procedure:

1. Install the control panel with the correct parameters onto the VFD.
2. Select MENU (press ⬭). The Main menu will display.
3. Use the UP or DOWN keys to highlight BACKUPS on the display screen and press SEL (press ⬭).
4. Use the UP or DOWN keys to highlight the backup file and press SEL (press ⬭).
5. The text "Restoring Parameters" will be displayed with a progress indicator. To stop the process, select CANCEL (press ⬭).
6. When the download is complete, the text "Parameter download successful" will be displayed.
7. The display will then return to the PAR BACKUP menu. Select BACK (press ⬭) to return to the main menu.
8. The control panel can now be disconnected from the drive.

Clock Set Mode

Use the clock set mode to set the date and time for the internal clock of the VFD. In order to use the timer functions of the VFD control, the internal clock must be set. The date is used to determine weekdays and is visible in the fault logs.

To set the clock, perform the following procedure:

1. Select MENU (press ⬭). The Main menu will display.
2. Use the UP or DOWN keys to highlight PRIMARY SETT. on the display screen and press ENTER (press ⬭). The Sub list will be displayed.
3. Use the UP or DOWN keys to highlight clock, region, and display, then press SEL (press ⬭). This parameter is used to display or hide the clock on the screen. Use the UP or DOWN keys to change the parameter setting. Press OK (press ⬭) to save the configuration and return to the Sub list menu.
4. Use the UP or DOWN keys to highlight SET TIME and press SEL (press ⬭). Use the UP or DOWN keys to change the hours and minutes. Press OK (press ⬭) to save the configuration and return to the Clock Set menu.
5. Use the UP or DOWN keys to highlight TIME FORMAT and press SEL (press ⬭). Use the UP or DOWN keys to change the parameter setting. Press OK (press ⬭) to save the configuration and return to the Clock Set menu.
6. Use the UP or DOWN keys to highlight SET DATE and press SEL (press ⬭). Use the UP or DOWN keys to change the day, month, and year. Press OK (press ⬭) to save the configuration and return to the Clock Set menu.
7. Use the UP or DOWN keys to highlight DATE FORMAT and press SEL (press ⬭). Use the UP or DOWN keys to change the parameter setting. Press OK (press ⬭) to save the configuration and return to the Clock Set menu.
8. Press BACK (press ⬭) twice to return to the main menu.

I/O Settings Mode

Use the I/O Settings mode to view and edit the I/O settings. To configure the I/O settings, perform the following procedure:

1. Select MENU (press ⬭). The Main menu will display.
2. Use the UP or DOWN keys to highlight PRIMARY SETT. on the display screen and press SEL (press ⬭). The Sub list will be displayed.
3. Use the UP or DOWN keys to highlight ADVANCED OPTIONS/FUNCTIONS on the display screen and press SEL (press ⬭). The Sub list will be displayed.
4. Use the UP or DOWN keys to highlight I/O SETTINGS on the display screen and press SEL (press ⬭). The I/O Settings parameter list will be displayed.
5. Use the UP or DOWN keys to highlight the desired I/O setting and press SEL (press ⬭).
6. Use the UP or DOWN keys to select the parameter to view. Press OK (press ⬭).
7. Use the UP or DOWN keys to change the parameter setting. Press SAVE (press ⬭) to save the configuration. Press CANCEL (SOFT KEY 1) to keep the previous value. Any modifications that are not saved will not be changed.
8. Press BACK (press ⬭) twice to return to the main menu.

VFD DIAGNOSTICS

The drive detects error situations and reports them using:

1. Status LED on the control panel.
2. Control panel display.
3. The Fault Word and Alarm Word parameter bits.

The form of the display depends on the severity of the error. The user can specify the severity for many errors by directing the drive to ignore the error situation, report the situation as an alarm, or report the situation as a fault.

Faults (Red LED Lit)

The VFD signals that it has detected a severe error, or fault, by:

1. Enabling the red LED on the drive (LED is either steady or flashing).
2. Setting an appropriate bit in a Fault Word parameter.
3. Overriding the control panel display with the display of a fault code.
4. Stopping the motor (if it was on).

