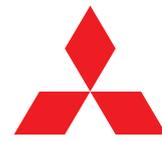




for a greener tomorrow



**MITSUBISHI ELECTRIC**

*Changes for the Better*

FACTORY AUTOMATION

New Product RELEASE

No.19-4E

# INVERTER FR-A800 Plus

Optimum functions for logistics and transportation



# A800 Plus

for Automated warehouse



**WARNING** Risk of injury and electric shock

- Read the manual and follow the safety instructions before use.
- Isolate from supply and wait 10 minutes before opening this cover.
- Ensure proper earth connection.

**CAUTION** Risk of fire

- Mount the inverter on a non-combustible surface.

**WARNING** Il y a un risque de blessure physique et de choc électrique

- Avant de travailler, lisez le manuel et suivez les instructions de sécurité.
- Isoler de l'alimentation et attendez 10 minutes avant d'ouvrir la couverture.
- Assurez la bonne connexion terre à la terre.

**AVERTISSEMENT** Il y a un risque d'un feu

- Montez le variateur de vitesse sur une surface non-combustible.

**注意** (1) 人身の怪我や感電の危険があります。

- 作業を行う前に、必ず取扱説明書（マニュアル）を十分に読んでください。
- 電源から切り離し、10分程度電源オフ（冷却）を待たせてからカバーを開けてください。
- 必ず適切な接地（アース）を行ってください。

**注意** (2) 火災の危険があります。

- インバータを燃焼性材料の上に設置しないでください。

**注意** (3) 作業時、必ず安全作業を行ってください。

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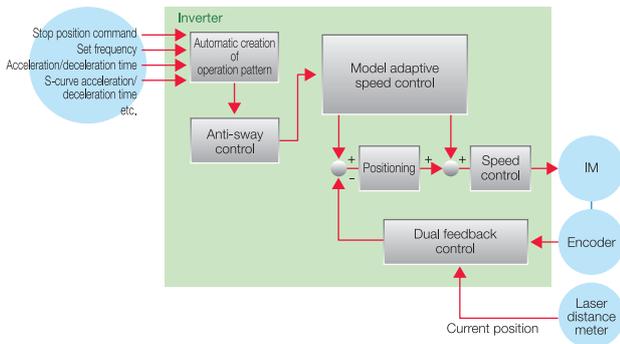
# Release of the new inverter for logistics and transportation

The FR-A800-AWH inverters are ideal for logistics and transportation, supporting dual feedback control, full-closed control, and nine types of distance sensors.



Stacker cranes store and retrieve goods quickly and steadily in automated warehouses. Each stacker crane controls three axes: the lift axis to move the carriage up and down, the fork axis to move the fork in and out of the rack, and the travel axis to move the shuttle car. The FR-A800-AWH inverter is used to stop the shuttle car exactly at the intended position with its full-closed control to detect the actual position using a distance meter, and dual feedback control.

Controlling operation using easy programs contributes to reduction in design costs.



## Full-closed control

This function is used to operate logistics/transport equipment in combination with distance meters and the host controller. The logistics/transport equipment is moved while position loop is compensated by inputting the feedback of the position detected by the distance meter.

## Dual feedback control

Changes in the distance meter feedback used for position control can be suppressed. This function is useful when the values measured by the distance meter are not stable and operation becomes unstable.

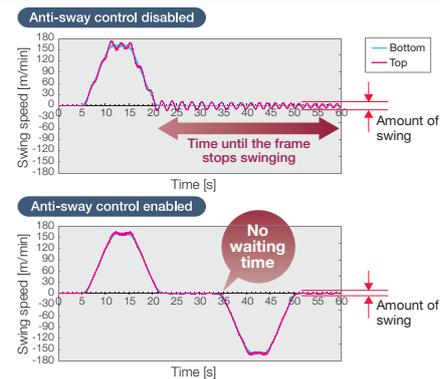
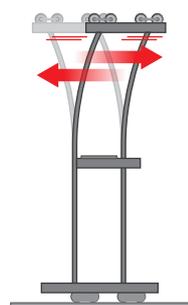
## Reducing tact time

### ■ Anti-sway control

This function minimizes the swinging of the crane frame while the shuttle car is traveling. This will contribute to tact time reduction as less time is required for the swinging to stop.

### ■ S-curve acceleration/deceleration

The patterns of S-curve acceleration/deceleration can be selected. It is possible to prevent load shifting during transportation.





# A800 Plus

A new lineup of dedicated inverters for specialized fields are born! Plus! The optimum functions for each dedicated field are added to the already high performance and high functionality FR-A800 series inverter.

