

IMPULSE®•G+/VG+ Series 5 Variable Frequency Drive Quick Start Guide



OVERVIEW

This procedure is a supplement to other documentation for the IMPULSE•G+/VG+ Series 5 variable frequency drive (VFD). This guide details the installation and setup of the VFD. Before using the VFD-controlled equipment, the operator shall read the operating manual of the hoisting machine, shall be trained, and understand the hazards of operating of cranes, hoists, or lifting devices.

⚠ DANGER! DANGEROUS VOLTAGES ARE PRESENT WHEN VFD IS ON. Improper wiring can cause bodily harm and damage to the equipment. Before applying power to the IMPULSE•G+/VG+ Series 5, ensure the protective covers are fastened and wiring connections are secure. After power has been turned OFF, wait at least 5 minutes until the charge indicator extinguishes completely before commissioning the VFD.

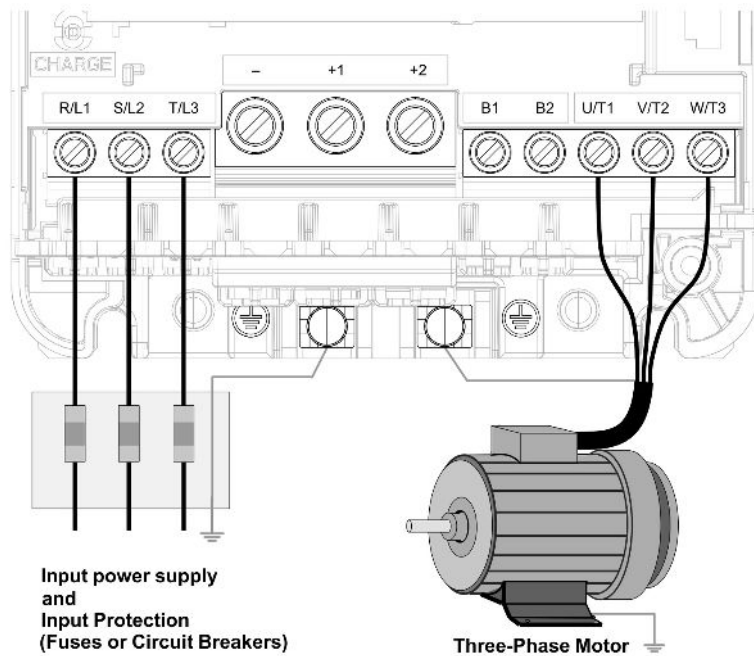
When installing the VFD, follow the required wiring practices and all applicable codes. Ensure that the mounting of components is secure and that the environment, such as extreme dampness, poor ventilation, etc., will not cause system degradation.

Read this document thoroughly before attempting installation. Refer to the technical manual for circuit protection and wiring recommendations, available at: www.cmco.com/magnetek

