

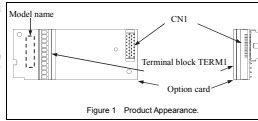
PG Interface Card "OPC-PG3"

Thank you for purchasing this PG interface card "OPC-PG3". Installing this card to your FRENIC-series enables to provide motor control according to feedback signal from encoder (12V/15V/24V complementary or open-collector type).

Note Connect this PG interface card to the C-port on control board of FRENIC-series. Do not connect it to any other port.

1. Check that:

- 1) A PG interface card and two screws (M3 × 8) are contained in the package.
 - 2) The PG interface card is not damaged during transportation—no defective devices, dents or warps.
 - 3) The model name "OPC-PG3" is printed on the front of the PG interface card as shown in Figure 1. (The "PG" on the front is a short name, as shown in Figure 1.)
- If you suspect the product is not working properly or if you have any questions about your product, contact the shop where you bought the product or your local Fuji branch office.



2. Installation Procedure

WARNING

Before starting installation and wiring, turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals (P+) and (N-) has dropped to the safe level (≤25 VDC or below).

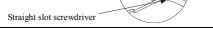
Otherwise, electric shock could occur.

- 1) Perform wiring on the PG interface card.
 - Refer to Section 4 "Wiring."
 - TERM1 is the removable terminal. Use it with below precautions.

CAUTION

Remove and connect the removable terminal after PG interface card is removed from inverter. Remove the removable terminal from the PG interface card by the tool (e.g. the straight slot screwdriver).

Otherwise, injuries could occur. Failure may occur the PG interface card.



- 2) Remove the front cover from the inverter and expose the control printed circuit board (control PCB). The PG interface card can be connected to the C-port only.
 - To remove the front cover, refer to the FRENIC-series Instruction Manual. For inverters with a capacity of 30 kW or above, open also the keypad enclosure.
- 3) Insert connector CNI1 on the back of the PG interface card into the C-port on the inverter's control PCB. Then tighten the two screws that come with the card.
 - Check that the positioning cutout is fitted on the tab and connector CNI1 is fully inserted. Do not connect the PG interface card to the ports other than C-port. Doing so may damage the card.
 - If necessary, please set change of the divided output with disconnection detection.
 - Refer to Section 8 "Setting."
- 4) Put the front cover back into place.
 - To put back the front cover, refer to the FRENIC-series Instruction Manual. For inverters with a capacity of 30 kW or above, close also the keypad enclosure.

8. Setting

8-1. Setting up the switch For OPC-PG3

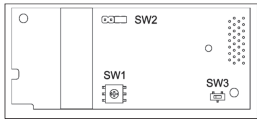


Figure 4 Location of the switch on OPC-PG3

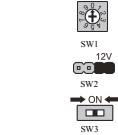


Figure 5 Switching example and factory default

Note Change the switch position using a tool with pointed end (end of tweezers, etc.) while taking care to avoid touching other electrical parts and so on. If the slider is in the center, this means that it is open. Push the slider in fully.

8-2. Switching between power supplies for PG

Before powering on the inverter, switch between power supplies for the PG using jumper SW2, referring Figure 6.

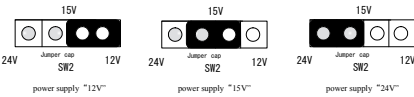


Figure 6 Configuration of Jumper SW2

Note When changing the output setting, set inverter output to OFF.

3. Product Guarantee

The product guarantee term is one year after installation or two years after manufacturing on the nameplate, whichever expires first. However, the guarantee will not apply in the following cases, even if the guarantee term has not expired.

- 1) The cause includes incorrect usage or inappropriate repair or modification.
- 2) The product is used outside the standard-specified range.
- 3) The failure is caused by dropping, damage or breakage during transportation after the purchase.
- 4) The cause is earthquake, fire, storm or flood, lightning, excessive voltage, or other types of disaster or secondary disasters.

4. Wiring

WARNING

In general, the covers of the control signal wires are not specifically designed to withstand a high voltage (i.e., reinforced insulation is not applied). Therefore, if a control signal wire comes into direct contact with a live conductor of the main circuit, the insulation of the cover might break down, which would expose the signal wire to a high voltage of the main circuit. Make sure that the control signal wires will not come into contact with live conductors of the main circuit.

Failure to observe this precaution could cause electric shock or an accident.

CAUTION

Noise may be emitted from the inverter, motor and wires. Take appropriate measures to prevent the nearby sensors and devices from malfunctioning due to such noise. An accident could occur.

Perform wiring properly, referring to the "Terminal Allocation and Symbol Diagram," "Terminal Specifications," and "Internal Block Diagram" shown below.

EA*	FA	FB*	FB-	FZ	FZ-	PO	CM	PA	PB	PZ
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Figure 2 Terminal Allocation and Symbol Diagram of OPC-PG3

Table 1 Terminal Specifications

Terminal Size	M2
Tightening Torque	0.22 to 0.25 N·m
Recommended Wire Gauge*	AWG16 to 26
Wire strip length	5 mm

* Installed wire with allowable temperature of 105°C (UL-listed are recommended).

5. Specifications

5-1. Specifications of applicable PG and PG interface card

Item	Specifications
PG output pulse frequency	30 kHz max. (Open collector) 100 kHz max. (Complementary)
Encoder pulse resolution	20 to 60000 P/R, A, B and Z phase (incremental)
Pulse output circuit	Open collector (Maximum cable length: 20 m) Complementary (Maximum cable length: 100 m)
Input pulse threshold	High level: 3V or more Low level: 3V or less
Pulse output current	8 mA max. (+12Vdc, +15Vdc) 20mA max. (+24Vdc)
PG power supply	+12Vdc/10% / 210mA or less +15Vdc/10% / 160mA or less +24Vdc/10% / 100mA or less

6. Storage Environment

6-1. Temporary Storage

Store the option card in an environment that satisfies the requirements listed in Table 2.

