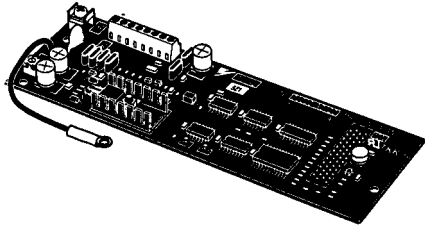


**3G3FV-PPG□2  
PG Speed Control Card  
(For the 3G3FV only)**

**INSTRUCTION SHEET**

Thank you for purchasing this OMRON product. Please read this instruction sheet and thoroughly familiarize yourself with the functions and characteristics of the product before use. This instruction sheet describes procedures for mounting and wiring the 3G3FV-PPG□2 PG Speed Control Card, and should be read in conjunction with the *3G3FV Inverter User's Manual (I516)*. Please retain this sheet for future reference.



**OMRON Corporation**

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**Safety Precautions**

Before attempting to operate the PG Speed Control Card, be sure to thoroughly familiarize yourself with the information contained in this instruction sheet and those of any other applicable equipment, make sure that you have a working knowledge about the equipment, and make sure that you are well versed on all safety procedures and precautionary items in order to ensure the safe and proper use of the OMRON Inverter and other peripheral devices.

Since diagrams in this instruction sheet may be shown with covers and protective shielding removed in order to provide more detailed explanations, make sure that covers and protective shielding are replaced as stipulated prior to using the product, and then use the product only as outlined in the *User's Manual*.

Be sure to contact our sales representative if the product is to be left in storage for an extended period of time.

Make sure that this instruction sheet and other applicable manuals are readily available to equipment operators.

Make sure that this instruction sheet is readily available once it is read.

- The precautionary items list critical information for safety. Be sure to heed these items at all times.
- The following conventions are used to indicate and classify precautions in this instruction sheet.

**! DANGER!** Not following a precaution given as a "DANGER" is likely to result in fatal or serious injury.

**! WARNING** Not following a precaution given as a "WARNING" may result in fatal or serious injury.

**! Caution** Not following a precaution given as a "Caution" can result in injury to people or damage to the product or system.

Items listed under caution may also have serious consequences depending on the circumstances, so be sure to heed these items at all times.

**Mounting**

**! WARNING** Never reach inside the Inverter as this may result in an electrical shock.

**! WARNING** Do not mount, remove, or wire Optional Cards without first shutting the Inverter power OFF and waiting until the prescribed amount of time (indicated on the front cover of the Inverter) has passed after all indicators on the Inverter are no longer lit. Failure to do so may result in an electrical shock.

**! WARNING** Do not nick, apply undue stress, place heavy objects on, or sandwich cables. Otherwise, this may result in an electrical shock.

**! Caution** Do not touch the elements of Optional Cards. Otherwise, this may result in injury due to electrical shock.

**Connections and Settings**

**! Caution** Do not change settings unless absolutely necessary. Otherwise, this will result in injury or equipment damage.

**! Caution** Do not mount or remove an Optional Card with Inverter power ON. Otherwise, this will result in injury or equipment damage.

**! Caution** Be sure to connect the ground wire (E) of Optional Cards. Otherwise, this may result in equipment damage or faulty operation due to noise.

**Description**

The 3G3FV-PPG□2 PG Speed Control Card is an Optional Card used only with the SYSDRIVE 3G3FV Inverter.

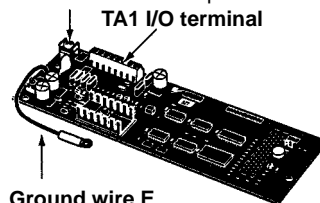
This Optional Card controls motor speed and feeds back speed information to the Inverter from pulse generators (speed detectors, such as encoders and pulse generators).

The Card is mounted on a 3G3FV Inverter control circuit board.