Step 1

Connect Motor and Line Power

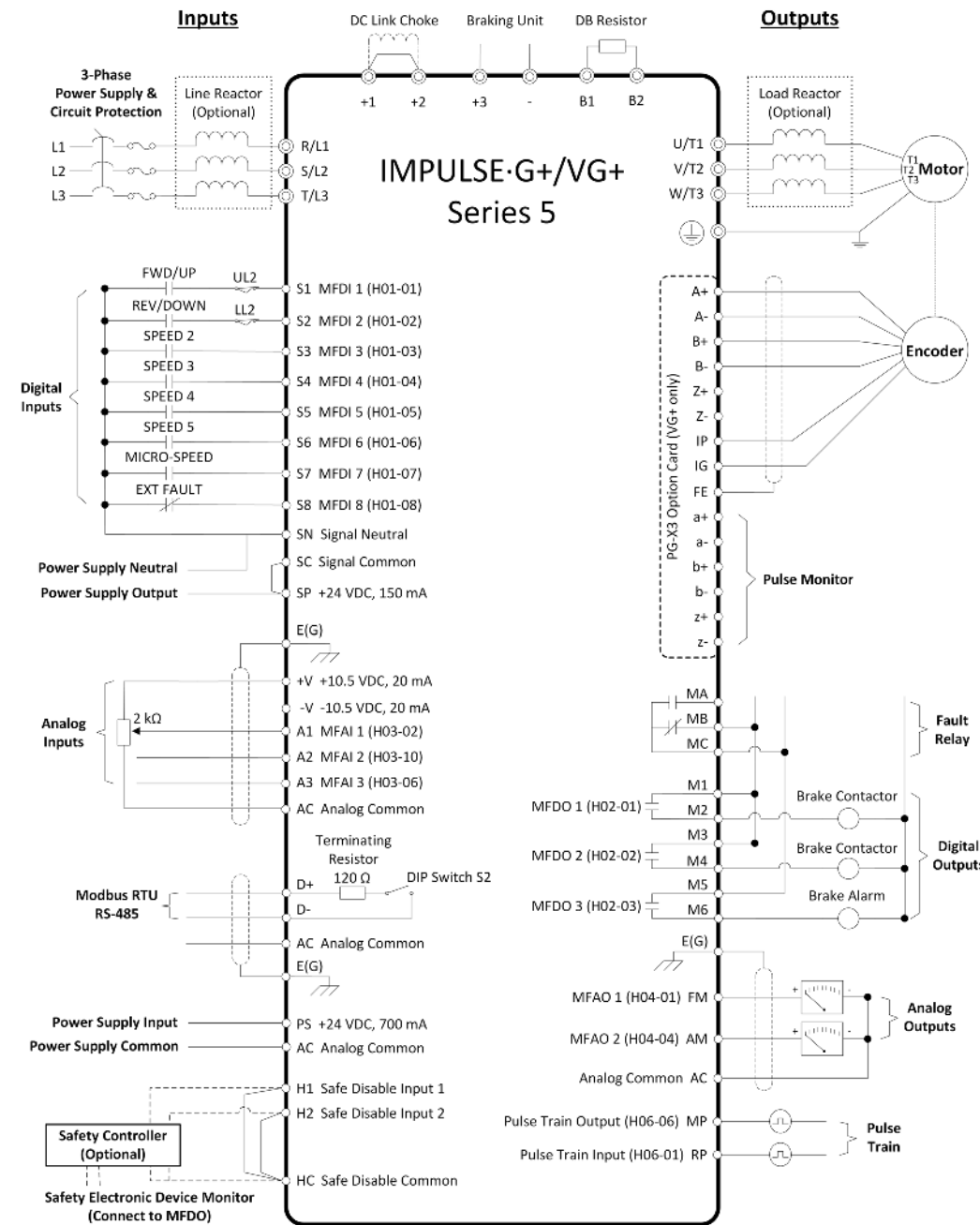
The following figure shows the electrical connections for the input power and motor terminals of the IMPULSE•G+/VG+ Series 5 VFD. Make the appropriate connections with power turned off. Follow required wiring practices and applicable electrical codes. Ensure the equipment is properly grounded, as shown.



Step 2

Typical Connection Diagram

Below is a typical wiring diagram and connection points for the IMPULSE•G+/VG+ Series 5 VFD. Wiring connections should only be made by trained and authorized personnel when power to the VFD is turned off.



