Instruction Manual

OPC-LM1-ID

Option Card for Frequency Divider

⚠ CAUTION

- Deliver this instruction manual without fail to those who actually operate the equipment.
- Read this operation manual and understand the description before installing, connecting (wiring), operating or performing maintenance and inspection of the option.
- Keep this instruction manual in a safe place until the option is discarded.
- The product is subject to change without prior notice.

Fuji Electric FA Components & Systems Co., Ltd. **INR-SI47-1088-E**

Preface

Thank you for purchasing our OPC-LM1-ID inverter option card. Before using the option card, read this manual carefully to understand how to use the option card correctly. Improper handling blocks correct operation or causes a short life or breakdown. This manual does not describe how to use the inverter. Refer to the FRENIC-Lift Instruction Manual for details about the inverter. Keep this manual on hand for reference when using the option card.

Safely Precautions

Note the following items when using the option card. Improper use may result in unexpected failure, electric shock, or possible injury.

(1) Application

WARNING
•This product must not be used for any lifesupport system or other purpose directly related to human safety. •Although this product is manufactured under strict quality control, be sure to install appropriate safety devices for applications where drive failure could result in serious accident or material loss. **An accident could occur.**

(2) Installation and Wiring

WARNING
• Wait at least five minutes after turning off the power before installing or wiring the option card. Use a multimeter or similar instrument to check the voltage before performing installation or wiring. (Check whether the charge lamp goes off.), **othewise electric shock may occur.** • Discharge statistic electricity from your body before handling the option card. Never touch the option card with wet hands, **othewise accident or electric shock may occur.** • No foreign matter such as screws, metal patches, lint, chips, and dust in the option card. **There is risk of fire or accident.** • Do not damage or stress the wiring, **othewise accident or electric shock may occur.** • Do not connect the reducer between the motor and the encoder. **There is a risk of accident.**

CAUTION
• Do not install or operate a damaged option card or one that is lacking parts, **othewise injury may occur.** • Since noise is generated by the inverter, motor, and wiring, carefully monitor surrounding sensors and devices for abnormal operation. **There is a risk of accident.**

(3) Operation

WARNING
• Check and adjust parameters before operation. Improper parameters may cause an unexpected action for some machines. **There is a risk of accident.**

CAUTION
• High-speed operation can be set easily for the inverter. Fully check motor or device performance before changing the setup, **othewise accident may occur.**

(4) Maintenance and Inspection, and Parts Replacement

WARNING
• Wait at least five minutes after turning off the power before inspecting the option card. (Check whether the charge lamp goes off.) **There is a risk of electric shock.** Only authorized personnel are allowed to maintain and inspect the option card and replace parts, **othewise electric shock or injury may occur.** • Never modify the option card, **othewise electric shock or injury may occur.**

CAUTION
• Do not execute a megger test (insulation resistance measurement).

(5) Discard

CAUTION
• Since the option card uses soldering lead, treat it as an industrial waste when discarding it.

Contents

If anything is unclear about the option card or there is something doubtful about its condition, contact your distributor or our nearest branch office.

1. General Information

1.1. Introduction to OPC-LM1-ID

This product is a palse generate output card installed in Fuji inverter FRENIC-Lift and it can output the divided encoder pulse signal.

1.2. Inverter Software Version Requirements

This option can be used for inverter software version LM1S10600 or later. To check the inverter software version, follow one of the following methods:

- Maintenance menu of multi-function keypad panel
- Use M25 through communications to check.
- Use FRENIC Loader to check.

1.3. Before Using the Option Card

Check the items described below when you receive this product. Also check whether this product has been damaged during transport. If anything is amiss, contact your distributor or our nearest branch office.

