



Installation Instructions

Part No: 09RC70000101, 09RC70000201, 09RC70000301

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SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location.

Only trained, qualified installers and service mechanics should install, start up, and service this equipment.

Untrained personnel can perform basic maintenance functions, such as cleaning coils. All other operations should be performed by trained service personnel. Qualified installers and service technicians are required to have been trained on the following topics when installing and servicing air-conditioning equipment with A2L refrigerant such as R-32:

1. Explosive potential of A2L refrigerants
2. Potential ignition sources
3. Safety measures for unventilated and ventilated rooms or enclosures
4. Refrigerant detectors
5. Concept of sealed components and sealed enclosures according to IEC 60079-15:2010
6. Correct work procedures for the following:
 - a. Commissioning
 - b. Maintenance
 - c. Repair
 - d. Decommissioning
 - e. Disposal

See Controls and Troubleshooting Guide for complete guidelines.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

1. Follow all safety codes.
2. Keep quenching cloth and fire extinguisher nearby when brazing.
3. Wear safety glasses and work gloves.
4. Use care in handling, rigging, and setting bulky equipment.

IMPORTANT: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause radio interference. It has been tested and found to comply with the limits of a Class A computing device pursuant to International Standard in North America EN 61000-2/3, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

⚠ WARNING

This system uses an A2L refrigerant (R-32) which have higher pressures than R-22 and other refrigerants. No other refrigerant can be used in this system. Failure to use gauge set, hoses, and recovery systems designed to handle refrigerant R-32 may result in equipment damage or personal injury. Refer to chiller installation instructions for guidelines on proper A2L refrigerant handling and equipment used for A2L refrigerant. If unsure about equipment, consult the equipment manufacturer.

⚠ WARNING

This product can expose you to chemicals including lead and lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

⚠ 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

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.

⚠ 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:

- Shut off electrical power to unit.
- Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
- 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.
- 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.
- 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.

GENERAL

This book contains instructions for the installation of the Greenspeed Variable Speed Fan Control.

The Greenspeed accessory uses a variable frequency drive (VFD) to control the speed of the condenser fans. All fans will operate at the same speed for single circuit units, 020-035. Dual circuit units, 050-060, have a separate VFD for each circuit. This can reduce energy usage and noise at off design conditions. The VFD is controlled by a transducer at the discharge gas line. The VFD controls to a preset pressure. This pressure value, parameter 20-21, depends on the refrigerant used. Typically the fan speed will increase with high ambient temperature to reduce head pressure. Opposite is true for lower ambient temperatures.

This accessory will also allow the unit to run down to -20°F ambient with the addition of the wind baffle accessory. At low ambient conditions, high winds can have a detrimental effect on head pressure control. The wind baffles prevent wind from blowing across the condenser coil to alleviate this issue.

IMPORTANT: Wind baffles are required for ambient temperatures below 35°F if wind velocity is anticipated to be greater than 5 mph (8 km/h).

Inspect Shipment

Inspect contents of the accessory package before installing. File a claim with the shipping company if there is shipping damage. Contact your local Carrier Representative if any parts are missing. See Table 1 for Greenspeed accessory usage. See Table 2 for accessory package contents.

Table 1 — Greenspeed® Accessory Usage

PART NO.	UNIT SIZES	QTY	VOLTAGE
09RC70000101	020-035	1	575
	050-060	2	575
09RC70000201	020-035	1	460
	050-060	2	460
09RC70000301	020-035	1	208/230
	050-060	2	208/230

INSTALLATION

Step 1 — Install Wind Baffle Accessory Kit

If the chiller is expected to run in ambient temperatures below 35°F and winds above 5 mph are expected, a wind baffle accessory kit is required. See below for part numbers that require the wind baffle accessory kit.

- 30RA-900---065 (sizes 020, 035)
- 30RA-900---066 (sizes 020, 030, 050, 060)

NOTE: Unit sizes 035-060 require two kits.

Step 2 — Mount the VFD

Verify the drive nameplate rating versus the unit nameplate rating for correct voltage range.

Disconnect all power from unit before proceeding.