**Nomenclature**

• **3G3FV-PPGA2**

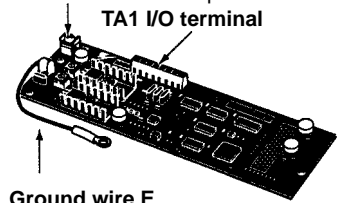
**TA2 shielded-wire connection terminal:** Shielded wire connection for an input wire



**TA1 I/O terminal**  
**Ground wire E**  
Connects to the 12 (G) terminal of the control circuit board.

• **3G3FV-PPGD2**

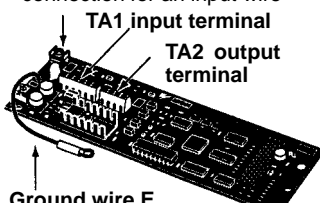
**TA2 shielded-wire connection terminal:** Shielded wire connection for an input wire



**TA1 I/O terminal**  
**Ground wire E**  
Connects to the 12 (G) terminal of the control circuit board.

• **3G3FV-PPGB2**

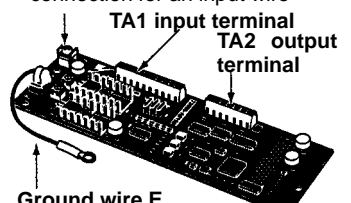
**TA3 shielded-wire connection terminal:** Shielded wire connection for an input wire



**TA1 input terminal**  
**TA2 output terminal**  
**Ground wire E**  
Connects to the 12 (G) terminal of the control circuit board.

• **3G3FV-PPGX2**

**TA3 shielded-wire connection terminal:** Shielded wire connection for an input wire



**TA1 input terminal**  
**TA2 output terminal**  
**Ground wire E**  
Connects to the 12 (G) terminal of the control circuit board.

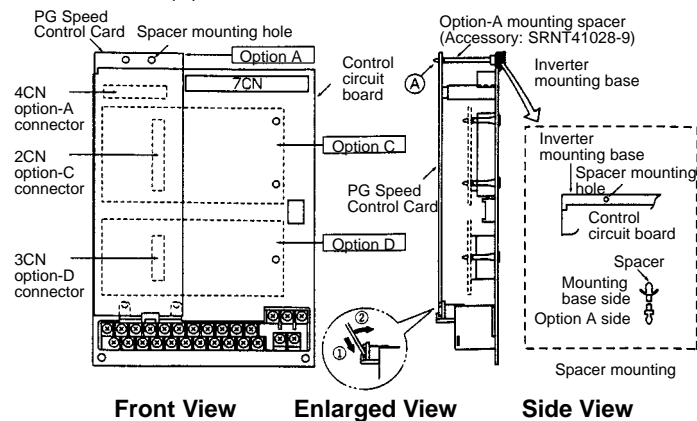
## Specifications

Model	Control mode	Input specifications	Maximum response frequency	Output specifications
3G3FV-PPGA2	V/f with PG feedback mode	Single pulse input Open collector output compatible	30 kHz (50% duty)	Pulse monitor output Voltage output 12 VDC ( $\pm 10\%$ ), 20 mA max.
3G3FV-PPGB2	Flux vector control mode	A/B-phase pulse input Open collector output compatible	30 kHz (50% duty)	A/B phase pulse monitor output Open collector output 24 VDC max. 30 mA max.
3G3FV-PPGD2	V/f with PG feedback mode	Single pulse input RS-422 level input	300 kHz (50% duty)	Pulse monitor output RS-422 level output
3G3FV-PPGX2	Flux vector control mode	A/B/Z-phase pulse input RS-422 level input	300 kHz (50% duty)	A/B/Z-phase pulse monitor output RS-422 level output