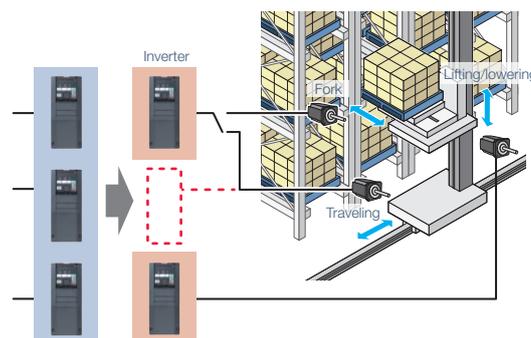
## Contributing to the cost reduction

### Selecting fork control

The fork of logistics/transport equipment is moved based on the set frequency while the start command is given through communication.

Three inverters are used to control the travel axis, lift axis, and fork axis. Alternatively, it is possible to use two inverters to control the three axes. The inverter for the travel axis motor or the lift axis motor can be used for the fork axis motor.

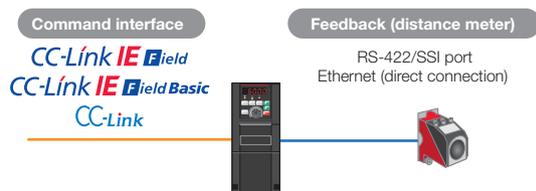
Controlling three motors by two inverters contributes to cost reduction.



## System support

### Network

The master gives the start command, speed command, or stop position command to the inverters through communication for the driving control.



Type	Network	Remarks
Command interface	CC-Link IE Field	When used with FR-A8NCE
	CC-Link IE Field Basic	Ethernet models only
	CC-Link	When used with FR-A8NC
Feedback (distance meter)	RS-422	RS-485 models only
	Ethernet	Ethernet models only
	SSI	When used with FR-A8APS-02

## Easy setup

### Communication registers

The inverter supports special commands for logistics/transport applications such as the 32-bit stop position command, the acceleration/deceleration time command, and the command used to monitor the current value.

Easy controller programming reduces the setup effort.

## Slippage prevention

### Brake sequence

This function is useful in preventing load slippage at a start due to poor mechanical brake timing and overcurrent alarm in stop status and enable secure operation. (This function is enabled when full-closed control is selected.)

## Improved environmental resistance

### Circuit board coating

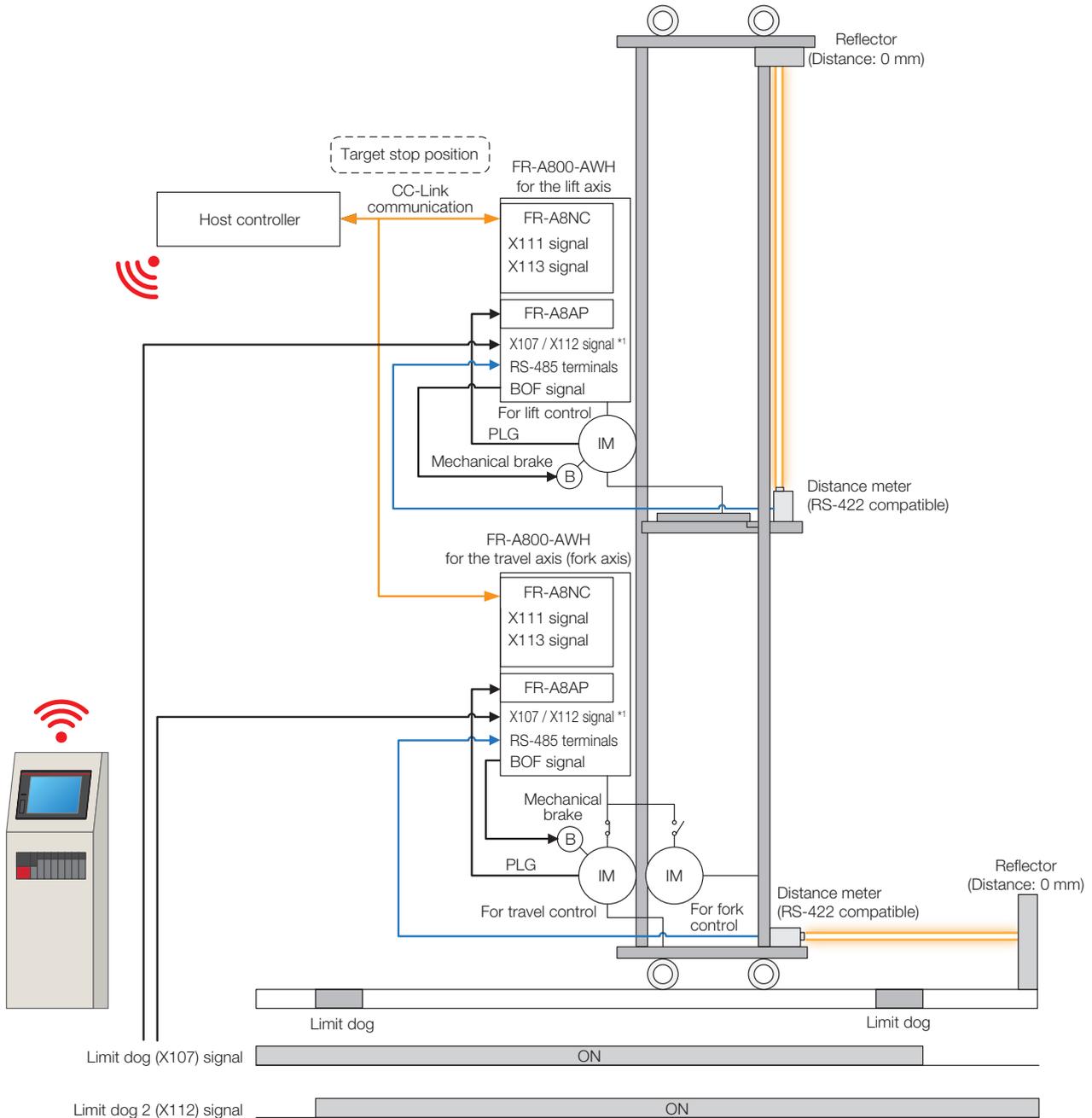
Using the inverter in the dusty environment may cause fault such as a short circuit.