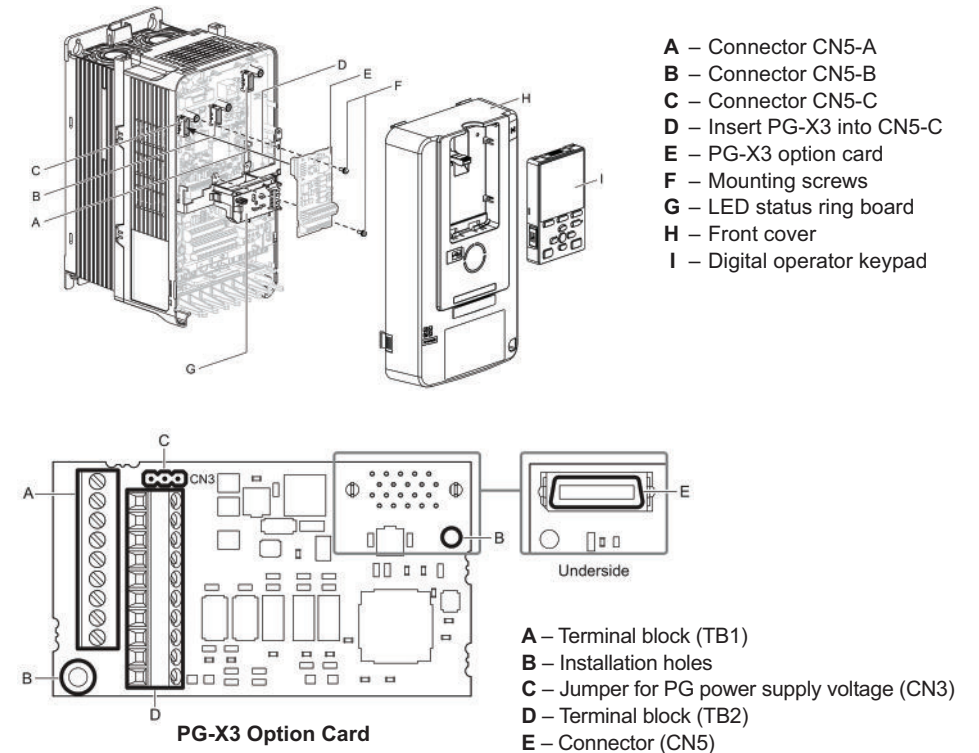
Step 3

PG-X3 Encoder Feedback Card and Encoder Wiring (IMPULSE•VG+ Series 5 Only)

This step explains the installation and encoder wiring of the PG-X3 encoder feedback option card. **WITH POWER OFF**, install the PG-X3 card as shown below. **Make sure to follow required wiring practices and follow all applicable codes.**

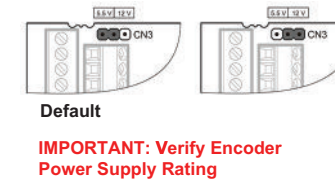
Option Card Installation

This option card must be inserted into the CN5-C (left) connector.



Encoder Power Supply (Max. 200mA)

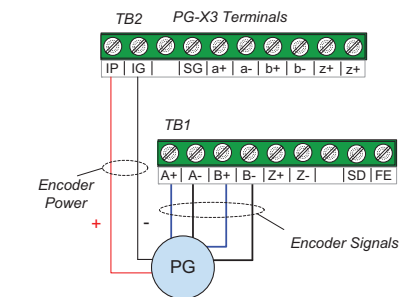
Select Encoder Power Supply (IP, IG) with Jumper CN3.



IMPORTANT: Verify Encoder Power Supply Rating

Encoder Connection

⚠ It is required to use a differential quadrature encoder with A+, A-, B+, B- channels.



(Required for Closed Loop Vector Operation)

PG-X3 Encoder Wiring

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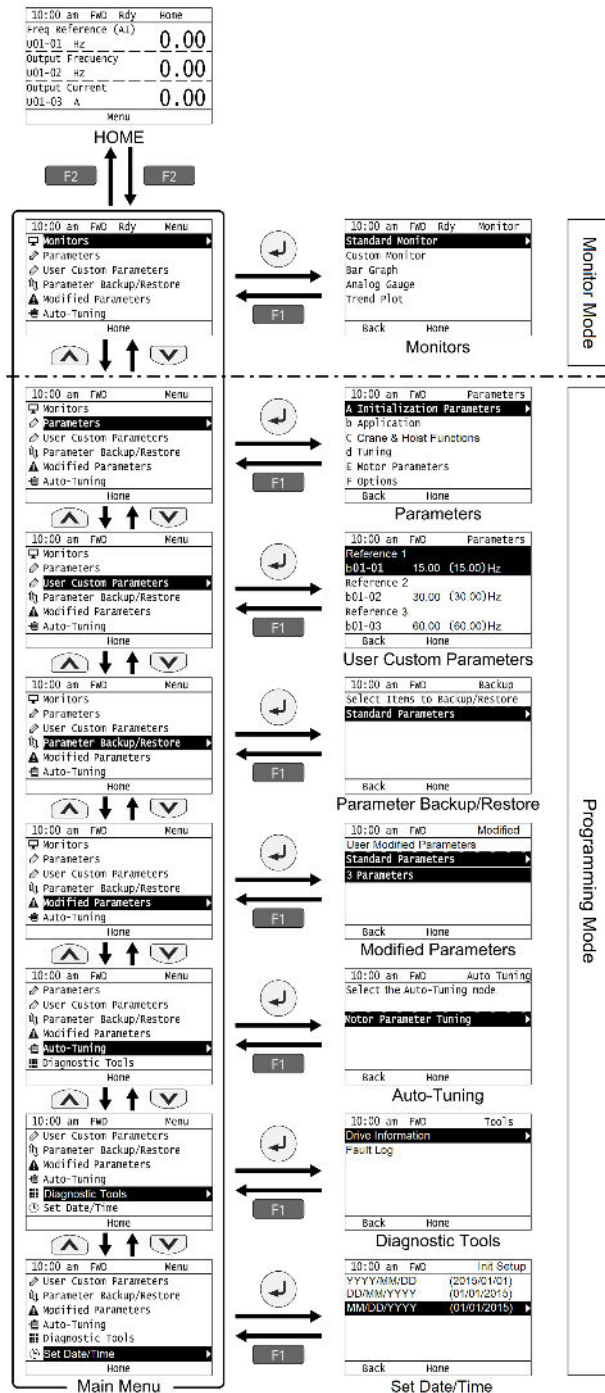


