

# New Model Added to the FR-A800 Series with High Functionality and High Performance

The slim model has been added to the 400 V class separated converter type inverters.



FR-CC2M-H315K

FR-A842M-06440(315K)

## ■ Slim structure

Downsizing of the enclosure contributes to cost reduction and the electric room's space saving.

## ■ Bus bar connection

Bus bar connection improves the storage efficiency.

## Benefits

### Contributing to the cost reduction of the enclosure

Side by side installation and bus bar connection between terminals P/+ and N/- can reduce the distance between units to 20 mm.

Improved storage efficiency makes the enclosure downsized, which contributes to cost reduction.

### Wire and space saving

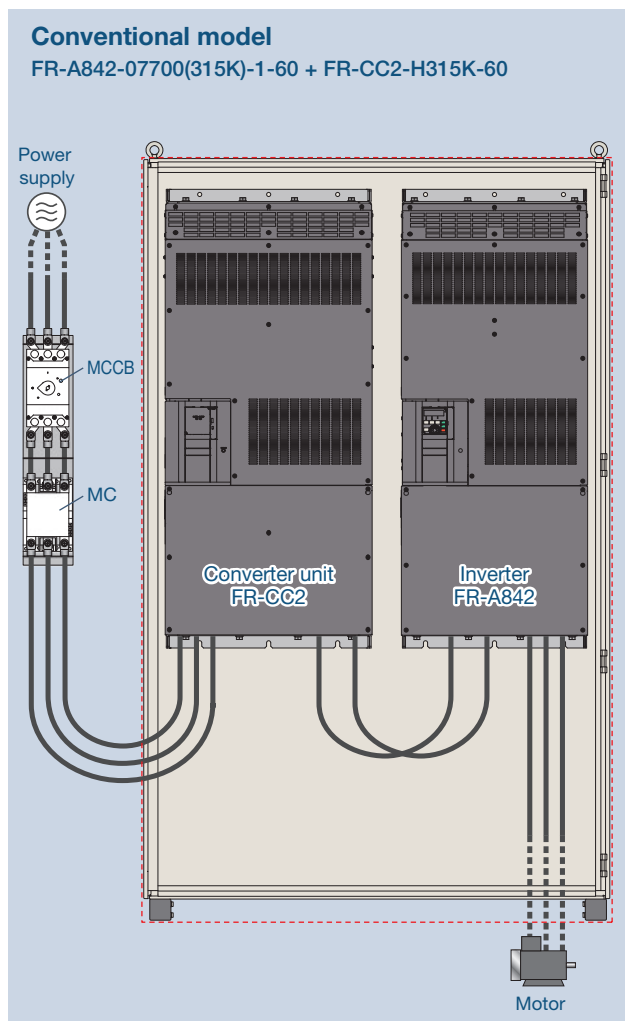
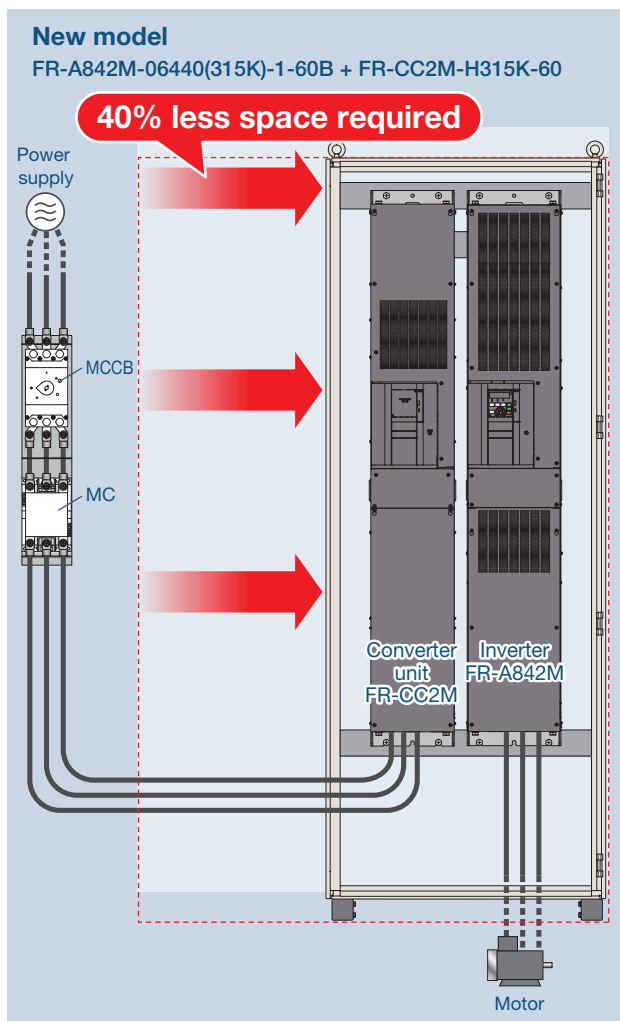
A DC reactor and an EMC filter are built in the converter unit. The inverter with built-in brake transistor is also available.\*

