



VECTOR INVERTER

-INSTRUCTION MANUAL-

ADDITIONAL OPEN COLLECTOR OUTPUT
/ PLG PULSE DIVISION OUTPUT

FR-V5AY

Thank you for choosing the Mitsubishi vector inverter option unit.

This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum.

Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect this product until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.

In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

SAFETY INSTRUCTIONS

1. Electric Shock Prevention

WARNING

- While power is on or when the inverter is running, do not open the front cover. You may get an electric shock.
- Do not run the inverter with the front cover removed. Otherwise, you may access the exposed high-voltage terminals and charging part and get an electric shock.
- If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.
- Before starting wiring or inspection, switch power off, wait for more than 10 minutes, and check for no residual voltage with a tester or the like.



WARNING

- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the option unit before wiring. Otherwise, you may get an electric shock or be injured.
- Handle this option unit with dry hands to prevent an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise, you may get an electric shock.

2. Injury Prevention



CAUTION

- Apply only the voltage specified in the instruction manual to each terminal to prevent burst, damage, etc.
- Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.
- Always make sure that polarity is correct to prevent burst, damage, etc.
- While power is on or for some time after power-off, do not touch the inverter as it is hot and you may get burnt.

3. Additional instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.:

(1) Transportation and mounting



CAUTION

- Do not install or operate the option unit if it is damaged or has parts missing.
- Do not stand or rest heavy objects on the product.
- Check that the mounting orientation is correct.
- Prevent screws, metal fragments or other conductive bodies or oil or other flammable substance from entering the inverter.

(2) Test operation and adjustment



CAUTION

- Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

(3) Usage

WARNING

- Do not modify the equipment.

CAUTION

- When parameter clear or all parameter clear is performed, each parameter returns to the factory setting. Re-set the required parameters before starting operation.
- For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.

(4) Maintenance, inspection and parts replacement

CAUTION

- Do not test the equipment with a megger (measure insulation resistance).

(5) Disposal

CAUTION

- Treat as industrial waste.

(6) General instruction

All illustrations given in this manual may have been drawn with covers or safety guards removed to provide in-depth description. Before starting operation of the product, always return the covers and guards into original positions as specified and operate the equipment in accordance with the manual.

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1. PRE-OPERATION INSTRUCTIONS

1.1 Unpacking and Product Confirmation

Take the option unit out of the package, check the unit name, and confirm that the product is as you ordered and intact.

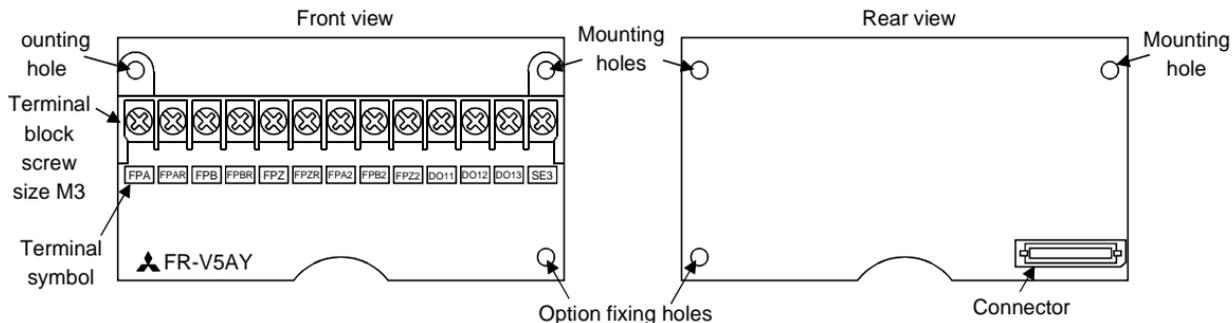
This product is an option unit designed for exclusive use in the Mitsubishi FR-V500 series vector inverter. Functions available differ, before using it, always make the following checks.