VFD will mount in the control panel. Open the control panel and find the mounting location. Mount the VFD in the panel using the #10 screws, flat washer, and star washer.

Mount the din rail with #8 screws at the FR, fan relay. Add the relay, relay socket, and din rail stops to the din rail.

Replace existing fuses and fuse blocks with ones supplied in the kit.

⚠ CAUTION

Internal refrigerant tubing is under high pressure. Do not damage piping while mounting VFD assembly. Serious injury may occur.

Step 3 — Wiring

Install and connect the wire harness per the markings on the wires and the schematic, Fig. 1 and 5. There are two harnesses included in the kit. Use the single harness for 020-035 size units and the dual harness for 050 and 060 units.

Move fan power wires from load side of fan contactor, 21, 22, 23, to load side of VFD, U,V,W. Reference Fig. 2 for fan number identification.

Replace fan cycling pressure switch with transducer from kit on discharge gas line.

Route transducer cable, DPT, through bottom of panel to transducer. See Fig. 3 and 4 for transducer wire routing.

Use included wire ties to restrain wires in panel and route transducer cable. Assure cable does not touch copper lines.

SPECIAL WIRING INSTRUCTIONS FOR 09RC050 AND 060 SINGLE CIRCUIT APPLICATIONS

In this application the two drives will run in a Primary/Secondary configuration. Only Circuit A transducer will be used. Circuit B drive will mirror the operation of A. Three wires must be added

between the VFDs for Primary/Secondary operation. The following connections should be made.

VFD-A-12 to VFD-B-18

VFD-A-42 to VFD-B-53

VFD-A-55 to VFD-B-55

Disconnect FR-B from VFD-B

Use TB-1, 2 only for control input. See Fig. 5 power schematic for reference.

Load parameters from Table 1 into VFD-B, the secondary VFD.

Step 4 — Setup

Once all wiring is terminated and all covers are back in place, power unit.

Set the parameters on the VFD as shown on Table 3 for 020-035 unit sizes and 050-060 dual circuit units. For 050-060 single circuit units, set VFD-A per Table 3 and VFD-B per Table 4. Refer to VFD manual on method for setting parameters.

Unit is now ready for operation.

Table 2 — Accessory Package Contents

ACCESSORY	VOLTAGE	PART NUMBER	QTY	DESCRIPTION
09RC70000101	575	HK30WA467	1	VFD, 575-v
		09RCHADBFV-A00	1	Harness, Greenspeed Single
		09RCHADBFV-A10	1	Harness, Greenspeed Dual
		HY10JK015	3	Fuse, 15A JKS-15
		JT60030	3	Fuse Holder Class J
		HY26EA023	1	DIN Rail - 2" Long
		AL04AU166	2	#8 .50"L Trilobe
		HN61ZP032	1	SPDT RT Relay
		HY11TC032	1	Relay Socket
		XBAES35N	2	DIN Rail End Stop
		AU02AG131	4	Washer, Flat #10 Z
		AU27AS131	4	Washer, Star #10
		AL04AU238	4	#10 .75"L Trilobe
		HK05ZZ010	1	Transducer
		HY76TB162	10	Wire Tie
09RC70000201	460	HK30WA460	1	VFD, 380/460-v
		09RCHADBFV-A00	1	Harness, Greenspeed Single
		09RCHADBFV-A10	1	Harness, Greenspeed Dual
		HY10JK015	3	Fuse, 15A JKS-15
		JT60030	3	Fuse Holder Class J
		HY26EA023	1	DIN Rail - 2" Long
		AL04AU166	2	#8 .50"L Trilobe
		HN61ZP032	1	SPDT RT Relay
		HY11TC032	1	Relay Socket
		XBAES35N	2	DIN Rail End Stop
		AU02AG131	4	Washer, Flat #10 Z
		AU27AS131	4	Washer, Star #10
		AL04AU238	4	#10 .75"L Trilobe
		HK05ZZ010	1	Transducer
		HY76TB162	10	Wire Tie
09RC70000301	208/230	HK30WA393	1	VFD, 230-v
		09RCHADBFV-A00	1	Harness, Greenspeed Single
		09RCHADBFV-A10	1	Harness, Greenspeed Dual
		HY10JK015	3	Fuse, 15A JKS-15
		JT60030	3	Fuse Holder Class J
		HY26EA023	1	DIN Rail - 2" Long
		AL04AU166	2	#8 .50"L Trilobe
		HN61ZP032	1	SPDT RT Relay
		HY11TC032	1	Relay Socket
		XBAES35N	2	DIN Rail End Stop
		AU02AG131	4	Washer, Flat #10 Z
		AU27AS131	4	Washer, Star #10
		AL04AU238	4	#10 .75"L Trilobe
		HK05ZZ010	1	Transducer
		HY76TB162	10	Wire Tie