\*: The FR-A842M-06440(315K) or lower has the built-in brake transistor.

Installation space and wiring work for stand-alone options are not required.

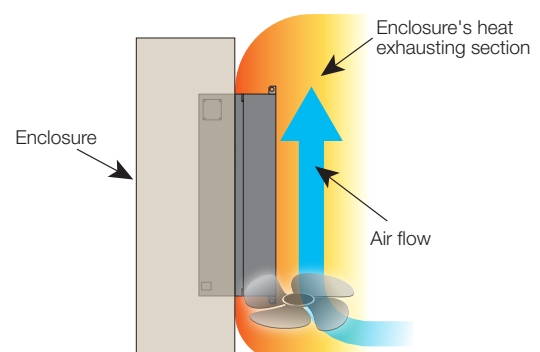


Product view without upper main circuit terminal cover (front)  
(Bus bars are not provided with the product.)



### Higher safety and reliability

- The charged sections are covered, ensuring the safety during maintenance of the enclosure.
- The heat exhausting section (heat sink) is separated from other sections inside the inverter. The enclosure can be downsized and have the higher protective structure by protruding the heat exhausting section (using the panel through attachment (to be supported)).



## Rated specification

### Inverter

Model FR-A842M-[]		05080	05720	06440	07260	08170	09080	10160
		250K	280K	315K	355K	400K	450K	500K
Applicable motor capacity (kW) <sup>*1</sup>	SLD	280	315	355	400	450	500	560
	ND (initial setting)	250	280	315	355	400	450	500
Rated capacity (kVA) <sup>*2</sup>	SLD	387	436	491	553	623	692	774
	ND (initial setting)	351	387	436	491	553	623	692
Rated current (A) <sup>*3</sup>	SLD	508	572	644	726	817	908	1016
	ND (initial setting)	454	508	572	644	726	817	908
Overload current rating <sup>*4</sup>	SLD	110% 60 s (inverse-time characteristics) at surrounding air temperature of 40°C						
	ND (initial setting)	150% 60 s (inverse-time characteristics) at surrounding air temperature of 40°C						
Rated voltage <sup>*5</sup>	Three-phase 380 to 500 V							
Regenerative braking torque <sup>*6</sup> (when used with the converter unit (FR-CC2M))	Brake transistor	Built-in (Built-in brake transistor model only)			FR-BU2 (option)			
	Maximum brake torque	10% torque, continuous						
Power supply voltage	430 to 780 VDC							
Control power supply auxiliary input	Single-phase 380 to 500 V, 50/60 Hz <sup>*7</sup>							
Permissible control power supply auxiliary input fluctuation	Frequency ±5%, voltage ±10%							
Protective structure	Open type IP20 (for IEC 60529 only) <sup>*8</sup>							
Cooling system	Forced air							
Noise level (dB) <sup>*9</sup>	73.5	73.5	73.5	81.8	81.8	84.4	84.4	
Approx. mass (kg) <sup>*10</sup>	125(130)	125(130)	125(130)	155	155	180	180	

\*1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric standard 4-pole motor.

\*2: The rated output capacity is the value with respect to 440 V output voltage.

\*3: Possible output currents during continuous operation under Real sensorless vector control, Vector control, or PM sensorless vector control are shown in the following tables.

PWM carrier frequency	05080		05720		06440		07260		08170		09080		10160	
	SLD	ND	SLD	ND	SLD	ND	SLD	ND	SLD	ND	SLD	ND	SLD	ND
2 kHz	421 A	454 A	474 A	508 A	534 A	572 A	602 A	644 A	678 A	726 A	753 A	817 A	843 A	908 A
4 kHz	254 A	227 A	286 A	254 A	322 A	286 A	363 A	322 A	408 A	363 A	454 A	408 A	508 A	454 A

The PWM carrier frequency is automatically decreased to 2 kHz for heavy duty applications when operating the motor under Real sensorless vector control, Vector control, or PM sensorless vector control with a PWM carrier frequency of more than 6 kHz (**Pr.72 PWM frequency selection** ≥ 6). The carrier frequency stays at 4 kHz in fast-response operation.