The fault code on the control panel display is temporary. Pressing the MENU button (press ⬭) removes the fault message. The message reappears after a few seconds if the control panel is not touched and the fault is still active. See Table A for a list of fault codes.

APPENDIX A — VFD INFORMATION (CONT)

Table A — FAULT AND ALARM CODES for ACH580 VFD

CODE (HEX)	WARNING / AUX. CODE	CAUSE	WHAT TO DO
A2B1	Overcurrent	Output current has exceeded internal fault limit. In addition to an actual overcurrent situation, this warning may also be caused by an earth fault or supply phase loss.	Check motor load. Check acceleration times in parameter group 23 Speed reference ramp (speed control) or 28 Frequency reference chain (frequency control). Also check parameters 46.01 Speed scaling, 46.02 Frequency scaling and 46.03 Torque scaling. Check motor and motor cable (including phasing and delta/star connection). Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter Electrical installation, section Checking the insulation of the assembly in the Hardware manual of the drive. Check there are no contactors opening and closing in motor cable. Check that the start-up data in parameter group 99 Motor data corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable.
A2B3	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	Check there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter Electrical installation, section Checking the insulation of the assembly in the Hardware manual of the drive. If an earth fault is found, fix or change the motor cable and/or motor. If no earth fault can be detected, contact your local Carrier representative.
A2B4	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable for cabling errors. Check motor and motor cable (including phasing and delta/star connection). Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter Electrical installation, section Checking the insulation of the assembly in the Hardware manual of the drive. Check there are no power factor correction capacitors or surge absorbers in motor cable.
A6A4	Motor nominal value	The motor parameters are set incorrectly.	Check the auxiliary code.
	Motor nominal value 0001	The drive is not dimensioned correctly.	Check the auxiliary code. Check the settings of the motor configuration parameters in groups 98 and 99. Check that the drive is sized correctly for the motor.
A780	Motor stall Programmable warning: 31.24 Stall function	Motor is operating in stall region because of, for example, excessive load or insufficient motor power.	Check motor load and drive ratings. Check fault function parameters.
A783	Motor overload	Motor current is too high.	Check for overloaded motor. Adjust the parameters used for the motor overload function (35.51...35.53) and 35.55...35.56.
A784	Motor disconnect	All three output phases are disconnected from motor.	Check that switches between drive and motor are closed. Check that all cables between drive and motor are connected and secured. If no issue was detected and drive output was actually connected to motor, contact Carrier.
A7AB	Extension I/O configuration failure	Installed extension module is not the same as configured.	Check that the installed extension module (shown by parameter 15.02 Detected extension module) is the same as selected by parameter 15.01 Extension module type.
A7C1	FBA A communication Programmable warning: 50.02 FBA A comm loss func	Cyclical communication between drive and fieldbus adapter module A or between PLC and fieldbus adapter module A is lost.	Check status of fieldbus communication. See user documentation of fieldbus interface. Check settings of parameter groups 50 Fieldbus adapter (FBA), 51 FBA A settings, 52 FBA A data in and 53 FBA A data out. Check cable connections. Check if communication master is able to communicate.
A7CE	EFB comm loss Programmable warning: 58.14 Communication loss action	Communication break in embedded fieldbus (EFB) communication.	Check the status of the fieldbus master (online/offline/error etc.). Check cable connections to the EIA-485/X5 terminals 29, 30 and 31 on the control unit.
A7EE	Panel loss Programmable warning: 49.05 Communication loss action	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check PC tool or control panel cconnection. Check control panel connector. Check mounting platform if being used. Disconnect and reconnect the control panel.
A88F	Cooling fan	Maintenance timer limit exceeded.	Consider changing the cooling fan. Parameter 05.04 Fan on-time counter shows the running time of the cooling fan.
AFAA	Auto reset	A fault is about to be auto reset.	Informative warning. See the settings in parameter group 31 Fault functions.
AFE1	Emergency stop (off2)	Drive has received an emergency stop (mode selection off2) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter 21.05 Emergency stop source.
AFE2	Emergency stop (off 1 or off3)	Drive has received an emergency stop (mode selection off1 or off3) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter 21.05 Emergency stop source. Informative warning. See parameter 21.22 Start delay.
AFE9	Start delay	The start delay is active and the drive will start the motor after a predefined delay.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive. If the emergency stop was unintentional, check the source selected by parameter 21.05 Emergency stop source. Informative warning. See parameter 21.22 Start delay. Check the setting of (and source selected by) parameter 20.40 Run permissive.
AFED	Run permissive	Run permissive is keeping the drive from running the motor.	
AFEE	Start interlock 1	Start interlock 1 is keeping the drive from starting.	Check the signal source selected for parameter 20.41 Start interlock 1.
AFEF	Start interlock 2	Start interlock 2 is keeping the drive from starting.	Check the signal source selected for parameter 20.42 Start interlock 2.

