Johnson Controls	INDOOR PACKAGED EQUIPMENT	
INSTALLATION & OPERATION	NEW RELEASE	Form 145.13-NO1 (1016)

VARIABLE FREQUENCY DRIVE
FOR
D-SERIES (DSV/DSH) AIR-COOLED SELF-CONTAINED UNITS, B STYLE
AND
C-SERIES (CSV) WATER-COOLED SELF-CONTAINED UNITS, B STYLE

R-410A

Issue Date:
October 6, 2016

IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During rigging, installation, operation, maintenance, or service, individuals may be exposed to certain components or conditions including, but not limited to: heavy objects, refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of rigging, installation, and operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized rigging, installation, and operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood the on-product labels, this document and any referenced materials. This individual shall also be familiar with and comply with all applicable industry and governmental standards and regulations pertaining to the task in question.

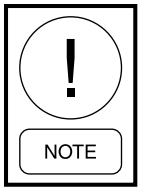
SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:

Indicates a possible hazardous situation which will result in death or serious injury if proper care is not taken.

Identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution if proper care is not taken or instructions and are not followed.

Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if proper care is not taken.



Highlights additional information useful to the technician in completing the work being performed properly.

External wiring, unless specified as an optional connection in the manufacturer's product line, is not to be connected inside the control cabinet. Devices such as relays, switches, transducers and controls and any external wiring must not be installed inside the micro panel. All wiring must be in accordance with Johnson Controls' published specifications and must be performed only by a qualified electrician. Johnson Controls will NOT be responsible for damage/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this warning will void the manufacturer's warranty and cause serious damage to property or personal injury.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls' policy for continuous product improvement, the information contained in this document is subject to change without notice. Johnson Controls makes no commitment to update or provide current information automatically to the manual or product owner. Updated manuals, if applicable, can be obtained by contacting the nearest Johnson Controls Service office or accessing the Johnson Controls QuickLIT website at http://cgproducts.johnsoncontrols.com.

It is the responsibility of rigging, lifting, and operating/service personnel to verify the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, rigging, lifting, and operating/service personnel should verify whether the equipment has been modified and if current literature is available from the owner of the equipment prior to performing any work on the chiller.

CHANGE BARS

Revisions made to this document are indicated with a line along the left or right hand column in the area the revision was made. These revisions are to technical information and any other changes in spelling, grammar or formatting are not included.

ASSOCIATED LITERATURE

MANUAL DESCRIPTION	FORM NUMBER
CSV060B-300B Water-Cooled Self-Contained Installation, Operation, Maintenance	145.15-IOM7
DSV060B-300B Air-Cooled Self-Contained Installation, Operation, Maintenance	145.29-IOM2
DSH024B-120B Air-Cooled Self-Contained Installation, Operation, Maintenance	145.32-IOM3

TECHNICAL SUPPORT

If Technical Support is required, please contact the Product Technical Support team at 877-329-7430 or AppliedDXTechSupport@jci.com.

