

# Retrofit Instructions

Part No. 30HX70000805 to 30HX70000810

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## SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment. Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves. It is important to recognize safety information. This is the safety-alert symbol. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards which could result in personal injury or death. CAUTION is used to identify unsafe practices, which may result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

## INTRODUCTION

This document is to be used in conjunction with the 30HX PIC6.1 Retrofit Kit Installation Instructions as a supplement. It provides specific information and instruction for the retrofitting of Series 7 ComfortLink controls to PIC6.1 Carrier controls which is required as part of this retrofit kit.

This kit is for use with 30HX Series 7 60 Hz chillers with rated voltages of 208/230-v or 460-v only. The VFD is intended for installation on compressor A1 only.

### Required Items

- Safety Glasses
- Gloves
- Drill
- #7 or 13/64 Drill Bit (0.2010 in.)
- 1/4 in. -20 Tap Size
- 30HX Carrier Controller Retrofit Kit P/N 30HX70000801

See Tables 1-3 for kit contents and part numbers.

**Table 1 — 30HX Carrier Controller Retrofit Kit Contents**

REF	PART NO.	DESCRIPTION	QTY
	<b>2008006498</b>	30HX PIC6.1 76-186 Power Schematic	1
	<b>2008006499</b>	30HX PIC6.1 206-271 Power Schematic	1
	<b>2008093699</b>	CPM Load Relays with VFD Wire Harness	1
	<b>2006771817</b>	LEN Network with VFD Wire Harness	1
	<b>2007647079</b>	VFD Interlock Wire Harness	1
	<b>2008015681</b>	HPS Wire Harness	1
	<b>2008064941</b>	TB9 Drill template	1
	<b>HY11UC384</b>	TB9 Terminal Block	1
	<b>AU01AM241</b>	Flat Washer for TB9	6
	<b>AU11AR241</b>	Lock Nut Washer for TB9	6
	<b>AT13JA241</b>	Hex Nut for the TB9	6
	<b>00PPN500000304A</b>	Bolt for VFD Mounting	4
	<b>2008094208</b>	Wood Crate (60X30X20)	1
	<b>AA45AB167</b>	#1/4-20 TB9 Mounting Screws	6
<b>1</b>	<b>2006273947</b>	30HX VFD Frame Support	2
<b>2</b>	<b>2006273952</b>	30HX VFD Frame Support	2
<b>3</b>	<b>2006273960</b>	30HX VFD Frame Support	2
<b>4</b>	<b>2006273967</b>	30HX VFD Support Bracket	4
<b>5</b>	<b>2006120446</b>	30HX VFD Support Bracket	1
<b>6</b>	<b>2006259494</b>	30HX VFD Support Bracket	4
<b>7</b>	<b>00PPN500000305A</b>	VFD Bracket Asy M10 Screw	48
<b>8</b>	<b>2006315086</b>	30HX VFD Support Bracket	4

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

**Table 2 – VFD Selection for 460V**

30HXC UNIT TONNAGE	CARRIER VFD P/N	kW	FRAME	KIT P/N
76	HR46ZY220	37 kW	C1	30HX70000805
86				
96				
106				
116	HR46ZY001	55 kW	C1	30HX70000806
126				
171				
206				
136				
146				
161				
186	HR46ZY003	75 kW	C2	30HX70000807
246				
261				
271				

**Table 3 – VFD Selection for 208/230v**

## Field-Supplied Items

For the VFD, install power wiring in conduits with proper fittings on both the supply and load sides. See Step 3 for connection details. Field-supplied wiring must be sized and installed in accordance with NEC and/or local electrical codes.

## RETROFIT INSTRUCTIONS

### Step 1 — Remove Power

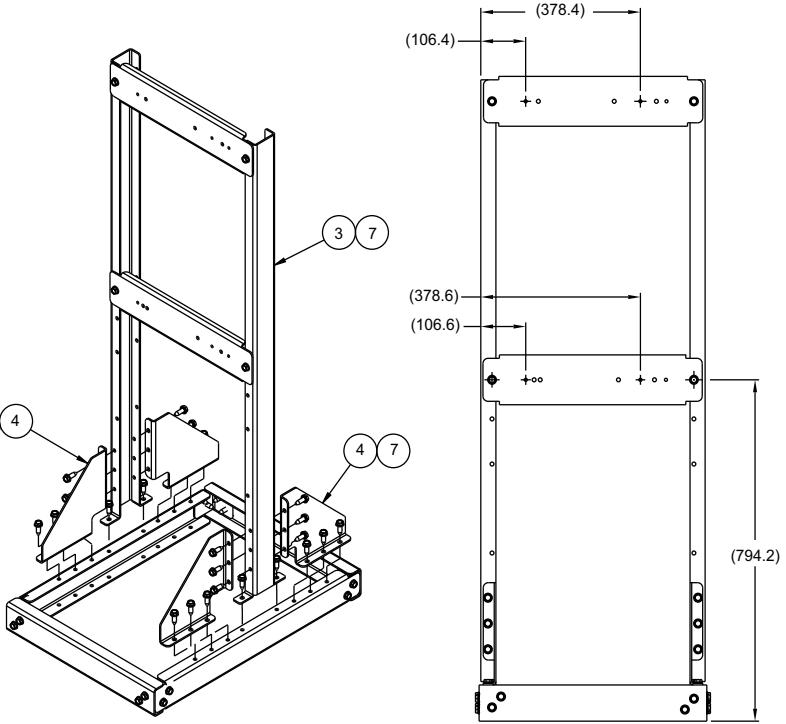
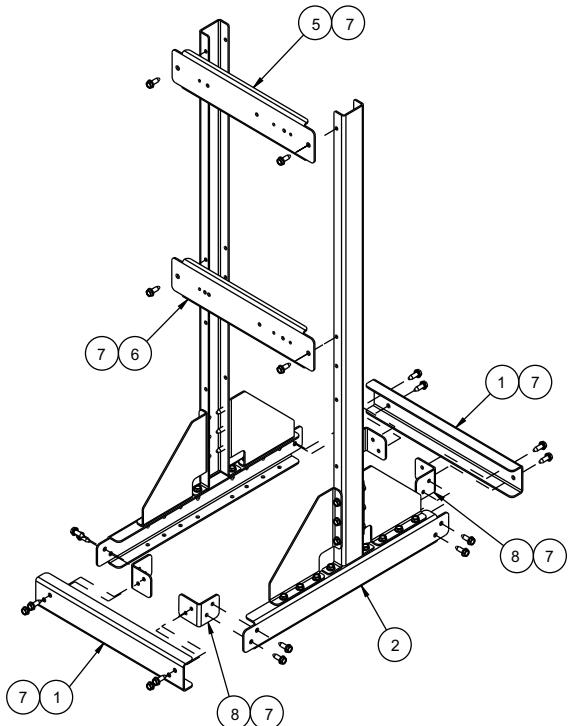
Shut off all power to unit and follow proper lock-out-tag-out procedures to ensure power is off. Measure the voltage levels at the input terminals using a multimeter to confirm the absence of power.