Table A — FAULT AND ALARM CODES for ACH580 VFD (cont)

CODE (HEX)	WARNING / AUX. CODE	CAUSE	WHAT TO DO
AFF0	Start interlock 3	Start interlock 3 is keeping the drive from starting.	Check the signal source selected for parameter 20.43. Start interlock 3.
AFF1	Start interlock 4	Start interlock 4 is keeping the drive from starting.	Check the signal source selected for parameter 20.44. Start interlock 4.
AFF2	Run permissive forced warning	A forced DI is used as a source for parameter 20.40 Run permissive.	If 20.40 Run permissive uses DIx as the source, check if the bit corresponding to DIx in parameter 10.03 DI force selection is 1.
AFF3	Start interlock forced warning	One or more forced DIs is used as a source for one or more of parameters 20.41 Start interlock 1 ... 20.44 Start interlock 4.	Check all parameters 20.41 Start interlock 1 ... 20.44. Start interlock 4. If any of these parameters uses DIx as the source, check if the bit corresponding to DIx in parameter 10.03 DI force selection is 1.
AFF5	Override new start required	The Safe torque off function was active and has been reset while in Override.	A new start signal is required to start the drive again.
AFF6	Identification run	Motor ID run will occur at next start.	Informative warning.
AFF8	Motor heating active	Preheating is being performed	Informative warning. Motor preheating is active. Current specified by parameter 21.16 Preheating current is being passed through the motor.
AFFE	Override active	Drive is in Override mode.	Informative warning.
B5A2	Power applied	The drive was powered up or the control board was rebooted successfully.	Informative event.
B681	Hand mode selected	The drive was placed in Hand mode.	Informative event. Check the control panel to ensure that the current control location is correct.
B682	Off mode selected	The drive was placed in Off mode.	Informative event. Check the control panel to ensure that the current control location is correct.
B683	Auto mode selected	The drive was placed in Auto mode.	Informative event. Check the control panel to ensure that the current control location is correct.
2310	Overcurrent	Output current has exceeded internal fault limit. In addition to an actual overcurrent situation, this fault may also be caused by an earth fault or supply phase loss.	Check motor load. Check acceleration times in parameter group 23 Speed reference ramp (speed control) or 28 Frequency reference chain (frequency control). Also check parameters 46.01 Speed scaling, 46.02 Frequency scaling and 46.03 Torque scaling. Check motor and motor cable (including phasing and delta/star connection). Check there are no contactors opening and closing in motor cable. Check that the start-up data in parameter group 99 corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. See chapter Electrical installation, section Checking the insulation of the assembly in the Hardware manual of the drive.
FF61	ID run	Motor ID run was not completed successfully.	Check safety circuit connections. For more information, see chapter The Safe torque off function in the Hardware manual of the drive and description of parameter 31.22 STO indication run/stop(page 520). Check the value of parameter 95.04 Control board supply. Check the nominal motor values in parameter group 99 Motor data. Check that no external control system is connected to the drive. Cycle the power to the drive (and its control unit, if powered separately). Check that no operation limits prevent the completion of the ID run. Restore parameters to default settings and try again. Check that the motor shaft is not locked. Check the auxiliary code.