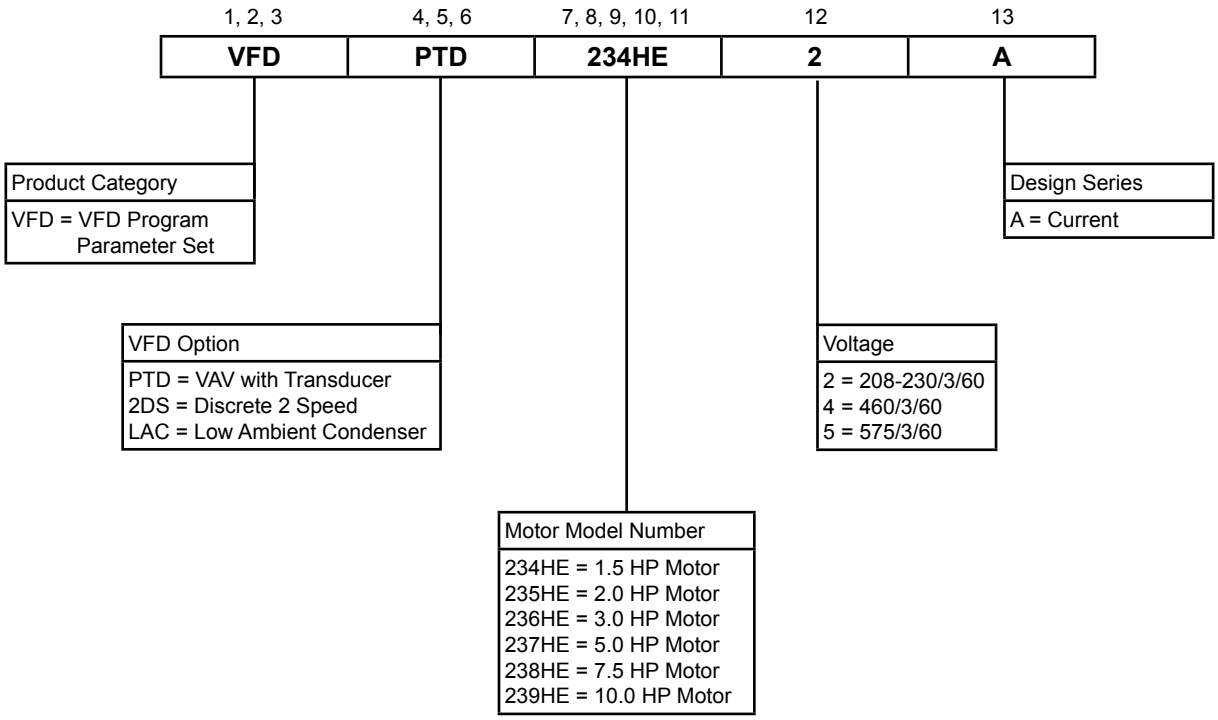
REPLACEMENT PARTS

For replacement parts, please contact your local Source1 Dealer.

Source1 Parts Phone Number: 800-536-6112

Source 1 Parts Website: http://www.source1parts.com

VFD NOMENCLATURE



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SECTION 1 - INSTALLATION

DO NOT enter Setup mode when powering on the VFD.

There are two main VFD options: Differential Pressure Transducer and Discrete 2 Speed. Consult your unit's nameplate to determine which you have, and refer to the* Differential Pressure Transducer section and Discrete 2 Speed Fan Control section on page 8 *for clarification on these Fan Methods.

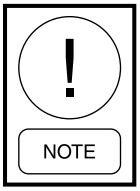
Do not change any parameters for Discrete 2 Speed Fan Control. For VAV units using Differential Pressure Transducer, parameters 4009 and 4011 will need adjusted.

Prior to installing or servicing the unit, ensure proper lockout/tagout (LOTO) procedures are followed per OSHA safety regulations (29 CFR 1910.147 and 29 CFR 1910.333). Failure to disconnect power supply may result in electrical shock or even death.

Always wait for at least 5 minutes after disconnecting the power before servicing the unit.

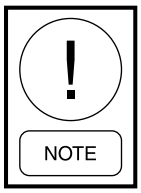
BACKGROUND

All D-Series and C-Series units 10 tons or larger will have a Variable Frequency Drive (VFD) installed. The VFDs are controlled by one of two Controlled Fan Methods: Differential Pressure Transducer or Discrete 2 Speed Fan Control.

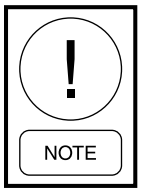


Refer to the nomenclature breakdown in the appropriate DSV/DSH/CSV Installation, Operation, and Maintenance (IOM) manual, as well as your unit's nameplate to determine your unit's Controlled Fan Method. The tenth digit of the nomenclature (ID Motor) will identify which method your unit has.

The VFD supplied with the unit allows the operator to set the external static (0.0–2.5 "WC), as measured from a supply duct location determined by field installer and/or as per field specifications. The VFD will control the frequency (speed) of the evaporator fan motor in order to meet the desired external static (ESP) setpoint. The VFD will control amps draw of the motor and will not let the motor draw more than nominal amps.



Do not run evaporator fan motor below 30Hz, otherwise coil freeze-up and nuisance lock-outs may occur. Unit is factory set to minimum 30 Hz output.



The unit does not carry a failsafe circuit to bypass the VFD and run the evaporator fan in the event of a VFD malfunction.

The unit does not carry a failsafe circuit bypass for the evaporator fan in the event of a VFD malfunction. During a VFD failure, the evaporator fan will become non-operational and as long as there is a demand for cooling, unit compressors will continue to run until the low pressure safety switch trips.

FACTORY SHIPPED

Units 10 tons or larger ship with a VFD controller factory installed and wired in the evaporator (air handler) corner post. See dimensional drawings in the IOM for location.