#### 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.

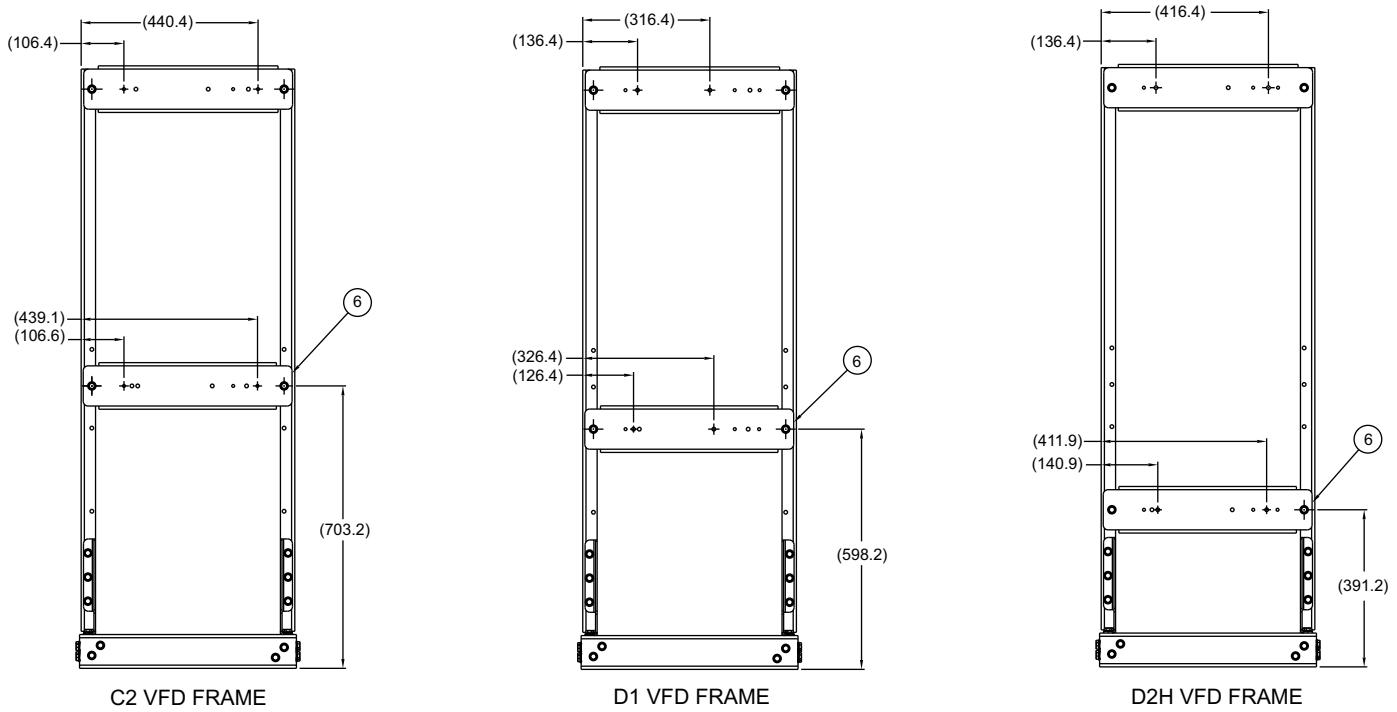
### Step 2 — Assemble VFD Bracket

1. Use the provided hardware (see Table 1, Ref 1 to 7) to assemble the standalone VFD bracket according to the VFD frame size. Use Tables 2 and 3 for the VFD selection as per tonnages and voltage rating. Refer to Fig. 1 and 2 for assembly and additional guidance.
2. Locate the mounting locations on the VFD and match them up to the locations on the mounting bracket according to the specified frame size (see Fig. 1 and 2 for the specified reference frame size positioning).
3. Once the VFD is in place and the mounting bolts (P/N 00PPN500000304A) are securely tightened, position the VFD as close to the unit as feasible.
4. Remove the front cover of the VFD to access the electrical connection terminals. See Fig. 3 and 4 for details.