Table 3 — VFD Parameter Settings

PARAMETER	FUNCTION	FACTORY SETTING	UNIT	NOTES
0-03	Regional Settings	North America		Default settings for 60 Hz mains
1-00	Configuration Mode	[3] Process Closed Loop		
1-01	Motor Control Principle	[1] VVC+		
1-03	Torque Characteristics	[1] Variable Torque		
1-22	Motor Voltage	Voltage Code Specific	V	Motor Nameplate
1-23	Motor Frequency	Voltage Code Specific	Hz	Motor Nameplate
1-24	Motor Current	Voltage Code Specific	A	Motor Nameplate
1-25	Motor Nominal Speed	850	rpm	Motor Nameplate
3-02	Minimum Reference	0		
3-03	Maximum Reference	667		
3-15	Reference 1 Source	[0] No function		Select speed reference resource
3-16	Reference 2 Source	[0] No function		Select speed reference resource
3-17	Reference 3 Source	[11] Local bus reference		Select speed reference resource
3-41	Ramp 1 Ramp Up Time	15	s	Load dependent
3-42	Ramp 1 Ramp Down Time	20	s	Load dependent
4-12	Motor Speed Low Limit [Hz]	0	Hz	Motor speed limits
4-14	Motor Speed High Limit [Hz]	60	Hz	Motor speed limits
4-18	Current Limit	110	%	
4-19	Max Output Frequency	62	Hz	Safety limit
5-10	Terminal 18 Digital Input	[8] Start		
5-11	Terminal 19 Digital Input	[0] No operation		
5-12	Terminal 27 Digital Input	[0] No operation		
6-20	Terminal 54 Low Voltage	0.5	V	Transducer scaling
6-21	Terminal 54 High Voltage	4.5	V	Transducer scaling
6-24	Terminal 54 Low Ref./Feedb. Value	14.5		Transducer scaling
6-25	Terminal 54 High Ref./Feedb. Value	667		Transducer scaling
6-90	Terminal 42 Mode	[1] 4-20 mA		Signal to Secondary Drive
6-91	Terminal 42 Analog Output	[100] Output Frequency		Signal to Secondary Drive
6-92	Terminal 42 Digital Output	[0] No Operation		
6-93	Terminal 42 Output Min Scale	0	%	
6-93	Terminal 42 Output Max Scale	60	%	
20-00	Feedback 1 Source	[2] Analog Input 54		Transducer Signal
20-01	Feedback 1 Conversion	[0] Linear		Feedback Source
20-20	Feedback Function	[3] Minimum		Feedback Source
20-21	Setpoint 1	330		Setpoint
20-81	Reverse PID	[1] Inverse		
20-83	PI Start Speed	0	Hz	
20-84	On Reference Bandwidth	0	%	
20-93	PI Proportional Gain	10		
20-94	PI Integral Time	40	s	
208/230-v 60 Hz				
1-22	Motor Voltage	208	V	Motor Nameplate
1-23	Motor Frequency	60	Hz	Motor Nameplate
1-24	Motor Current	12	A	Motor Nameplate
380-v 60 Hz				
1-22	Motor Voltage	380	V	Motor Nameplate
1-23	Motor Frequency	60	Hz	Motor Nameplate
1-24	Motor Current	7.8	A	Motor Nameplate
380-v 50 Hz				
1-22	Motor Voltage	380	V	Motor Nameplate
1-23	Motor Frequency	50	Hz	Motor Nameplate
1-24	Motor Current	7.8	A	Motor Nameplate
460-v 60 Hz				
1-22	Motor Voltage	460	V	Motor Nameplate
1-23	Motor Frequency	60	Hz	Motor Nameplate
1-24	Motor Current	5.8	A	Motor Nameplate
575-v 60 Hz				
1-22	Motor Voltage	575	V	Motor Nameplate
1-23	Motor Frequency	60	Hz	Motor Nameplate
1-24	Motor Current	4.8	A	Motor Nameplate