**Note** Inverter speed control accuracy falls off at frequency bands below 50 Hz.

## Mounting Procedure

- 1, 2, 3...** Be sure to turn OFF the main Inverter power supply, wait at least 1 minute (at least 3 minutes for 30-kW-or-higher Inverters), remove the front cover of the Inverter, and make sure the charge indicator is not lit.
- The PG Speed Control Card is an option A. Mount the Card in the option-A location as shown in the diagram below.
- Insert the spacer that is provided into the spacer mounting hole located on the mounting base of the Inverter. There are 2 holes located on 3.7-kW-or-lower Inverters. Insert the spacer in the hole on the 7CN side. Be very careful because spacers cannot be removed if they are inserted in the wrong hole.
- Proceed in order with steps ① and ② in the enlarged view below. Align the PG Speed Control Card and the supports, make sure the connector on the Card is aligned with the option-A connector, and then push the spacer through the spacer mounting hole on the Card. (Side View (A))  
Make sure the 4CN positions are properly aligned, and push the spacer through the hole until it clicks into place.
- Connect the ground wire of the Card to the FG terminal 12(E) on the Inverter control circuit board.



Front View

Enlarged View

Side View

## Wiring

### Description of PG Speed Control Card Terminal Blocks

#### • 3G3FV-PPGA2 (For V/f With PG Feedback Mode Only)

Terminal	No.	Description	Specification
TA1	1	Pulse generator power supply	12 VDC ( $\pm 5\%$ ), 200 mA max.
			0 VDC (Power supply ground)
	3	+12-V/open collector switching	This terminal switches between 12-V voltage input and open collector input. Short pins 3 and 4 for open collector input.
	5	Pulse input	H: +4 to 12 V, L: +1 V max. (30-kHz maximum response frequency)
	7	Pulse monitor output	12 VDC ( $\pm 10\%$ ), 20 mA max.
8			
			Pulse monitor output common
TA2	(E)	Shielded wire connection	---

#### • 3G3FV-PPGB2 (For Flux Vector Control Mode Only)

Terminal	No.	Description	Specification
TA1	1	Pulse generator power supply	12 VDC ( $\pm 5\%$ ), 200 mA max.
			0 VDC (Power supply ground)
	3	A-phase pulse input	H: +8 to 12 V, L: +1 V max. (30 kHz maximum response frequency)
	5	B-phase pulse input	H: +8 to 12 V, L: +1 V max. (30 kHz maximum response frequency)
			Pulse input common
TA2	1	A-phase monitor output	Open collector output: 24 VDC max., 30 mA max.
			2
	3	B-phase monitor output	Open collector output: 24 VDC max., 30 mA max.
			B-phase monitor output common
TA2	(E)	Shielded-wire connection	---

#### • 3G3FV-PPGD2 (For V/f With PG Feedback Mode Only)

Terminal	No.	Description	Specification	
TA1	1	Pulse generator power supply	12 VDC ( $\pm 5\%$ ), 200 mA max.	
			0 VDC (Power supply ground)	
	3	Pulse input +	Line driver input (RS-422 level input) 300-kHz maximum response frequency	
				4
	5	Pulse input -	Line driver input (RS-422 level input) 300-kHz maximum response frequency	
				6
				Common
	7	Pulse monitor output +	Line driver output (RS-422 level output)	
8				
			Pulse monitor output -	
TA2	(E)	Shielded-wire connection	---	