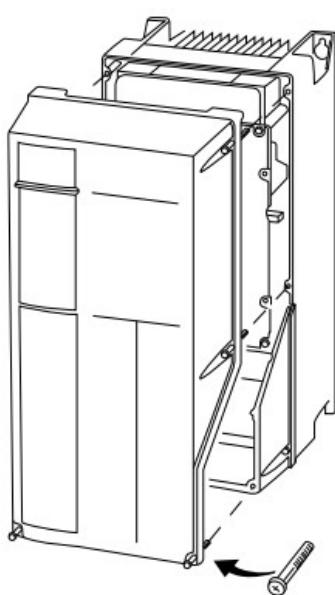


C1 VFD FRAME

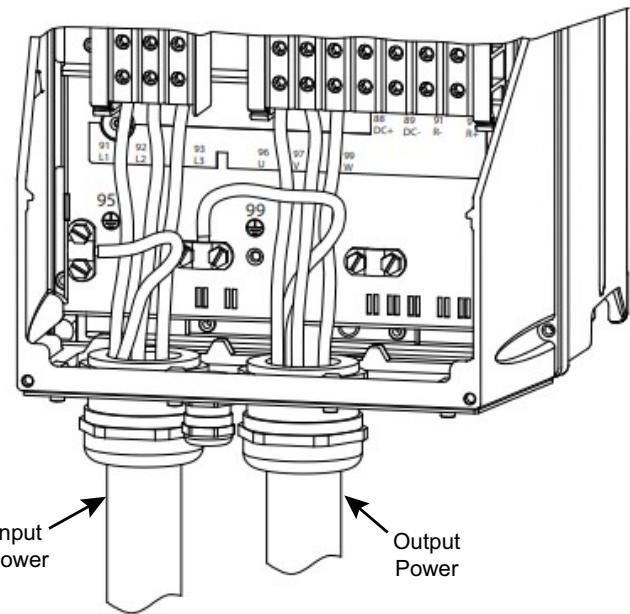
Fig. 1 — Bracket Assembly



**Fig. 2 – VFD Frame Assembly Drawing**



**Fig. 3 – VFD Front Cover**



**Fig. 4 – VFD Electrical Connection Terminals**

### Step 3 — Disconnect the Circuit A1 Compressor Power Wiring

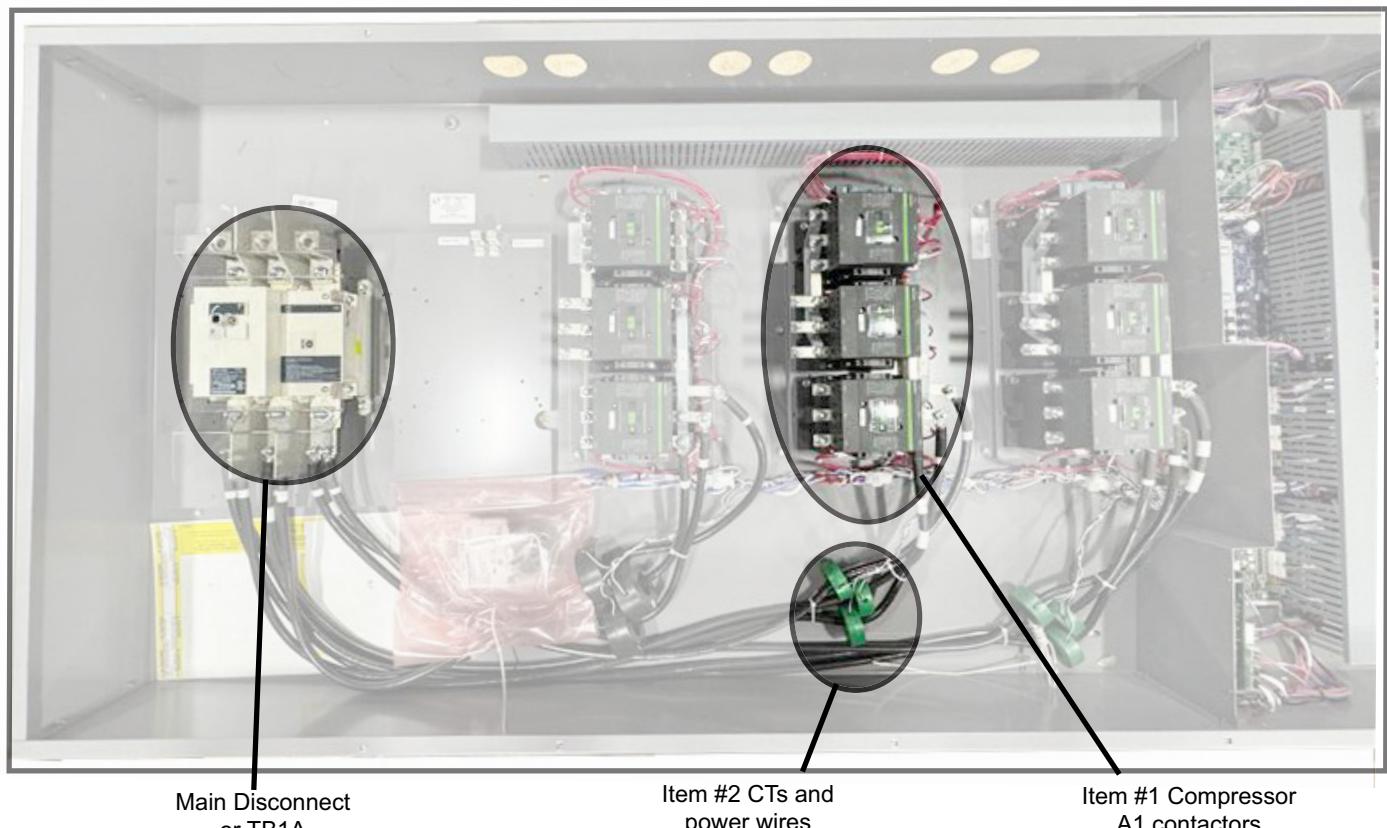
1. Disconnect the power wiring from the Compressor A1 contactor. See Item #1 in Fig. 5 below for additional details.
2. Remove the CTs and power wire between the Main Disconnect/TB1A and the Circuit A1 compressor contactor(s). See Items 1 and 2 in Fig. 5. The CTs will be reused, retain them in the bottom of the enclosure for future use.
3. Remove the Circuit A1 compressor contactor (across the line) or contactors (Wye-Delta) (refer to Item #1 in Fig. 5).
4. Locate and use the TB9 drill template (Fig. 6, P/N 2008064941) to mark the hole locations/pattern for mounting TB9 in the location where Compressor A1 contactor(s) was located. See Fig. 7.
5. For all holes, use a #7 (13/64 inch) drill bit to drill holes, then use a 1/4-20 tap to thread the hole for a 1/4-20 bolt size.
6. Install the terminal block TB9 using the provided hardware (1/4-20-inch bolts and flat washers) and apply the TB9 label sticker from the kit in the location shown in Fig. 7.
7. Add appropriately sized knockouts to the electrical enclosure to attach the field-supplied VFD conduit assemblies. These should be located below the TB9 terminal block mounting
8. Connect the field-supplied wire to the load side of Power Disconnect/TB1A, be sure to put the CTs from Step 2 around each of the conductors prior to making the connection to Disconnect/TB1A. Be sure to correctly orient the CT with the “H1” label facing the incoming power.
9. Connect field-supply 3-phase AC input power wiring to the line power input terminals L1, L2, and L3. Connect ground wire to the nearest grounding terminal. See Fig 4 for VFD connection detail. Comply with local and national electrical codes for cable sizes. See the torque requirement in Table 4.
10. Connect the field-supply 3-phase Compressor wiring to terminals 96 (U), 97 (V), and 98 (W) and other end to Lug side of the TB9. Connect ground wire to the nearest grounding terminal. See Fig 4 for the VFD connection. Comply with local and national electrical codes for cable sizes. See the torque requirement in Table 4.
11. Connect the existing compressor wire to the TB9 stud side using the provided hardware (AU11AR241 and AT13JA241) and refer to the schematic drawings (Fig. 8 and 9) for the connection. Secure all the cable with cable ties wherever possible.

**Table 4 — Torque Requirement**

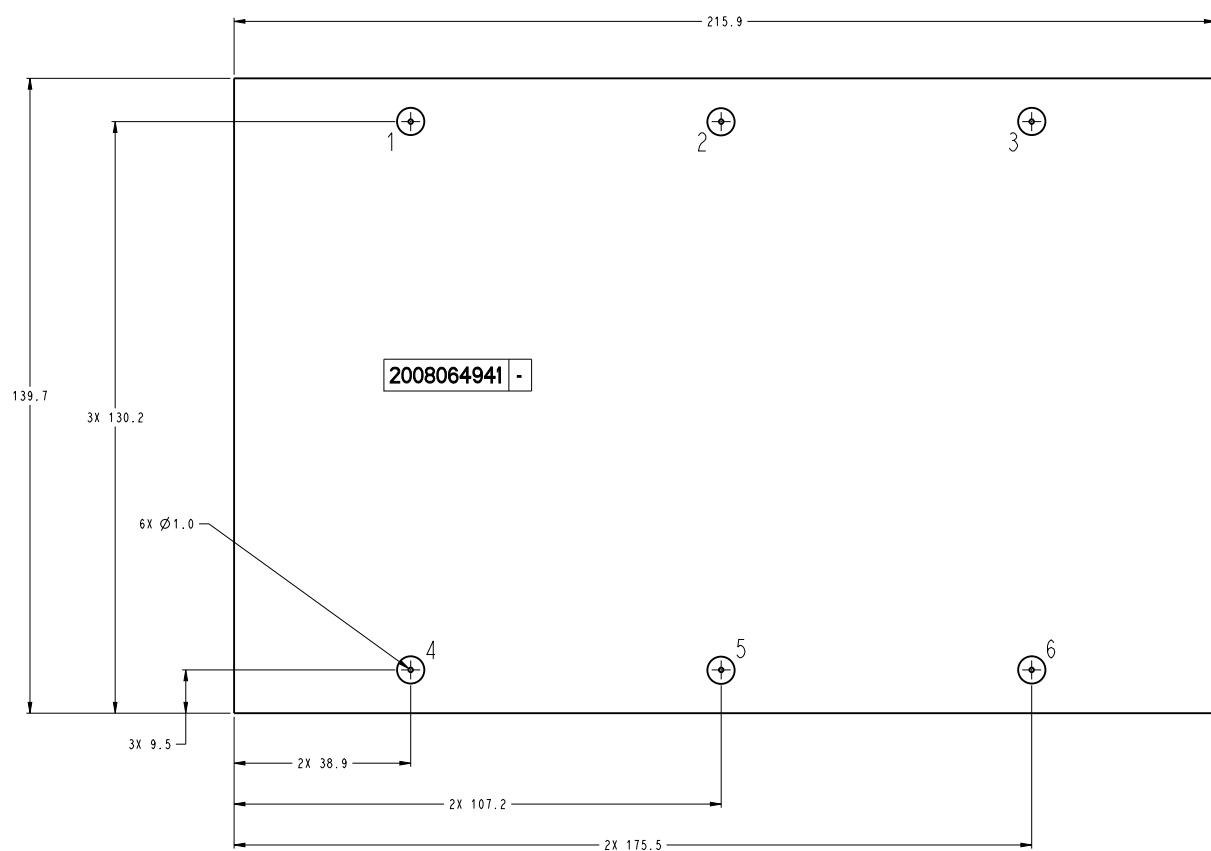
ENCLOSURE/FRAME TYPE	LINE POWER TERMINAL TORQUE (in.-lb)	OUTPUT POWER TERMINAL TORQUE (in.-lb)	BOLT SIZE	GROUND TORQUE (in.-lb)	GROUND BOLT SIZE
C1	10	10	—	3	—
C2	14-24	14-24	—	3	—
D1	168-354	168-354	M10	75-181	M8
D2H	168-354	168-354	M10	168-354	M10

location as the line side VFD cables will need to be routed through the CTs and the wire length on the CTs is limited.

