

# IMPULSE®•G+/VG+ Series 4 Variable Frequency Drive Quick Start Guide



## OVERVIEW

The following procedure is a supplement to other documentation available for the IMPULSE•G+/VG+ Series 4 variable frequency drive (VFD). This will guide the user in proper installation and setup of the system.

Before using the VFD-controlled equipment, the operator shall read the operating manual of the hoisting machine, shall be trained, and has to know all hazards by 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 4, ensure that all protective covers are fastened and all wiring connections are secure. After power has been turned OFF, wait at least 5 minutes until the charge indicator extinguishes completely before touching any wiring, circuit boards, or components.**

When installing the system, be sure to follow good 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.

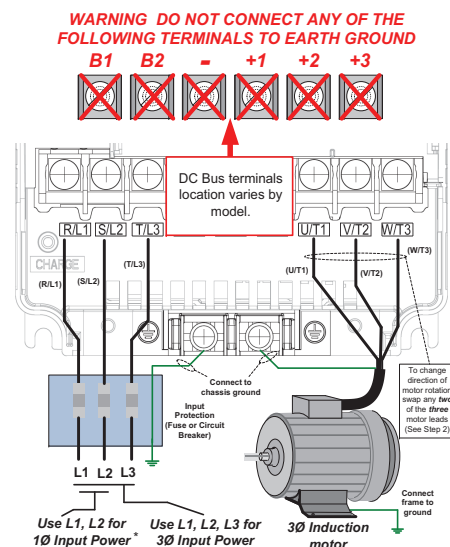
Read this document thoroughly before attempting installation. Refer to the technical manual available at: [www.columbusmckinnon.com/magnetek](http://www.columbusmckinnon.com/magnetek).

## Step 1

### Connect Motor and Line Power

The following figure shows the electrical connections for the input power and motor terminals on IMPULSE•G+/VG+ Series 4 VFD. Make the appropriate connections with power turned off. Follow good wiring practices and follow all applicable electrical codes. Ensure the equipment is properly grounded, as shown.