\*4: The percentage of the overload current rating is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

\*5: The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about  $\sqrt{2}$ .

\*6: Value for the ND rating.

\*7: For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**. (For details, refer to the Instruction Manual (Detailed).)

\*8: FR-DU08: IP40 (except for the PU connector)

\*9: Values measured 1 m in front of the inverter and 1.6 m from the floor.

\*10: The value in the parentheses is the approx. mass of the built-in brake transistor model.

### Converter unit

Model FR-CC2M-H[] (12P)		250K	280K	315K	355K	400K	450K	500K	560K	
Applicable motor capacity (kW)		250	280	315	355	400	450	500	560	
Output	Overload current rating <sup>*1</sup>	150% 60s							110% 60s	
	Rated voltage <sup>*2</sup>	430 to 780 VDC <sup>*3</sup>								
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50/60 Hz								
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50/60 Hz								
	Permissible frequency fluctuation	±5%								
	Rated input current (A)	454	508	572	644	726	817	908	1016	
Power supply capacity (kVA) <sup>*4</sup>		351	387	436	491	553	623	692	774	
Protective structure		Open type IP20 (for IEC 60529 only) <sup>*5</sup>								
Cooling system		Forced air								
DC reactor		Built-in								
Noise level (dB) <sup>*6</sup>		76.5	76.5	76.5	81.4	81.4	81.4	81.4	81.4	
Approx. mass (kg)		125	125	130	190	190	190	200	200	

\*1: The percentage of the overload current rating is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the converter unit and the inverter to return to or below the temperatures under 100% load.

\*2: The converter unit output voltage varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by  $\sqrt{2}$ .

\*3: The permissible voltage imbalance ratio is 3% or less.

(Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)

\*4: The power supply capacity is the value at the rated output current. The input power impedances (including those of the input reactor and cables) affect the value.

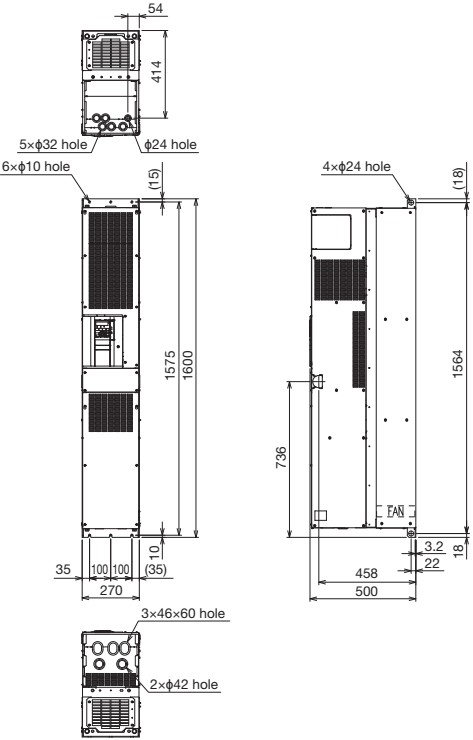
\*5: FR-DU08: IP40 (except for the PU connector)

\*6: Values measured 1 m in front of the converter unit and 1.6 m from the floor.

## Outline dimension drawings

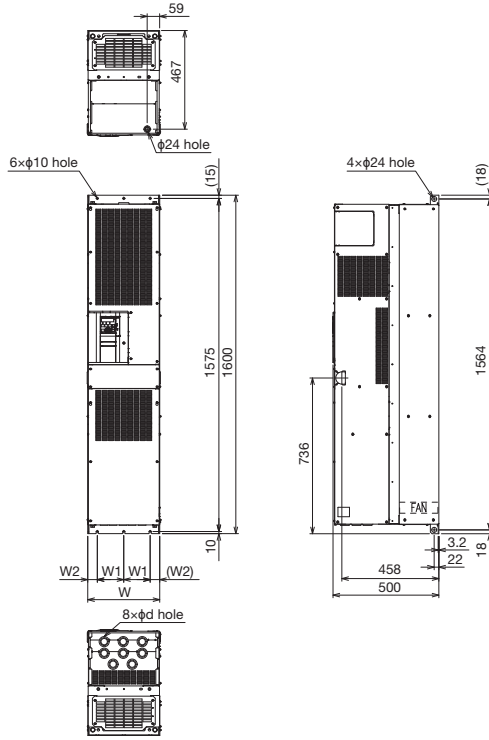
### Inverter

FR-A842M-05080(250K) to 06440(315K)