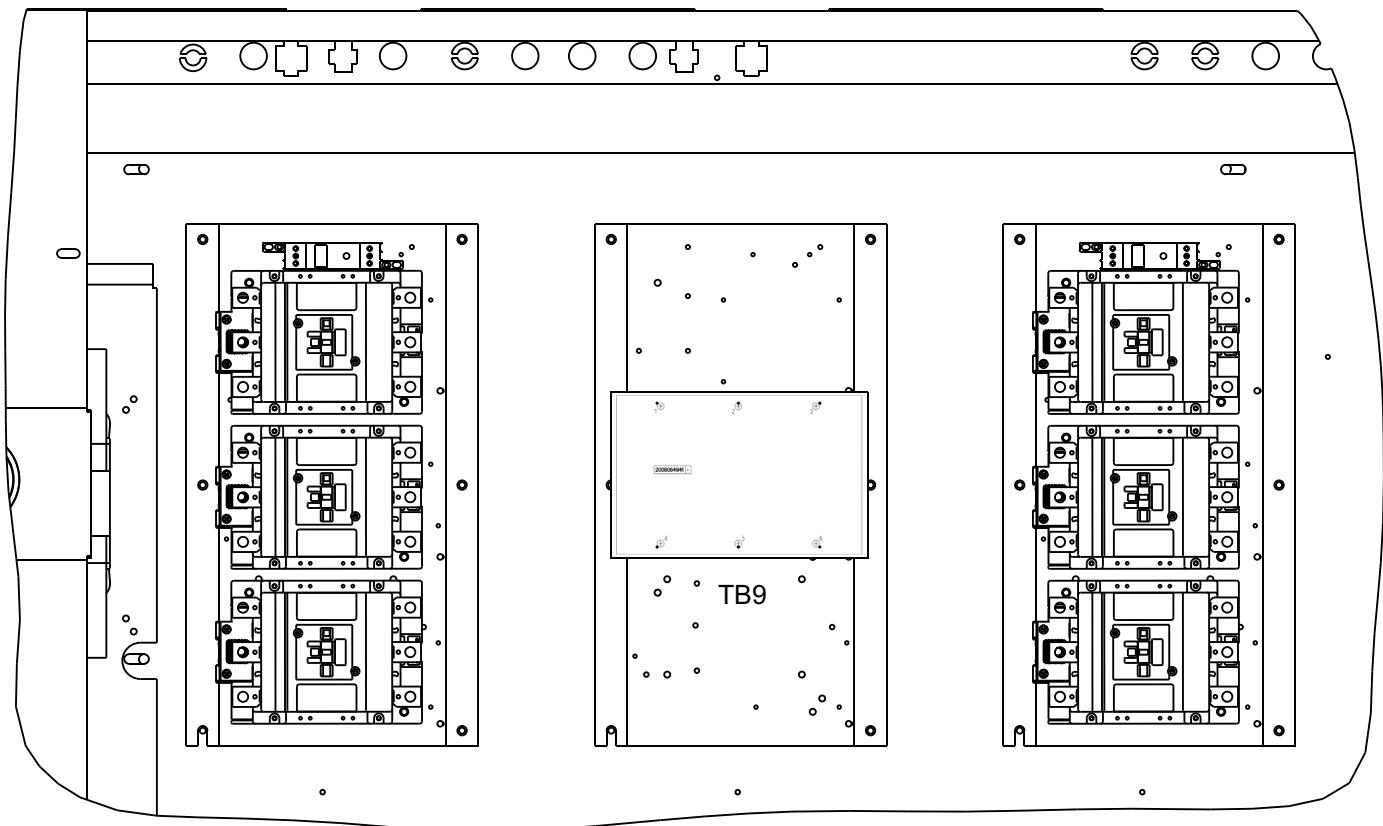
1. Connect the field-supplied wire to the load side of Power Disconnect/TB1A, be sure to put the CTs from Step 2 around each of the conductors prior to making the connection to Disconnect/TB1A. Be sure to correctly orient the CT with the “H1” label facing the incoming power.
2. Connect field-supply 3-phase AC input power wiring to the line power input terminals L1, L2, and L3. Connect ground wire to the nearest grounding terminal. See Fig 4 for VFD connection detail. Comply with local and national electrical codes for cable sizes. See the torque requirement in Table 4.
3. Connect the field-supply 3-phase Compressor wiring to terminals 96 (U), 97 (V), and 98 (W) and other end to Lug side of the TB9. Connect ground wire to the nearest grounding terminal. See Fig 4 for the VFD connection. Comply with local and national electrical codes for cable sizes. See the torque requirement in Table 4.
4. Connect the existing compressor wire to the TB9 stud side using the provided hardware (AU11AR241 and AT13JA241) and refer to the schematic drawings (Fig. 8 and 9) for the connection. Secure all the cable with cable ties wherever possible.