Alarms (Green LED Flashing)

For less severe errors, called alarms, the diagnostic display is advisory. For these situations, the drive is simply reporting that it had detected something unusual. In these situations, the drive:

1. Flashes the green LED on the drive (does not apply to alarms that arise from control panel operation errors).
2. Sets an appropriate bit in an Alarm Word parameter.
3. Overrides the control panel display with the display of an alarm code and/or name.

Alarm messages disappear from the control panel display after a few seconds. The message returns periodically as long as the alarm condition exists. See Table A for a list of alarm codes.

Correcting Faults

The recommended corrective action for faults is shown in Table A. The VFD can also be reset to remove the fault. If an external source for a start command is selected and is active, the VFD may start immediately after fault reset.

To reset a fault indicated by a flashing red LED, turn off the power for 5 minutes. To reset a fault indicated by a red LED (not flashing), press RESET from the control panel or turn off the power for 5 minutes. Depending on the value of parameter, digital input or serial communication could also be used to reset the drive. When the fault has been corrected, the motor can be started.

Correcting Alarms

To correct alarms, first determine if the alarm requires any corrective action (action is not always required). Use Table A to find and address the root cause of the problem.

If diagnostics troubleshooting has determined that the drive is defective during the warranty period, contact Carrier.

Control Panel Cleaning

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

Battery Replacement

A battery is only used in assistant control panels that have the clock function available and enabled. The battery keeps the clock operating in memory during power interruptions. The expected life for the battery is greater than ten years. To remove the battery, use a coin to rotate the battery holder on the back of the control panel. Replace the battery with type CR2032.

ACH580 MAINTENANCE SCHEDULE

These ACH580 Maintenance Schedules are valid for drives manufactured or maintained in 2017 onward. Recommended maintenance intervals and component replacements are based on specified operational and environmental conditions. Annual drive inspections are recommended to ensure the highest reliability and optimum performance.

IMPORTANT: Long term operation near the maximum specified ratings or environmental conditions may require shorter maintenance intervals for certain components.

LEGEND FOR TABLES B-D
I — Inspection (inspection and maintenance action if needed)
P — Performance of on/off-site work (commissioning, tests, measurements, or other work)
R — Replacement

Table B — Maintenance – Annual Actions

RECOMMENDED ANNUAL ACTIONS BY THE USER	
Connections and Environment	
Cabinet door filters IP54	R
Quality of supply voltage	P
Spare Parts	
Spare parts	I
DC circuit capacitors reforming for spare modules and spare capacitors	P
Inspections by User	
IP22 and IP42 air inlet and outlet meshes	I
Tightness of terminals	I
Dustiness, corrosion and temperature	I
Heat sink cleaning	I

Table C — Maintenance Cooling

COOLING	YEARS FROM START-UP						
	3	6	9	12	15	18	21
Fans, IP21 UL (NEMA) Type 1 Frames R1 to R9							
Main cooling fans R0-R5		R		R		R	
Main cooling fans R6-R8 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards R4v2 89A/IP21 & R4v2 77A/IP21		R		R		R	
Auxiliary cooling fan for circuit boards Only R5 – R8 LONGLIFE			R			R	
Fans, IP55 UL (NEMA) Type 12 Frames R1 to R8 (Not standard offering)							
Main cooling fans R1-R5		R		R		R	
Main cooling fans R6-R8 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards R1-R2	R	R	R	R	R	R	R
Auxiliary cooling fan for circuit boards R3, R4 LONGLIFE			R			R	
Auxiliary cooling fan for circuit boards R4v2		R		R		R	
Auxiliary cooling fan for circuit boards R5-R8 LONGLIFE			R			R	
Second Auxiliary cooling fan Only R8 LONGLIFE			R			R	

Table D — Maintenance Aging

COOLING	YEARS FROM START-UP						
	3	6	9	12	15	18	21
Common, Control Panel Battery							
Control panel battery			R			R	
Cabinet auxiliary 24 vdc power supplies and buffers >-<				R			
Frequency Converter Frames R1 to R8							
CCU control unit				R			
Frequency Converter Frames R6 to R8							
Flat ribbon cables				R			
DC circuit electrolytic capacitors and discharging resistors			R			R	
ZINT, ZPOW, ZINP, QINT module internal circuit boards				R			

MAIN FAN REPLACEMENT IP21 and IP55 (UL Type 1 and UL Type 12)

The main cooling fan of the VFD has a life span of about 60,000 operating hours at maximum rated operating temperature and drive load. The expected life span doubles for each 18°F drop in the fan temperature (fan temperature is a function of ambient temperatures and drive loads).