**Note** 5 VDC and 12 VDC cannot be used simultaneously.

• **3G3FV-PPGX2 (For Flux Vector Control Mode Only)**

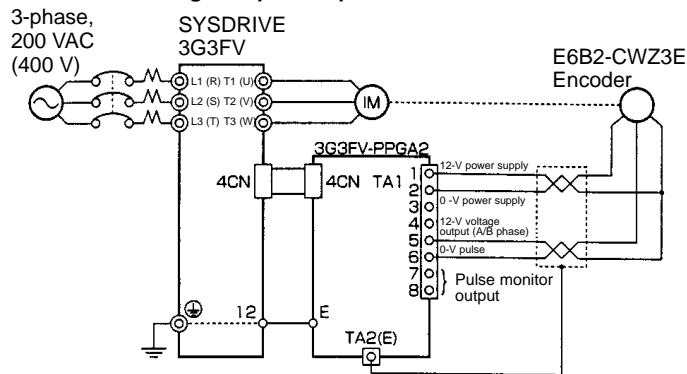
Terminal	No.	Description	Specification
TA1	1	Pulse generator power supply	12 VDC ( $\pm 5\%$ ), 200 mA max.
	2		0 VDC (Power supply ground)
	3		5 VDC ( $\pm 5\%$ ), 200 mA max.
	4	A-phase input +	Line driver input (RS-422 level input) 300-kHz maximum response frequency
	5	A-phase input -	
	6	B-phase input +	
	7	B-phase input -	
	8	Z-phase input +	
	9	Z-phase input -	
	10	Common	0 VDC (Power supply ground)
TA2	1	A-phase output +	Line driver output (RS-422 level output)
	2	A-phase output -	
	3	B-phase output +	
	4	B-phase output -	
	5	Z-phase output +	
	6	Z-phase output -	
	7	Control circuit common	Control circuit GND
TA2	(E)	Shielded line connection	---

**Note** 5 VDC and 12 VDC cannot be used simultaneously.

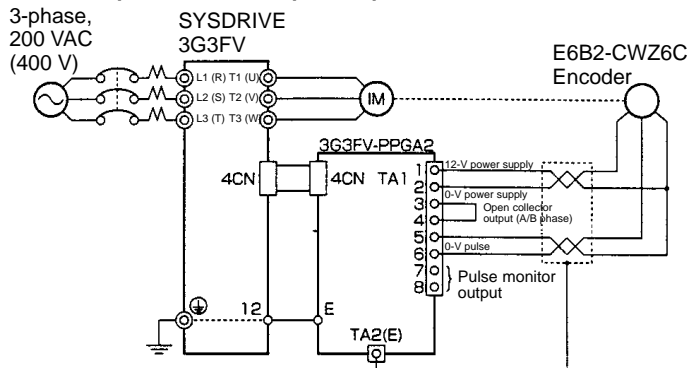
**Wiring the PG Speed Control Card**

• **3G3FV-PPGA2 (For V/f With PG Feedback Mode Only)**

**When a 12-V Voltage Output is Input**



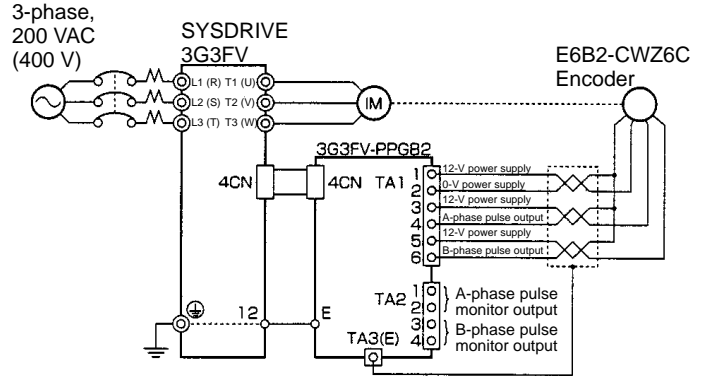
**When an Open Collector Output is Input**



- Note**
1. Be sure to use twisted-pair shielded wire for the signal line.
  2. Do not use the PG power supply for equipment other than the PG (encoder). Otherwise, noise may cause faulty operation.
  3. Make sure that PG wiring is less than 30 m long.