DSV MODELS

DSV060 is factory assembled and requires no field assembly. All other DSV units ship factory split (condenser and evaporator) and need to be assembled in the field. Evaporator motor power conductors need to be field connected to the distribution block on VFD. Connect low voltage wiring from VFD unit (10VDC) and to the evaporator fan VFD relay (RVFD). The RVFD relay acts as a switch to turn on the VFD. Connect two 1/4" Q.C. to common and normally open positions (red wire to "C"; yellow wire to "NO"). The VFD switch runs on 10VDC. See *VFD Option Schematics on page 14* for connecting details.

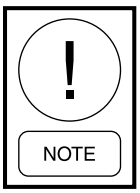
Do not cross 24VAC and 10VDC wiring on RVFD relay.

DSH MODELS

DSH units' VFD controller is factory wired and evaporator fan power conductors are factory wired to distribution block. Control wiring for field split applications needs to be field provided and routed from condenser to evaporator.

CSV MODELS

CSV units that are 10–20 tons are factory wired; no field wiring is required. The 25-ton CSV unit ships split, and field wiring of evaporator fan motor conductors to terminal block in electrical box is required. Connect low voltage wiring from VFD unit (10VDC) to the evaporator fan VFD relay RVFD (red wire to "C"; yellow wire to "NO"). The RVFD relay acts as a switch to turn on the VFD. The VFD switch runs on 10VDC. See *VFD Option Schematics on page 14*.



Do not cross 24VAC and 10VDC wiring.

VAV UNITS

Differential Pressure Transducer

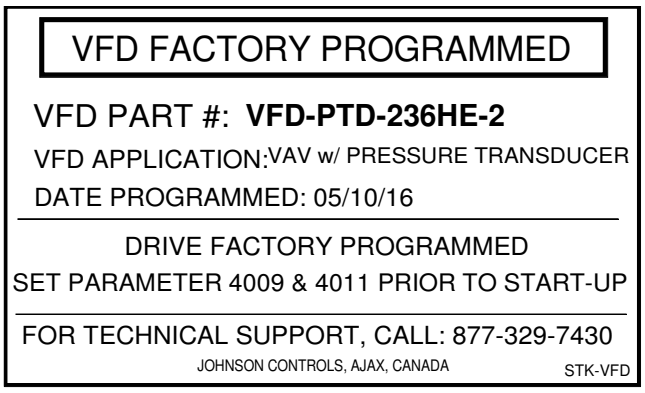


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FIGURE 1 - WARNING LABEL ON UNIT/VFD FOR VAV WITH PRESSURE TRANSDUCER

Units with a VAV option have a factory-wired differential pressure transducer mounted inside the VFD control box. The transducer senses gage pressure (static) and converts this pressure difference to an analog signal. The unit is wired for 4-20mA output from the transducer.

Transducer comes with two 1/4-inch OD pressure fittings and accepts field provided 1/4-inch push-on tubing for lengths of up to 300 feet. The positive (HIGH) and negative (LOW) pressure ports are indicated on the transducer. Connect unit RETURN AIR tubing to negative (LOW) fitting and SUPPLY AIR tubing to positive (HIGH) fitting.

- Only on 208/230-460 VAC units; not on 575 VAC
- Parameters 4009 and 4011 are factory set at 0.5 "WC. These are field adjusted points that need to be adjusted at start-up. These setpoints are based upon system requirements.

Example: If the Supply Duct Static Pressure was designed for 1.0 "WC, both Parameters 4009 and 4011 need set to 1. Adjust Parameters 4009 and 4011 up or down accordingly until the required setpoint is achieved. Once the setpoint is adjusted, please document Parameters 4009 and 4011 for future reference.

The VFD setpoint should never be adjusted to be greater than the duct system's or unit's maximum design pressures.

- The differential pressure transducer will provide a signal to the VFD, and the VFD will control to the setpoint parameters 4009 and 4011
- Only use the 24VDC from the VFD (Term. 9) to the differential pressure transducer (Term. Exc.)
- Term. 2 from the VFD will be wired to the differential pressure transducer (Term. COM)
- The Term. OUT on the differential pressure transducer is not wired
- The jumper on the VFD, AI1, needs to be set to 4-20Ma
- The VFD is enabled by the Evaporator Fan VFD Relay (RVFD)
- If the VAV option is not selected, the unit will have Discrete 2 Speed Fan Control by default for all units 10 tons or larger

DISCRETE 2 SPEED FAN CONTROL

LD20872

FIGURE 2 - WARNING LABEL ON UNIT/VFD FOR DISCRETE 2 SPEED FAN CONTROL

The Discrete 2 Speed Fan Control is available on all DSV and CSV units 10 tons or larger. For DSH units, it is only available on the 10-ton units.