(Unit:mm)

FR-A842M-07260(355K) to 10160(500K)

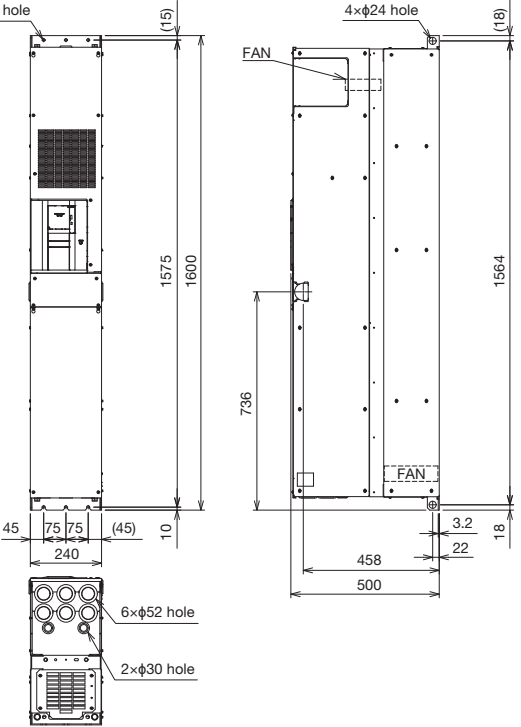


Inverter model	W	W1	W2	d
FR-A842M-07260(355K), 08170(400K)	340	125	45	38
FR-A842M-09080(450K), 10160(500K)	400	150	50	42

(Unit:mm)

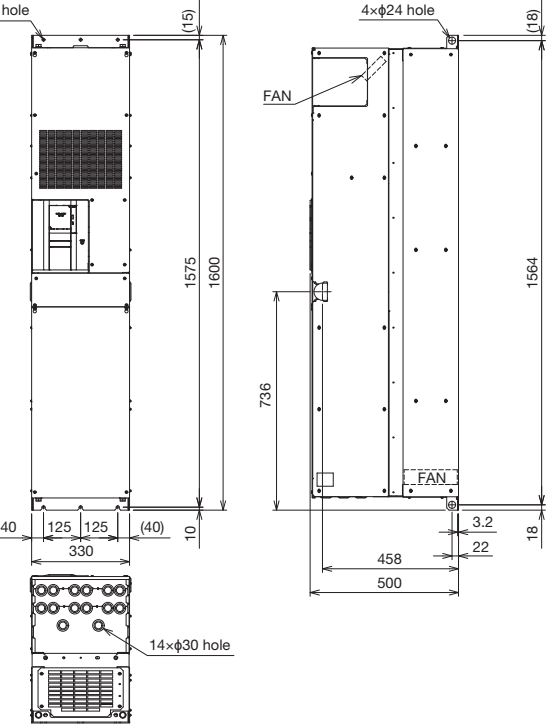
### Converter unit

FR-CC2M-H250K to H315K



(Unit:mm)

FR-CC2M-H355K to H560K



(Unit:mm)

