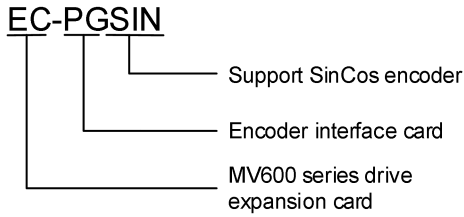


# EC-PGSIN

## User Manual

### 1 Product introduction

#### 1.1 Naming rules



#### 1.2 Function introduction

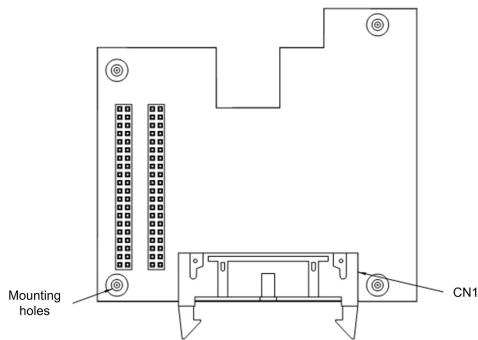
EC-PGSIN is option of MV600 series drive, its function is as follows:

1. Provide encoder interface PG1, support SinCos encoder as the motor speed and position feedback.
2. Provide pulse frequency dividing output of PG1, can be used for speed or position synchronization.
3. Provide pulse command interface PG2, can receive the pulse command of upper level device, can be used for speed or position command.

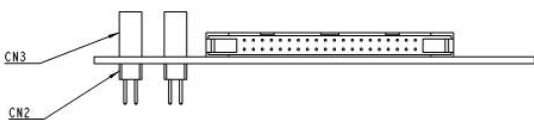
#### 1.3 Terminal description

##### 1.3.1 Terminal distribution

The front view of EC-PGSIN is shown below.



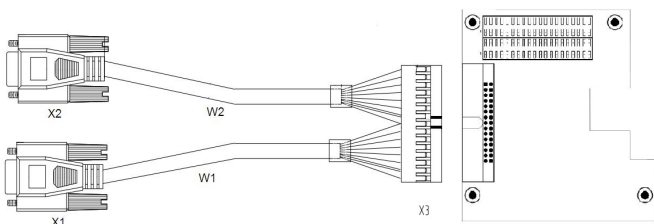
The side view is shown below.



Where CN1 is used to connect the adapter cable, CN2 is used to connect to the main control board of the drive, CN3 is used to connect other expansion boards, multiple expansion boards can be stacked on the drive by CN3.

##### 1.3.2 Pin definition

CN1 terminal can not be directly used as the terminal of the user, and must first be converted into two standard DB15 female connector with the adapter cable supplied with the card. Adapter cable is as shown below.



The adapter cable outputs two DB15 terminals, where X1 is female connector, it is used to connect the motor encoder PG1, and X2 is male connector, it is used for the motor synchronization, providing the PG1 pulse frequency dividing and receiving PG2 pulse command. The signal definition is as follows.

DB15 corresponding to X1 terminal signal definition is shown below.

X1 port definition		
Pin	Signal name	Signal description
1	GND	Ground
2	VCC	5V power output
3	NC	Empty
4	NC	Empty
5	SR+	Encoder SR+ signal
6	SR-	Encoder SR- signal
7	SD+	Encoder SD+ signal
8	SD-	Encoder SD- signal
9	SC+	Encoder SC+ signal
10	SC-	Encoder SC- signal
11	SB+	Encoder SB+ signal
12	SB-	Encoder SB- signal
13	SA+	Encoder SA+ signal
14	SA-	Encoder SA- signal
15	NC	Empty
Shell	Shield	Shield

DB15 corresponding to X2 terminal signal definition is shown below.