Supply Fan VFD Sequence for 208/230-460 VAC units (Discrete 2 Speed Fan Control):

Speed 1

- Supply fan only

  OR

- Supply fan and compressor #1 running
- Factory set at 35 Hz (do not set lower than 35 Hz)
- Set at parameter 1202
- 24 VDC applied to terminal 12 of VFD

Speed 2

- Supply fan and compressors #1 and #2 are running
- Factory set at 60hz
- Set at parameter 1204
- 24 VDC applied to terminal 12 and 13 of VFD

Supply Fan VFD Sequence for 575 VAC units (only Discrete 2 Speed Fan Control is used):

Speed 1

- Supply fan only

  OR

- Supply fan and compressor #1 running
- Factory set at 35 Hz (do not set lower than 35 Hz)
- Set at parameter 1202
- 24 VDC applied to terminal 4 of VFD

Speed 2

- Supply fan and compressors #1 and #2 are running
- Factory set at 60hz
- Set at parameter 1204
- 24 VDC applied to terminal 4 and 6 of VFD

VFD KEYPAD

VFD requires a keypad to program the VFD. Once the VFD is programmed, the keypad is not required in order to operate the unit. Each unit comes with factory installed and programmed remote keypad and short Ethernet clip-on connector. An Ethernet communication cable is not factory supplied. A single keypad can be used to program multiple units. If needed, consult with local Johnson Controls sales office to order additional keypads.

LD20860

FIGURE 3 - VFD KEYPAD

LD20861

LD20862

FIGURE 4 - VFD KEYPAD AND ETHERNET CONNECTOR

INSTALLATION

Install a field supplied 1/4-inch push-on tube to the return air side of the unit. Pass the tube through the opening on the side of the corner post adjacent to the VFD controls, and connect to the negative (LOW) side fitting.

Install a field supplied Pitot tube in the supply duct as required, run 1/4-inch push-on tube to the corner post opening, and connect to the positive (HIGH) side fitting.

LD20863

FIGURE 5 - CONNECTING NEGATIVE AND POSITIVE SIDE FITTINGS

Ensure the tubes are secure inside duct and firmly connected to transducer fitting, otherwise unit will not operate as intended.

INSTALL GRILLE COVER

When unit is wired and push-on tubing has been connected to transducer, attach the grille cover using the screws provided, with angled blades point upward at the top.

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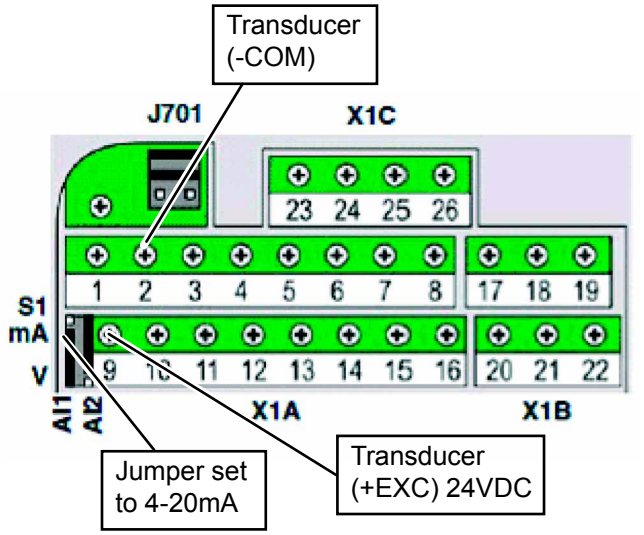
FIGURE 6 - VFD GRILLE COVER

SECTION 2 - OPERATION

INPUT/OUTPUT



Jumper required between 10, 11

FIGURE 7 - INPUT/OUTPUT DIAGRAM

PARAMETER TABLES

In the parameter menu, set the following parameters listed in the parameters tables in order to operate the VFD controller correctly. For troubleshooting, check that the parameters match.

DISPLAY

In AUTO MODE, the following parameters will be displayed on control display:

1. 30–60Hz is the output frequency to the motor. Minimum factory set frequency allowed is 30 Hz.
2. 0.0 to Nominal Motor Amps. Maximum amps draw is factory set, and it is set to nominal amp draw of motor used.
3. 0.0-2.5 "WC is the actual reading from the pressure transducer.
4. Located in the upper-right corner, the setpoint value is displayed. It goes from 0% to 100%. That is the actual setpoint for the controller. Setpoint can be 0%, which is 0.0 "WC or 100%, which is 2.5 "WC.

