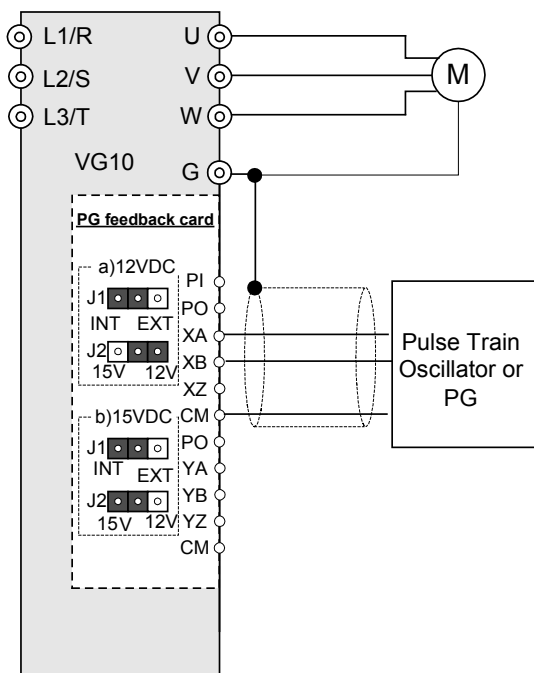


PG Option Card as Pulse Follower (P/N SOPCG11SPG)

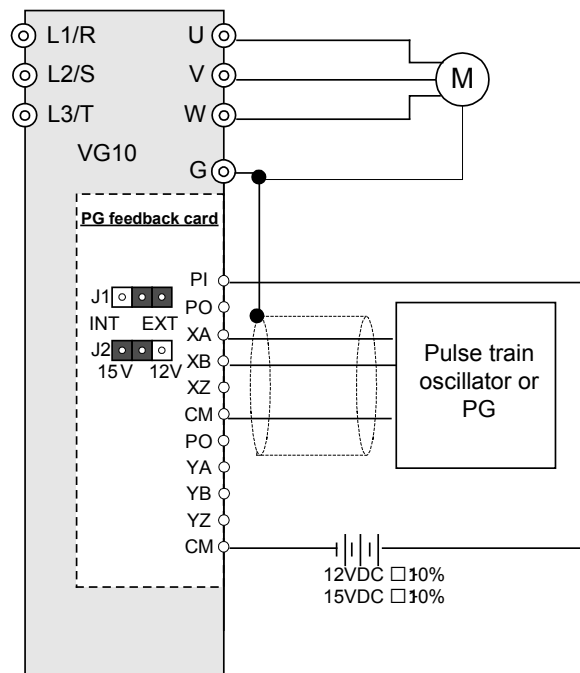
This tech note will allow the VG10 to accept a pulse signal to follow. Pulse follower is when the drive speed changes are controlled through the frequency changes on the pulse input, instead of following the analog reference signal. Pulse followers are generally used to increase the overall speed accuracy of a several drive system. Typical system is when a master speed reference is given to the master or first drive on the system, that drive is running in closed loop operation. Then use the encoder signal from the master or first drive as the speed reference to the second or follower drive. Therefore the use of the encoder will increase the overall speed accuracy and control of the system.

Basic Connection Diagram

Drive Internal Power Supply



External Power Supply



List of Pulse Train Input Terminals Functions.

Terminal Symbol	Terminal Name	Function	
Option	PI	External Power Supply Input	Supplies power from external power supply.
	PO	Power Output	Power output
	CM	Common	Power supply common
	XA	Command Phase-A Pulse Input	Connects command phase-A signal
	XB	Command Phase-B Pulse Input	Connects command phase-B signal

Input Polarity of Pulse Train

At phase-A/phase-B pulse train input (Figure 1), command polarity is determined depending on the phase relationship between phase-A signal and phase-B signal. At phase-B pulse input (Figure 2), command polarity is determined by the phase-A signal voltage. The direction of motor rotation is set by combining pulse train input polarity with the FWD/REV command. Table 1 shows the relationship between the pulse train input polarity and the direction of rotation.

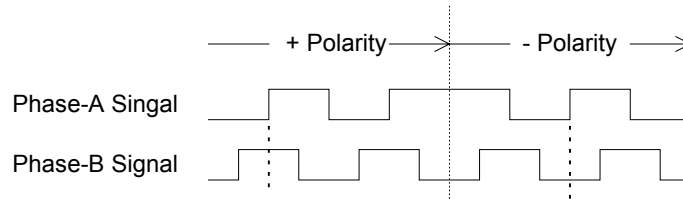


Figure 1 Phase-A / phase-B pulse Train Input Polarity.

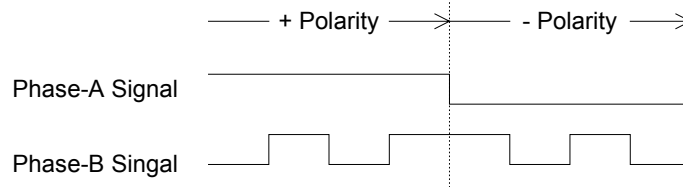


Figure 2 Phase-B Pulse Train Input Polarity.

Table 1 Relationship between Pulse Train Input Polarity and Direction of Rotation.

Pulse Train Input Polarity	FWD/REV Command	Direction of Rotation
+	FWD	Forward
+	REV	Reverse
-	FWD	Reverse
-	REV	Forward

Table 2 List of Function Codes.