X2 port definition		
Pin	Signal name	Signal description
1	GND	Ground
2	VCC	5V power output
3	PZO+	Encoder frequency dividing output ZO+
4	PZO-	Encoder frequency dividing output ZO-
5	PBO+	Encoder frequency dividing output BO+
6	PBO-	Encoder frequency dividing output BO-
7	PAO+	Encoder frequency dividing output AO+
8	PAO-	Encoder frequency dividing output AO-
9	RZ+	Pulse command Z+
10	RZ-	Pulse command Z-
11	RB+	Pulse command B+
12	RB-	Pulse command B-
13	RA+	Pulse command A+
14	RA-	Pulse command A-
15	NC	Empty
Shell	Shield	Shield

##### 1.3.3 Signal description

CN1 is input terminal of encoder PG1 signal, CN2 is the frequency dividing output terminal of PG1 signal, and the input terminal of pulse command PG2 signal.

Input and output signals of CN1 and CN2 are described in the following table.

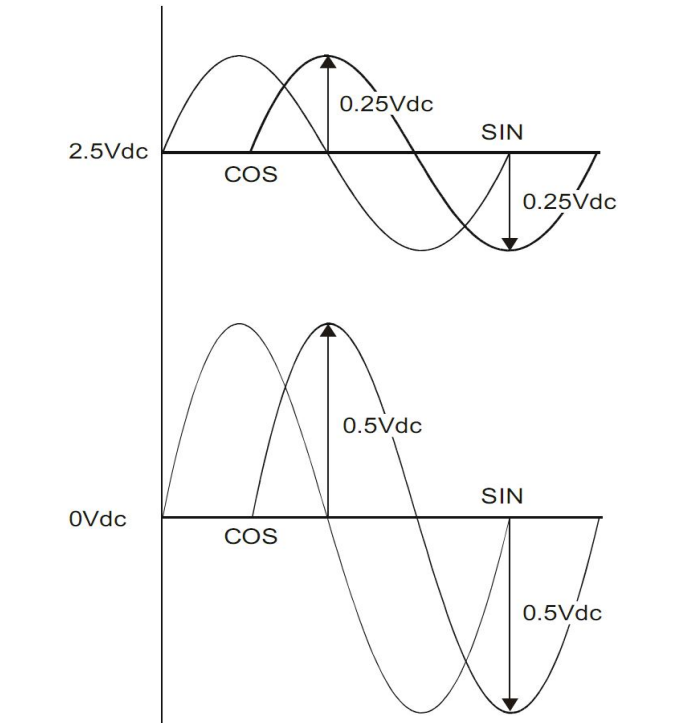
Signal	Description
PG1 input	SinCos encoder input signal, the maximum input frequency is 250K.
PG2 input	5V differential pulse command input signal, the maximum input frequency is 250K.
PG1 frequency dividing output	5V differential output signal, the frequency dividing coefficient is set by the function code.

##### SinCos encoder signal of PG1

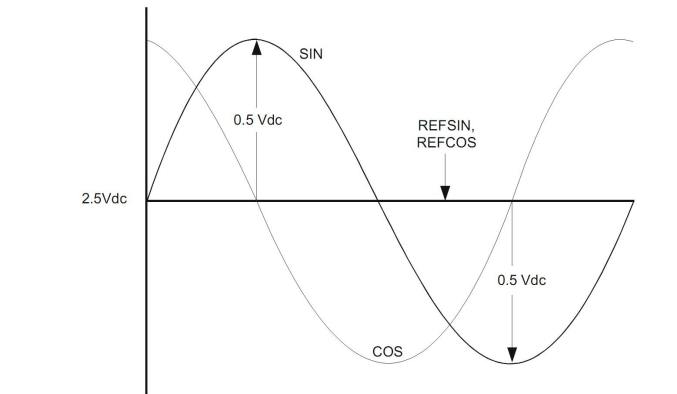
PG1 SinCos encoder interface can be connected to SinCos encoders of different manufacturers. The following are typical HEIDENHAIN and Sigg SinCos encoder signals.