1.2 Packing Confirmation

Make sure that the package includes the following

- Instruction manual1
- Mounting screws M3 × 102

1.3 Structure



2.INSTALLATION

2.1 Pre-Installation Instructions

Make sure that the input power of the inverter is off.



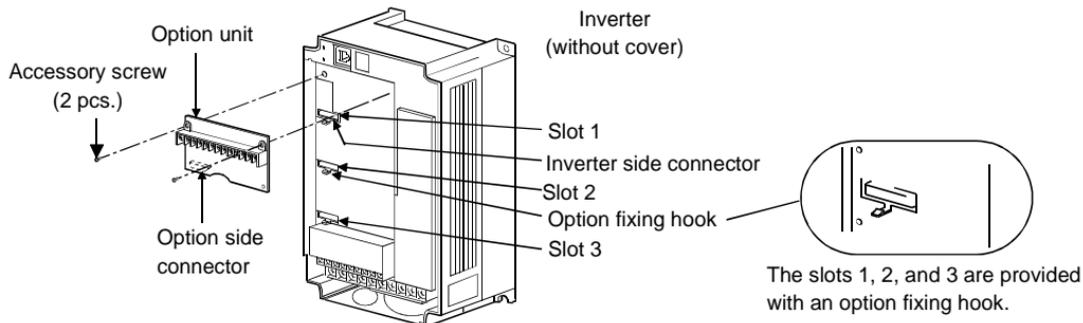
CAUTION



With input power on, do not install or remove the option unit. Otherwise, the inverter and option unit may be damaged.

2.2 Installation Procedure

- (1) Securely insert the connector of the option unit far into the connector of the inverter. At this time, fit the option fixing holes snugly.
Also be sure to fit the unit into the option fixing hook.
- (2) Securely fix the option unit to the inverter on both sides with the accessory mounting screws. If the screw holes do not match, the connector may not have been plugged snugly. Check for loose plugging.



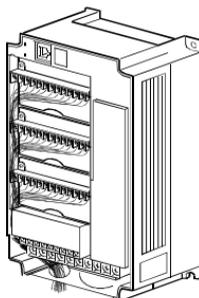
CAUTION

1. Only one type of option per inverter may be used. When two or more options are mounted, priority is in order of slots 1, 2 and 3, the options having lower priority are inoperative.
2. When the inverter cannot recognize that the option is mounted, it displays the option error. The errors shown differ according to the mounting slots 1, 2, 3.

Mounting Position	Error Display
Slot 1	E.OP1
Slot 2	E.OP2
Slot 3	E.OP3

2.3 Wiring

Route the wires so that they do not take up a large space in the control circuit terminal block of the option unit. During wiring, do not leave wire off-cuts in the inverter. They may cause a fault, failure or malfunction. Use the space on the left side of the Control circuit terminal unit to route the wires.



Cable routing

REMARKS

The wires with large gauge may not be connected to the terminal block. When connected in parallel, all wires may not fit in the wiring space due to the increased number of wires. In such cases, perform wiring by using a junction terminal block.



CAUTION



When installing the inverter front cover, the cables to the inverter's control circuit terminals and option terminals should be routed properly in the wiring space to prevent them from being caught between the inverter and its cover.

3.ADDITIONAL OPEN COLLECTOR OUTPUT

3.1 Overview

Three terminal output points can be added by making the assignment of the output terminals using Pr. 410 to Pr. 412 (output terminal function selection). At this time, since four more points can be chosen with Pr. 190 to Pr. 192 and Pr. 195 (output terminal function selection) of the inverter, a total of seven output terminals are available.

3.2 Explanation of the Terminals

Terminal Symbol	Terminal Name	Rated Current, etc.	Description
DO11	Multi-function output terminal	Open collector output Permissible load 24VDC, max. 100mA	Set function assignment in Pr. 410 to Pr. 412 (output terminal function selection).
DO12			
DO13			
SE3	Open collector output common	—	Common terminal for the DO11, DO12 and DO13 terminals. Isolated from the common of the control circuit. Do not earth this terminal.