**Fig. 5 — Panel Layout**

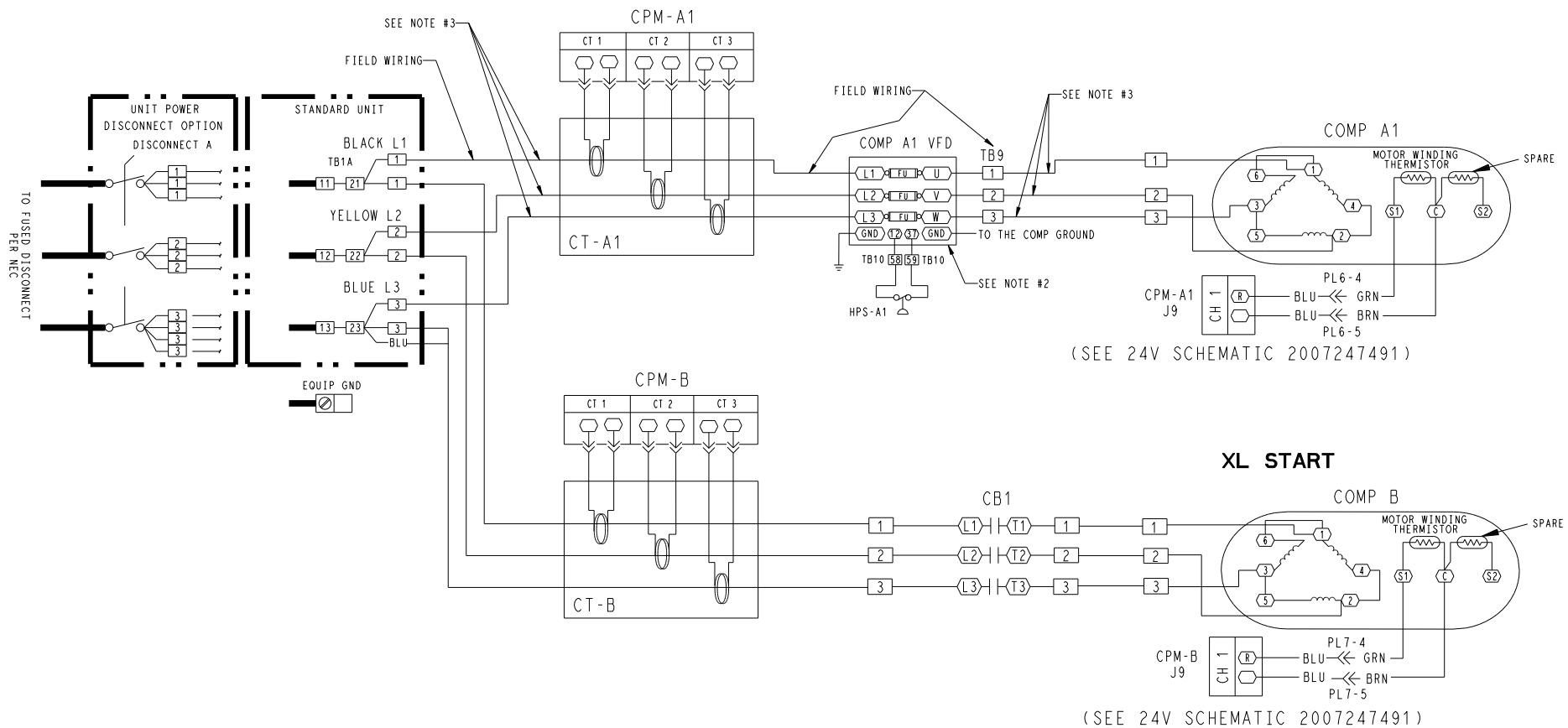


**Fig. 6 — TB9 Drill Template**



**Fig. 7 — TB9 Panel**

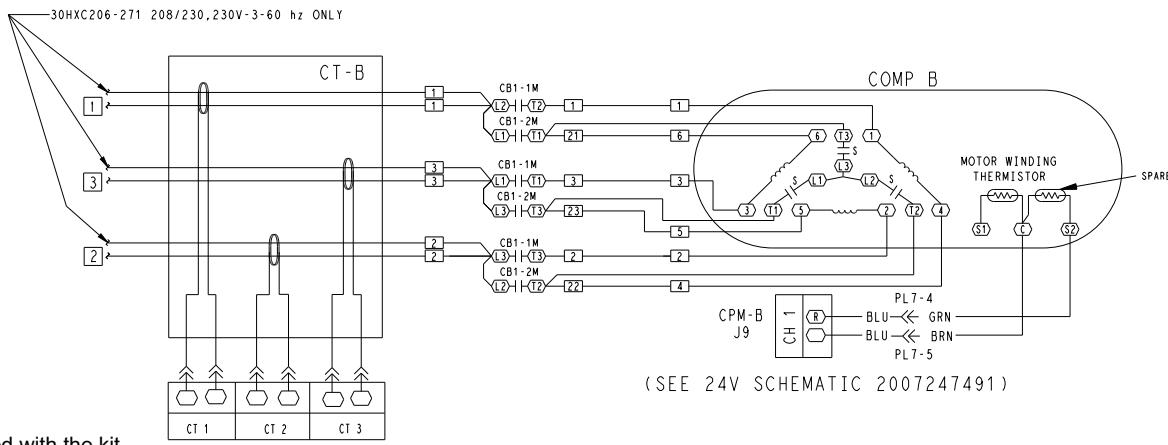
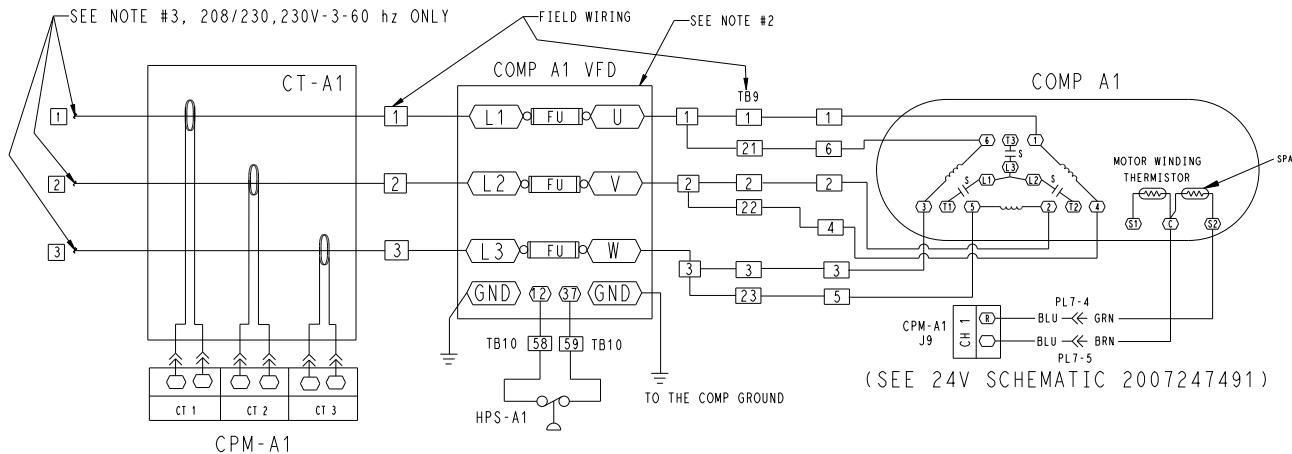
## 30HX076-186 (ONLY FOR VFD OPTION)



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Fig. 8 – 30HX076-186 Control Schematic (VFD Option)

## Y-DELTA START

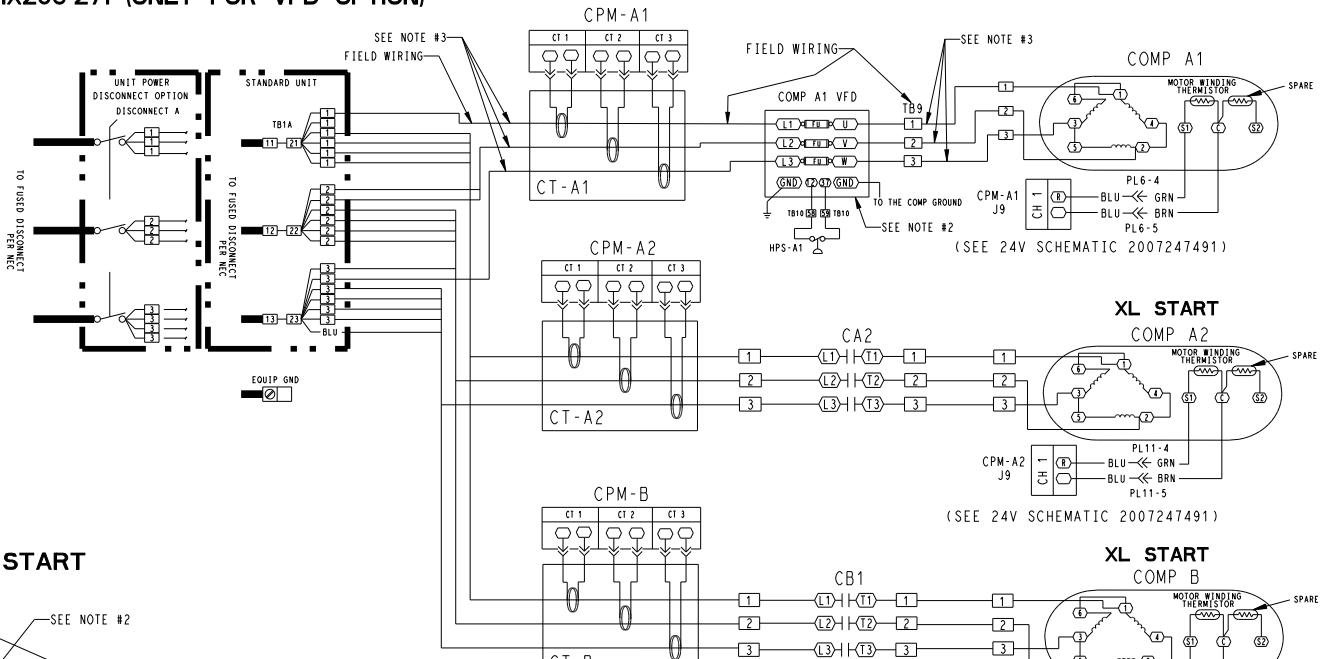


NOTE: For notes please refer to the schematic that is shipped with the kit.

