

## INVERTER

**New Product RELEASE**

No.20-2E

### 690 V Specification

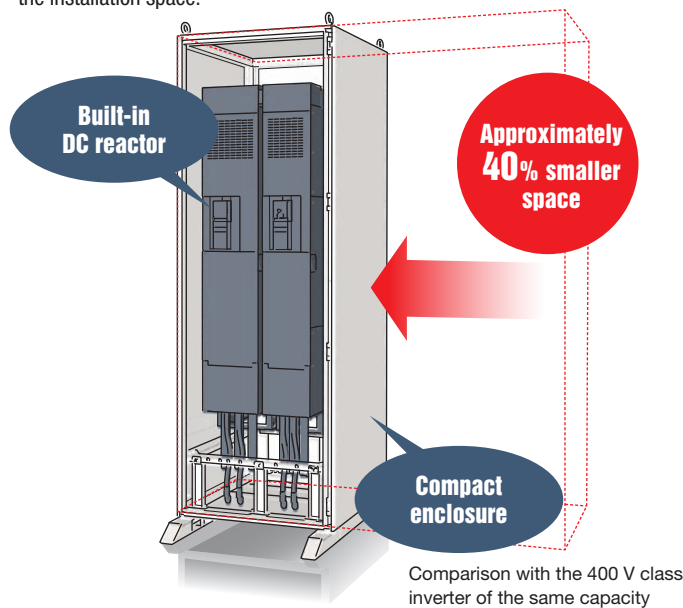
# Release of the FR-A872-E Inverter and the FR-CC2-N Converter Unit

Separated converter type inverters and their companion converter units are added to the FR-A870 series. (575 V power input is also available.)

#### Features

#### Small installation space

- Narrow dimensions allow for easy installation in an enclosure, greatly reducing the installation space.



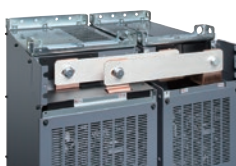
#### Harmonic suppression

- The DC reactor compliant with EN 61000-3-12 is built in. The exclusive wire connection attachment allows for connection with 12-phase rectifier power transformer.

#### Benefits

#### Contributing to the cost reduction of the enclosure

Side by side installation and bus bar connection improve the storage efficiency. Downsizing of the enclosure contributes to cost reduction.



Product view without covers  
(Bus bars are not provided.)

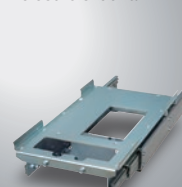


Enclosure wire connection attachment



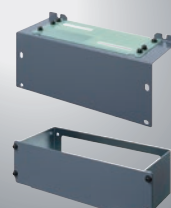
FR-A8CW39-N

Enclosure slide rail



FR-A8SR39

IP20 compliant attachment



FR-A8CU39-N

## Rated specifications

### Inverter

#### ■ 690 VAC power input

#### ■ 575 VAC power input

Model FR-A872-□		05690	06470	07150	05690	06470	07150
Applicable motor capacity (kW) <sup>1</sup>	SLD	500	560	630	400	450	500
	ND (initial setting)	450	500	560	355	400	450
Rated capacity (kVA) <sup>2</sup>	SLD	680	773	855	567	644	712
	ND (initial setting)	612	680	773	510	567	644
Rated current (A) <sup>3</sup>	SLD	569	647	715	569	647	715
	ND (initial setting)	512	569	647	512	569	647
Overload current rating <sup>4</sup>	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C			110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C		
	ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C			150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C		
Rated voltage <sup>5</sup>		Three-phase 600 to 690 V			Three-phase 525 to 600 V		
Power supply voltage		849 to 1025 VDC			742 to 891 VDC		
Control power supply auxiliary input		Single-phase 525 to 690 V, 50/60 Hz			Single-phase 525 to 690 V, 50/60 Hz		
Permissible control power supply auxiliary input fluctuation		Frequency ±5%, voltage ±10%			Frequency ±5%, voltage ±10%		
Protection rating of structure (IEC 60529) <sup>6</sup>		Open type (IP00)			Open type (IP00)		
Cooling system		Forced air			Forced air		
Noise level (dB) <sup>7</sup>		74	74	74	74	74	74
Approx. mass (kg)		186	186	186	186	186	186

\*1: The values in the "690 VAC power input" table indicate the maximum applicable motor capacity at a power input of 690 V. The values in the "575 VAC power input" table indicate the one at a power input of 575 V.

\*2: The values in the "690 VAC power input" table indicate the rated output capacity at a power input of 690 V. The values in the "575 VAC power input" table indicate the one at a power input of 575 V.

\*3: Possible output currents during continuous operation under Real sensorless vector control or Vector control are shown in the table below.

PWM carrier frequency	05690		06470		07150	
	SLD	ND	SLD	ND	SLD	ND
2 kHz	472 A	440 A	537 A	489 A	593 A	556 A
4 kHz	284 A	296 A	323 A	330 A	357 A	375 A

The PWM carrier frequency is automatically decreased to 2 kHz for heavy duty applications when operating the motor under Real sensorless vector control or Vector control with a PWM carrier frequency of 6 kHz (Pr.72 = 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: FR-DU08: IP40 (except for the PU connector)

\*7: Values measured 1 m in front of the inverter and 1.6 m from the floor.

### Converter unit ■ 690 VAC power input

### ■ 575 VAC power input

Model FR-CC2-N□	450K	500K	560K	630K	450K	500K	560K	630K
Applicable motor capacity (kW)	450	500	560	630	355	400	450	500
Output	Overload current rating <sup>1</sup>			110% 60 s, 120% 3 s at surrounding air temperature of 40°C	150% 60 s, 200% 3 s at surrounding air temperature of 40°C			110% 60 s, 120% 3 s at surrounding air temperature of 40°C
	Rated DC voltage <sup>2</sup>		849 to 976 VDC <sup>3</sup>			742 to 849 VDC <sup>4</sup>		
Power supply	Power supply capacity (kVA) <sup>3</sup>	612	680	773	855	510	567	644
	Rated input current (A)	512	569	647	715	512	569	647
	Rated input AC voltage/frequency	Three-phase 600 V to 690 V 50/60 Hz			Three-phase 525 V to 600 V 50/60 Hz			
	Permissible AC voltage fluctuation	Three-phase 540 V to 759 V 50/60 Hz			Three-phase 472 V to 660 V 50/60 Hz			
Permissible frequency fluctuation	±5%				±5%			
Protective structure (IEC60529)	Open type (IP00)				Open type (IP00)			
Cooling system	Forced air				Forced air			
DC reactor	Built-in				Built-in			
Noise level (dB) <sup>5</sup>	74	74	74	74	74	74	74	74
Approx. mass (kg)	237	241	245	248	237	241	245	248

\*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 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.

\*4: 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)

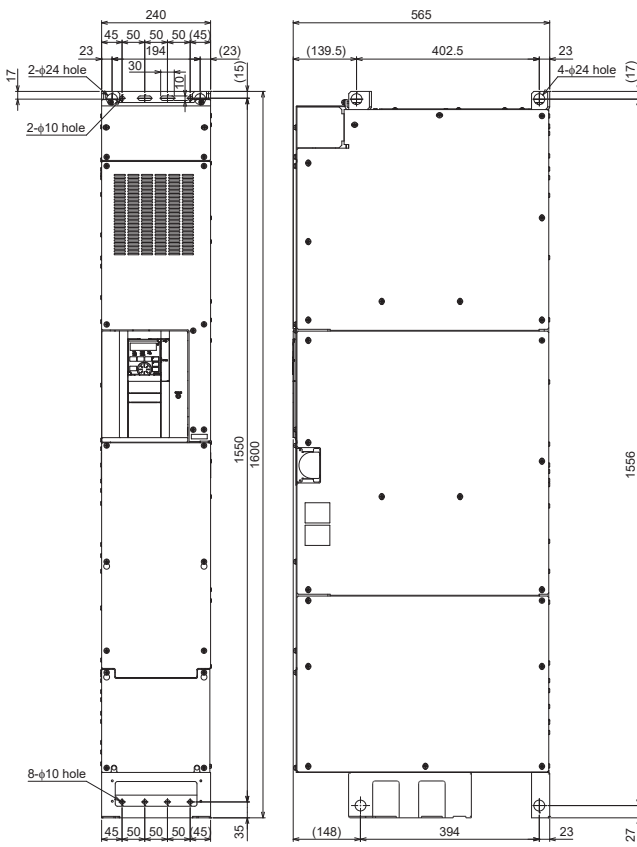
\*5: Values measured 1 m in front of the converter unit and 1.6 m from the floor.

## Outline dimensions

(Unit: mm)

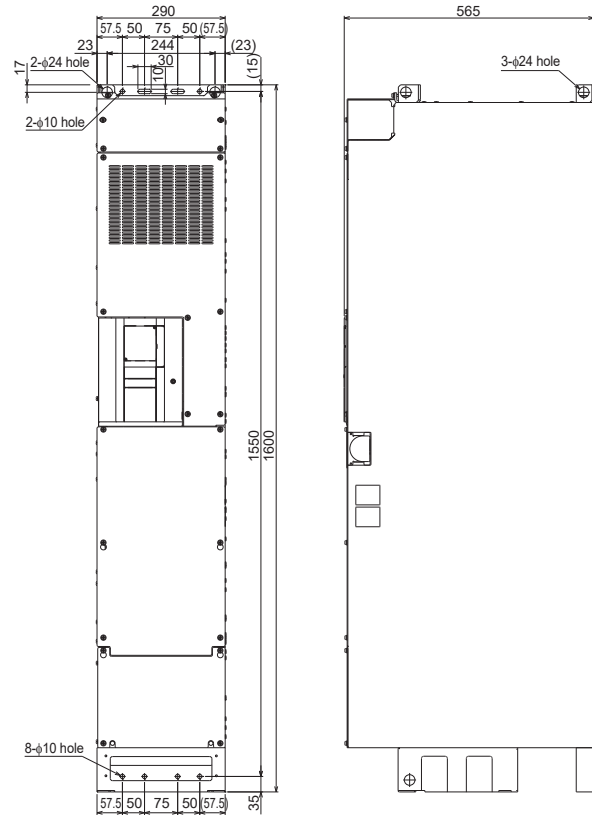
### Inverter

FR-A872-05690 to 07150



### Converter unit

FR-CC2-N450K to N630K



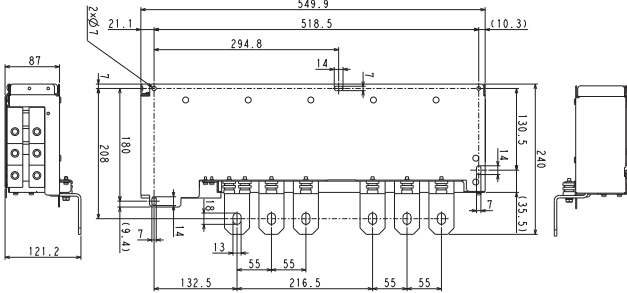
## Outline dimensions

(Unit: mm)

### Dedicated options

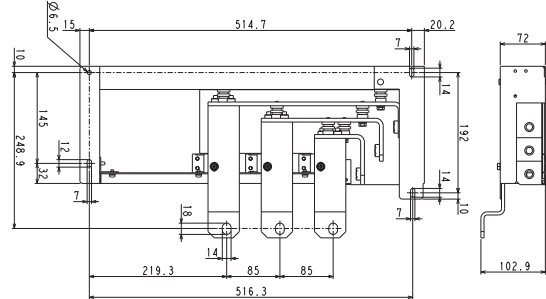
#### Enclosure wire connection attachment FR-A8CW29-N/FR-A8CW39-N

Upper attachment (FR-A8CW29-N-A/FR-A8CW39-N-A)

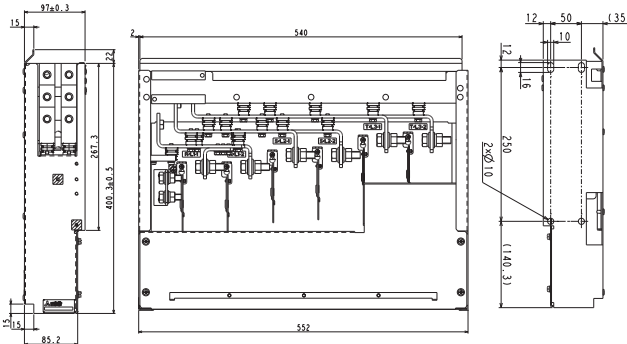


#### FR-A8CW59-N

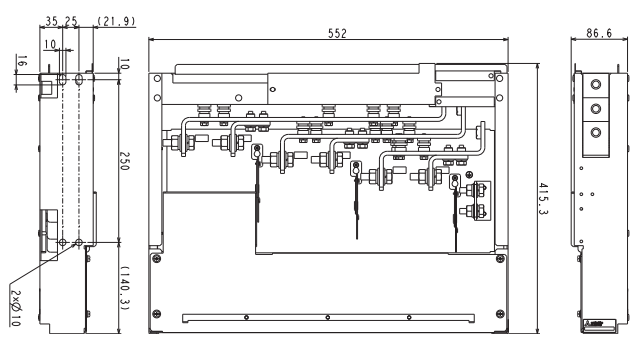
Upper attachment (FR-A8CW59-N-A)



Lower attachment (FR-A8CW29-N-B/FR-A8CW39-N-B)

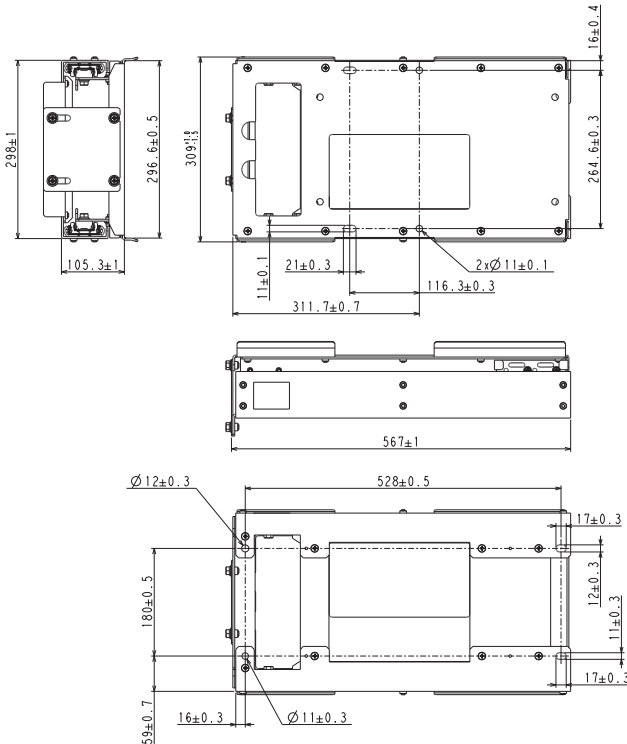


Lower attachment (FR-A8CW59-N-B)



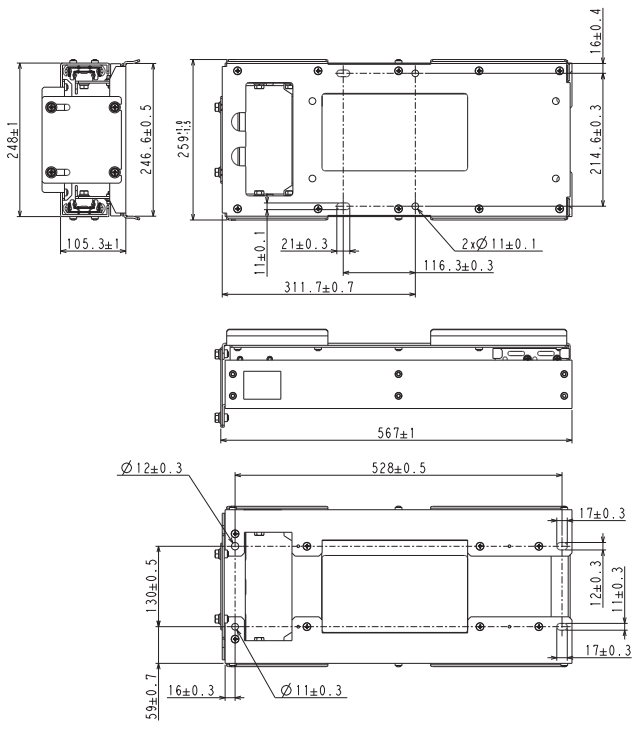
#### Enclosure slide rail FR-A8SR39

Slide rail unit (FR-A8SR39-A)

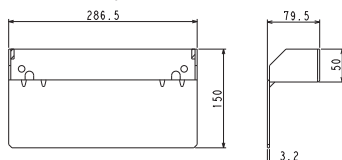


#### FR-A8SR59

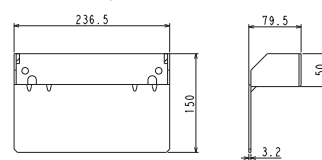
Slide rail unit (FR-A8SR59-A)



Lifter guide (FR-A8SR39-B)



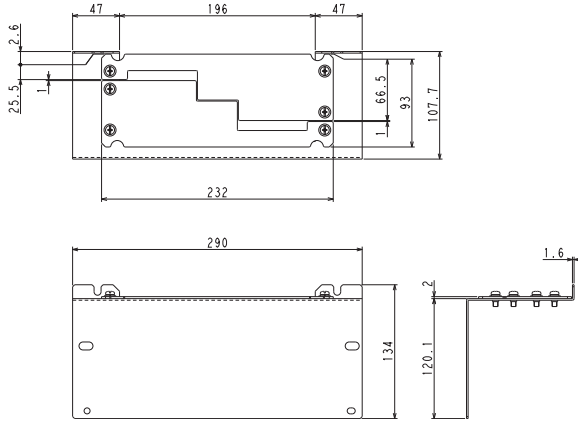
Lifter guide (FR-A8SR59-B)



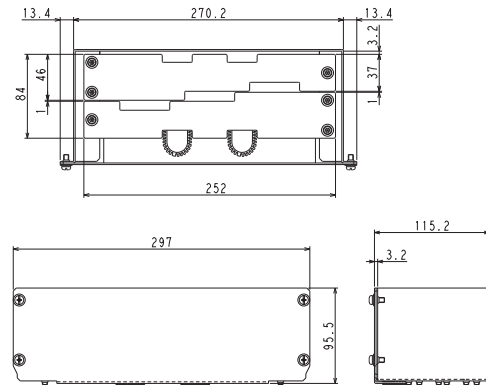
(Unit: mm)

### IP20 compliant attachment FR-A8CU39-N

Upper IP20 cover (644H02)

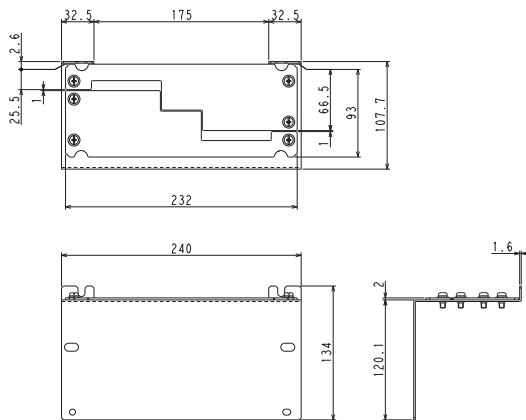


Lower IP20 cover (644H05)

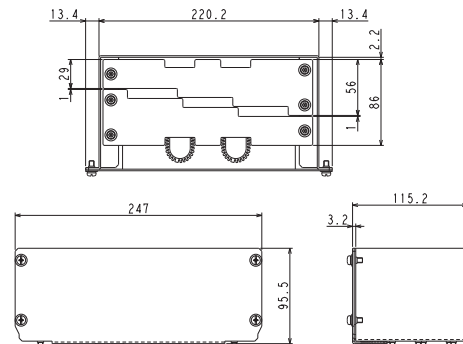


### FR-A8CU59-N

Upper IP20 cover (644H01)

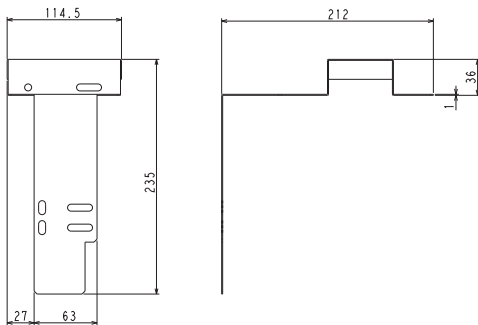


Lower IP20 cover (644H04)

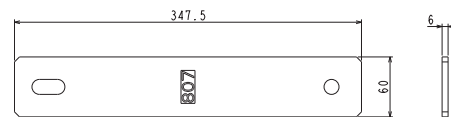


### FR-A8CU79-N

Upper IP20 cover (644H03)



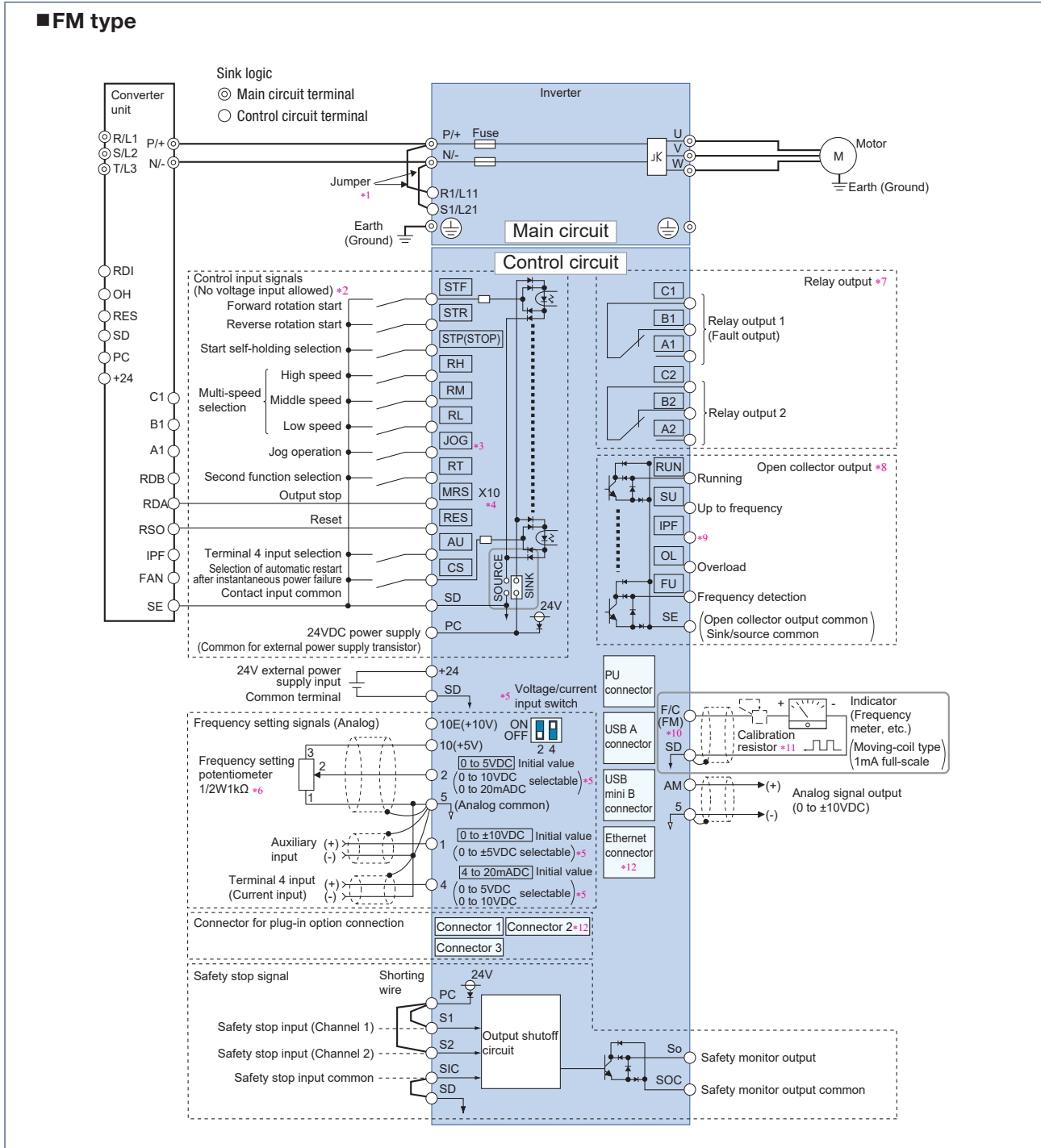
Bus bar for terminals P/+ and N/- (807)



## Outline dimensions

### Inverter

#### ■ FM type



\*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 5 V/0 to 10 V), 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: The function of these terminals can be changed using the Output terminal function selection (Pr.195 or Pr.196).

\*8: The function of these terminals can be changed using the Output terminal function selection (Pr.190 to Pr.194).

\*9: No function is assigned in the initial setting. Use Pr.192 for function assignment.

\*10: Terminal FM can be used to output pulse trains as open collector output by setting Pr.291.

\*11: Not required when calibrating the scale with the operation panel.

\*12: The option connector 2 cannot be used because the Ethernet board is installed in the initial status.

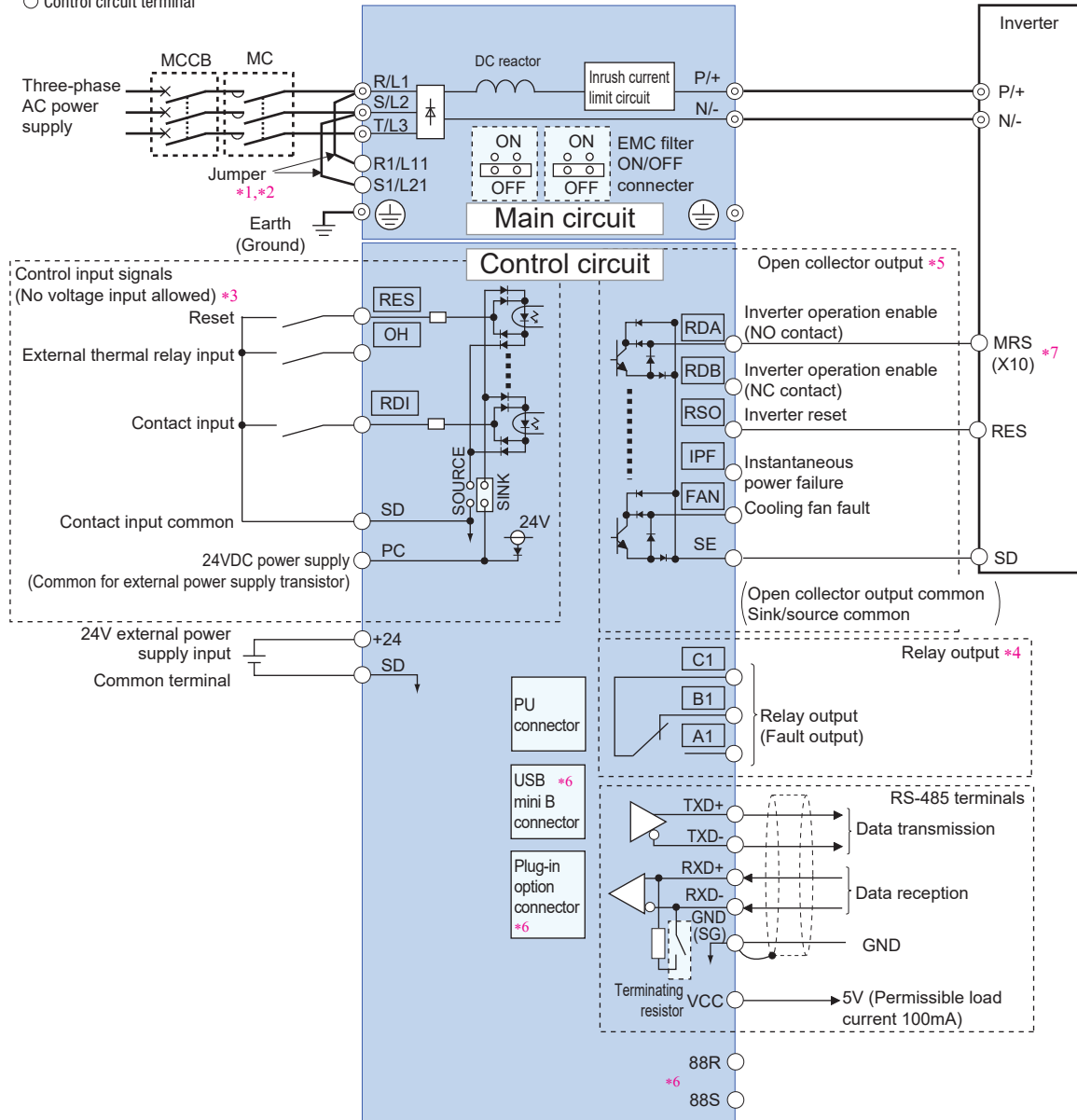
The Ethernet board must be removed to install a plug-in option to the option connector 2. (However, Ethernet communication is disabled in that case.)

## Converter unit

### ■ When the sink logic is selected

Sink logic

- ⊙ 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: To use the power failure time deceleration-to-stop function, remove the jumpers connected to terminals R1/L11 and S1/L21, and connect terminal R1/L11 and the terminal P/+ bus bar and terminal S1/L21 and the terminal N/- bus bar.

Pass wires between the converter unit and the inverter and through the rubber bush on the side face of the converter unit to the terminals inside.

\*3: The function of these terminals can be changed using the Input terminal function selection (Pr.178, Pr.187, Pr.189).

\*4: The function of these terminals can be changed using the Output terminal function selection (Pr.195).

\*5: The function of these terminals can be changed using the Output terminal function selection (Pr.190 to Pr.194).

\*6: For manufacturer setting. Do not use.

\*7: 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.)

## Lineup

### Inverter

**FR - A 872 - 05690 - E 1 - 60**

Symbol	Voltage class	Symbol	Description	Symbol	Type	Communication type	Symbol	Circuit board coating <sup>*2</sup>	Plated conductor
7	690 V class <sup>*1</sup>	05690 to 07150	Inverter SLD rated current (A)	E1	FM	Ethernet	60	With	Without
				E2	CA		06	With	With

### Converter unit

**FR - CC 2 - N 450K - 60**

Symbol	Voltage class	Symbol	Description	Symbol	Circuit board coating <sup>*2</sup>	Plated conductor
N	690 V class	450K to 630K	Rated converterunit capacity (kW)	60	With	Without
				06	With	With

\*1: The insulation distance conforms to IEC 61800.

\*2: Conforming to IEC60721-3-3 3C2/3S2.

### Dedicated options

#### IP20 compliant attachment

Attachment specially made for the FR-A872(-P) and FR-CC2-N(-P) to satisfy IP20 structural protection requirements.

**FR - A 8 C U  - N**

Symbol	Application	Applicable model
39	Makes the main circuit terminals IP20 rated when connecting terminals with bus bars.	FR-CC2-N450K(-P) to N560K(-P), N630K FR-A872-05690(-P) to 07150(-P)
79	Makes the main circuit terminals IP20 rated when installing the inverter and the converter unit side by side.	FR-A872-05690 to 07150 + FR-CC2-N450K to N630K

#### Enclosure wire connection attachment

Attachment for wire connection for the FR-A872(-P) and FR-CC2-N(-P) (used with the FR-A8SR slide rail).

Use the FR-A8CW29-N for the FR-CC2-N(-P) to enable the 6-phase rectification, and use the FR-A8CW39-N to enable the 12-phase rectification.

**FR - A 8 C W  - N**

Symbol	Application	Applicable model
29	Attachment for cable connection for the converter unit (for 6-phase rectification).	FR-CC2-N450K(-P) to N560K(-P), N630K
39	Attachment for cable connection for the converter unit (for 12-phase rectification).	FR-CC2-N450K(-P) to N560K(-P), N630K
59	Attachment for cable connection for the inverter.	FR-A872-05690(-P) to 07150(-P)

#### Enclosure slide rail

Attachment to facilitate the installation in the enclosure, maintenance, and unit replacement when a fault occurs.

**FR - A 8 S R**

Symbol	Applicable model
39	FR-CC2-N450K(-P) to N560K(-P), N630K
59	FR-A872-05690(-P) to 07150(-P)

**MITSUBISHI ELECTRIC CORPORATION**

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