Table 4 — Secondary VFD Parameter Settings (09RCM050, 060 Single Circuit)

PARAMETER+G2:K30	FUNCTION	FACTORY SETTING	UNIT	NOTES
0-03	Regional Settings	North America		Default settings for 60 Hz mains
1-00	Configuration Mode	[0] Open		
1-01	Motor Control Principle	[1] VVC+		
1-03	Torque Characteristics	[1] Variable Torque		
1-22	Motor Voltage	Voltage Code Specific	V	Motor Nameplate
1-23	Motor Frequency	Voltage Code Specific	Hz	Motor Nameplate
1-24	Motor Current	Voltage Code Specific	A	Motor Nameplate
1-25	Motor Nominal Speed	850	rpm	Motor Nameplate
3-02	Minimum Reference	0		
3-03	Maximum Reference	60		
3-15	Reference 1 Source	[1] Analog Input		Signal from Primary Drive
3-16	Reference 2 Source	[0] No function		Select speed reference resource
3-17	Reference 3 Source	[11] Local bus reference		Select speed reference resource
3-41	Ramp 1 Ramp Up Time	5	s	Load dependent
3-42	Ramp 1 Ramp Down Time	5	s	Load dependent
4-12	Motor Speed Low Limit [Hz]	0	Hz	Motor speed limits
4-14	Motor Speed High Limit [Hz]	60	Hz	Motor speed limits
4-18	Current Limit	110	%	
4-19	Max Output Frequency	62	Hz	Safety limit
5-10	Terminal 18 Digital Input	[8] Start		
5-11	Terminal 19 Digital Input	[0] No operation		
5-12	Terminal 27 Digital Input	[0] No operation		
6-12	Terminal 53 Low Current	4	mA	
6-13	Terminal 53 High Current	20	mA	
6-14	Terminal 53 Low Ref./Feedback Value	0	Hz	
6-15	Terminal 53 High Ref./Feedback Value	60	Hz	Signal from Primary Drive
6-16	Terminal 53 Filter Time Constant	0.01	s	
6-19	Terminal 53 Mode	[0] Current Mode		Signal from Primary Drive