Inverters with circuit board coating (conforming to IEC 60721-3-3 3C2/3S2) and plated conductors ensure reliability even in poor environments.

("-60" or "-06" is affixed to the end of the inverter model name.)

# System configuration diagram

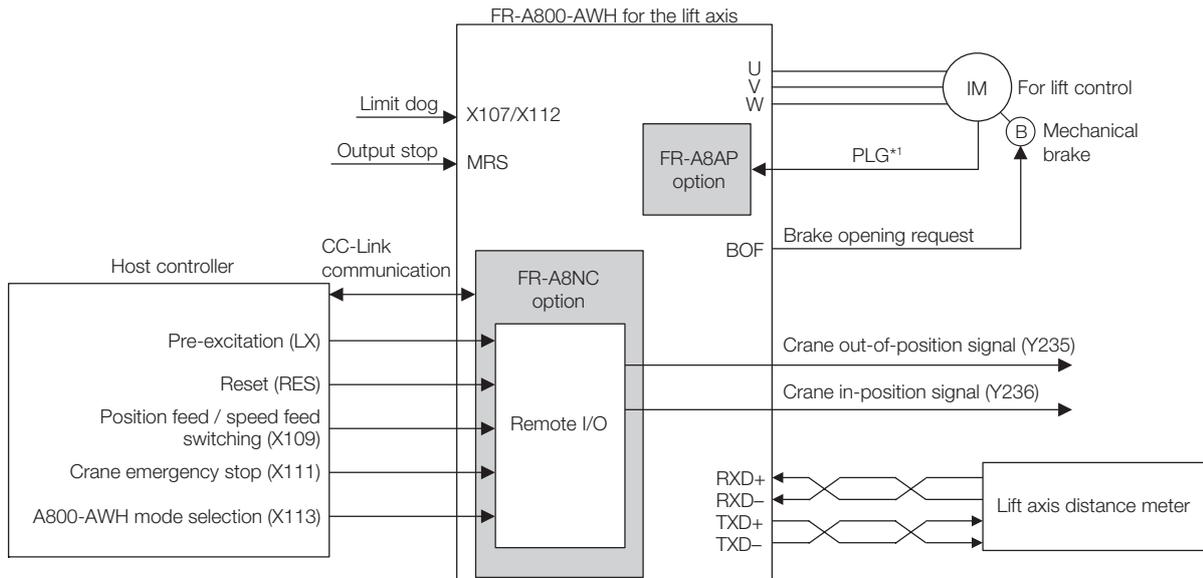
Communication with the host controller: CC-Link, communication with the distance meter: RS-422