Fan failure can be predicted by increasing noise from fan bearings and the gradual rise in the heat sink temperature in spite of heat sink cleaning. If the drive is operated in a critical part of a process, fan replacement is recommended once these symptoms start appearing. Replacement fans are available from Carrier.

To replace the main fan for frame sizes R1 and R2, perform the following (see Fig. F-G):

1. Remove power from drive. Wait 5 minutes and then make sure by measuring that there is no voltage.
2. Remove drive cover.
3. For frame sizes R1, R2, R3, and R4, press together the retaining clips on the fan cover and lift.
4. Disconnect the fan cable.
5. Install the new fan by reversing Steps 2 to 4.
6. Restore power.

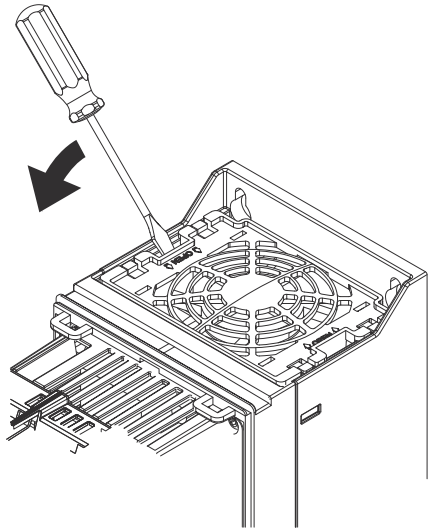

Fig. F — Remove Main Fan (Frame Sizes R1 up to R4)

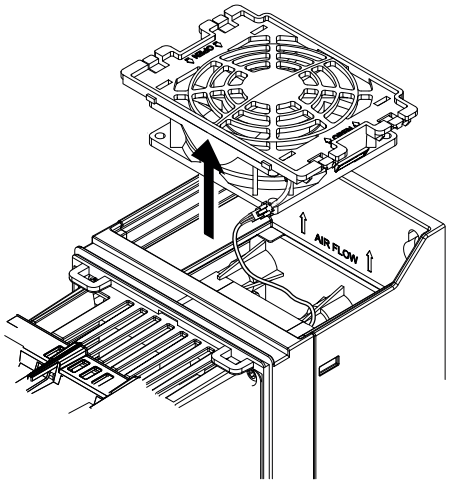

Fig. G — Remove Main Fan (Frame Sizes R1 up to R3)

AUXILIARY COOLING FAN REPLACEMENT IP21 and IP55 (UL Type 1 and UL Type 12)

The VFD IP21 and IP55 / UL Type 1 and 12 enclosures have an additional internal fan to circulate air inside the enclosure.

To replace the internal enclosure fan for frame sizes IP55 (UL Type 12) R1, R2, and R3, perform the following (Fig. H-K):

1. Remove power from drive (R1, R2, and R3).
2. Remove the front cover (R1, R2, and R3).
3. Unplug fan power supply wires from drive (R1, R2, and R3).
4. Remove the finger-guard by inserting a screwdriver into the finger-guard hole (R1, R2 only).
5. Unplug fan power supply wires from drive (R1, R2, and R3).
6. Pull off the plastic housing (R3 only).
7. Pull off the fan (R1, R2, and R3).
8. Install the new fan by following these steps in reverse order (R1, R2, and R3).

NOTE: Make sure that the arrow on the fan points the same direction as the arrow on the drive frame.

CONTROL PANEL CLEANING

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

BATTERY REPLACEMENT

A battery is only used in assistant control panels that have the clock function available and enabled. The battery keeps the clock operating in memory during power interruptions. The expected life for the battery is greater than ten years. To remove the battery, use a coin to rotate the battery holder on the back of the control panel. Replace the battery with CR2032.