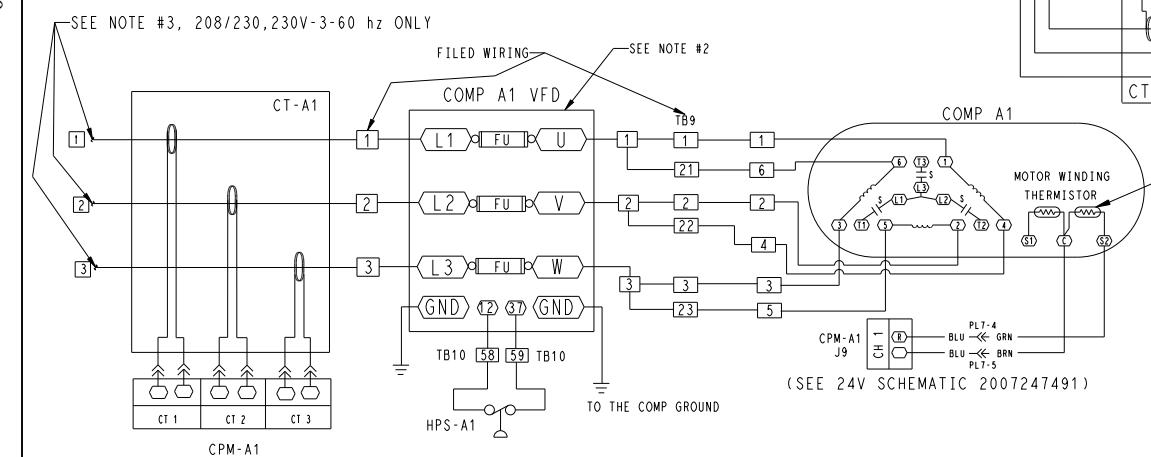
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Fig. 8 – 30HX076-186 Control Schematic (VFD Option) (cont)

30HX206-271 (ONLY FOR VFD OPTION)



## Y-DELTA START

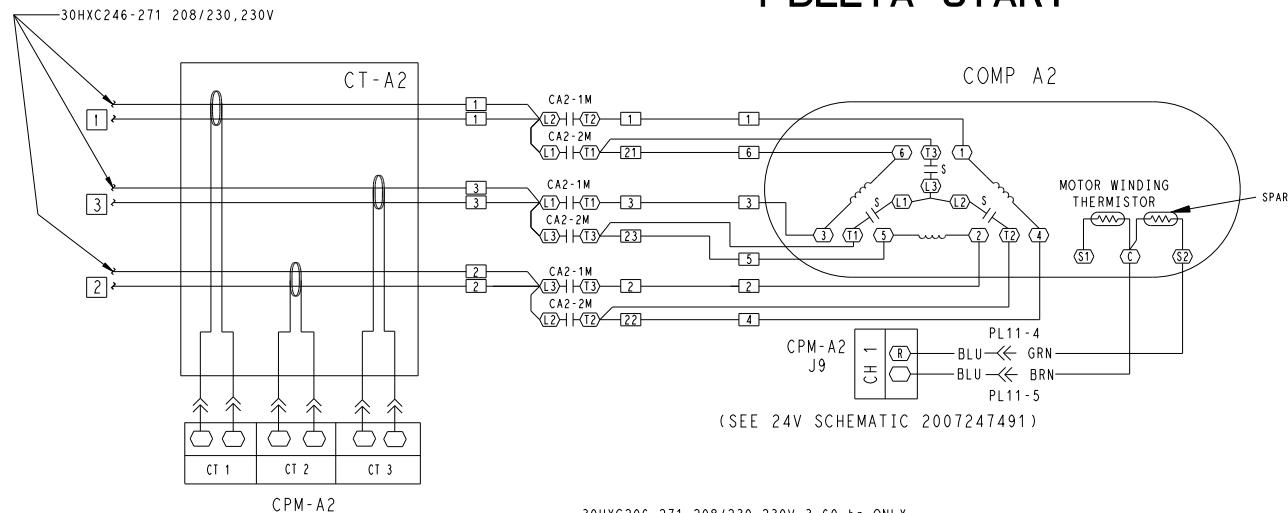


NOTE: For notes please refer to the schematic that is shipped with the kit.

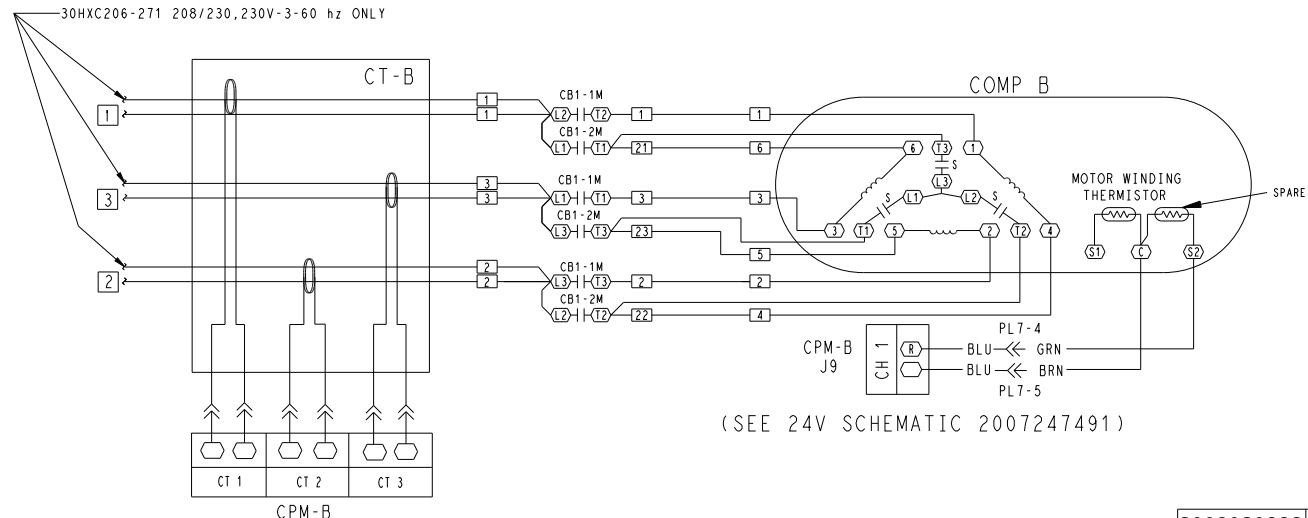
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**Fig. 9 – 30HX206-271 Control Schematic (VFD Option)**