(1) The option card is contained in the package.
(2) The option card is not damaged during transportation-no defective electronic devices, dents or warps.
(3) The model name "OPC-LM1-ID" is printed on the option card. (See Figure 1.1)

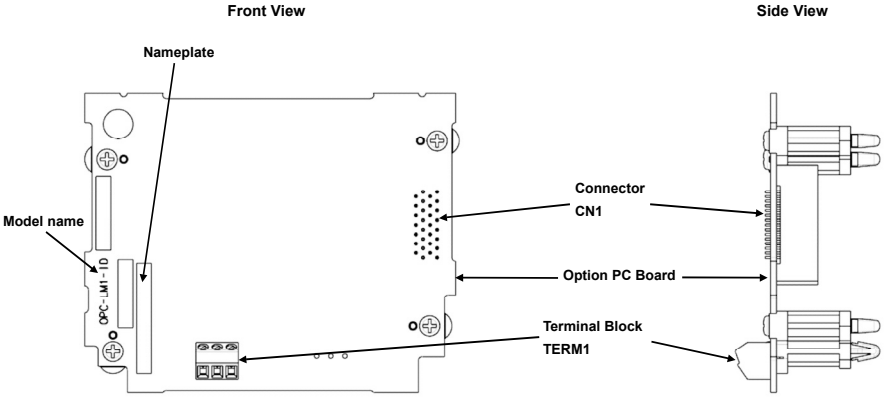


Figure 1.1 Product Appearance.

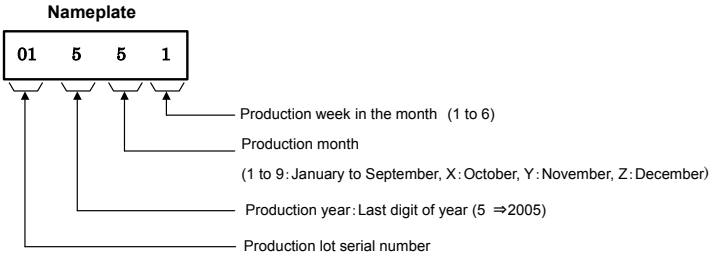
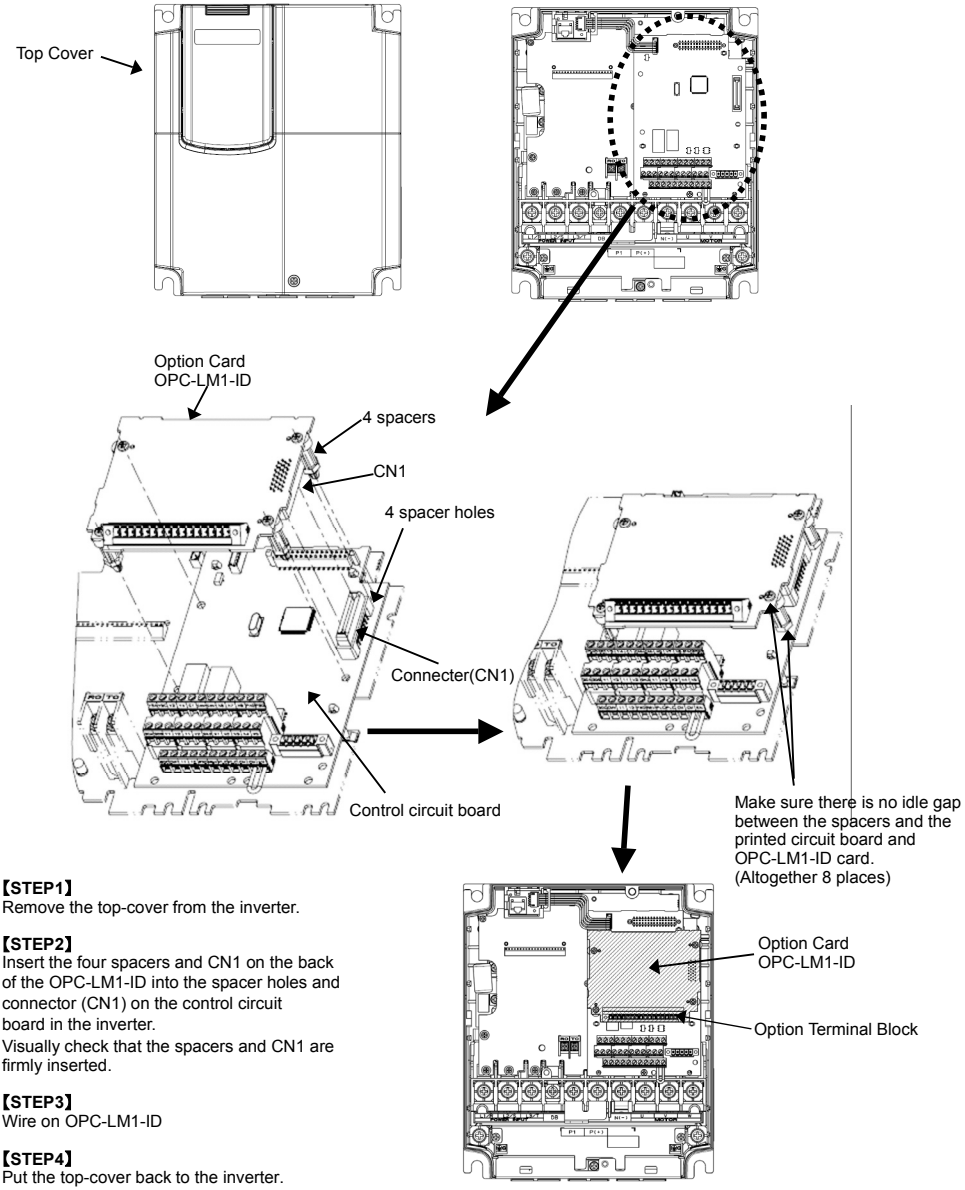