Step 4

Keypad Navigation and Menu Displays

This step shows the keypad menu structure and how to access the Parameter and Monitor locations along with the locations for Parameter Backup, Auto-Tuning, Diagnostic Tools, and Time Settings.

Make sure all protective covers have been re-attached and power is turned on. **DO NOT RUN THE MOTOR.**



Step 5

Select a Control Method

This step explains the available Control Method settings.

V/f:

Set parameter A01-02 = 0 (V/f).

Only available for IMPULSE•G+ Series 5 and is recommended for most Traverse and Mechanical Load Brake hoist applications.

Open Loop Vector:

Set parameter A01-02 = 1 (Open Loop Vector).

Only available for IMPULSE•G+ Series 5 and is recommended for Traverse and Mechanical Load Brake hoist applications that require finer speed control or torque limiting.

Closed Loop Vector:

Set parameter A01-02 = 3 (Closed Loop Vector).

Only available for IMPULSE•VG+ Series 5 and is locked to this setting. It is recommended for Hoist applications without load brake and requires encoder feedback.

NOTE: An Auto-Tune is recommended when using the Open Loop Vector or Closed Loop Vector control methods.

Step 6

Select a Motion

This step explains how to configure the VFD for a Hoist or Traverse application.

Traverse:

Set parameter A01-03 = 0 (Traverse).

Hoist (with Mechanical Load Brake):

Set parameter A01-03 = 1 (Standard Hoist).

Not available for IMPULSE•VG+ Series 5.

Hoist (with No Load Brake):

Set parameter A01-03 = 2 (NLB Hoist).

Not available for IMPULSE•G+ Series 5.

NOTE: An Auto-Tune is recommended when using a No Load Brake Hoist motion.

Step 7

Select a Speed Reference

This step lists the Speed Reference settings.

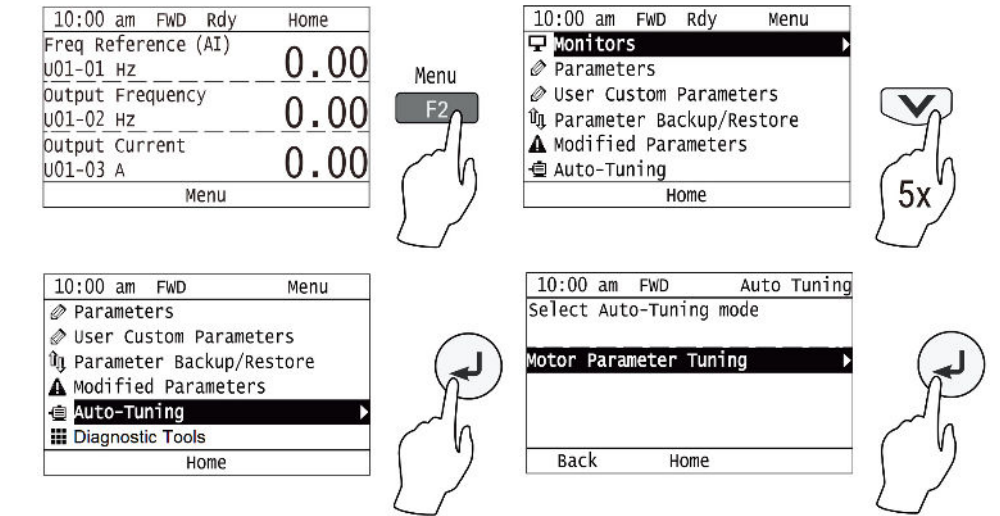
NOTE: Default speed settings will be automatically applied via X-Press Programming. See technical manual for more details and wiring instructions.