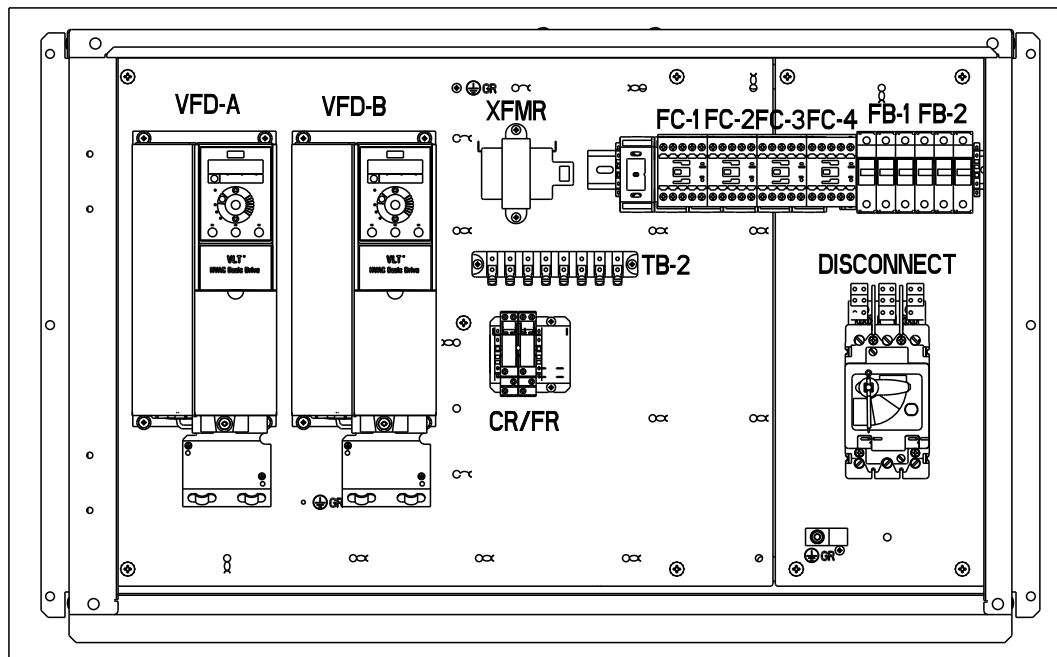


Fig. 1 — Control Panel Arrangement

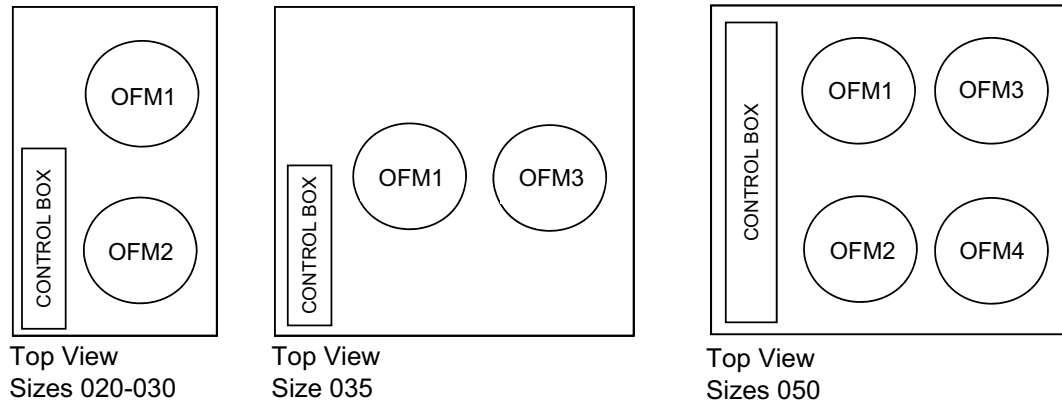


Fig. 2 — Fan Identification

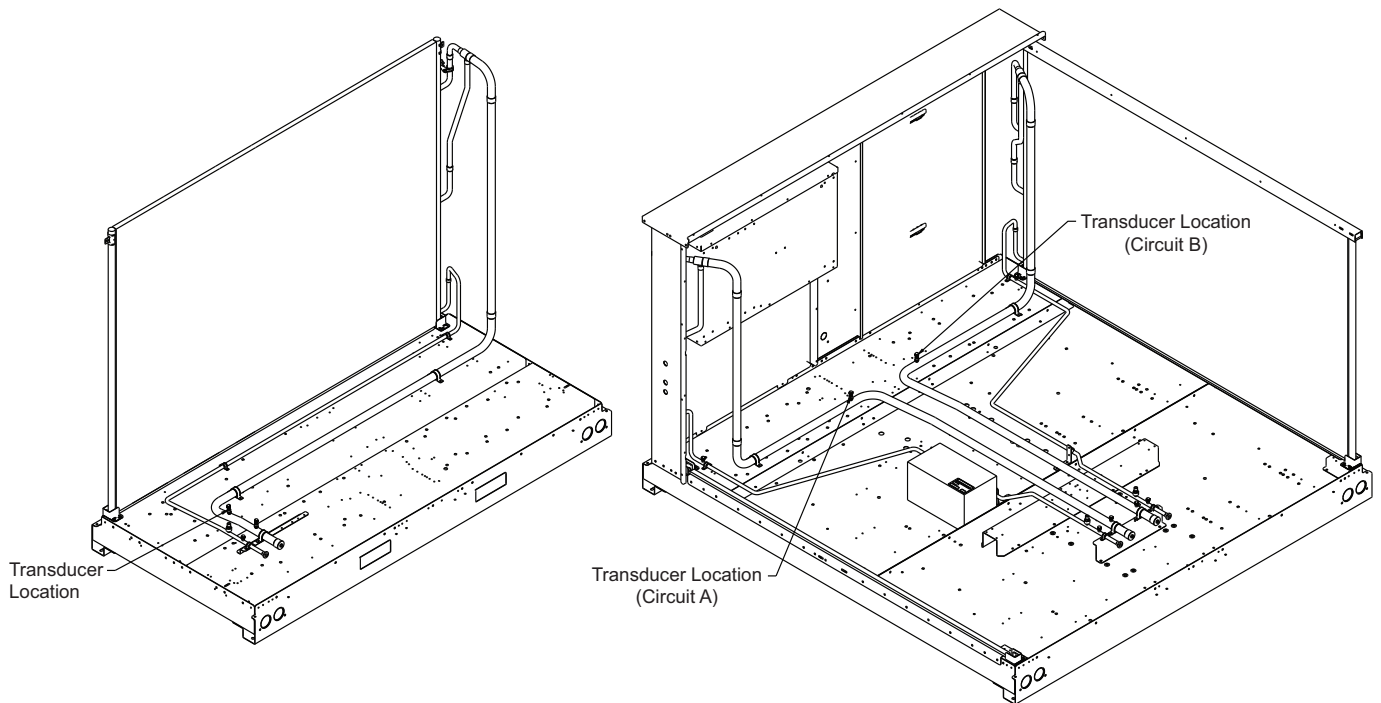


Fig. 3 — Transducer Location

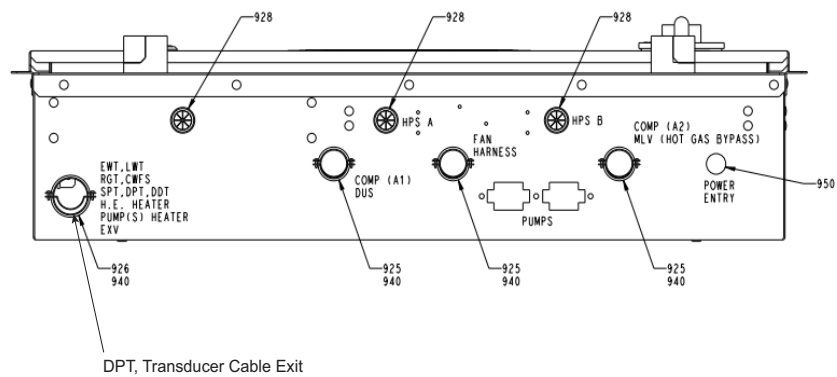
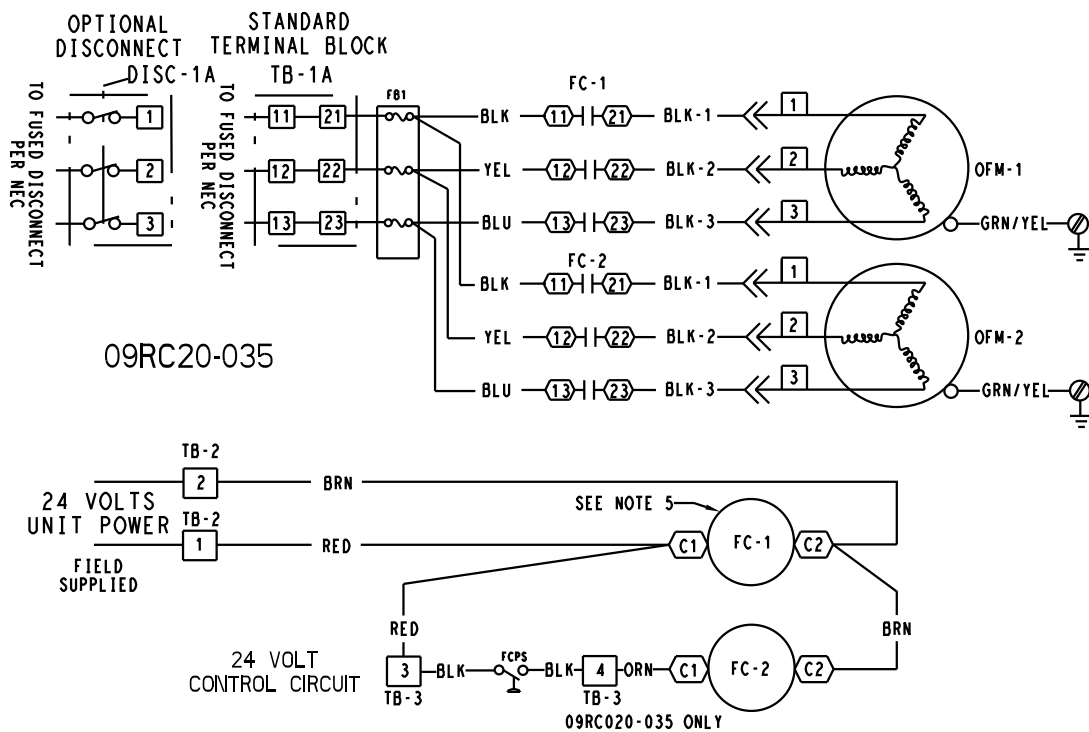
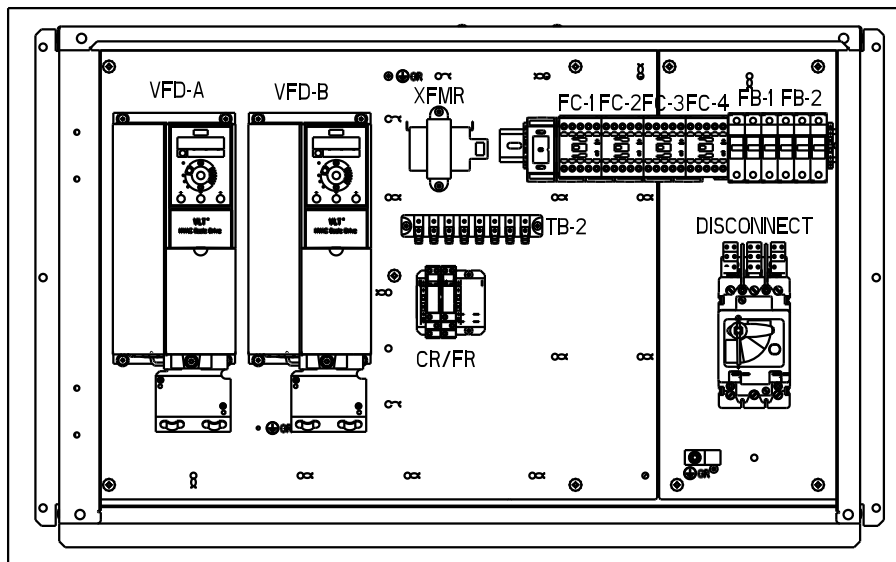


Fig. 4 — Transducer Wire Routing

09RC020-060 POWER SCHEMATIC & COMPONENT ARRANGEMENT



NOTES:

1. FACTORY WIRING IS IN ACCORDANCE WITH UL 60335-2-40 STANDARDS. ANY FIELD MODIFICATIONS OR ADDITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
2. USE 75°C MIN WIRE FOR FIELD POWER SUPPLY.
3. FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASE CONDITIONS.
4. FOR 500 SERIES UNIT OPERATION AT 208-3-60V LINE VOLTAGE, TRANSFORMER PRIMARY CONNECTION MUST BE MOVED TO TERMINAL MARKED 208.
5. FOR UNITS WITH LOW AMBIENT FLOP/ACCESSORY, FAN CONTACTOR FC1 IS REPLACED WITH FAN RELAY FR-A.
6. UNITS ARE SUPPLIED WITH (2) R-32 FCPS. REFER TO INSTALLATION INSTRUCTIONS FOR PROPER INSTALLATION AND ALTERNATE REFRIGERANT APPLICATIONS.