Example: 20% corresponds to 0.5 "WC setpoint. Setpoint can be updated using parameter 4011.

TABLE 1 - VFD FACTORY PARAMETERS FOR VAV APPLICATION 208/230 & 460 VAC (ABB ACS320)

PARAMETER	DESCRIPTION	VALUE
GROUP 99: START-UP DATA		
9901	LANGUAGE	0: *(ENGLISH)*
9902	APPLICATION MACRO	1: *(HVAC DEFAULT)*
9905	MOTOR NOMINAL VOLTAGE	MOTOR NAMEPLATE
9906	MOTOR NOMINAL CURRENT	MOTOR NAMEPLATE
9907	MOTOR NOMINAL FREQUENCY	MOTOR NAMEPLATE
9908	MOTOR NOMINAL SPEED	MOTOR NAMEPLATE
9909	MOTOR NOMINAL POWER	MOTOR NAMEPLATE
GROUP 10		
1003	DIRECTION	1: *(FORWARD)*
GROUP 11		
1102	EXT1/EXT2/SELECTION	7: *(EXT2)*
1103	REF1 SELECT	0: *(KEYPAD)*
GROUP 13		
1301	MINIMUM AI1	0%
GROUP 16		
1601	RUN ENABLE	1: *(DI1)*
1608	START ENABLE 1	0: *(NOT SELECTED)*
1611	PARAMETER VIEW	3: *(LONG VIEW)*

TABLE 1 - VFD FACTORY PARAMETERS FOR VAV APPLICATION 208/230 & 460 VAC (ABB ACS320) (CONT'D)

PARAMETER	DESCRIPTION	VALUE
GROUP 20		
2003	MAX CURRENT	DRIVE DEPENDENT
2007	MINIMUM FREQUENCY	30 HZ
GROUP 34		
3403	SIGNAL 1 MAX	60 HZ
3405	OUTPUT 1 UNIT	3: *(HZ)*
3407	OUTPUT 1 MAX	60
3416	SIGNAL 3 MIN	20
3419	OUTPUT 3 UNIT	59: *(in WC)*
3421	OUTPUT 3 MAX	2.5
GROUP 40		
4006	UNITS	59: *(in WC)*
4007	UNIT SCALE	2
4008	0% VALUE	0
4009	100% VALUE	FIELD SET (DEFAULT 0.5)
4010	SETPOINT SELECTION	19: *(INTERNAL)*
4011	INTERNAL SETPOINT	FIELD SET (DEFAULT 0.5)
4012	SETPOINT MIN	0
4013	SETPOINT MAX	100
4014	FBK SELECT	1: *(ACT1)*
4016	ACT1 INPUT	1: *(AI1)*
4018	ACT1 MIN	20
4019	ACT1 MAX	100

TABLE 2 - FACTORY PARAMETERS FOR 2 SPEED APPLICATION 208/230 & 460 VAC (ABB ACS320)

PARAMETER	DESCRIPTION	VALUE
GROUP 99		
9901	LANGUAGE	0: *(ENGLISH)*
9902	APPLICATION MACRO	1: *(HVAC DEFAULT)*
9905	MOTOR NOMINAL VOLTAGE	MOTOR NAMEPLATE
9906	MOTOR NOMINAL CURRENT	MOTOR NAMEPLATE
9907	MOTOR NOMINAL FREQUENCY	MOTOR NAMEPLATE
9908	MOTOR NOMINAL SPEED	MOTOR NAMEPLATE
9909	MOTOR NOMINAL POWER	MOTOR NAMEPLATE
GROUP 10		
1002	EXT2 COMMANDS	0: *(NOT SELECTED)*
GROUP 11		
1103	REF 1 SELECT	0: *(KEYPAD)*
1106	REF 2 SELECT	0: *(KEYPAD)*
GROUP 12		
1201	CONSTANT SPEED SEL	7: *(DI1,DI2)*
1202	CONSTANT SPEED 1	35 (*See Note)
1204	CONSTANT SPEED 2	60

TABLE 2 - FACTORY PARAMETERS FOR 2 SPEED APPLICATION 208/230 & 460 VAC (ABB ACS320) (CONT'D)

PARAMETER	DESCRIPTION	VALUE
GROUP 16		
1608	START ENABLE 1	1: *(DI1)*
1611	PARAMETER VIEW	3: *(LONG VIEW)*
GROUP 20		
2003	MAX CURRENT	DRIVE DEPENDENT
GROUP 34		
3403	SIGNAL 1 MAX	60
3405	OUTPUT 1 UNIT	3: *(HZ)*
3407	OUTPUT 1 MAX	60
3408	SIGNAL 2 PARAMETER	NOT SELECTED
3415	SIGNAL 3 PARAMETER	NOT SELECTED

*Note: If only one speed fan operation is wanted, adjust to 60.