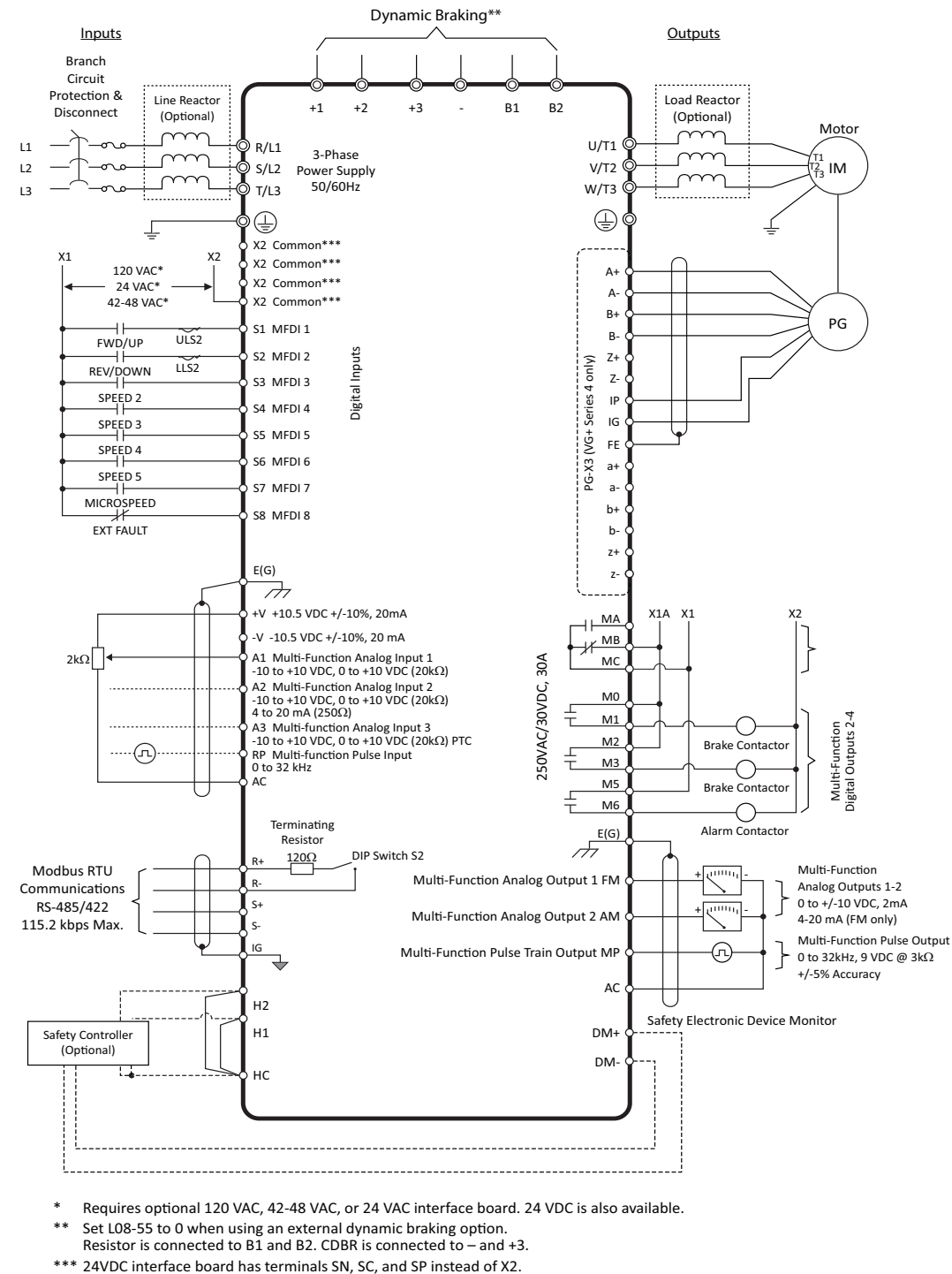
**⚠ WARNING: DO NOT CONNECT ANY OF THE FOLLOWING TERMINALS TO EARTH GROUND.**



## Step 2

### Typical Connection Diagram

This step shows a typical wiring diagram and connection points for the IMPULSE•G+/VG+ Series 4 VFD. Wiring connections should only be made by trained and authorized personnel when power to the VFD is turned off.



\* Requires optional 120 VAC, 42-48 VAC, or 24 VAC interface board. 24 VDC is also available.  
 \*\* Set L08-55 to 0 when using an external dynamic braking option. Resistor is connected to B1 and B2. CDBR is connected to - and +3.  
 \*\*\* 24VDC interface board has terminals SN, SC, and SP instead of X2.

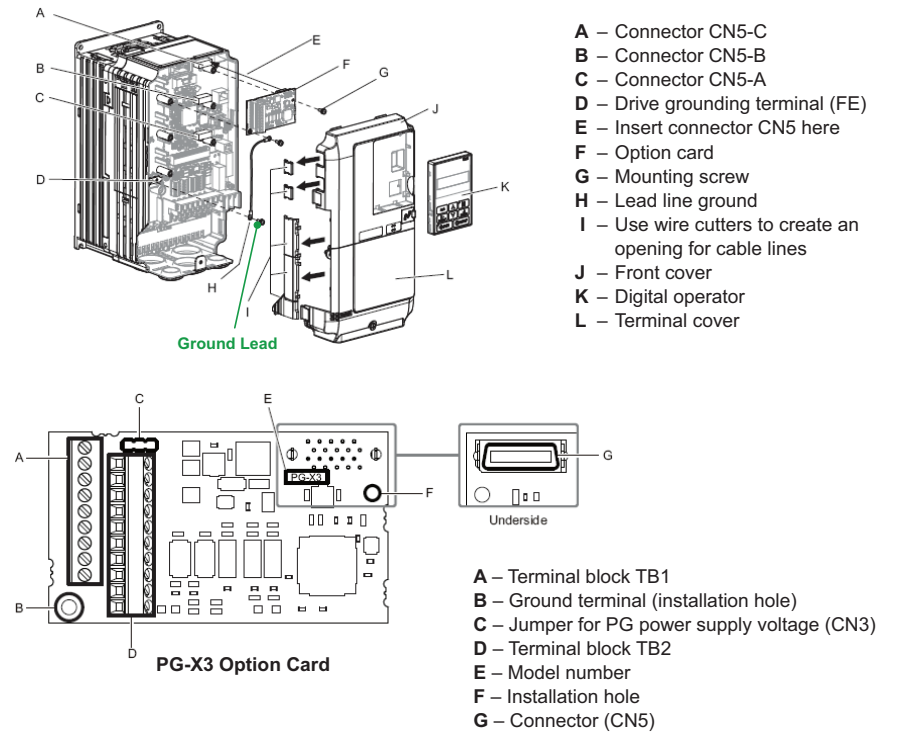
## Step 3

### PG-X3 Encoder Feedback Card and Encoder Wiring (IMPULSE•VG+ Series 4 Only)

In this step the PG-X3 encoder feedback card is installed. **WITH POWER OFF**, install the PG-X3 card as shown below. **Make sure to follow good wiring practices and follow all applicable codes. Ensure that the feedback card is grounded properly as shown in item H below.**

#### Option Card Installation

This option card can be inserted into the CN5-C (top) connector located on the drive's control board.