## Y-DELTA START



CPM-A2

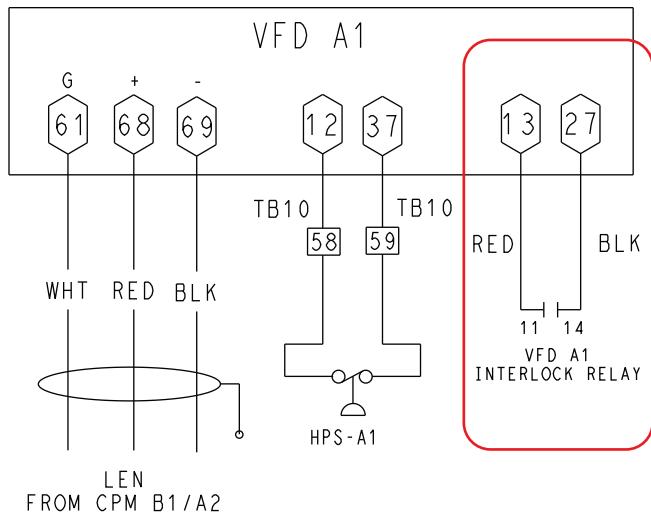


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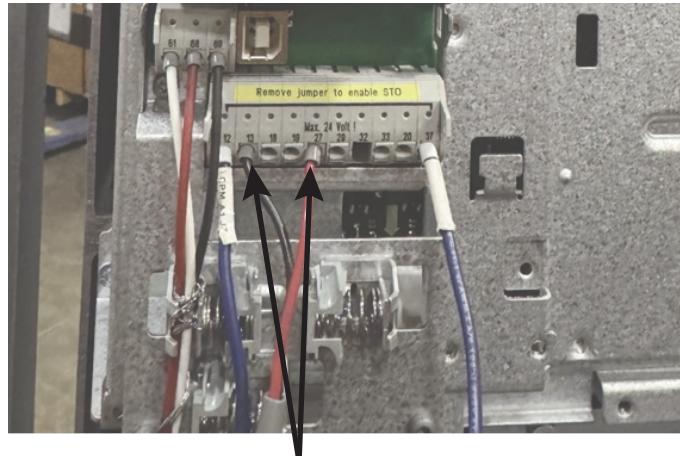
Fig. 9 – 30HX206-271 Control Schematic (VFD Option) (cont)

## Step 4 — VFD Interlock Connection

Locate wiring harness labeled 2007647079. Connect the wire to the Interlock Relay terminal 11 and 14 as shown in Fig. 10. Connect the opposite end of the harness, labeled Comp A1 VFD 13 and 27, to the VFD terminal block at positions 13 and 27. See Fig. 11 for the VFD terminal block 13 and 27 connection location.



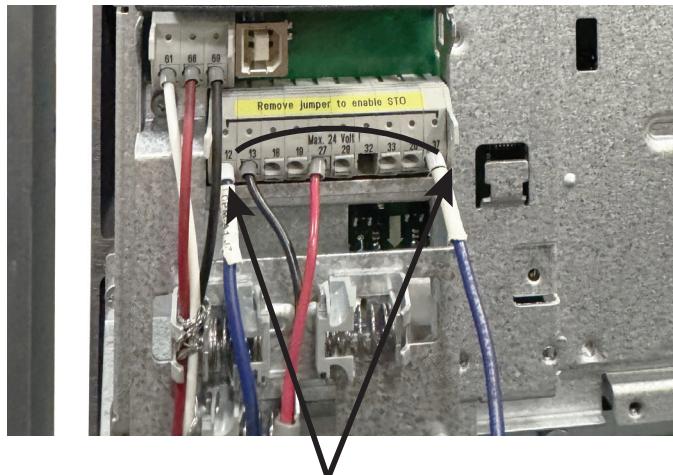
**Fig. 10 — Interlock Relay Terminals**



**Fig. 11 — VFD Safety Interlock Connection**

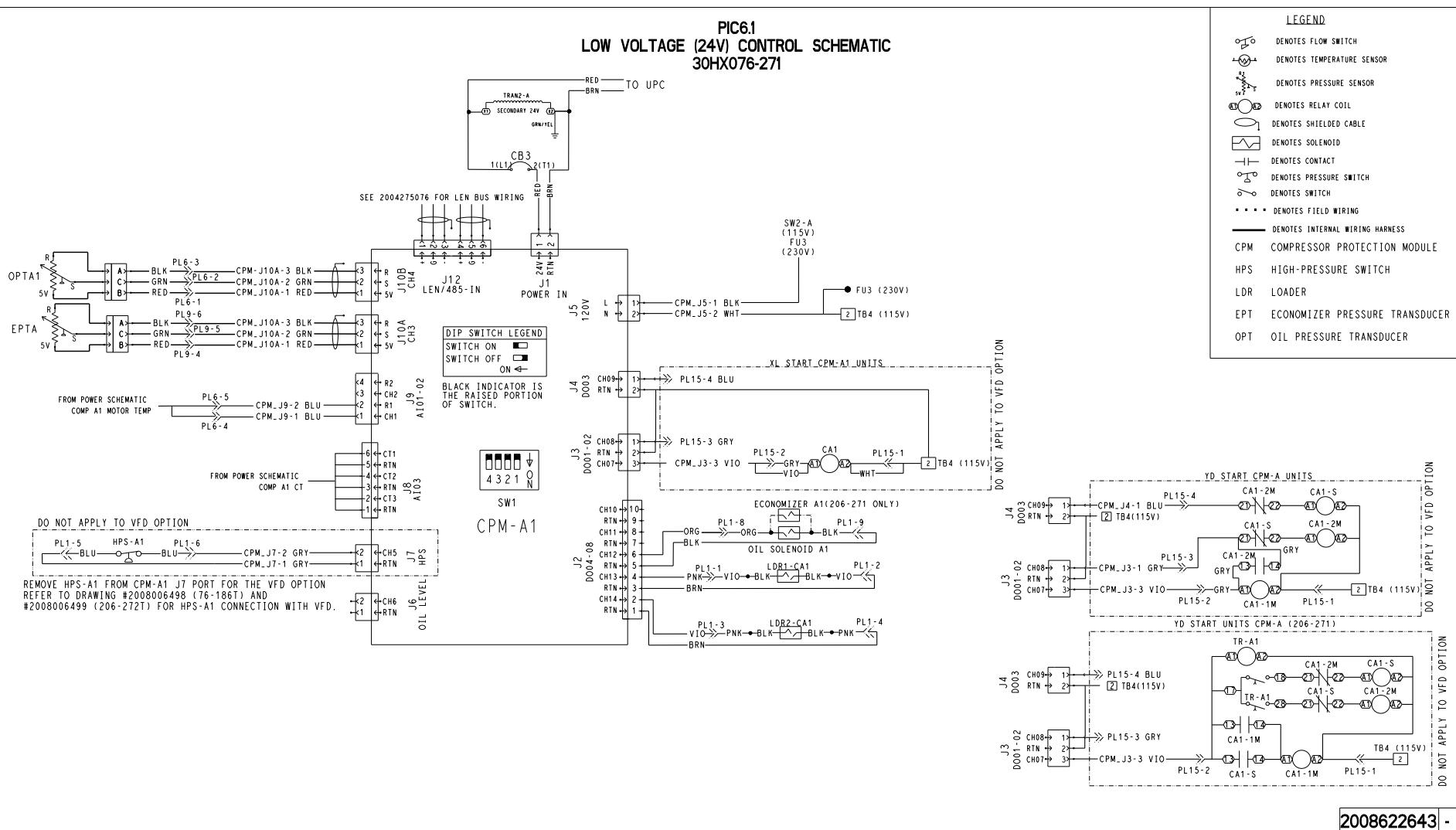
## Step 5 — High Pressure Switch Connection

1. Remove the jumper wire connecting pins 12 and 37 on the VFD terminal block.
2. Locate wiring harnesses 2008093699 and 2008015681 for wiring the high pressure switch and the CPM board for operation with the VFD. Wiring harness 2004275068 from Kit 30HX70000801 will not be needed.
3. Locate the red and black wires in harness assembly 2008093699 labeled 58 and 59 respectively. Connect the 58 and 59 labeled ends of harness to the left side of terminal block TB10 at positions 58 and 59. (Refer to the 30HX PIC6.1 Retrofit Kit Installation Instructions for TB10 details.)
4. Locate the red and black wires in harness assembly 2008015681 labeled 58R and 59R respectively. Connect the 58R and 59R to the right side of terminal block TB10 at positions 58 and 59. Connect the opposite end of wiring harness assembly 2008015681, labeled Comp A1 VFD 12 and 37, to the VFD terminal block at positions 12 and 37 as shown in Fig. 12. Follow the schematic (Fig. 13) for more guidance.