HEIDENHAIN encoders typical signal is as follows. SinCos signals A, B are differential signals, a single-ended signal for each pair of differential signals is an offset of 2.5V, the amplitude is about 0.25V of SinCos signal, the differential signal is SinCos signal with amplitude of about 0.5V. In addition, HEIDENHAIN encoders usually provide C, D and R signals, C and D are also sine and cosine signals similar to A and B, the signal amplitude and offset are the same as A and B signals, which are used to indicate the

absolute position of the encoder, the encoder rotates once, and the C and D signals change one cycle. The R signal is similar to the Z signal in an incremental encoder, as a zero signal.

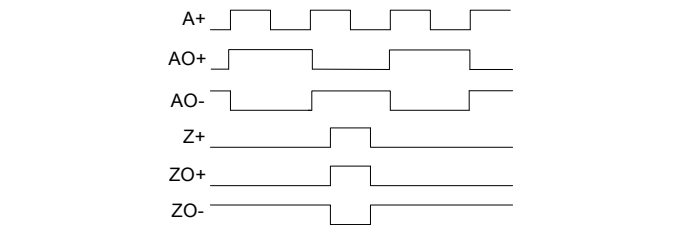


Sigg SinCos encoder signal is as follows, the biggest different with HEIDENHAIN encoders is single ended signal of SinCos signal A, B, for example, A- is not a SinCos signal, it is a signal fixed about 2.5V, and A + is a SinCos signal that offset is 2.5V and amplitude is 0.5V.



## 2 frequency dividing output signal of PG1

2 frequency dividing output signal waveform of PG1 is shown below.



B signal frequency dividing output is the same with A signal frequency dividing output.

### Note

1. A signal includes the A- and A + signal. B, C, D, R, AO, BO, ZO, RA, RB and RZ signal likewise.
2. Ensure that when A signal advances B signal, U signal advances V signal, V signal advances W signal.

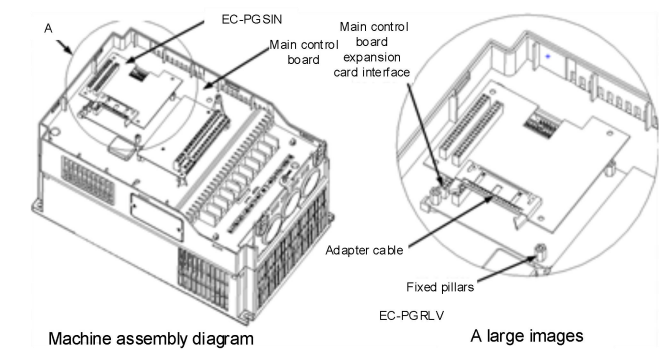
## 2 Installation

### 2.1 Accessory description

Accessory name	Specification	Quantity
Adapter cable	DuPont head, /DB15/50cm	1
Copper stud	M3*11	4
Screw	M3*8	4
User manual	A4*3	1

### 2.2 Installation method

EC-PGSIN is installed on the main control board CN4 slots (40 pin) of MV600, as shown below.



Main control board CN4 slot can stack two different option cards, the specific operation steps is divided into two.

#### Installation steps when expansion slot CN4 is not inserted card

1. Remove the drive cover, specific operation steps, see "MV600 High Performance Vector Control Variable Speed Drive User Manual".
2. Remove the original four screws of control board, then turn four short copper studs screw supplied with the card onto support of the main control board.
3. Insert EC-PGSIN into the expansion board slot of MV600 main control board.
4. Fix EC-PGSIN with screws.
5. Insert DuPont head terminal of encoder adapter cable into CN1 of EC-PGSIN, and lead two DB15 terminals out of the enclosure.
6. Connect the motor encoder cable to X1 DB15 terminal, if used for synchronous motor cable, connect the sync pulse signal cable to the X2 DB15 terminal.
7. Close the drive cover.