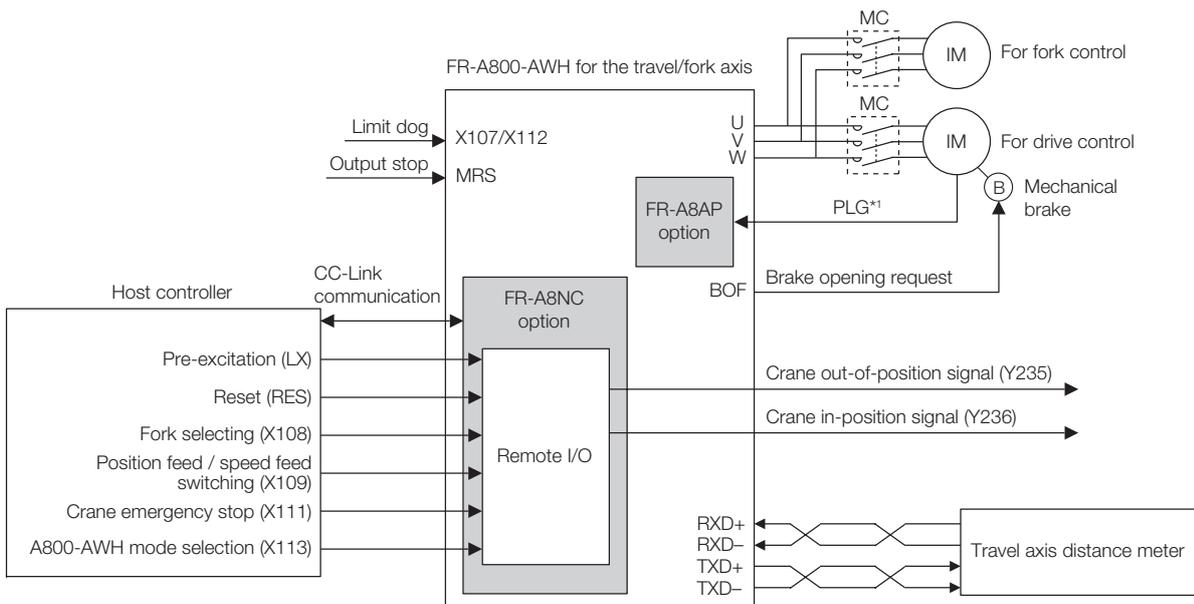
\*1: To use the inverter safely, it is recommended to use the Limit dog (X107) signal and the Limit dog 2 (X112) signal.

# Terminal connection diagrams

## Wiring example of a lift axis inverter



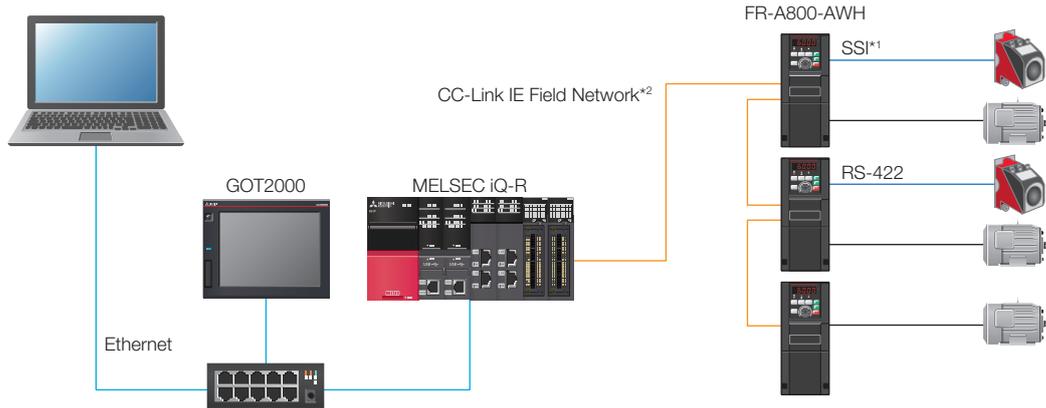
## Wiring example of a travel/fork axis inverter



\*1: A separate power supply of 5 V / 12 V / 15 V / 24 V is necessary according to the encoder power specification.

# Application example

## FR-A8NCE (CC-Link IE Field Network communication)



\*1: When the FR-A8APS-02 is used.  
 \*2: For compatible command interfaces, refer to page 3.

### Compatible FR-A8NCE

The FR-A8NCE manufactured in November 2019 or later can be used. Check the SERIAL number indicated on the circuit board for the production year and month. Compatibility depends on the SERIAL number as shown in the table on the right.