3.3 Related Parameters

Parameter Number	Name	Factory Setting	Setting Range	Minimum Setting Increments
410	DO11 terminal function selection	9999	0 to 199, 9999	1
411	DO12 terminal function selection	9999	0 to 199, 9999	1
412	DO13 terminal function selection	9999	0 to 199, 9999	1

REMARKS

For Pr.410 to Pr.412, write is disabled during operation even when "2" is set in Pr.77. When changing the parameter setting, stop the operation.

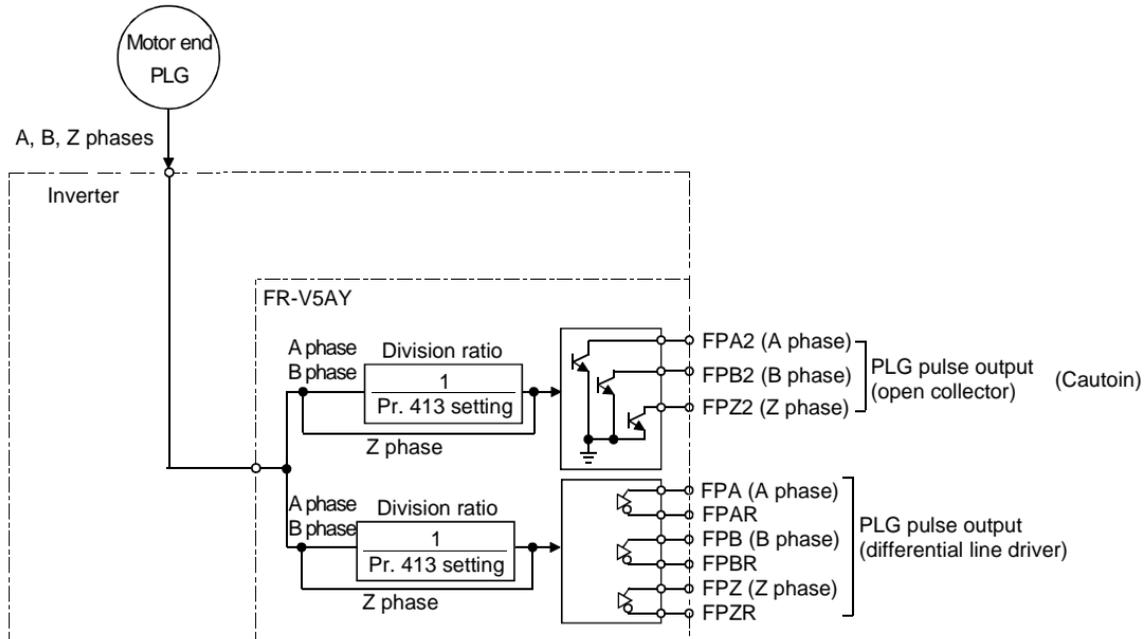
3.4 Setting

The functions of the DO11, DO12 and DO13 output terminals can be assigned individually. The settings of Pr. 410 to Pr. 412 (output terminal function selection) are the same as those of Pr. 190 to Pr. 192 and Pr. 195 (output terminal function selection). For details of Pr. 190 to Pr. 192 and Pr. 195, refer to the Inverter Instruction Manual (basic).

4. PLG PULSE DIVISION OUTPUT

The PLG pulse input connected to the inverter can be divided and output from the terminals of the option.