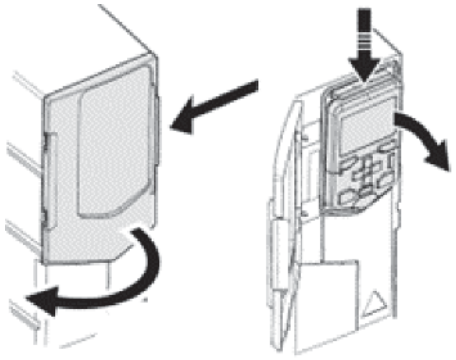

Fig. H — Remove Auxiliary Fan (Frame Sizes R1, R2, R3, R4 and R5)

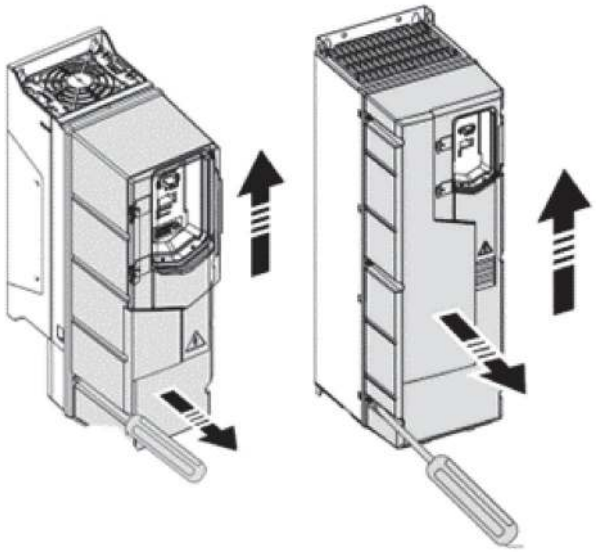

Fig. I — Remove Drive Cover
(Frame Sizes R1, R2, R3, R4, and R5)

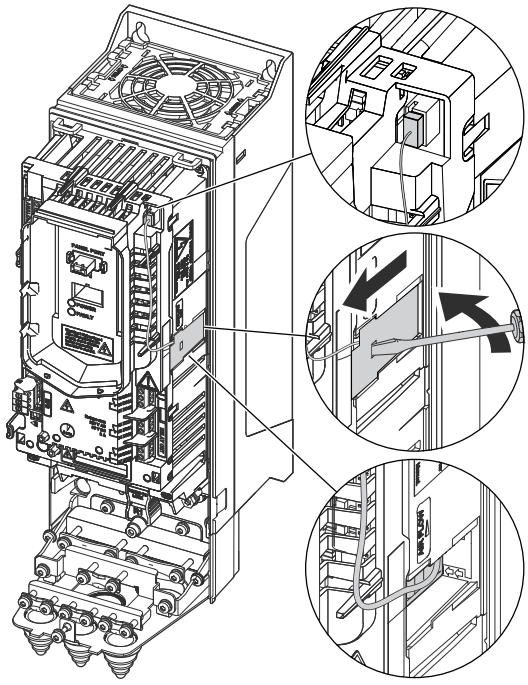

Fig. J — Remove Auxiliary Fan
(Frame Sizes R1 and R2)

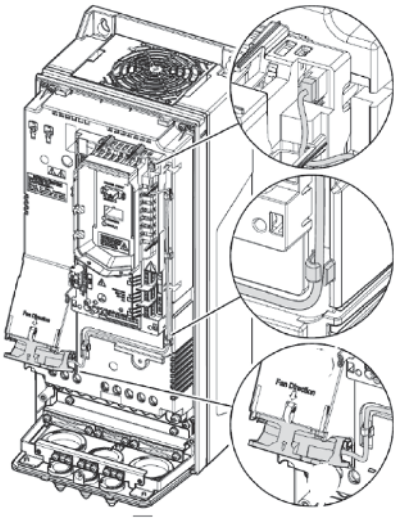

Fig. K — Remove Auxiliary Fan
(Frame Sizes R3)

APPENDIX B — ACH580 BRANCH CIRCUIT PROTECTION

This appendix outlines the applicable fuses that can be used for branch circuit protection for ACH580 drives. The drive ACH580 has been tested by ABB in accordance with UL Standard 61800-5-1 on a circuit having available system fault current of 100 kA maximum using fusing protection.