Figure 1.2 Nameplate.

1.4. Installation Procedure

WARNING
• Turn off the power and wait for at least five minutes before starting installation. Further, check that the LED monitor is unlit, and check the DC link circuit voltage between the P (+) and N (-) terminals to be lower than 25 VDC. **Otherwise, electric shock could occur.**



【STEP1】
Remove the top-cover from the inverter.

【STEP2】
Insert the four spacers and CN1 on the back of the OPC-LM1-ID into the spacer holes and connector (CN1) on the control circuit board in the inverter.
Visually check that the spacers and CN1 are firmly inserted.

【STEP3】
Wire on OPC-LM1-ID

【STEP4】
Put the top-cover back to the inverter.

Figure 1.3 Installation drawing

1.5. 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, lightening, excessive voltage, or other types of disaster or secondary disasters.

2. Specifications

2.1. Storage Environment

2.1.1. Temporary Storage

Store the option card in an environment that satisfies the requirements listed in Table 2.1.

Table 2.1 Environmental requirements for storage and transportation

Item	Requirements	
Storage Temperature *1	-25 to 70°C	Location where the option card is not subject to abrupt changes in temperature that would result in the formation of condensation or ice.
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/cm^2 or less per year)	
Atmospheric pressure	86 to 106 kPa (in strage)	
	70 to 106 kPa (during transportation)	

*1 Assuming a comparatively short storage period (e.q., 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).

2.1.2. 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 2.1.

2.2. Operating Environment

Install the inverter in an environment that satisfies the requirements listed inTable 2.2.

Table 2.2 Environment requirements

Item	Specifications
Location	Indoors
Ambient temperature	-10 to 45°C
Relative humidity	5 to 95% (No condensation)
Atmosphere	The option card must not be exposed to dust, direct sunlight, corrosive gases, flammable gas, oil mist, vapor or water drops. The atmosphere must contain only a low level of salt. (0.01 mg/cm^2 or less per year) The inverter must not be subjected to sudden changes in temperature that will cause condensation to form.
Altitude	1,000 m max. (Note 1)
Vibration	3mm (Max. amplitude):2Hz to 9Hz, 9.8m/s^2:9Hz to 20Hz, 2m/s^2:20Hz to 55Hz 1m/s^2:55Hz to 200Hz

(Note 1) If you use the inverter in an altitude above 1000 m, you should apply an output current derating factor as listed in Table 2.3.