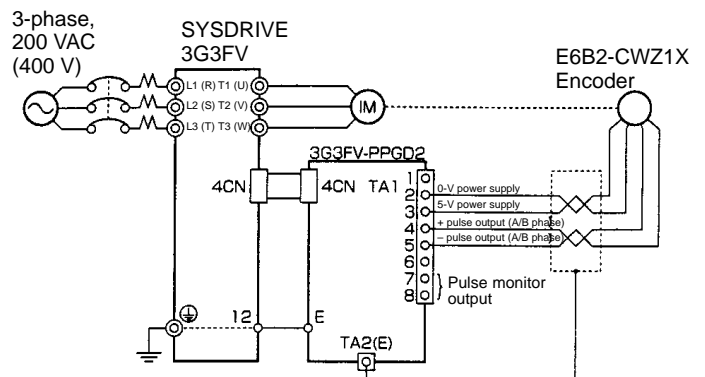
4. Be sure to select a PG with an output impedance of less than 3 k $\Omega$  when connecting a voltage output-type PG (encoder).
5. Make sure the signal line is placed at least 30 cm away from the Inverter output line and other power lines.
6. Refer to the *User's Manual (I516)* for details on components that comprise the input block.

• **3G3FV-PPGB2 (For Flux Vector Control Mode Only)**



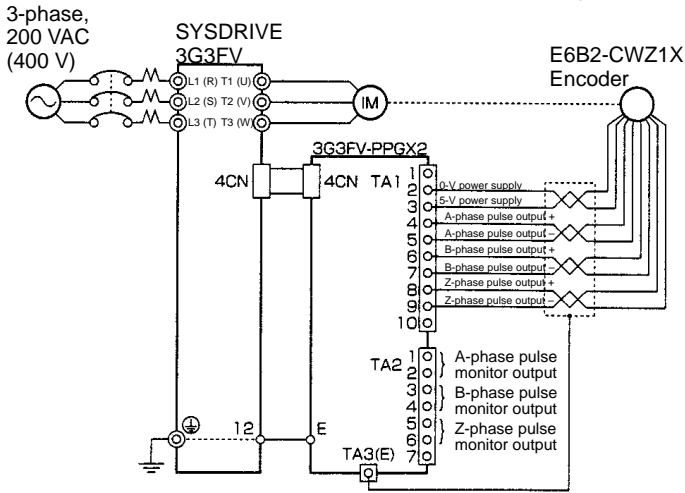
- Note**
1. Be sure to use twisted-pair shielded wire for the signal line.
  2. Do not use the PG power supply for equipment other than the PG (encoder). Otherwise, noise may cause faulty operation.
  3. Make sure that PG wiring is less than 30 m long.
  4. Be sure to select a PG with an output impedance that allows a current of 12 mA or more to the photocoupler (diode) of the input block when connecting a voltage output-type PG (encoder). The E6B2-CWZ3E Encoder cannot be used here.
  5. Make sure the signal line is placed at least 30 cm away from the Inverter output line and other power lines.
  6. Refer to the *User's Manual (I516)* for details on components that comprise the input block.

• **3G3FV-PPGD2 (For V/f With PG Feedback Mode Only)**



- Note**
1. Be sure to use twisted-pair shielded wire for the signal line.
  2. Do not use the PG power supply for equipment other than the PG (encoder). Otherwise, noise may cause faulty operation.
  3. Make sure that PG wiring is less than 50 m long.
  4. Make sure the signal line is placed at least 30 cm away from the Inverter output line and other electrical wiring.

### • 3G3FV-PPGX2 (For Flux Vector Control Mode Only)



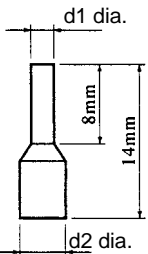
- Note**
1. Be sure to use twisted-pair shielded wire for the signal line.
  2. Do not use the PG power supply for equipment other than the PG (encoder). Otherwise, noise may cause faulty operation.
  3. Make sure that PG wiring is less than 50 m long.
  4. Make sure the signal line is placed at least 30 cm away from the Inverter output line and other power lines.

### Wire Thicknesses

Terminal	Terminal screw	Wire thickness (mm <sup>2</sup> )	Type of wire
Pulse generator power supply	---	Stranded wire: 0.5 to 1.25	Shielded twisted-pair wire
Pulse input		Single wire: 0.5 to 1.25	Shielded, polyethylene-covered vinyl sheath cable used for measuring
Pulse monitor output			
Shielded line connection	M3.5	0.5 to 2	

### Solderless Terminal Sizes (For Signal Line Connection)

For better reliability and easier wiring, we recommend using solderless terminals for input and output signals.

