Induction Motor with Invertek ODE VFD Simple Programming Guide

This document is intended to assist with the initial setup and programming of Invertek variable frequency drives (VFDs) provided by PennBarry for use on PennBarry air moving equipment. It is assumed that prior to using this document, the VFD and fan motor have been wired and installed according to local codes and guidelines. For further information on the drives and how to safely install and operate them, please visit https://www.invertekdrives.com/ and review the user guide(s) for the corresponding VFD model.

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Basic Programming for Keypad Control

This setup will make the fan run while allowing the user to adjust the drive's output frequency with the keypad arrows. This is the starting point for all subsequent setups.

Parameter Number	Parameter Setting	Description
P-07	[motor nameplate voltage]	Motor rated voltage (V)
P-08	[motor nameplate FLA]	Motor rated current (A)
P-09	[motor nameplate frequency]	Motor rated frequency (Hz)
P-12	1	Uni-directional Keypad Control
P-13	2	Operating Mode: Fan
P-14	101	Unlock Extended Parameters
P-15	5	Macro Function 5

Install a jumper wire or wire in a switch between control terminals 1 & 2 to enable the drive.
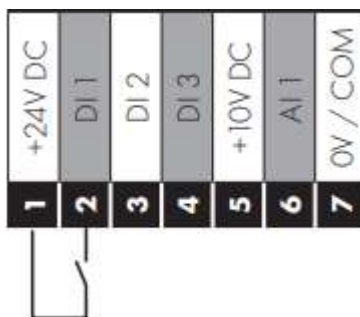
If the fan runs backwards, once it is safe to do so, either add another jumper wire between control terminals 1 and 3 (frequency will display as negative) or reverse the polarity between the drive and motor.

Auto-Tune

Auto-tune has the drive measure data from the motor to optimize its operation. The auto-tune process should only be done once all the motor related parameters are entered per the *Basic Programming for Keypad Control*.

Parameter Number	Parameter Setting	Description
P-14	201	Unlock Extended and Advanced Parameters
P-52	1	Enable Auto-tune*

*Caution: The auto-tune process will begin immediately upon setting P-52 to 1 and the motor shaft may move.

Auto-Restart

Auto-restart tells the drive to return to the selected frequency setting when power to the drive is restored after an outage. Enter at least the *Basic Programming for Keypad Control* parameters before setting up auto-restart. Set parameters P-30 and P-31 to the desired settings per the following table.

Par.	Description		Min	Max	Default	Units
P-30	Start/ Restart / Fire Mode Configuration					
	Index 1: Start Mode / Auto Restart		N/A		Edge-r	-
	Ed9E-r: Following Power on or reset, the drive will not start if Digital Input 1 remains closed. The Input must be closed after a power on or reset to start the drive. RUto-0: Following a Power On or Reset, the drive will automatically start if Digital Input 1 is closed. RUto-1 To RUto-5: Following a trip, the drive will make up to 5 attempts to restart at 20 second intervals.					
	Index 2: Fire Mode Input Logic		0	1	0	-
	0: Normally Closed (NC) input. Fire Mode active if input is open. **1: Normally Open (NO) input.** Fire Mode active if input is closed.					
	Index 3: Fire Mode Input Latch		0	1	0	-
	0: Latched input. The drive will remain in Fire Mode, only as long the fire mode input signal remains. **1: Momentary input.** Fire Mode is activated by a momentary signal on the input. Normally Open or Normally Closed operation is supported depending on Index 2 setting. **2: Normally Closed (NC) Input,** Preset Speed 4 (P-23). **3: Normally Open (NO) Input,** Preset Speed 4 (P-23).					
P-31	**Keypad Start Mode Select**		0 - 3	7	1	-
	0: Minimum Speed, Keypad Start 1: Previous Speed, Keypad Start 2: Minimum Speed, Terminal Enable 3: Previous Speed, Terminal Enable	4: Current Speed, Keypad Start 5: Preset Speed 4, Keypad Start 6: Current Speed, Terminal Start 7: Preset Speed 4, Terminal Start				

*Opening and re-closing the enable jumper circuit on control terminals 1 and 2 may be required after entering the auto-restart parameters for them to take effect.

Start/Stop

If using the *Basic Programming for Keypad Control* setup, the fan/motor can be started and stopped using the START and STOP buttons respectively.

When the drive is set up to *Auto-Restart*, the START and STOP buttons are overridden and a switch will need to be installed between control terminals 1 and 2 to close/open the circuit if the fan needs to be started/stopped.

0-10VDC / 4-20mA Control

The following changes to the *Basic Programming for Keypad Control* setup allow the drive to adjust the output frequency using a 0-10VDC or 4-20mA signal.

Parameter Number	Parameter Setting	Description
P-12	0	Terminal Control Mode
P-15	0	Macro Function 0
P-16	(see below)	Analog input signal format

Par.	Description		Min	Max	Default	Units
P-16	**Analog Input 1 Signal Format**		**See Below**		**U0-10**	-
	U 0-10 : Unidirectional, External 0 – 10Volt reference / pot b 0-10 : Bi-directional, External 0 – 10Volt reference / pot A 0-20 : External 0 – 20mA signal t 4-20 : External 4 – 20mA signal, trip on loss r 4-20 : External 4 – 20mA signal, P-20 on loss	t 20-4 : External 20 – 4mA signal, trip on loss r 20-4 : External 20 – 4mA signal U 10-0 : External 10 – 0 Volt signal I n-Pot : **Switched units only** : Internal pot				

The control terminal wiring for this setup is included below.
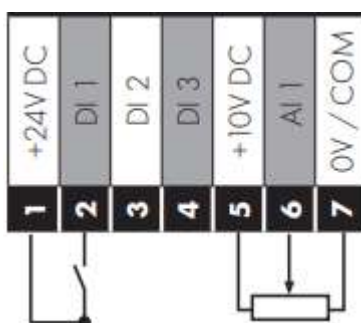

Multi-Speed

Multi-speed (or 2-speed) control runs the fan at user defined frequencies instead of keypad control and a switch can be used to swap between the 2 preset frequencies. Begin with the *Basic Programming for Keypad Control* setup and adjust the following parameters for multi-speed control.
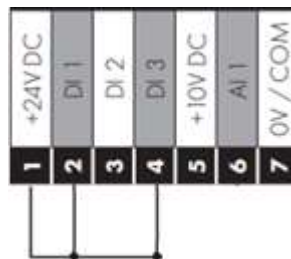
Parameter Number	Parameter Setting	Description
P-12	0	Terminal Control Mode
P-15	8	Macro Function 8
P-20	[1st preset speed frequency]	Preset Frequency 1 (Hz)
P-21	[2nd preset speed frequency]	Preset Frequency 2 (Hz)

The wiring diagrams below show the control terminal connections to achieve each preset frequency.
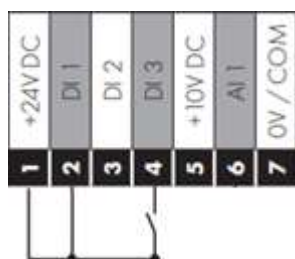
Preset Frequency 1 *Preset Frequency 2*

BMS and More Complex Control Schemes

For BMS or other more complex control schemes please refer to Invertek's corresponding quick start guide or user guide. The Invertek ODE model is capable of Modbus RTU. For additional support on more complex control schemes, Invertek's USA headquarters can be reached at 847-549-3669 or info@invertekdrives.com.