TABLE 3 - FACTORY PARAMETERS FOR 2 SPEED APPLICATION 575 VAC (ABB ACS250)

PARAMETER	DESCRIPTION	VALUE
GROUP 99		
9902	APPLICATION MACRO	8
9905	MOTOR NOMINAL VOLTAGE	MOTOR NAMEPLATE
9906	MOTOR NOMINAL CURRENT	MOTOR NAMEPLATE
9907	MOTOR NOMINAL FREQUENCY	MOTOR NAMEPLATE
9908	MOTOR NOMINAL SPEED	MOTOR NAMEPLATE
GROUP 11		
1103	PRIMARY COMMAND	0: TERMINAL CONTROL
GROUP 12		
1202	CONSTANT SPEED 1	0
1203	CONSTANT SPEED 2	35 (* See Note)
1204	CONSTANT SPEED 3	0
1205	CONSTANT SPEED 4	60

***NOTE:** If only one speed fan operation is wanted, adjust to 60.

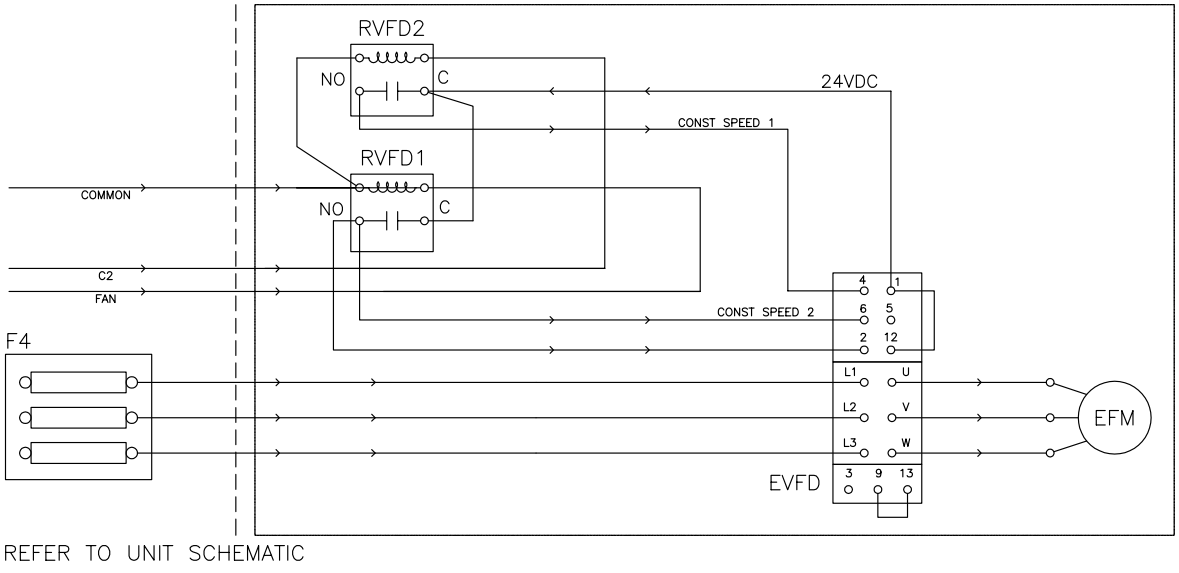
TABLE 4 - DRIVE DEPENDENT PARAMETERS GROUP 99

VFD PROGRAM PART #	AJAX MOTOR (BALDOR MOTOR) MODEL #	ABB VFD MODEL #	VOLTAGE	HP	MOTOR NOMINAL CURRENT FLA	MOTOR NOMINAL SPEED RPM
VFD-PTD-234HE-2	MTR-234HE (EM3154T)	ACS320-03U-07A4-2	208-230/3/60	1.50	4.50	1755
VFD-PTD-234HE-4		ACS320-03U-03A3-4	460/3/60		2.20	
VFD-PTD-235HE-2	MTR-235HE (EM3157T)	ACS320-03U-07A4-2	208-230/3/60	2.00	5.80	1750
VFD-PTD-235HE-4		ACS320-03U-04A1-4	460/3/60		2.90	
VFD-PTD-236HE-2	MTR-236HE (EM3211T)	ACS320-03U-10A8-2	208-230/3/60	3.00	8.50	1765
VFD-PTD-236HE-4		ACS320-03U-05A6-4	460/3/60		4.20	
VFD-PTD-237HE-2	MTR-237HE (EM3218T)	ACS320-03U-19A4-2	208-230/3/60	5.00	14.00	1750
VFD-PTD-237HE-4		ACS320-03U-08A8-4	460/3/60		6.60	
VFD-PTD-238HE-2	MTR-238HE (EM3311T)	ACS320-03U-26A8-2	208-230/3/60	7.50	20.40	1770
VFD-PTD-238HE-4		ACS320-03U-12A5-4	460/3/60		9.70	