- | | |
|---|---|
| 2-Speed Multi-Step: A01-04 = 0 | 3-Step Infinitely Variable: A01-04 = 4 |
| 3-Speed Multi-Step: A01-04 = 1 | Uni-Polar Analog: A01-04 = 5 |
| 5-Speed Multi-Step: A01-04 = 2 | Bi-Polar Analog: A01-04 = 6 |
| 2-Step Infinitely Variable: A01-04 = 3 | |

Step 8

Auto-Tuning with Motor

In this step, the IMPULSE•G+/VG+ Series 5 VFD is set up for use with the motor. Make sure all protective covers have been re-attached and then apply full line power to the VFD. **DO NOT RUN THE MOTOR.**



V/f:

Select "Stationary Line-Line Resistance"

Open Loop Vector and Closed Loop Vector:

Decouple motor from load and disengage brake.

Select "Rotational Auto-Tuning"

When prompted, enter the following motor parameters:

Motor Rated Power (US: HP, Europe: kW)

Motor Rated Voltage (e.g., 230 V, 460 V)

Motor Rated Current (e.g., 22.0 A)

Motor Base Frequency (e.g., 60.0 Hz)

Number of Motor Poles (e.g., 4 Poles)

Motor Base Speed (e.g., 1750 rpm)

Encoder Pulse Count (e.g., 1024 PPR)

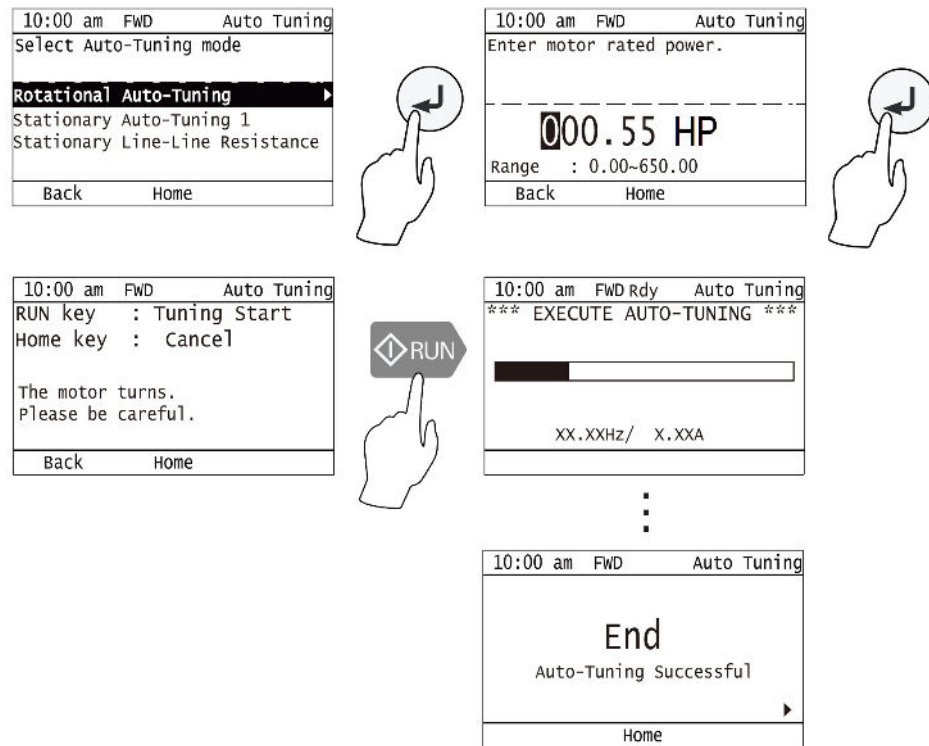
Motor No-Load Current (e.g., 5.0 A)

Motor Rated Slip Frequency (e.g., 2.90 Hz)

Motor No-Load Voltage (e.g., 391.0 VAC)

NOTE: Refer to the technical manual for detailed information on the parameters and monitors.

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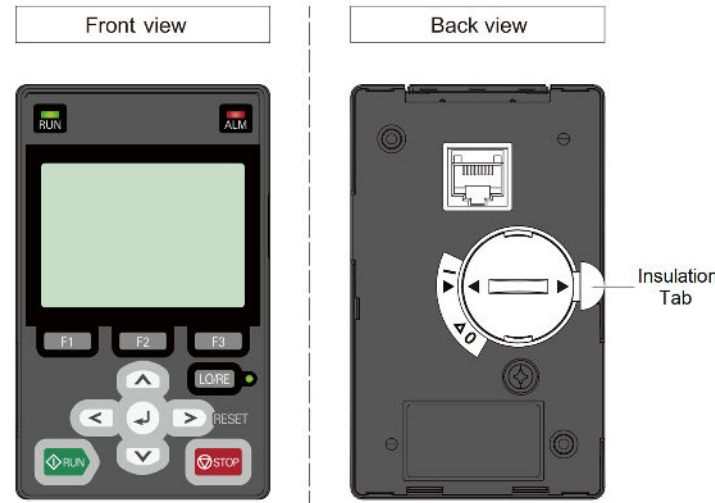


Step 9

Remove Keypad Insulation Tab

Detach the keypad and pull the insulation tab located on the back, next to the battery compartment. The battery will now maintain the date and time settings.