#### Installation steps when expansion slot is inserted card

1. Remove the drive cover, specific operation steps, see "MV600 High Performance Vector Control Variable Speed Drive User Manual".
2. Remove the original four screws of the inserted expansion card, then turn four short copper studs screw supplied with the card onto the mounting holes of the installed expansion card.
3. Insert EC-PGSIN into the slot which has installed option card and connected to main control board.
4. Fix EC-PGSIN with screws.
5. Insert DuPont head terminal of encoder adapter cable into CN1 of EC-PGSIN, and lead two DB15 terminals out of the enclosure.
6. Connect the motor encoder cable to X1 DB15 terminal, if used for synchronous motor cable, connect the sync pulse signal cable to the X2 DB15 terminal.
7. Close the drive cover. Because two option cards are inserted, the height may cause the cover unable to be closed.

### Note

1. All these operations must be performed when the drive is completely powered down, including encoder cable and sync signal pulse cable connections.
2. Output capability of EC-PGSIN 5V power supply is 200mA , please do not connect the load of more than the rated capacity.

### 3 EC-PGSIN function code list

EC-PGSIN function code list, as shown below.

Function code	Name	Setting range	Minimum unit	Default value	Change
P04.00	Speed feedback encoder selection	Unit place: Encoder selection of motor 1	1	00H	×
		0: Local differential encoder			
		1: X7 & X8 double-phase pulse input			
		2: Expansion encoder			
		Tens place: Encoder selection of motor 2			
		0: Local differential encoder			
		1: X7 & X8 double-phase pulse input			
		2: Expansion encoder			
P04.01	Number of pulses per revolution of local PG (Reserved)	1~10000	1	1024	○
P04.02	Rotation direction of local PG	0: A before B	1	0	×
		1: B before A			
P04.03	Filtering coefficient of local differential encoder	Unit place: High-speed filtering of local PG: 0~9	1	30	○
		Tens place: Low-speed filtering of local PG: 0~9			
P04.04	Expansion PG interface card type (R)(Reserved)	0: Digital incremental interface card	1	0	*
		1: SinCos card			
		2: Resolver card			
P04.05	Number of pulses per revolution of expansion PG1	1~10000	1	2048	○
P04.06	Rotation direction of expansion PG1	0: A before B	1	0	×
		1: B before A			
P04.07	Number of pulses per revolution of expansion PG2	1~10000	1	2048	○
P04.08	Rotation direction of expansion PG2	0: A before B	1	0	○
		1: B before A			
P04.09	Expansion PG signal enabled	Unit place: Expansion PG1 Z pulse enabled	1	10	×
		Tens place: Expansion PG1 UVW signal enabled			
		Hundreds place: Expansion PG2 Z pulse enabled			
P04.10	Expansion PG signal filtering coefficient	Unit place: High-speed filtering of expansion PG1: 0~9	1	30	○
		Tens place: Low-speed filtering of expansion PG1: 0~9			
		Hundreds place: High-speed filtering of expansion PG2: 0~9			
		Thousands place: Low-speed filtering of expansion PG2: 0~9			
P04.11	Number of pulses per revolution of X7/X8	1~9999	1	1024	×
P04.12	Quadrature encoding direction of X7/X8	0: X7 before X8	1	0	×
		1: X8 before X7			
P04.13	Filtering coefficient of	Unit place: High-speed filtering of X7/X8: 0~9	1	30	○

	X7/X8	Tens place: Low-speed filtering of X7/X8: 0~9			
P04.14	Frequency division coefficient	0~4096	1	1	×
P04.15	Encoder wire-break detection time	0.0: Disabled	0.1	0	×
		0.1~10.0 s			
P04.16	Encoder wire-break protection action	0: Coast to stop (Er.PG1 or 2)	1	1	○
		1: Switch to SVC running (reserved)			

#### Description

- : Means the function code can be changed during running.
- ×: Means the function code can be changed in the stop state.
- \*: Means the function code can be read only, can not be changed.
- For details, refer to "MV600 High Performance Vector Control Variable Speed Drive User Manual".

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