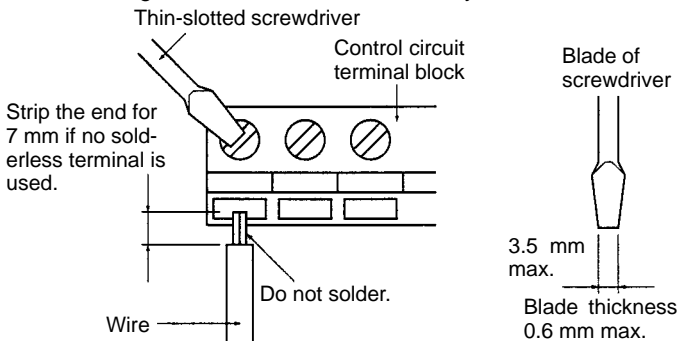


Wire thickness	Model	d1	d2
0.5 mm <sup>2</sup>	AI 0.5-8 WH	1.00	2.60
0.75 mm <sup>2</sup>	AI 0.75-8 GY	1.20	2.80
1 mm <sup>2</sup>	AI 1-8 RD	1.40	3.00
1.5 mm <sup>2</sup>	AI 1.5-8 BK	1.70	3.50

(Manufacturer: Phoenix Contact)

### • Wiring Procedure

- 1, 2, 3...**
1. Use a thin-slotted screwdriver to loosen the terminal screws.
  2. Insert the wire from underneath the terminal block.
  3. Tighten the terminal screws firmly.



### Round Solderless Terminal Sizes and Screw Torque (Shielded Wire Connection Terminal)

Wire thickness (mm <sup>2</sup> )	Terminal screw	Size	Screw torque (N • m)
0.5	M3.5	1.25-3.5	0.8
0.75		1.25-3.5	
1.25		1.25-3.5	
2		2-3.5	

### Selecting the Number of PG Pulses

#### 3G3FV-PPGA2/PPGB2

The maximum response frequency is 30 kHz.

Select a smaller number of pulses than those given below if necessary based on the encoder pulse width deviation (90±45° phase difference) and waveform distortion that occurs with longer cables. (With an open collector I/O, longer cables increase waveform distortion and make higher frequency pulses difficult to read.)

Maximum motor speed (r/min)	1,800	1,500	900
Encoder pulse count [p/r]	500	600	1,000
Maximum encoder frequency [kHz]	15	15	15

#### 3G3FV-PPGD2/PPGX2

The maximum response frequency is 300 kHz.

The number of encoder pulses (upper limit) can, depending on the encoder pulse width deviation (90±45° phase difference), be calculated using the equation given below.

$$\text{No. of encoder pulse [p/r]} = \frac{60 \times \text{max. response freq. (300 kHz)}}{2 \times \text{max. motor speed (r/min)}}$$

We recommend an encoder of 1,000 to 2,000 [p/r] if the maximum motor speed is less than 4,000 r/min. Selecting an encoder with a higher resolution than required will not improve the speed control range or precision.

### Parameter Settings

#### Control Method Selection: A1-02

When selecting the control method (A1-02), use the control method setting for the particular Optional Card.

Set "1" (V/f With PG Feedback Mode) for the 3G3FV-PPGA2/PPGD2 and "3" (Flux Vector Control Mode) for the 3G3FV-PPGB2/PPGX2.

#### PG Speed Control Card: F1-01 to F1-13

Use the PG Speed Control Card settings for the application.

A more detailed description of the settings is given in *Chapter 5 Basic Operation of the SYSDRIVE 3G3FV User's Manual (I516)*.

Check your settings by referring back to *5-4 Flux Vector Control* and *5-5 V/f Control with PG*.

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**Note:** Specifications subject to change without notice.

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