**Fig. 12 — HPS connection at VFD Terminal Block**

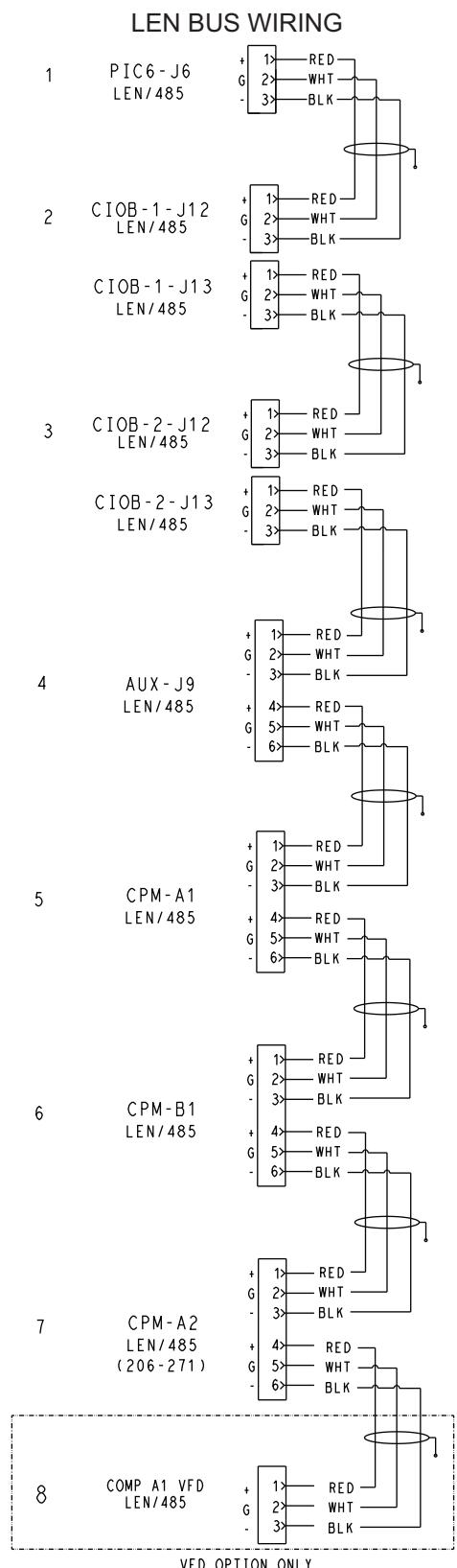
**PIC6.1**  
**LOW VOLTAGE (24V) CONTROL SCHEMATIC**  
**30HX076-271**



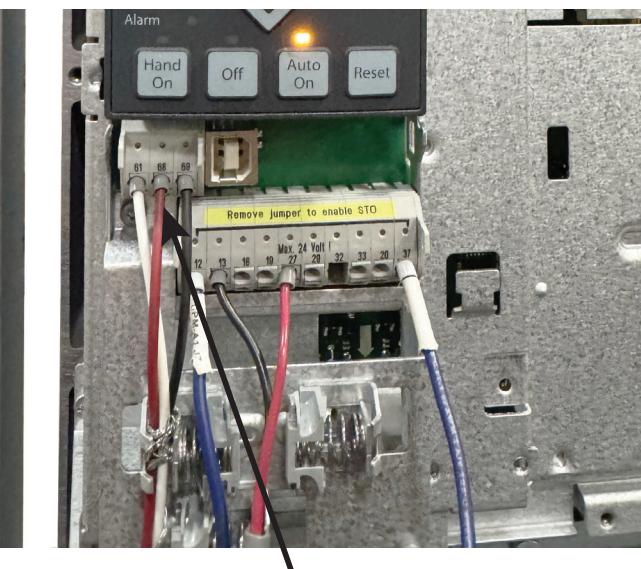
**Fig. 13 – 30HX076-186 Control Schematic**

## Step 6 — LEN Communication Connection

Locate wire harness 2006771817 and attach to appropriate connection points on the control boards per the schematic shown in Fig. 14 and the VFD as shown in Fig. 15.



**Fig. 14 — Carrier Controller PIC6.1 (24-v), LEN BUS Wiring with VFD**



LEN connection at VFD Terminal Block – Pin 61, 68 and 69

**Fig. 15 — LEN BUS Wiring with VFD**

## APPENDIX A — Unit Configuration with VFD and VFD Parameters

1. Refer to 30HX PIC6.1 Retrofit Kit Installation Instructions for the Unit Factory configuration with VFD.
2. Validate the VFD parameters using the values listed in the Table A and adjust them if they differ from the specified values.

**Table A — VFD Parameters**

PARAMETER	DESCRIPTION	UNITS	SETTING
0-02	Motor speed unit	[1]Hz	1
0-03	Regional setting	[0]International	0
0-40	[Hand on] Key on LCP	[0]Disable	0
1-03	Torque Characteristics	[0] Compressor torque	0
1-20	motor kW	size dependent	Based on Unit Compressor Rating
1-22	motor volts	size dependent	460v or 208/230V
1-23	motor frequency	size dependent	60
1-24	motor amperage	size dependent	Based on Unit Compressor Rating
1-25	motor rpm	size dependent	Based on Unit Compressor Rating
1-78	Compressor Max Start speed [Hz]	25hz	25
1-79	Compressors start max time to trip	5s	5
1-80	Stop Function	[0]Coast	0
1-87	Trip Speed Low	[Hz]	27
3-02	min ref	0	0
3-03	max reference	size dependent	50
3-13	Reference Site	[1]Remote	1
3-15	src ref#1	[0]no function	0
3-16	src ref#2	[0]no function	0
3-41	ramp up	100s	40
3-42	ramp down	100s	200
3-82	Starting Ramp Up Time	3s	3
4-10	motor speed direct	[0]clockwise [2]Both directions	0
4-12	motor speed low limit	27Hz	27.5
4-14	motor speed high limit	size dependent	50
4-16	torque limit	size dependent	150%
4-18	current limit	size dependent	129%
4-19	max output frequency	60Hz	60
5-12	DI #27 Digital Input	[2] Coast inverse	2
5-19	DI#37 safe stop	[1]safe stop alarm	1
8_01	control site	[0]Digital and ctrl.word	0
8-02	Control Source	[1]FC port=RS485	1
8-03	Control Timeout Time	10s	10
8-04	Control Timeout Function	[5]stop and trip	5
8-31	Address	181	181
14-01	switching frequency	[4]3kHz	4
14-03	overmodulation	[0]no	0
14-10	main failure	[6]alarm	6
14-11	Mains voltage at Mains fault	[180 - 600V]	300
14-50	RFI Filter	[1]on	1
14-60	function at overtemp	[0]Trip	0
14-61	Function at Inverter Overload	[0]Trip	0