Function Code	Name	Unit	Setting Range	Factory Setting	Change during Operation
F01	Frequency Command 1	-	0 to 11	0	N
C30	Frequency Command 2	-	0 to 11	2	N
o01	Speed Command System / Automatic Speed Control System	-	00, 01, 10, 11, 20, 21	00	N
o10	Time Constant of Pulse Train Input Filter	s	0.000 to 5.000	0.005	Y
o11	Command Pulse Compensation Coefficient 1	kp/s	1 to 10000	1	N
o12	Command Pulse Compensation coefficient 2	Hz	1 to 10000	1	N

Detailed Explanation of Option Card Functions

Function code F01 or C30 needs to be programmed for 11 to operate in a pulse follower mode.

Function code o01: Set the ten's digit (left side) of data of o01 to 1 or 2 to use pulse train input.

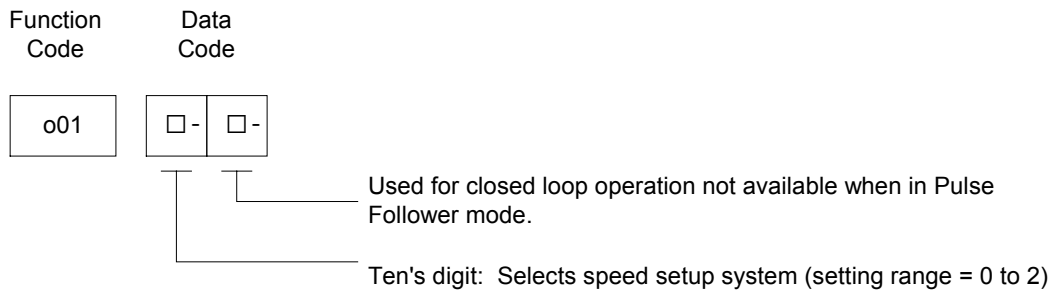


Table 2 Function Codes.

Function Code	Function	
o01	0*	Without pulse train input
	1*	Phase-A/phase-B pulse train input
	2*	Phase-B pulse train input

Function code o10: Sets time constant of primary delay filter for the speed setup value.

Function codes o11 and o12: For pulse train input, sets the relationship between the number of input pulses and the frequency reference value using function codes o11 or o12.

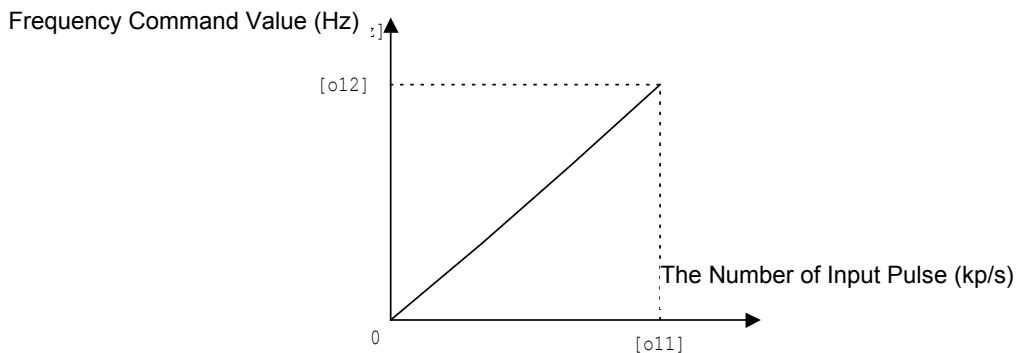


Figure 3 Relationship between Input Pulse and Frequency Command Value.

As shown in Figure 3, set the number of pulses [kp/s] in function code o11 (command pulse compensation coefficient 1). Set the frequency command value [Hz] in the value set in function

$$F^* = N_p \times \frac{\text{Pulse Compensation Coe. 2 (o12)}}{\text{Pulse Compensation Coe. 1 (o11)}}$$

code o11 in function code o12 (command pulse compensation coefficient 2). Set the same value of function code o12 as that of function code F03 (A01) (maximum output frequency). The number of pulses input in phase A or phase B and drive frequency reference value f^* (or speed command value) are obtained from the following formula

- f^* [Hz] : Drive frequency reference value (synchronous speed frequency for speed command)
- N [kp/s] : The number of pulses to be input in phase A or phase B

Pulse Train Input Specifications

Item	Specifications	Remarks
Frequency Setting Range	0 to 400[Hz]	-
Frequency Accuracy	$\pm 0.02\%$ of maximum frequency	
Maximum Number of Input Pulses	100[kp/s]	
Circuit Type	Open Collector System Push/Pull or Totem-Pole system	
Input Pulse Voltage	12VDC $\pm 10\%$ (*2) 15VDC $\pm 10\%$ (*3)	

(*1) Maximum Number of Input Pulse depends on both PG circuit type and wiring length as follows.

PG circuit type :Open Collector System, wiring length : 66' (20m)

Maximum Number of Input Pulse 25(kp/s)

PG circuit type :Push/Pull or Totem-Pole system, wiring length : 330' (100 m)

Maximum Number of Input Pulse 100(kp/s)

(*2) When 12V DC for internal or external power supply selected

(*3) When 15V DC for internal or external power supply selected

Note: For additional assistance refers to the PG option card instruction manual and the VG10 instruction manual.