Item	Requirements
Storage Temperature * 1	-25 to 70°C
Relative humidity	5 to 95% * 2
Atmosphere	The inverter must not be exposed to dust, direct sunlight, corrosive or flammable gases, oil mist, vapor, water drops or vibration. The atmosphere must contain only a low level of salt (0.01 mg/m ³ or less per year)
Atmospheric pressure	86 to 106 kPa (in storage) 70 to 106 kPa (during transportation)

* 1 Assuming a comparatively short storage period (e.g., during transportation or the like)
* 2 Even if the humidity is within the specified requirements, avoid such places where the option card will be subjected to sudden changes in temperature that will cause condensation to form.

Precautions for temporary storage

- 1) Do not leave the inverter directly on the floor.
- 2) If the environment does not satisfy the specified requirements, wrap the option card in an airtight vinyl sheet or the like for storage.
- 3) If the option card is to be stored in an environment with a high level of humidity, put a drying agent (such as silica gel) in the airtight package described in item (2).

6-2. Long-term Storage

The long-term storage methods for the inverter vary largely according to the environment of the storage site. General storage methods are described below.

- 1) The storage site must satisfy the requirements specified for temporary storage.
- 2) The inverter must be stored in a package that is airtight to protect it from moisture. Include a drying agent inside the package to maintain the relative humidity inside the package to within 70%.
- 3) If the option card has been installed in the equipment or control board at a construction site where it may be subjected to humidity, dust or dirt, then remove the option card and store it in a suitable environment specified in Table 2.

8.5. Encoder installation and signal

The encoder shall rotate in the direction of Figure 8 when terminal FWD is ON. Encoder output pulse is shown the Figure 9. Connect the encoder directly to the motor using a coupling. If encoder rotation is different from Figure 8, change the parameter of H190. The rotational direction of IEC standard motors is opposite to Figure 8.

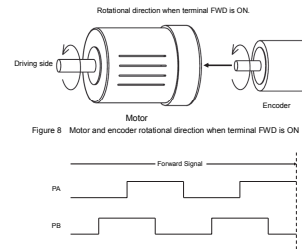


Figure 9 Encoder signals

7. Terminal Functions

Table 3 lists terminal specifications.

Terminal symbol	Name	Functions
[P+]	Power supply for encoder *1	DC12V/10%, max.210mA (Factory default setting) DC15V/10%, max.160mA DC24V/10%, max.100mA
[CM]	Common terminal of power supply	DC0V (GND for power supply)
[PA]	Pulse input terminal A	Input frequency max.30kHz (open-collector) Input frequency max.100kHz (Complementary)
[PB]	Pulse input terminal B	Complementary or open-collector
[PZ]	Pulse input terminal Z	Complementary or open-collector
[FA+]	Pulse output terminal FA(+)	Line Driver output (RS422)
[FA-]	Pulse output terminal FA(-)	Ratio of dividing frequency setting
[FB+]	Pulse output terminal FB(+)	I1, I2, I4, I8, I16, I32, I64, I128
[FB-]	Pulse output terminal FB(-)	Wavy accuracy: refer to Figure 3
[FZ+]	Pulse output terminal FZ(+)	Line Driver output (RS422)
[FZ-]	Pulse output terminal FZ(-)	FZ single output the pulse signal same as FZ signal. FZ signal can't divide by SW1

* 1 Turn the internal switch (SW2) to the proper position according to the PG power requirement. The factory default position is "12V."

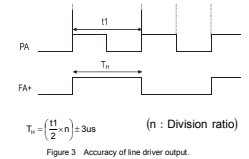


Figure 3 Accuracy of line driver output.

9. Drive Control

For details of PG interface functions available, refer to the FRENIC-series Instruction Manual, "Details of Function Codes" or the FRENIC-series User's Manual.

9-1. Speed control (Vector control with speed sensor)

The inverter detects the motor's rotational speed from PG feedback signals, decomposes the motor drive current into the exciting and torque current components, and controls each of components in vector. The vector control enables speed control with high accuracy and high response.

For settings and adjustments of the vector control, refer to FRENIC-series Instruction Manual and FRENIC-series User's Manual.

9-2. Connection diagram examples

Figure 10 shows the connection diagram example for speed control.

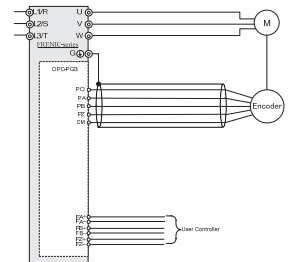


Figure 10 Basic Wiring Diagram.

Use shielding wire for wiring. The shield must be grounded. To prevent malfunction resulting from noise, try as best as possible to keep the PG interface card wiring separate from the main circuit wiring. Employ such measures as bundling wires as bundling wires inside the inverter to ensure that the PG interface card wiring does not come into direct contact with live parts of the main circuit (e.g., main circuit terminal blocks). If the wiring between the encoder and inverter is long, signal output from the encoder may malfunction as a result of A phase and B phase interference, possibly resulting in abnormal noise or torque pulsation. In a case such as this, improvements may be seen by significantly shortening the wiring length (review of wiring route) or using cables with low stray capacitance may be made. Review the shielding wire if the influence of noise remains significant even after taking the above measures.