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Fig. 5 — Power Schematic

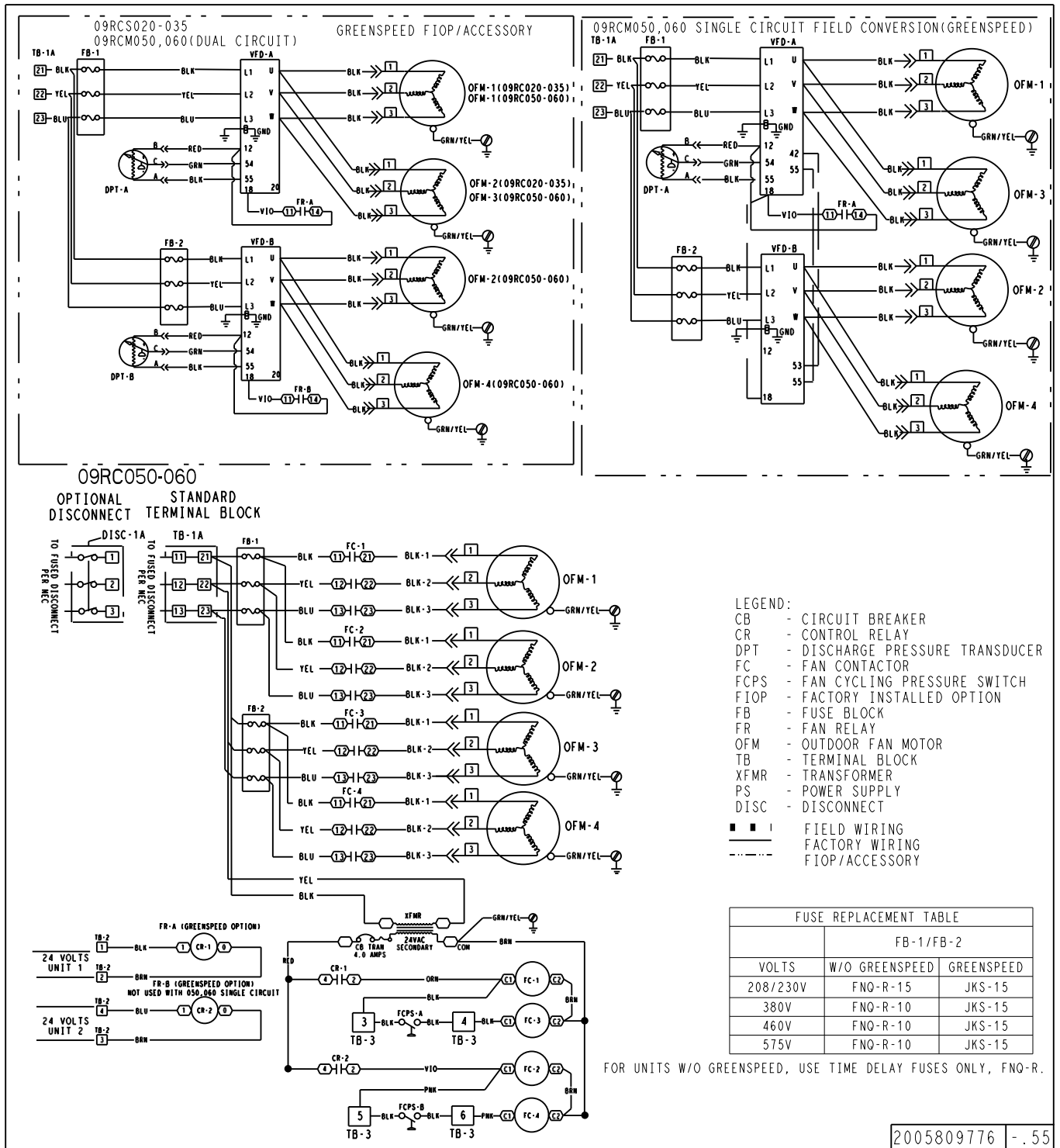


Fig. 5 — Power Schematic (cont)