TABLE 4 - DRIVE DEPENDENT PARAMETERS GROUP 99 (CONT'D)

VFD PROGRAM PART #	AJAX MOTOR (BALDOR MOTOR) MODEL #	ABB VFD MODEL #	VOLTAGE	HP	MOTOR NOMINAL CURRENT FLA	MOTOR NOMINAL SPEED RPM
VFD-2DS-234HE-2	MTR-234HE (EM3154T)	ACS320-03U-07A4-2	208-230/3/60	1.50	4.50	1755
VFD-2DS-234HE-4		ACS320-03U-03A3-4	460/3/60		2.20	
VFD-2DS-234HE-5	MTR-534HE (EM3154T-5)	ACS250-03U-03A1-6	575/3/60		1.80	
VFD-2DS-235HE-2	MTR-235HE (EM3157T)	ACS320-03U-07A4-2	208-230/3/60	2.00	5.80	1750
VFD-2DS-235HE-4		ACS320-03U-04A1-4	460/3/60		2.90	
VFD-2DS-235HE-5	MTR-535HE (EM3157T-5)	ACS250-03U-03A1-6	575/3/60		2.30	
VFD-2DS-236HE-2	MTR-236HE (EM3211T)	ACS320-03U-10A8-2	208-230/3/60	3.00	8.50	1765
VFD-2DS-236HE-4		ACS320-03U-05A6-4	460/3/60		4.20	
VFD-2DS-236HE-5	MTR-536HE (EM3211T-5)	ACS250-03U-04A1-6	575/3/60		3.40	
VFD-2DS-237HE-2	MTR-237HE (EM3218T)	ACS320-03U-19A4-2	208-230/3/60	5.00	14.00	1750
VFD-2DS-237HE-4		ACS320-03U-08A8-4	460/3/60		6.60	
VFD-2DS-237HE-5	MTR-537HE (EM3218T-5)	ACS250-03U-06A5-6	575/3/60		5.30	
VFD-2DS-238HE-2	MTR-238HE (EM3311T)	ACS320-03U-26A8-2	208-230/3/60	7.50	20.40	1770
VFD-2DS-238HE-4		ACS320-03U-12A5-4	460/3/60		9.70	
VFD-2DS-238HE-5	MTR-538HE (EM3311T-5)	ACS250-03U-09A0-6	575/3/60		7.50	