## Major differences

### Comparison with FR-A840

Item	FR-A840	FR-A842M
Pr.30 Regenerative function selection	Setting range "0 to 2, 10, 11, 20, 21, 100 to 102, 110, 111, 120, 121" Initial value "0"	Setting range "2, 10, 11, 102, 110, 111" Initial value "10"
Pr.70 Special regenerative brake duty	With the parameter	With the parameter* <sup>1</sup>
Monitor function (Pr.52, Pr.54, Pr.158, Pr.774 to Pr.776, Pr.992, Pr.1027 to Pr.1034)	Regenerative brake duty: Available	Regenerative brake duty: Available* <sup>1</sup>
Input terminal function selection (Pr.178 to Pr.189)	DC feeding operation permission (X70) and DC feeding cancel (X71): Available	DC feeding operation permission (X70) and DC feeding cancel (X71): Not available
Pr.187 MRS terminal function selection	Initial value "24" (MRS)	Initial value "10" (X10)
Output terminal function selection (Pr.190 to Pr.196, Pr.313 to Pr.322)	Instantaneous power failure/undervoltage (IPF), regenerative brake pre-alarm (RBP), DC feeding (Y85), main circuit capacitor life (Y87), inrush current limit circuit life (Y89): Available	Instantaneous power failure/undervoltage (IPF), regenerative brake pre-alarm (RBP) <sup>1</sup> , DC feeding (Y85), main circuit capacitor life (Y87), inrush current limit circuit life (Y89): Not available
Pr.192 IPF terminal function selection	Initial value "2" (IPF)	Initial value "9999" (No function)
Inrush current limit circuit life display, Main circuit capacitor life display (Pr.256, Pr.258, Pr.259)	With the parameter	Without the parameter
Pr.599 X10 terminal input selection	Initial value "0" (NO contact specification)	Initial value "1" (NC contact specification)
Pr.872 Input phase loss protection selection	With the parameter	Without the parameter
Warning, protective function	Regenerative brake pre-alarm (RB), instantaneous power failure (E.IPF), undervoltage (E.UVT), input phase loss (E.ILF), brake transistor alarm detection (E.BE), inrush current limit circuit fault (E.IOH): Available	Regenerative brake pre-alarm (RB)* <sup>1</sup> , instantaneous power failure (E.IPF), undervoltage (E.UVT), input phase loss (E.ILF), brake transistor alarm detection (E.BE)* <sup>1</sup> , inrush current limit circuit fault (E.IOH): Not available

\*1: The function is available for the built-in brake transistor model only.

### Comparison with FR-A842

Item	FR-A842	FR-A842M
Compatible converter unit* <sup>1</sup>	FR-CC2	FR-CC2M
Surrounding air temperature	LD, ND (initial setting), HD: -10°C to +50°C (non-freezing) SLD: -10°C to +40°C (non-freezing)	-10°C to +55°C* <sup>2,3</sup> (non-freezing)
Storage temperature	-20°C to +65°C	-40°C to +65°C
Altitude	Maximum 2500 m* <sup>3</sup>	Maximum 4000 m* <sup>4</sup>
Protective structure	Open type (IP00)	Open type IP20 (for IEC 60529 only)
Brake transistor (brake resistor usable)	Not provided	Built-in* <sup>5</sup>
Output terminal function selection (Pr.190 to Pr.196, Pr.313 to Pr.322)	Regenerative brake pre-alarm (RBP): Not available	Regenerative brake pre-alarm (RBP)* <sup>5</sup> : Available
PWM carrier frequency automatic reduction function (Pr.260 PWM frequency automatic switchover)	Current value to enable the function for each rating: 85% or higher	Current value to enable the function for each rating: Output frequency ≤ 5 Hz: 50% or higher 5 Hz < Output frequency ≤ 10 Hz: 60% or higher 10 Hz < Output frequency: 70% or higher
Multiple rating (Pr.570 Multiple rating setting)	SLD, LD, ND (initial setting) and HD ratings Setting range "0 to 3"	SLD and ND (initial setting) ratings Setting range "0 or 2"
Warning	Regenerative brake pre-alarm (RB): Not available	Regenerative brake pre-alarm (RB)* <sup>5</sup> : Available
Protective function	Brake transistor alarm detection (E.BE): Not available	Brake transistor alarm detection (E.BE)* <sup>5</sup> : Available
Internal circuit fault (E.13)	Main circuit fuse melting detection: Not available	Main circuit fuse melting detection: Available

\*1: The FR-A842 inverters cannot be used with the FR-CC2M converter units, and the FR-A842M inverters cannot be used with the FR-CC2 converter units.

\*2: For use at a temperature above 40°C, consider a 2% reduction in the rated current per 1°C increase in temperature.

\*3: -10°C to +50°C when the safety stop function is used.