To meet the SCCR Safety Requirements described in UL Standard 61800-5-1, it is recommended to utilize the fusing protection listed in Table E. The use of alternative electrical protection brands is permissible only if the fuses are rated under UL Standards 248-8 (CLASS J) or 248-15 (CLASS T) and have been tested by ABB. For information on approved electrical components, please reach out to your local representative.

VFD FUSE BOX

For the VFD outdoor fan factory-installed option, fuses are in the back side of the VFD enclosure (Fig. L). For fuse selection, refer to Table E.

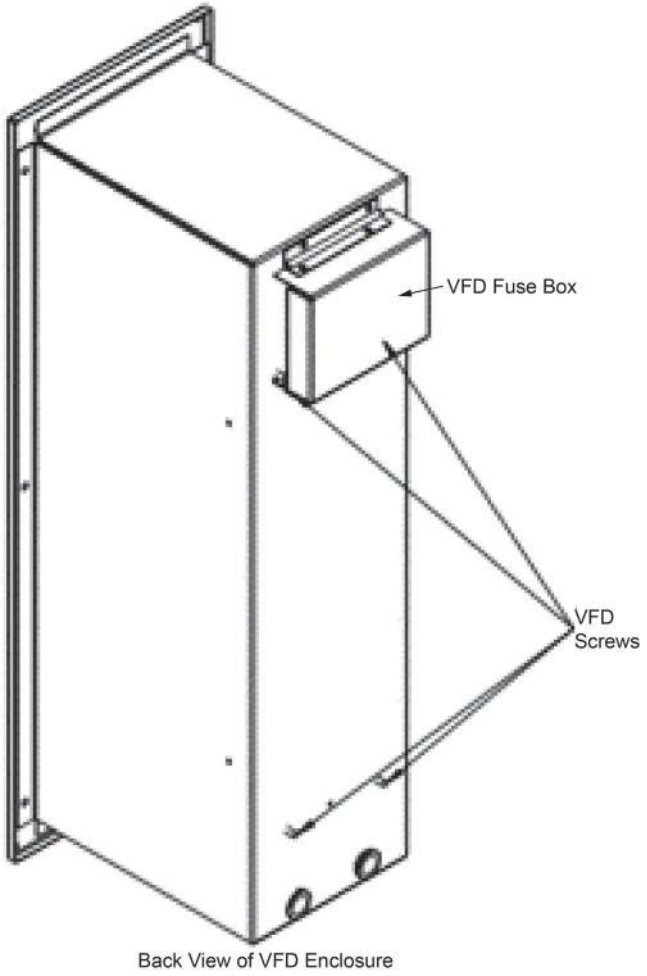

Fig. L — 09XC Outdoor Fan VFD Factory-Installed Option

Table E — VFD Fuse for SCCR Protection

ACH550 CROSS	ACH580 P/N	FUSE HOLDER CARRIER P/N	FUSE CARRIER P/N	VOLTAGE(V)	POWER(HP)	CURRENT(AMPS)
HK30WA001	HK30WB305	HY11UT030	HY10KB093	208-230	5	16.7
HK30WA002	HK30WB305	HY11UT030	HY10KB093	208-230	5	16.7
HK30WA003	HK30WB306	HY11UT030	HY10KB095	208-230	7.5	24.2
HK30WA008	HK30WB321	HY11UT030	HY10KB090	460	5	7.6
HK30WA009	HK30WB322	HY11UT030	HY10KB092	460	7.5	12
HK30WA010	HK30WB322	HY11UT030	HY10KB092	460	7.5	12
HK30WA021	HK30WB341	HY11UT030	HY10KB090	575	5	6.1
HK30WA022	HK30WB343	HY11UT030	HY10KB093	575	10	11

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