Refer to Step 4 for the location of the Set Date/Time menu.



Frequently Asked Questions

Question: How do I reset the VFD parameters back to factory default settings?
Answer: There are two options. Setting A01-05 = 1110 will revert the parameters to the settings saved at the factory. Setting A01-05 = 2220 will revert all parameters back to default.

Question: How do I adjust the time it takes the motion to speed up or slow down?
Answer: Adjust the acceleration time parameter b05-01 and deceleration time parameter b05-02.

Question: How do I prevent the occurrence of an OV fault (overvoltage) while my motor is ramping down?
Answer: Increase deceleration time parameter b05-02 and check braking resistor.

Question: How do I prevent the occurrence of an OL1 fault (overload) while my motor is ramping down?
Answer: Verify motor rated current parameter E02-01 and motor overload protection time parameter L01-02.

Question: How can I run my motor above the base motor speed?
Answer: Increase the value of parameter E01-04 Maximum Frequency. For hoists, the Ultra-Lift feature is recommended. Verify that the motor and system allow for this.

Question: How can I change motor direction without changing the motor leads?
Answer: Set parameter b03-04 = 1 (exchange phases).

Question: What should I do when the VFD detects a brake failure and displays a BE6 or BE8 fault?
Answer: Do not turn off power! Lower the load to the ground and inspect the brakes.

Question: On no load brake (NLB) hoist applications, why does the brake stay open temporarily at the end of a run?
Answer: This feature is called Load Float and reduces wear on the brakes. See parameter C08-10 to adjust the time.

Question: Where can I find troubleshooting information regarding faults and alarms?
Answer: Reference the technical manual.

- WARNING! SUDDEN MOVEMENT HAZARD.** The motor will spin during a Rotational Auto-Tune.
- WARNING! ELECTRIC SHOCK HAZARD.** High voltage will be supplied to the motor when Auto-Tuning is performed. Do not touch the motor during Auto-Tuning.

Encoder Direction → Check the motor speed monitor U01-05 while turning the motor manually in forward direction (CW). If the sign displayed is negative, power down the VFD, **wait at least five minutes until the charge indicator extinguishes completely**, then swap encoder wires A+ with A- on the PG-X3 card. Next, power up the VFD and repeat this test. Or, reverse the encoder direction with parameter F01-02.

Step 10

Quick Start Parameters

The following table lists commonly used parameters as well as frequently asked questions.

Refer to Step 4 for the location of the parameters.

Parameter	Description	Settings	Comments
A01-01	Access Level	0 = Operation 1 = User 2 = Advanced (Default) 3 = Expert	Advanced level contains the most commonly used parameters and hides the rest. Expert level contains every available parameter.
A01-02	Control Method	0 = V/f 2 = Open Loop Vector* 3 = Closed Loop Vector*	* Auto-Tune Recommended
A01-03	Motion	0 = Traverse 1 = Hoist w/ Load Brake (G+ only) 2 = Hoist w/o Load Brake (VG+ only)	
A01-04	Speed Reference	0 = Two-Speed Multi-Step 1 = Three-Speed Multi-Step 2 = Five-Speed Multi-Step 3 = Two-Step Infinitely Variable 4 = Three-Step Infinitely Variable 5 = Uni-Polar Analog (0-10VDC, 4-20mA) 6 = Bi-Polar Analog (-10 – +10VDC)	
b01-01 – b01-16	Speed References	0.00 - 300.00 Hz	Limited by E01-04
b05-01	Acceleration Time	0.0 - 60.0 Seconds	
b05-02	Deceleration Time	0.0 - 60.0 Seconds	
E02-01	Motor Rated FLA	Dependent on o02-04 Setting	See Motor Nameplate
H01-xx	Digital Inputs	See Technical Manual for Settings	Terminals S1 - S8
H02-xx	Digital Outputs		Terminals M1-M2, M3-M4, M5-M6
H03-xx	Analog Inputs		Terminals A1, A2, A3
H04-xx	Analog Outputs		Terminals AM, FM