SERIAL number of the FR-A8NCE	FR-A800-AWH
<input type="checkbox"/> 9 X ○○○ or earlier (October 2019 or earlier)	Not compatible (E1 error)
<input type="checkbox"/> 9 Y ○○○ or later (November 2019 or later)	Compatible

### SERIAL example of the FR-A8NCE



The SERIAL consists of one symbol, two characters indicating the production year and month, and three characters indicating the control number. The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).

## Supported distance meter models

Inverter	Distance meter			
	Model	Manufacturer	Measurement method	Communication method
RS-485 model	DME5000*1	SICK	Laser	RS-422
	OLM100-1003	SICK	Laser (reading bar codes)	
	DL100pro*2	SICK	Laser	
	AMS300i*3	Leuze	Laser	
	CEV58M-00884	TR-electronic	Absolute encoder	
Ethernet model	AMS308i*4	Leuze	Laser	Ethernet
RS-485 model/ Ethernet model (only when used with the FR-A8APS-02)	BPS307i	Leuze	Laser (reading bar codes)	SSI
	AMS304i	Leuze	Laser	
	CMV58M-00002	TR-electronic	Absolute encoder	

\*1: DME5000-113 and DME5000-213 support the inverter.  
 \*2: DL100-21AA2103, DL100-21HA2103, DL100-22AA2103, DL100-22HA2103, DL100-23AA2103, and DL100-23HA2103 support the inverter.  
 \*3: AMS300i-40H, AMS300i-120H, AMS300i-200H, and AMS300i-300H support the inverter.  
 \*4: AMS308i-40H, AMS308i-120H, AMS308i-200H, and AMS308i-300H support the inverter.

## Lineup

Outline dimensions are the same as those of FR-A800 series inverters.  
Some functions are restricted. (For details of parameters and differences with the FR-A800 series, refer to the Instruction Manual.)

# FR - A 8 2 0 - 0.4K - 1 - [ ] AWH

Symbol	Voltage class	Symbol	Structure/function	Capacity*1	Description	Symbol	Type*2	Communication type	Symbol	Circuit board coating (IEC60721-3-3 C2/S2 compatible)	Plated conductor	Symbol	Dedicated function
2	200 V class	0	Standard model	0.4K to 90K	Inverter ND rated capacity (kW)	1	FM	RS-485	None	Without	Without	AWH	Logistics/ transport model
4	400 V class					2	CA		60	With			
						E1	FM	Ethernet	06*3				
						E2	CA						

Three-phase 200 V class FR-A820-□*4	00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-phase 400 V class FR-A840-□*4	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

●: Released model

\*1: Models can be alternatively indicated with the inverter rated current (SLD rating).

\*2: Specification differs by the type as follows.

\*3: Available for the 5.5K or higher.

\*4: For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.

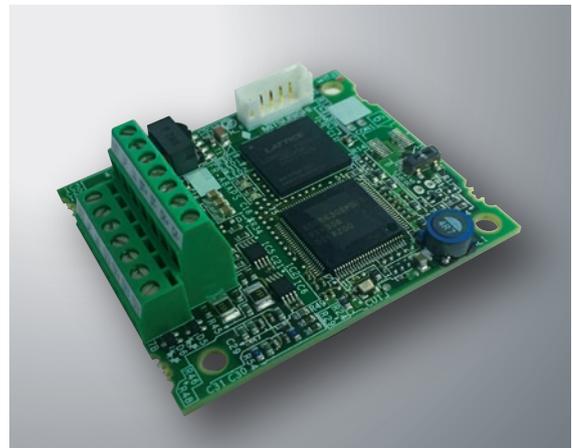
Type	Monitor output	Initial setting			
		Built-in EMC filter	Control logic	Rated frequency	Pr.19 Base frequency voltage
FM (terminal FM equipped model)	Terminal FM: pulse train output Terminal AM: analog voltage output (0 to ±10 VDC)	OFF	Sink logic	60 Hz	9999 (same as the power supply voltage)
CA (terminal CA equipped model)	Terminal CA: analog current output (0 to 20 mADC) Terminal AM: analog voltage output (0 to ±10 VDC)	ON	Source logic	50 Hz	8888 (95% of the power supply voltage)

## Plug-in option for SSI communication

### FR-A8APS-02

Distance meters other than those specified on page 6 with SSI interface can be used when the following requirements are met.

Specification	Requirement
Distance meter type	Laser/barcode/encoder
Data rate	0.1/0.2/1.0 MHz
Data code format	Binary data / gray code
Effective data length	8 to 46 bits
Resolution (encoder)	4096



Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001 (standards for quality assurance management systems).



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