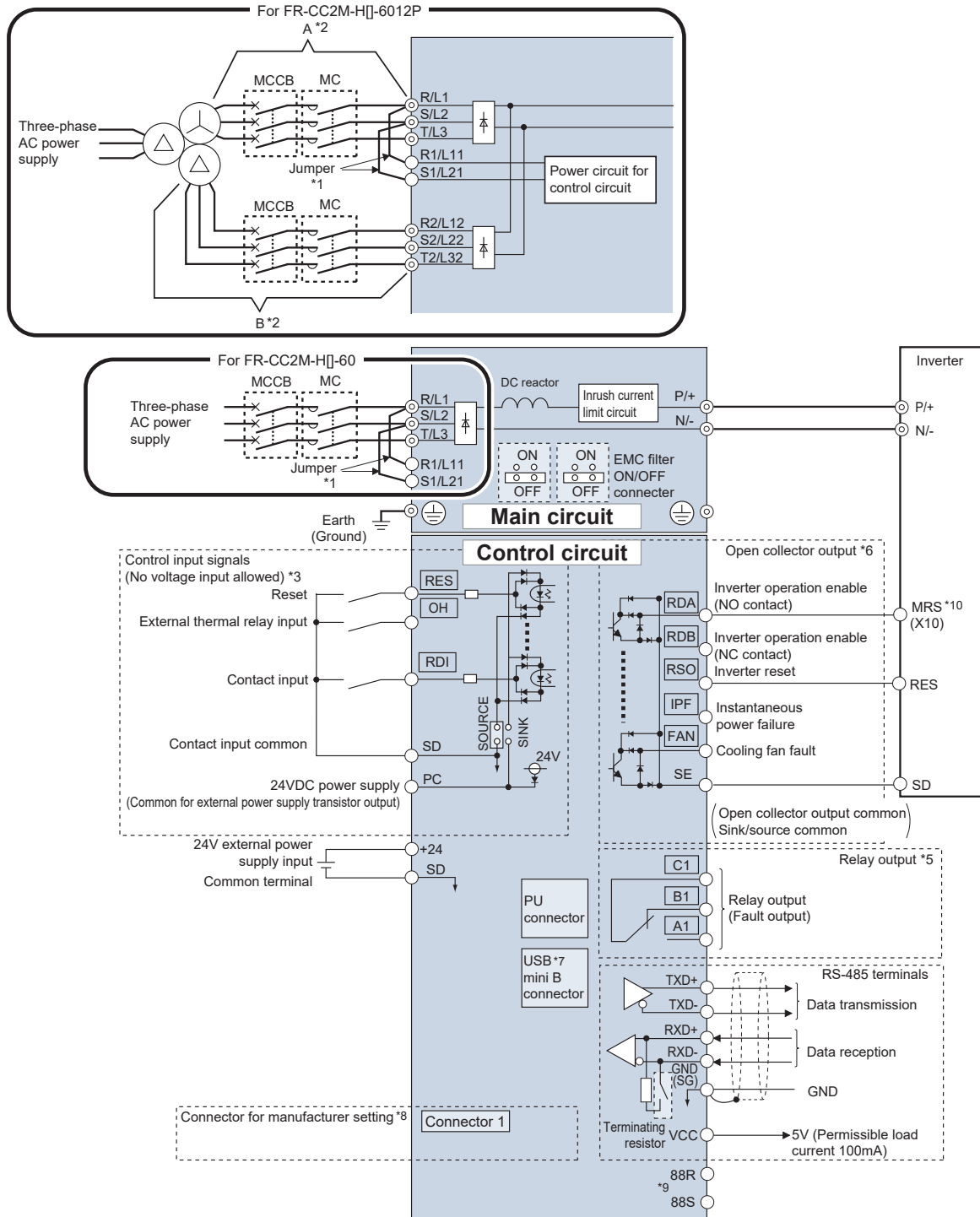
\*4: For installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.

\*5: Available for the built-in brake transistor model only.