Table 2.3 Output Current Derating Factor in Relation to Altitude

Altitude	Output current derating factor
1000 m or lower	1.00
1000 to 1500 m	0.97
1500 to 2000 m	0.95
2000 to 2500 m	0.91
2500 to 3000 m	0.88

2.3. Terminal Arrangement

FA	FB	CM

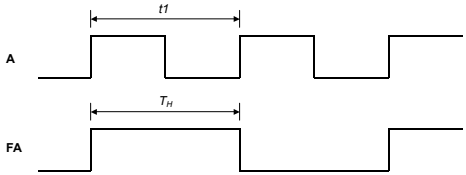
Figure 2.1 Terminal arrangement

2.4. Terminal Function and Specifications

Table 2.4 Terminal function and electrical specification of OPC-LM1-ID

Terminal Symbol	Contents	Specifications
FA	Frequency divider output terminal	・Transistor output (Open collector) ・Output frequency : max 100kHz ・Operation voltage of ON level : max 27V ・Operation voltage of OFF level : max 2.0V ・Load current at ON : max 50mA ・Leakage current at OFF : max 200 μ A ・ Ratio of dividing frequency setting *n* *n* =1, 2, 4, 8, 16, 32, 64 Wavy accuracy : refer to *A
FB	Frequency divider output terminal	
CM	FA, FB common terminal	

***A（The accuracy of output terminal FA, FB）**



$$T_H = \left(\frac{t1}{2} \times n\right) \pm 3\text{us}$$

$(n:$ Frequency divider ratio$)$

2.5. Block Diagram

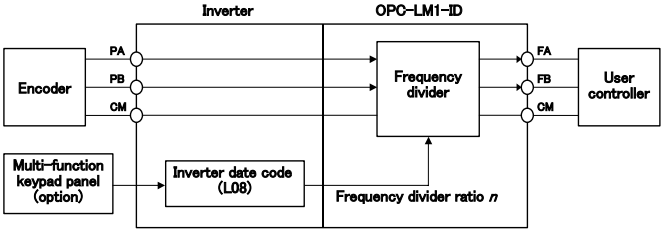


Figure 2.5 Block Diagram

2.6. Function Code Setting

The frequency divider ratio *n* is set with function setting.

Table 2.6 Frequency divider ratio *n*

Function code	LCD Dispiay (Note 1)	*n*
L08	0 : 1/1（Factory setting）	1
	1 : 1/2	2
	2 : 1/4	4
	3 : 1/8	8
	4 : 1/16	16
	5 : 1/32	32
	6 : 1/64	64

(Note 1) Can be set or checked, using the multi-function keypad panel (option).

3. Wiring

CAUTION
• Check the wiring again before operating the inverter. Improper wiring may cause unexpected inverter operation or device operation. **There is a risk of accident or injury.**

3.1. Wiring Length and Cable Size

Table 3.1 Maximum wiring length

Item	Specification
The maximum wiring length between option card (terminal FA,FB) and user controller	5m

3.2. Basic Wiring Diagram

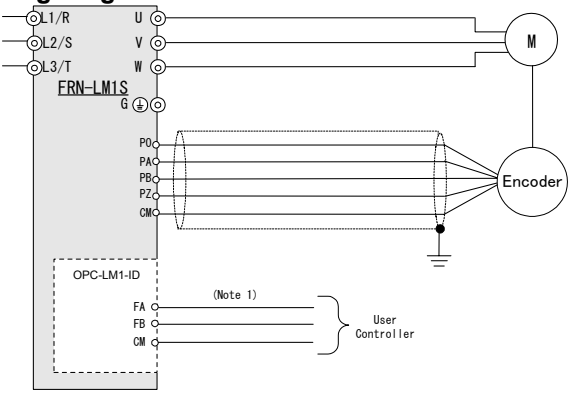


Figure 3.1 Basic Wiring Diagram.

(Note 1) It is recommended that terminal FA,FB are pulled up with lowest value of resistor with the sink current not exceeding 50mA when terminal FA,FB are used.
If malfunctions are caused due to noise in the FA, FB output signal, use shielded cables for the wiring between the option card (terminal FA, FB) and user controller, and connect the shield to the CM terminal on the inverter side. But, the improvement effect is various.

4. Terminals

4.1. Applicable terminal plugs

Table 4.1 Applicable plug model

Terminal Plugs Type	Company
SMKDS1/3-3.81	Phoenix Contact

Specification of plug

Table 4.2 Specification of plug

Item	Specification
Tightening torque	0.22 to 0.25 N・m
Size of screw	M2
Bared wire length	7mm
The applicable maximum wire size	AWG16

(Note) Insert the wire into the upper side of the metal bracket on the terminal block, and tighten the screw.