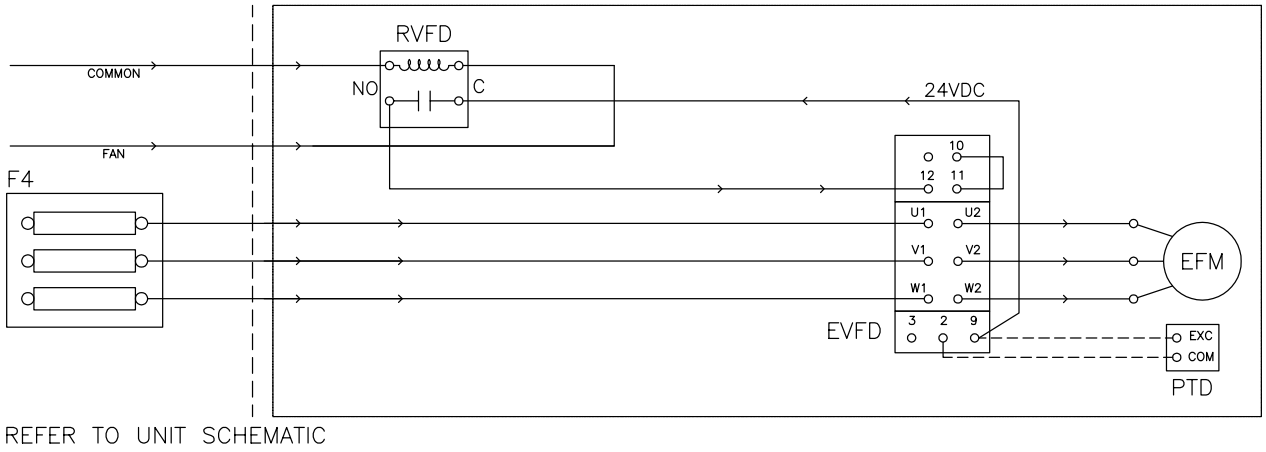
VFD OPTION SCHEMATICS



EFM — EVAPORATOR FAN MOTOR
C2 — COMPRESSOR TWO
EVFD — EVAP. FAN MOTOR VFD
RVFD1 — EVAP. FAN MOTOR RELAY 1
RVFD2 — EVAP. FAN MOTOR RELAY 2
24VDC — LOW VOLTAGE SUPPLY FROM VFD TRANSFORMER
F4 — EVAP. FAN VFD FUSES

LD20866

FIGURE 8 - EVAPORATOR VFD OPTION FOR DISCRETE 2 SPEED WIRING SCHEMATIC (575V/3PH/60HZ)

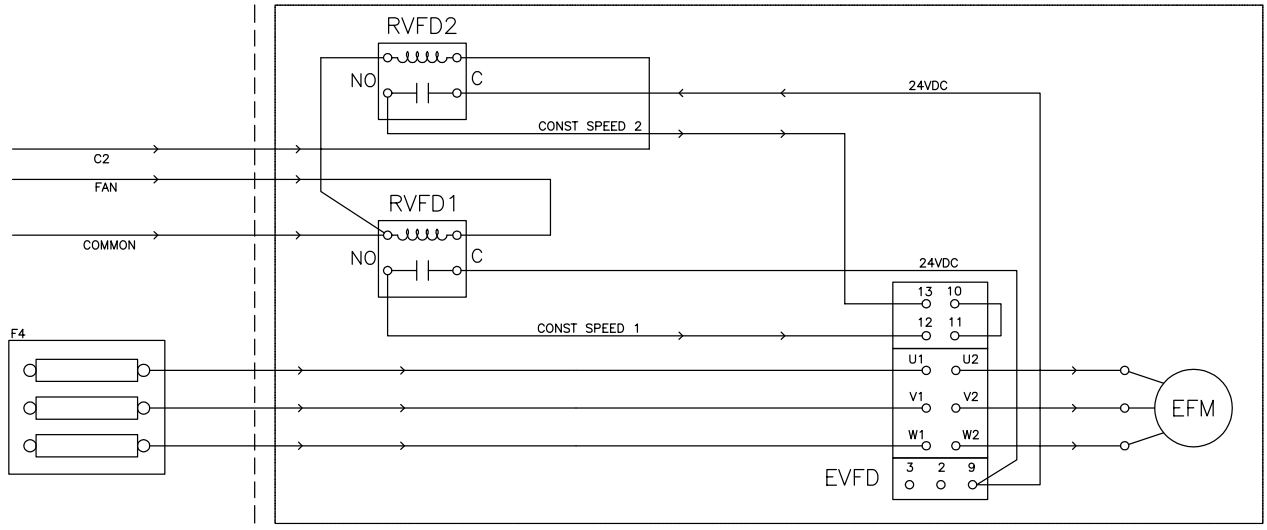


REFER TO UNIT SCHEMATIC

EFM = EVAPORATOR FAN MOTOR
PTD – PRESSURE TRANSDUCER
EVFD – EVAP. FAN MOTOR VFD
RVFD – EVAP. FAN MOTOR RELAY 1
24VDC – LOW VOLTAGE SUPPLY FROM VFD TRANSFORMER
F4 – EVAP. FAN VFD FUSES

LD20867

FIGURE 9 - EVAPORATOR VFD OPTION FOR DUCT STATIC PRESSURE WIRING SCHEMATIC (208-230V/460V/3PH/60HZ)



REFER TO UNIT SCHEMATIC

EFM – EVAPORATOR FAN MOTOR
C2 – COMPRESSOR TWO
EVFD – EVAP. FAN MOTOR VFD
RVFD1 – EVAP. FAN MOTOR RELAY 1
RVFD2 – EVAP. FAN MOTOR RELAY 2
24VDC – LOW VOLTAGE SUPPLY FROM VFD TRANSFORMER
F4 – EVAP. FAN VFD FUSES

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FIGURE 10 - EVAPORATOR VFD OPTION FOR DISCRETE 2 SPEED WIRING SCHEMATIC (208-230V/460V/3PH/60HZ)

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