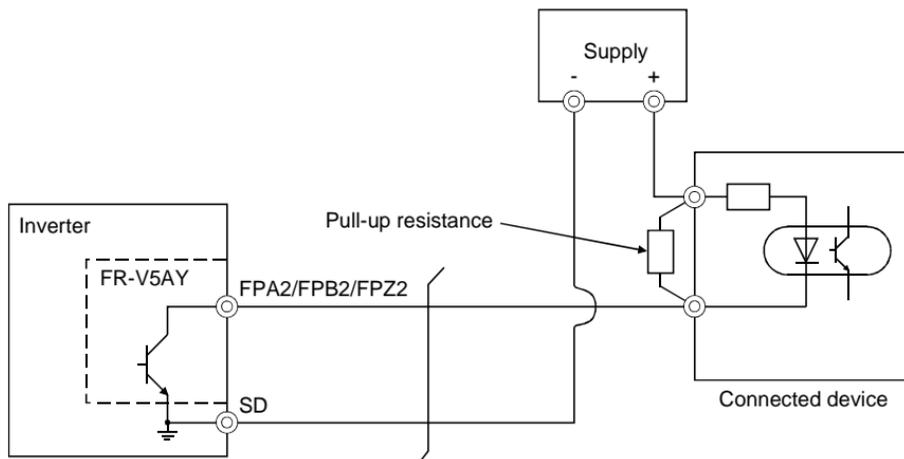
4.1 Block Diagram



CAUTION

For open collector output, the signal becomes unstable when the input resistance of the connected device is high, resulting in miss detection of the signal. This may be improved by connecting the pull-up resistance.

Select the resistance value of the pull-up resistance considering the input current of the connected device so that the open collector output current does not exceed the permissible output load current.



4.2 Explanation of the Terminals

Output the A-phase, B-phase and Z-phase (origin and mark pulse) signals from the PLG. The A-phase and B-phase signals can be divided by the ratio (1/n) and output. n = 1 to 32767 (integer). Set the ratio in Pr. 413 "PLG pulse division ratio".

This PLG pulse division output function uses the following terminals.

- Open collector

Terminal Symbol	Terminal Name	Rated Current, etc.	Remarks
FPA2	A-phase output terminal	Open collector output Permissible load 24VDC, max. 50mA	The common terminal is the SD terminal of the inverter.
FPB2	B-phase output terminal		
FPZ2	Z-phase output terminal		

- Differential line driver

Terminal Symbol	Terminal Name	Rated Current, etc.	Remarks
FPA	Differential A-phase output terminal	Differential output Permissible load 0.1A	-
FPAR	Differential A-phase inverse signal output terminal		
FPB	Differential B-phase output terminal		
FPBR	Differential B-phase inverse signal output terminal		
FPZ	Differential Z-phase output terminal		
FPZR	Differential Z-phase inverse signal output terminal		

* The division ratio setting is same for open collector output and differential line driver output.

4.3 Related Parameters

Parameter Number	Name	Factory Setting	Setting Range	Minimum Setting Increments
413	PLG pulse output division ratio	1	1 to 32767	1

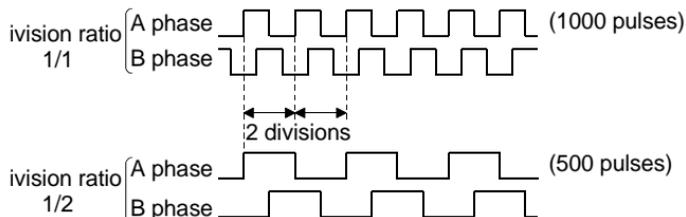
(1) Pr. 413 "PLG pulse output division ratio"

The signals of motor end PLG pulses can be divided and output at the division ratio set in Pr. 413. Used to lower the response level of the machine to which pulses are input, for example.

(2) Division waveforms according to the division ratio

Both the ON and OFF widths are multiplied by the set value. (50% duty)

- Pulse waveform when Pr. 413 = 2 (ON/OFF example at input of 1000 pulses)



REMARKS

Forward/reverse rotation control is exercised according to the phase difference between the A and B phases.

- When the A phase leads the B phase by 90° : Forward rotation
- When the A phase lags the B phase by 90° : Reverse rotation

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Oct., 2001	IB(NA)-0600085-A	First edition