## Terminal connection diagrams

### Converter unit

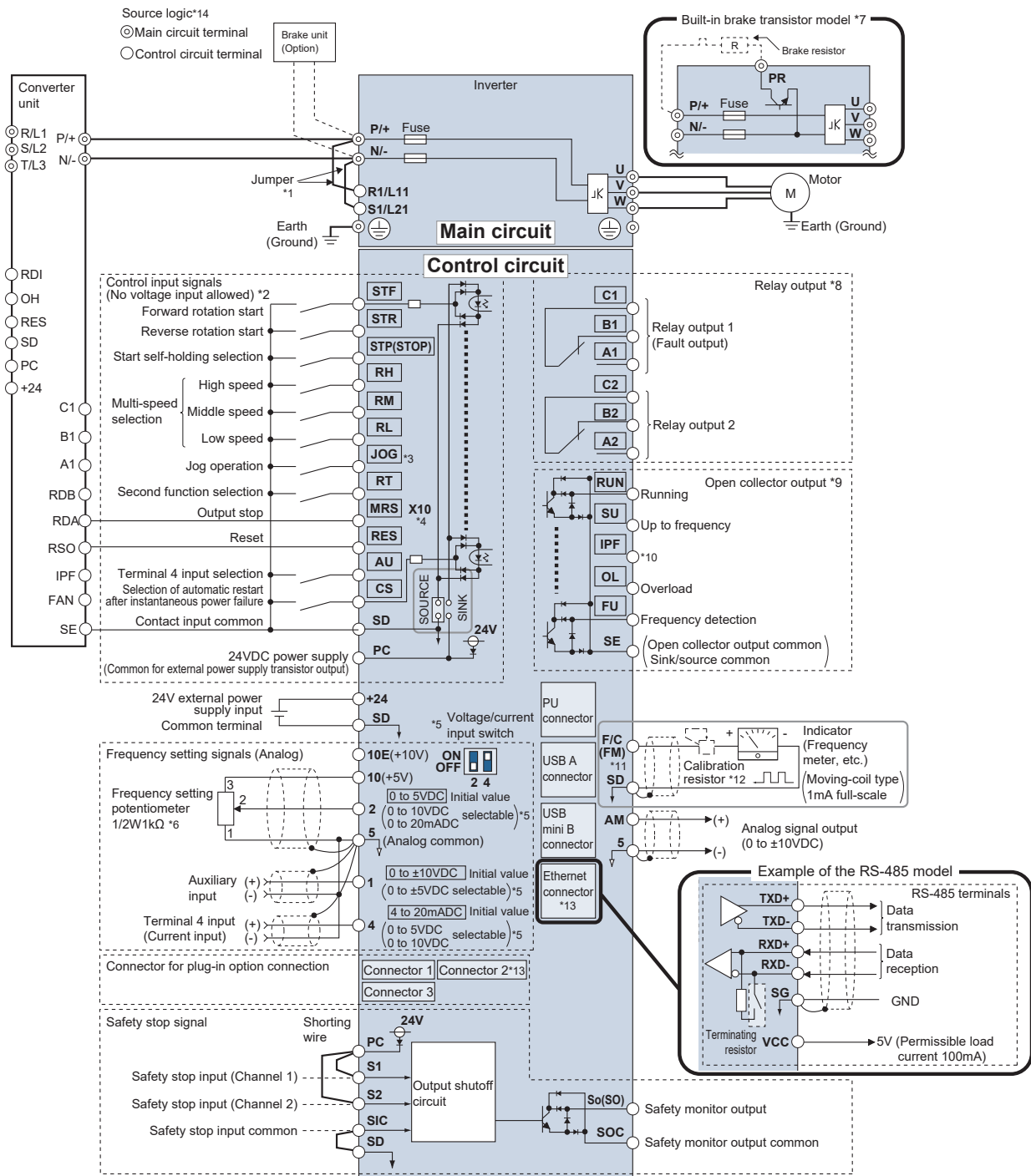
- Source logic\*11  
 ◎ Main circuit terminal  
 ○ Control circuit terminal



- \*1: To use separate power supply for the control circuit, remove each jumper at terminal R1/L11 and terminal S1/L21.  
 \*2: The wiring length from the power transformer to the converter unit should be the same for both section A (from the wye connection output terminals to terminals R/L1, S/L2, T/L3) and section B (from the delta connection output terminals to terminals R2/L12, S2/L22, T2/L32).  
 \*3: The function of these terminals can be changed using the Input terminal function selection (**Pr.178, Pr.187, Pr.189**).  
 \*4: The sink logic is initially set. The control logic can be changed with the jumper connector position.  
 \*5: The function of these terminals can be changed using the Output terminal function selection (**Pr.195**).  
 \*6: The function of these terminals can be changed using the Output terminal function selection (**Pr.190 to Pr.194**).  
 \*7: This connector is for manufacturer setting. Do not use.  
 \*8: Plug-in options cannot be used.  
 \*9: For manufacturer setting, Do not use.  
 \*10: To use the RDA signal of the converter unit, select the normally-closed contact input specification for the input logic of the MRS signal or X10 signal of the inverter. To use the RDB signal of the converter unit, select the normally-open contact input specification for the input logic of the MRS signal or X10 signal of the inverter. (For changing the input logic, refer to the Instruction Manual of the inverter.)  
 \*11: For the terminal connection diagram for the sink logic, refer to the FR-CC2M Instruction Manual.