#### Encoder Power Supply (Max. 200mA)

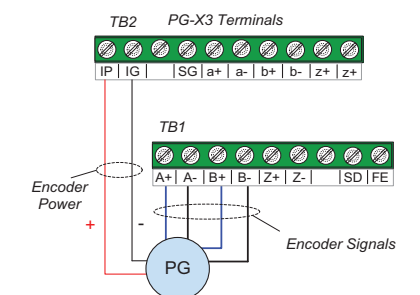
Select Encoder Power Supply (IP + IG TB2) with Jumper CN3.



**IMPORTANT: Verify Encoder Power Supply Rating**

#### Encoder Connection

**⚠** It is required to use a differential quadrature encoder in Flux Vector control mode (A01-02 = 3).



(Required for Flux Vector Operation)

#### PG-X3 Encoder Wiring

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## Step 4

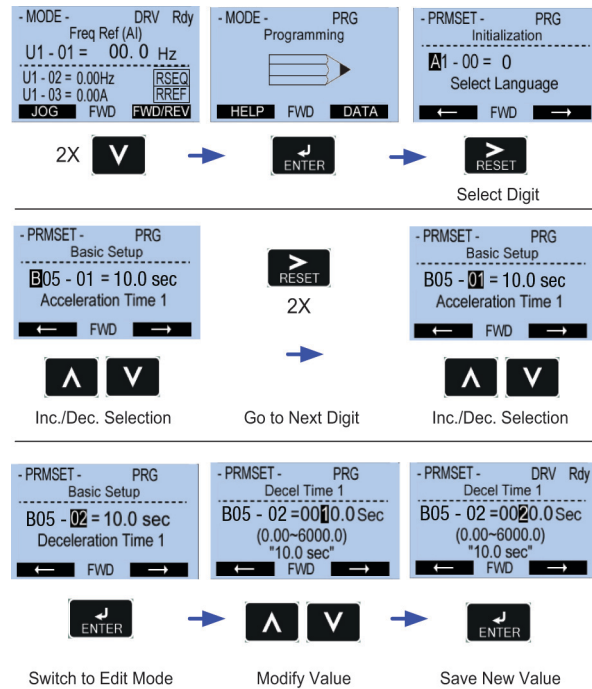
### Changing Parameters and Monitoring

This step shows how to access and modify a parameter as well as how to monitor signals such as output frequency and motor current.

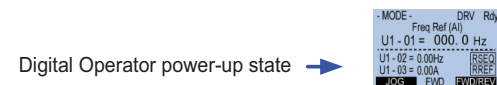
Make sure all protective covers have been re-attached and power is turned on. **DO NOT RUN THE MOTOR.**

### Access Parameter Menu and Change Parameters

Press **V** until the digital operator shows the parameter menu.

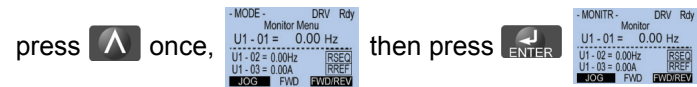


### Monitor Motor Frequency and Motor Current



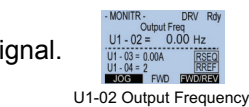
Output Frequency and Motor Current can be monitored simultaneously.

To monitor output frequency and motor current or other signals individually,



Next press **RESET** to select monitor. Digits Flashing

Use **▲** **V** to select monitor signal.



**NOTE:** Refer to the technical manual on how to access other drive monitors.

## Step 5

### Select a Control Method

This step explains the available Control Method settings.

#### V/f:

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

This setting is only available for IMPULSE•G+ Series 4 drives and is recommended for most Traverse and Mechanical Load Brake hoist applications.

#### Open Loop Vector:

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

This setting is only available for IMPULSE•G+ Series 4 drives and is recommended for Traverse and Mechanical Load Brake hoist applications that require finer speed control or torque limiting.

#### Flux Vector:

Set parameter A01-02 = 3 (Flux Vector).

This setting is only available for IMPULSE•VG+ Series 4 drives and is locked to this setting. It is recommended for Hoist applications with no load brake and requires encoder feedback.

**NOTE:** An Auto-Tune is recommended when using the Open Loop Vector or Flux 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).

This setting is not available for IMPULSE•VG+ Series 4 drives.

#### Hoist (with No Load Brake):

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

This setting is not available for IMPULSE•G+ Series 4 drives.

**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-Speed Multi-Step:** A01-04 = 1

**5-Speed Multi-Step:** A01-04 = 2

**2-Step Infinitely Variable:** A01-04 = 3

**3-Step Infinitely Variable:** A01-04 = 4

**Uni-Polar Analog:** A01-04 = 5

**Bi-Polar Analog:** A01-04 = 6

**Industrial Communication:** A01-04 = 7

**RS485 Communication:** A01-04 = 8

## Step 8

### Auto-Tuning with Motor

In this step the IMPULSE•G+/VG+ Series 4 drive is set up for use with the motor. Make sure all protective covers have been re-attached and then apply power to the VFD. **DO NOT RUN THE MOTOR.**

Press **V** until the Digital Operator shows the Auto-Tuning menu. Then press **ENTER**.

#### V/f:

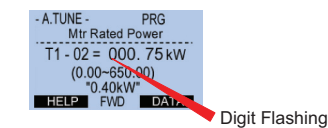
Set T01-01 = 2 (Term Resistance)

#### Open Loop Vector and Flux Vector:

Decouple motor from load and disengage brake.

Set T01-01 = 0 (Standard Tuning)

Press **▲** until the Digital Operator shows parameter T01-02 Mtr Rated Power. Then press **ENTER**.



For Europe: Enter Motor Power in kW  
For USA: Enter Motor Power in HP

Press **RESET** to select the digit you would like to change and use **▲** **V** to adjust value, then press **ENTER** to save.

Press **▲** to select the next parameter and follow the same procedure described above to adjust its value.

T01-03 Rated Voltage (e.g., 230 V, 460 V)

T01-04 Rated Current (e.g., 22.0 A)

T01-05 Rated Frequency (e.g., 60.0 Hz)

T01-06 Number of Poles (e.g., 4 Poles)

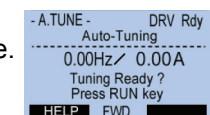
T01-07 Rated Speed (e.g., 1750 rpm)

T01-08 Encoder Pulses per Rev (e.g., 1024 PPR)

T01-09 No-Load Current (e.g., 5.0 A)

T01-10 Motor Rated Slip (e.g., 2.90 Hz)

Press the RUN key to start the Auto-Tune.



**WARNING! SUDDEN MOVEMENT HAZARD. The motor will spin during a standard 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.**



# IMPULSE®•G+/VG+ Series 4 Variable Frequency Drive

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Next, press  on the Digital Operator. The IMPULSE•G+/VG+ Series 4 will now start the Auto-Tuning procedure. The display will show message “*Tune Successful*” when the Auto-Tuning procedure has been successfully completed. Please reference the technical manual or repeat the procedure again if the display shows an error message.

### 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 drive, **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 drive and repeat this test. Or, reverse the encoder direction with parameter F01-02.

## Step 9

### Quick Start Parameters

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

Refer to Step 4 for a detailed explanation on how to change parameters.

Parameter	Description	Settings	Comments
A01-01	Access Level	0 = Operation 1 = User 2 = Advanced	
A01-02	Control Method	0 = V/f 2 = Open Loop Vector* 3 = Flux Vector*	* Auto-Tune Recommended
A01-03	Motion	0 = Traverse 1 = Hoist w/ Load Brake (G+ only) 2 = Hoist w/o Load Brake (VG+ only) 4 = Braketronic	
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) 7 = Industrial Communication 8 = RS485 Communication	
B01-01 – B01-16	Speed References	0.00 - 150.00 Hz	Limited by E01-04
B05-01	Acceleration Time	0.0 - 25.5 Seconds	
B05-02	Deceleration Time	0.0 - 25.5 Seconds	
E01-01	Input Voltage	155 - 255 VAC (230 VAC Models) 310 - 510 VAC (460 VAC Models) 446 - 733 VAC (575 VAC Models)	Line Voltage
E02-01	Motor Rated FLA	Dependent on O02-04 Setting	See Motor Nameplate
H01-xx	Digital Inputs	See Technical Manual for Options	Terminals S1 - S8
H02-xx	Digital Outputs		Terminals M0-M1, M2-M3, M5-M6
H03-xx	Analog Inputs		Terminals A1, A2, A3
H04-xx	Analog Outputs		Terminals AM, FM

## Frequently Asked Questions

**Question:** How do I reset the drive back to factory default settings?

**Answer:** Go to parameter A01-05 and enter 1110.

**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 my drive from tripping on 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 my drive from tripping on 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.

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 to 1 (exchange phases).

**Question:** What should I do when the drive 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 an IMPULSE•VG+ Series 4 hoist application, 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.