# Terminal connection diagrams

## Inverter



- \*1: A jumper is installed across terminal R1/L11 and terminal P/+, and across terminal S1/L21 and terminal N/-. When using a separate power supply for the control circuit, remove the jumpers connected to terminals R1/L11 and S1/L21.
- \*2: The function of these terminals can be changed using the Input terminal function selection (Pr.178 to Pr.189).
- \*3: Terminal JOG is also used as a pulse train input terminal. Use Pr.291 to choose JOG or pulse.
- \*4: The X10 signal (NC contact input specification) is assigned to the terminal MRS in the initial setting. Set Pr.599 = "0" to change the input specification of the X10 signal to NO contact.
- \*5: Terminal input specifications can be changed by analog input specification switchover (Pr.73, Pr.267). To input voltage (0 to 5V/0 to 10V), set the voltage/current input switch OFF. To input current (4 to 20 mA), set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. (Pr.561)
- \*6: It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
- \*7: For the built-in brake transistor model, connect a brake resistor across terminals P/+ and PR. To prevent overheating and damage of brake resistors, select a brake resistor that meets the specifications and install a thermal relay. (For the details, refer to the FR-A802M (Separated Converter Type) Instruction Manual (Hardware).)
- \*8: The function of these terminals can be changed using the Output terminal function selection (Pr.195 or Pr.196).
- \*9: The function of these terminals can be changed using the Output terminal function selection (Pr.190 to Pr.194).
- \*10: No function is assigned in the initial setting. Use Pr.192 for function assignment.
- \*11: Terminal FM can be used to output pulse trains as open collector output by setting Pr.291.
- \*12: Not required when calibrating the scale on the operation panel.
- \*13: The option connector 2 on the Ethernet model is not available for use because it is occupied by the Ethernet board which is pre-installed in the initial status. The Ethernet board must be removed to install a plug-in option to the option connector 2. (However, Ethernet communication is disabled in that case.)
- \*14: For the terminal connection diagram for the sink logic, refer to the FR-A802M (Separated Converter Type) Instruction Manual (Hardware).

# INVERTER

## Lineup

For the details of the lineup, please contact your sales representative.

### Inverter

Symbol	Voltage class	Symbol	Structure, functionality	Symbol	Description
4	400 V class	2	Separated converter type	05080 to 10160	Inverter rated current (SLD) (A)
				250K to 500K	Applicable motor capacity (ND)(kW)

**FR-A8 4 2 M - 05080 - 2 - 60**

Symbol	Structure	Symbol	Type*1	Communication type	Symbol	Circuit board coating (Conforming to IEC 60721-3-3:1994 3C2/3S2)	Plated conductor	Built-in brake transistor
M	Slim model	1	FM	RS-485	60	With	Without	Without
		2	CA		06		With	
		E1	FM	Ethernet*2	60B		Without	With*3
		E2	CA		06B		With	

\*1: Specification differs by the type as follows.

Type	Monitor output	Initial setting		
		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))	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))	Source logic	50 Hz	8888 (95% of the power supply voltage)

\*2: Inverter equipped with a built-in Ethernet board (FR-A8ETH).

\*3: Available for the FR-A842M-06440(315K) or lower.

### Converter unit

Symbol	Structure	Symbol	Voltage class	Symbol	Description
M	Slim model	H	400 V class	250K to 560K	Rated converter unit capacity (kW)

**FR-CC2 M - H 250K - 60 12P**

Symbol	Circuit board coating (Conforming to IEC 60721-3-3:1994 3C2/3S2)	Plated conductor	Symbol	Structure
60	With	Without	None	6-phase rectification
06		With	12P	12-phase rectification

### Released model

Model	05080	05720	06440	07260	08170	09080	10160
	250K	280K	315K	355K	400K	450K	500K
FR-A842M-[] (Separated converter type)	●	●	●	●	●	●	●

Model	250K	280K	315K	355K	400K	450K	500K	560K
	FR-CC2M-H[] (Converter unit)	●	●	●	●	●	●	●

●: Newly released model -: Not applicable

**MITSUBISHI ELECTRIC CORPORATION**

HEAD OFFICE: TOKYO BLDG., 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN