MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

INVERTER
HIGHLY PROTECTIVE STRUCTURE (IP55)

FR-A800/FR-F800

- Direct installation near machines
- Reduced installation time
- Wire and space saving

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

Contents

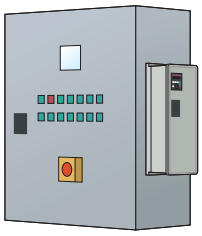
Inverters for Industrial Environments

FR-A806 and FR-F806 inverters have a highly protective structure with the IP55 rating, which enables installation near machines.

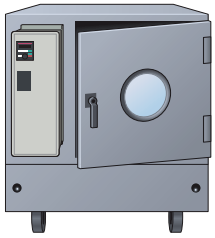
■ Inverter for installation outside of the enclosure

1. Direct installation near machines

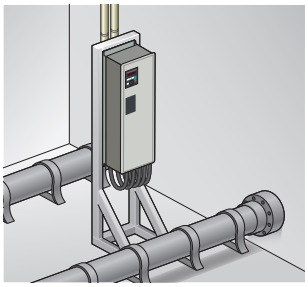
Since the inverter is compatible with hostile environments such as high humidity and dusty environments, you can easily install the inverter near the machine or in available spaces. By installing the inverter outside of the enclosure, the enclosure design becomes easier in terms of protection against heat, and the enclosure is downsized as well.



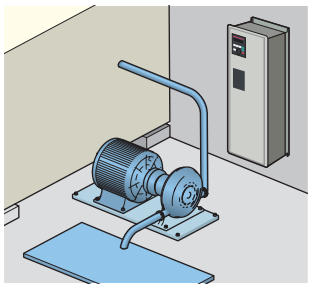
Installation on the side of the enclosure



Installation on the surface of the equipment



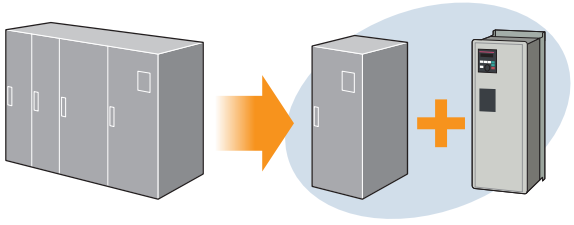
Stand-alone installation



Wall installation

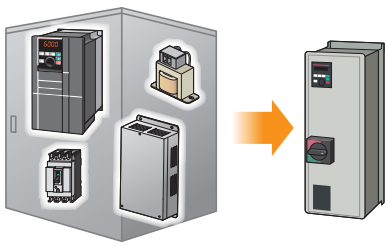
2. Reduced installation time

There is no need to install more enclosures to use more inverters. The inverter can be installed easily without using an enclosure. At the time of the drive system upgrade by changing from the commercial power drive to the inverter drive, the inverter can be installed outside of the enclosure.



3. Wire and space saving

The inverter has a built-in DC reactor and EMC filter, requiring less wiring work for the peripheral devices.
The inverter with a built-in disconnecting switch*1 is also available. The remote switch enables turning ON/OFF of the input power when the power panel is located away from the inverter. *1: For the details, please contact your sales representative.



IP55 rating

The IP code represents the specified protection ratings using a code. The first and the second digits following IP (International Protection) represent the protection ratings.

IP 5 5

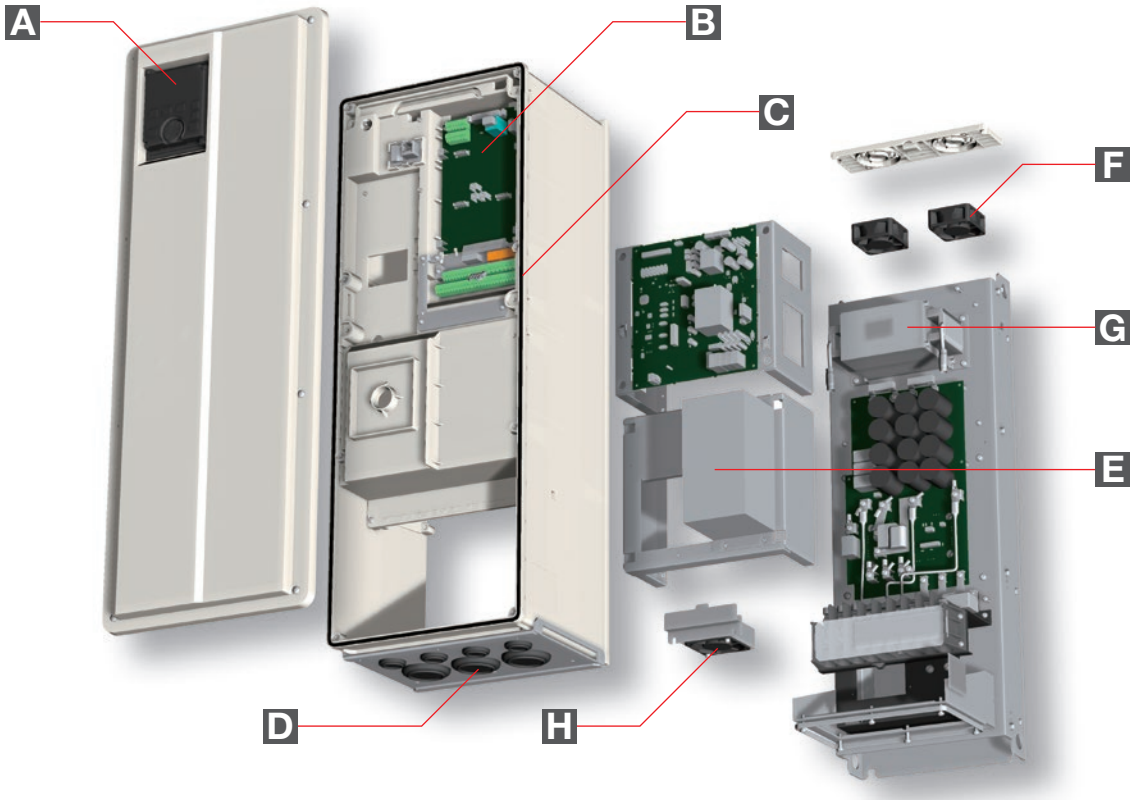
• First digit (protection rating against solid objects)

Protection level	Description
Class 5*2	Protection against dust. No ingress of dust that may inhibit normal operation. IP5X refers to protection of the inverter functions and maintenance of safety when the inverter is put into a stirring device containing dust of 75 µm or smaller in diameter, stirred for 8 hours, and then removed from the device.

• Second digit (protection rating against water)

Protection level	Description
Class 5	Protection against water jets from any direction IPX5 refers to protection of the inverter functions against water jets from any direction when about 12.5-liter water*3 is injected from a nozzle with an inside diameter of 6.3 mm from the distance of about 3 m for at least 3 minutes.

*2: FR-A806 and FR-F806 inverters are IP55 category 1 certified (no ingress of dust with negative pressure inside the inverter).
*3: Water here refers to fresh water at room temperature (5 to 35°C).



Refer to page 27 for details on the main differences between standard FR-A800/FR-F800 models and IP55 certified models.

A Operation panel (FR-DU08-01)

The FR-DU08-01 is compatible with the IP55 rating and detachable from the inverter. An optional LCD operation panel (FR-LU08-01) is available for replacement.

B Circuit board coating

The coating conforms to IEC 60721-3-3 :1994 3C2/3S2 for improved environmental resistance.

C Gasket

Reliable gasket sealing is provided.

D Cable connection

To ensure compliance with the IP55 rating of the cable section, cable glands are available.

E EMC filter

The inverter has a built-in filter for industrial environments (EN 61800-3 C3). A filter for residential environments (EN 61800-3 C2) is also available.

F Waterproof fan

The cooling fan is compatible with the IP55 rating. It is detachable from the inverter without disconnecting the main circuit wiring. (The cooling fan is provided for the FR-A846-7.5K or higher and the FR-F846-11K or higher.)

G DC reactor

The inverter has a built-in DC reactor compatible with the EN 61000-3-2/12 standard.

H Internal air circulation fan

The internal cooling fan (detachable) circulates air inside the inverter.

Application examples

The inverter is usable in many applications
even where space is limited or in hostile environments.

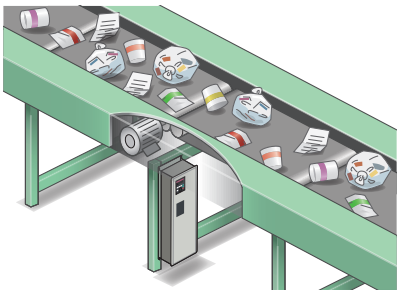
Waste transfer conveyor A806

Point

The inverter can be installed directly below the conveyor.
The inverter is usable even where waste may fall off the line or water may splash.

PLC function

When the signals from the object sensors are directly input to the inverter, whole control can be performed by the inverter only according to the operation of the peripherals.



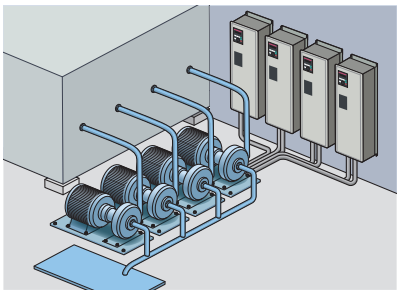
Building water pumps F806

Point

The inverter can be installed in a vacant space near the pump or in a narrow space. The inverter is usable even if water drops fall nearby.

PID pre-charge function

This function is used to avoid rapid acceleration caused by starting the PID action while the pipe is empty, which prevents water hammer damage to pumps or other parts.



Marine equipment A806

Point

The FR-A846-C2 inverter is approved as compliant with ship classification standards, and usable in many applications on a ship. The inverter has a built-in EMC filter compliant with the ship classification standards.

Certification body	
NK	(Nippon Kaiji Kyokai)
ABS	(American Bureau of Shipping)
BV	(Bureau Veritas)
LR	(Lloyd's Register of Shipping)

Certification body	
DNV GL	(DNV GL AS)
CCS	(China Classification Society)
KR	(Korean Register of Shipping)

For details, refer to the Application Catalog for Ships (L(NA)06105ENG).

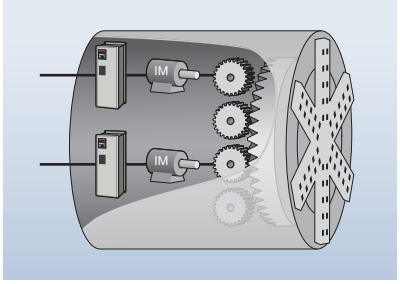
Shield machine A806

Point

The inverter can be installed near the cooling pipe of water-cooled motors, minimizing the cable length between the inverter and the motor. The inverter is usable in dusty environments.

Real sensorless vector control

The motor control without using an encoder improves reliability in an unfavorable operating environment, such as where vibrations exist.



Lineup

Inverter

FR-A800 series

FR - A8 [4] [6] - [7.5K] - [1] - [60] [C3]

Symbol	Voltage class
4	400 V class

Symbol	Structure, functionality
6	IP55 compatible model

Symbol*1	Description
0.4K to 132K	Inverter ND rated capacity (kW)

Symbol	Type*2	Communication type
1	FM	RS-485
2	CA	
E1	FM	Ethernet
E2	CA	

Symbol	Circuit board coating (IEC60721-3-3:1994 3C2/3S2 compatible)	Plated conductor
60	With	Without
06	With	With

Symbol	EMC filter	Operation panel
C2	Built-in C2 filter Residential environments (EN 61800-3 C2)	FR-DU08-01
C3	Built-in C3 filter Industrial environments (EN 61800-3 C3)	
L2	Built-in C2 filter Residential environments (EN 61800-3 C2)	FR-LU08-01

Three-phase 400V class FR-A846-[] (with a built-in DC reactor)	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K
	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470
	●	●	●	●	●	●	●	●	●	●
	22K	30K	37K	45K	55K	75K	90K	110K	132K	
	00620	00770	00930	01160	01800	02160	02600	03250	03610	
	●	●	●	●	●	●	●	●	●	

●: Available models

FR-F800 series

FR - F8 [4] [6] - [7.5K] - [1] - [60] [C3]

Symbol	Voltage class
4	400 V class

Symbol	Structure, functionality
6	IP55 compatible model

Symbol*1	Description
0.75K to 160K	Inverter LD rated capacity (kW)

Symbol	Type*2	Communication type
1	FM	RS-485
2	CA	
E1	FM	Ethernet
E2	CA	

Symbol	Circuit board coating (IEC60721-3-3:1994 3C2/3S2 compatible)	Plated conductor
60	With	Without
06	With	With

Symbol	EMC filter	Operation panel
C2	Built-in C2 filter Residential environments (EN 61800-3 C2)	FR-DU08-01
C3	Built-in C3 filter Industrial environments (EN 61800-3 C3)	
L2	Built-in C2 filter Residential environments (EN 61800-3 C2)	FR-LU08-01

Three-phase 400V class FR-F846-[] (with a built-in DC reactor)	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K
	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470
	●	●	●	●	●	●	●	●	●	●
	30K	37K	45K	55K	75K	90K	110K	132K	160K	
	00620	00770	00930	01160	01800	02160	02600	03250	03610	
	●	●	●	●	●	●	●	●	●	

●: Available models

*1: Inverters whose name includes the rated current of the standard model in SLD rating are also available.
*2: Specification differs by the type as follows.

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))	Built-in C2 filter: ON, Built-in C3 filter: 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)

Lineup

Motor

Premium efficiency dustproof/waterproof type motor SF-PRP

The motor is compliant with the dust test and water test specifications in JIS C 4034-5. The motor ensures reliability in environments exposed to plenty of water.

S F - PR V P - KR

Symbol	Structure
S	Superline series

Symbol	Outer sheath
F	Totally-enclosed fan-cooled

Symbol	Series
PR	Premium series (Steel plate frame)

Symbol	Installation
None	Foot mounting type
V	Vertical type
F	Flange type

Symbol	Classification
P	Dustproof/waterproof type (IP55)

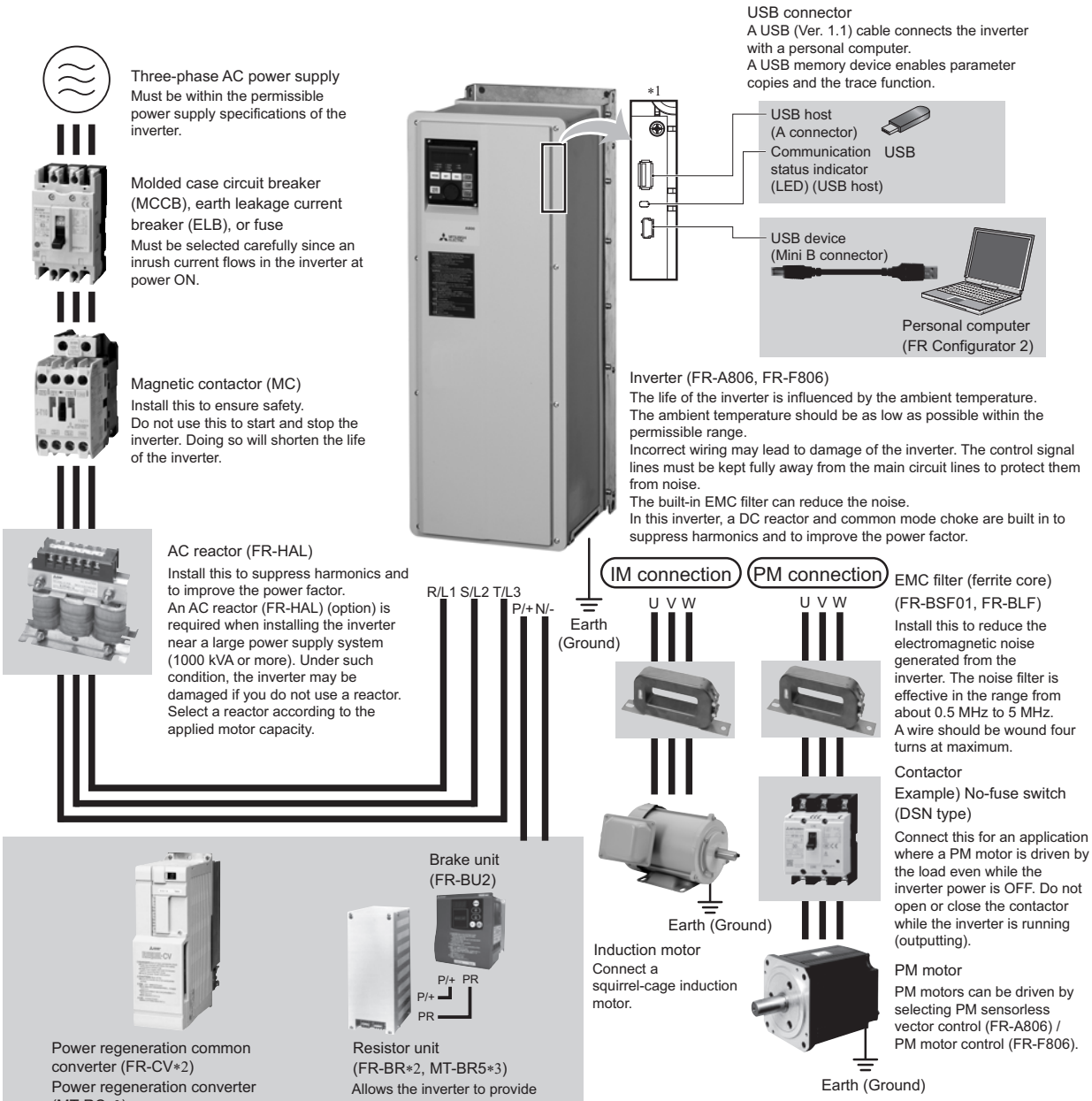
Symbol	Country code
None	Japan and the U.S.A.
EU	Europe
VN	Vietnam
RU	Russia
KR	Korea
CN	China
MX	Mexico
UL	UL standard

Type		Totally-enclosed fan-cooled Dustproof/waterproof type																		
Model		SF-PRP			SF-PRP-EU			SF-PRP-VN	SF-PRP-RU			SF-PRP-KR	SF-PRP-CN			SF-PRP-UL			SF-PRP-MX		
Number of poles		2P	4P	6P	2P	4P	6P	4P	2P	4P	6P	4P	2P	4P	6P	2P	4P	6P	2P	4P	6P
Output [kW]	0.75	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	2.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	3.7	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	5.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	7.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	11	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	15	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	18.5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	22	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	30	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	37	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	45	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	55	●	●	—	●	●	—	●	●	●	—	●	●	●	—	●	●	●	●	●	—

●: Available

For the delivery time, please contact your sales representative.

Connection Example



*1 The figure shows the area when the front cover is removed.
*2 Compatible with the FR-A846-01800(55K) or lower / FR-F846-01160(55K) or lower.
*3 Compatible with the FR-A846-02160(75K) or higher / FR-F846-01800(75K) or higher.

Standard Specifications (FR-A806)

● Rating

Model FR-A846-[ ]			00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600	03250	03610
			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	110K	132K
Applicable motor capacity (kW) *1		LD	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
		ND (initial setting)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132
Output	Rated capacity (kVA) *2	LD	1.6	2.7	3.7	5.8	8.8	12	18	22	27	33	43	53	65	81	110	137	165	198	248
		ND (initial setting)	1.1	1.9	3	4.6	6.9	9.1	13	18	24	29	34	43	54	66	84	110	137	165	198
	Rated current (A)	LD	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106	144	180	216	260	325
		ND (initial setting)	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260
	Overload current rating *3	LD	120% 60 s, 150% 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																		
	Rated voltage *4		Three-phase 380 to 500 V																		
	Regenerative braking	Maximum brake torque *5	10% torque/continuous																		
Power supply	Rated input AC voltage/frequency		Three-phase 380 to 500 V 50 Hz/60 Hz *8																		
	Permissible AC voltage fluctuation		323 to 550 V 50 Hz/60 Hz																		
	Permissible frequency fluctuation		±5%																		
	Rated input current (A) *6	LD	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106	144	180	216	260	325
		ND (initial setting)	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260
	Power supply capacity (kVA) *7	LD	1.6	2.7	3.7	5.8	9	12	18	22	27	33	43	53	65	81	110	137	165	198	248
		ND (initial setting)	1.1	1.9	3	4.6	6.9	9	13	18	24	29	34	43	54	66	102	110	137	165	198
Protective structure		IEC 60529	Dust- and water-proof type (IP55) *10																		
		UL50	UL Type12 *9																		
Cooling system			Self cooling + internal fan						Forced-air-cooling + internal fan												
DC reactor			Built-in																		
Approx. mass (kg)			15	15	15	15	16	17	26	26	27	27	59	60	63	64	147	150	153	189	193

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.
*2 The rated output capacity indicated assumes that the output voltage is 440 V.
*3 The % value of the overload current rating indicated 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.
*4 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 $\sqrt{2}$.
*5 Value for the ND rating.
*6 The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*7 The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
*8 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**.
*9 UL Type 12 Enclosure-Suitable for Installation in a Compartment Handling Conditioned Air (Plenum)
*10 For compliance with IP55, remove the protective bushes and install the recommended cable glands.

Common specifications

Control specifications	Control method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, vector control*1, and PM sensorless vector control
	Output frequency range		0.2 to 590 Hz (The upper-limit frequency is 400 Hz under Advanced magnetic flux vector control, Real sensorless vector control, vector control*1, and PM sensorless vector control.)
	Frequency setting resolution	Analog input	0.015 Hz/60 Hz (0 to 10 V/12 bits for terminals 2 and 4) 0.03 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1) 0.06 Hz/60 Hz (0 to ±5 V/11 bits for terminal 1)
		Digital input	0.01 Hz
	Frequency accuracy	Analog input	Within ±0.2% of the max. output frequency (25°C ±10°C)
		Digital input	Within 0.01% of the set output frequency
	Voltage/frequency characteristics		Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/F can be selected.
	Starting torque		LD rating: 150% 0.3 Hz, ND rating: 200%*5 0.3 Hz (Real sensorless vector control, vector control*1)
	Torque boost		Manual torque boost
	Acceleration/deceleration time setting		0 to 3600 s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode, backlash countermeasures acceleration/deceleration can be selected.
	DC injection brake (induction motor)		Operation frequency (0 to 120 Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable
	Stall prevention operation level		Activation range of stall prevention operation (LD rating: 0 to 150%, ND rating: 0 to 220%). Whether to use the stall prevention or not can be selected (V/F control, Advanced magnetic flux vector control)
	Torque limit level		Torque limit value can be set (0 to 400% variable). (Real sensorless vector control, vector control*1, PM sensorless vector control)
Operation specifications	Frequency setting signal	Analog input	Terminals 2 and 4: 0 to 10 V, 0 to 5 V, 4 to 20 mA (0 to 20 mA) are available. Terminal 1: -10 to +10 V, -5 to +5 V are available.
		Digital input	Input using the setting dial of the operation panel or parameter unit Four-digit BCD or 16-bit binary (when used with option FR-A8AX)
	Start signal		Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.
	Input signals (twelve terminals)		Low-speed operation command, Middle-speed operation command, High-speed operation command, Second function selection, Terminal 4 input selection, Jog operation selection, Selection of automatic restart after instantaneous power failure, flying start, Output stop, Start self-holding selection, Forward rotation command, Reverse rotation command, Inverter reset The signal to be input can be changed using **Pr.178 to Pr.189 (Input terminal function selection)**.
		Pulse train input	100 kpps
	Operational functions		Maximum and minimum frequency settings, multi-speed operation, acceleration/deceleration pattern, thermal protection, DC injection brake, starting frequency, JOG operation, output stop (MRS), stall prevention, regeneration avoidance, increased magnetic excitation deceleration, DC feeding, frequency jump, rotation display, automatic restart after instantaneous power failure, electronic bypass sequence, remote setting, automatic acceleration/deceleration, retry function, carrier frequency selection, fast-response current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, droop control, load torque high-speed frequency control, speed smoothing control, traverse, auto tuning, applied motor selection, gain tuning, RS-485 communication, Ethernet communication*2, PID control, PID pre-charge function, easy dancer control, cooling fan operation selection, stop selection (deceleration stop/coasting), power-failure deceleration stop function, stop-on-contact control, PLC function, life diagnosis, maintenance timer, current average monitor, multiple rating, orientation control*1, speed control, torque control, position control, pre-excitation, torque limit, test run, 24 V power supply input for control circuit, safety stop function, anti-sway control
	Output signal Open collector output (five terminals) Relay output (two terminals)		Inverter running, Up to frequency, Instantaneous power failure/undervoltage, Overload warning, Output frequency detection, Fault The signal to be output can be changed using **Pr.190 to Pr.196 (Output terminal function selection)**. Fault codes of the inverter can be output (4 bits) from the open collector.
		Pulse train output	50 kpps
Indication	For meter	Pulse train output (FM type)	Max. 2.4 kHz: one terminal (output frequency) The monitored item can be changed using **Pr.54 FM/CA terminal function selection.**
		Current output (CA type)	Max. 20 mADC: one terminal (output frequency) The monitored item can be changed using **Pr.54 FM/CA terminal function selection.**
		Voltage output	Max. 10 VDC: one terminal (output frequency) The monitored item can be changed using **Pr.158 AM terminal function selection.**
	Operation panel	Operating status	Output frequency, Output current, Output voltage, Frequency setting value The monitored item can be changed using **Pr.52 Operation panel main monitor selection**.
		Fault record	Fault record is displayed when a fault occurs. Past 8 fault records (output voltage/current/frequency/cumulative energization time immediately before the fault occurs) are stored.

Standard Specifications (FR-A806)

Protective/ warning function	**Protective function**	Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative overvoltage trip during acceleration, Regenerative overvoltage trip during constant speed, Regenerative overvoltage trip during deceleration or stop, Inverter overload trip, Motor overload trip, Heatsink overheat, Instantaneous power failure, Undervoltage, Input phase loss∗4, Stall prevention stop, Loss of synchronism detection∗4, Brake transistor alarm detection, Output side earth (ground) fault overcurrent, Output short circuit, Output phase loss, External thermal relay operation∗4, PTC thermistor operation∗4, Option fault, Communication option fault, Parameter storage device fault, PU disconnection, Retry count excess∗4, CPU fault, Operation panel power supply short circuit, 24 VDC power fault, Abnormal output current detection∗4, Inrush current limit circuit fault, Communication fault, Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence∗4, Speed deviation excess detection∗1∗4, Signal loss detection∗1∗4, Excessive position fault∗1∗4, Brake sequence fault∗4, Encoder phase fault∗1∗4, 4 mA input fault∗4, Pre-charge fault∗4, PID signal fault∗4, Opposite rotation deceleration fault∗4, Internal circuit fault, User definition error by the PLC function, Abnormal internal temperature, Magnetic pole position unknown∗1
	Warning function	Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Electronic thermal relay function pre-alarm, PU stop, Speed limit indication∗4, Safety stop, Maintenance signal output∗4, USB host error, Home position return setting error∗4, Home position return uncompleted∗4, Home position return parameter setting error∗4, Operation panel lock∗4, Password locked∗4, Parameter write error, Copy operation error, 24 V external power supply operation, Internal-circulation fan alarm, Continuous operation during communication fault, Ethernet communication fault∗2
Environment	**Ambient temperature**	-10°C to +40°C (non-freezing)
	Surrounding air humidity	95% RH or less (non-condensing),
	Storage temperature∗3	-20°C to +65°C
	Atmosphere	Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude/vibration	Maximum 2500 m (for installation at an altitude above 1,000 m, derate the rated current 3% per 500 m.), 5.9 m/s^2 or less∗6 at 10 to 55 Hz (directions of X, Y, Z axes)

∗1 Available when a vector control compatible option is mounted.
∗2 Available for the FR-A806-E only.
∗3 Temperature applicable for a short time, e.g. in transit.
∗4 This protective function is not available in the initial status.
∗5 In the initial setting for the the FR-A846-00170(5.5K) or higher, it is limited to 150% by the torque limit level.
∗6 2.9 m/s^2 or less for the FR-A846-01800(55K) or higher.

Standard Specifications (FR-F806)

Rating

Model FR-F846-[]			00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600	03250	03610
			0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K	110K	132K	160K
Applicable motor capacity (kW) *1			0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Output	Rated capacity (kVA) *2		1.6	2.7	3.7	5.8	8.8	12	18	22	27	33	43	53	65	81	110	137	165	198	248
	Rated current (A)		2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106	144	180	216	260	325
	Overload current rating *3		120% 60 s, 150% 3 s (inverse-time characteristics) at ambient temperature of 40°C																		
	Rated voltage *4		Three-phase 380 to 500 V																		
Power supply	Rated input AC voltage/frequency		Three-phase 380 to 500 V 50 Hz/60 Hz *7																		
	Permissible AC voltage fluctuation		323 to 550 V 50 Hz/60 Hz																		
	Permissible frequency fluctuation		±5%																		
	Rated input current (A) *5		2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106	144	180	216	260	325
	Power supply capacity (kVA) *6		1.6	2.7	3.7	5.8	9	12	18	22	27	33	43	53	65	81	110	137	165	198	248
Protective structure		IEC 60529	Dust- and water-proof type (IP55) *9																		
		UL50	UL Type12 *8																		
Cooling system			Self cooling + internal fan						Forced-air-cooling + internal fan												
DC reactor			Built-in																		
Approx. mass (kg)			15	15	15	15	16	17	26	26	27	27	59	60	63	64	147	150	153	189	193

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor.
*2 The rated output capacity indicated assumes that the output voltage is 440 V.
*3 The % value of the overload current rating indicated 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.
*4 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 $\sqrt{2}$.
*5 The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*6 The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
*7 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**.
*8 UL Type 12 Enclosure-Suitable for Installation in a Compartment Handling Conditioned Air (Plenum)
*9 For compliance with IP55, remove the protective bushes and install the recommended cable glands.

Common specifications

Control specifications	Control method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control (Optimum excitation control), Advanced magnetic flux vector control (Advanced optimum excitation control) and PM motor control)
	Output frequency range		0.2 to 590 Hz (The upper-limit frequency is 400 Hz under Advanced magnetic flux vector control, and PM motor control.)
	Frequency setting resolution	Analog input	0.015 Hz/60 Hz (terminal 2, 4: 0 to 10 V/12 bits) 0.03 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1) 0.06 Hz/60 Hz (0 to ±5 V/11 bits for terminal 1)
		Digital input	0.01 Hz
	Frequency accuracy	Analog input	Within ±0.2% of the max. output frequency (25°C ±10°C)
		Digital input	Within 0.01% of the set output frequency
	Voltage/frequency characteristics		Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/F can be selected.
	Starting torque	Induction motor	120% 0.5 Hz (Advanced magnetic flux vector control)
		IPM motor	50%
	Torque boost		Manual torque boost
	Acceleration/deceleration time setting		0 to 3600 s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode, backlash countermeasures acceleration/deceleration can be selected.
	DC injection brake (induction motor)		Operation frequency (0 to 120 Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable
	Stall prevention operation level		Activation range of stall prevention operation (0 to 150%). Whether to use the stall prevention or not can be selected. (V/F control, Advanced magnetic flux vector control)
Operation specifications	Frequency setting signal	Analog input	Terminals 2 and 4: 0 to 10 V, 0 to 5 V, 4 to 20 mA (0 to 20 mA) are available. Terminal 1: -10 to +10 V, -5 to 5 V are available.
		Digital input	Input using the setting dial of the operation panel or the parameter unit Four-digit BCD or 16-bit binary (when used with option FR-A8AX)
	Start signal		Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.
	Input signals (twelve terminals)		Low-speed operation command, Middle-speed operation command, High-speed operation command, Second function selection, Terminal 4 input selection, Jog operation selection, Output stop, Start self-holding selection, Forward rotation command, Reverse rotation command, Inverter reset The input signal can be changed using **Pr.178 to Pr.189 (input terminal function selection)**.
		Pulse train input	100 kpps
	Operational functions		Maximum and minimum frequency settings, multi-speed operation, acceleration/deceleration pattern, thermal protection, DC injection brake, starting frequency, JOG operation, output stop (MRS), stall prevention, regeneration avoidance, increased magnetic excitation deceleration, DC feeding, frequency jump, rotation display, automatic restart after instantaneous power failure, electronic bypass sequence, remote setting, retry function, carrier frequency selection, fast-response current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, speed smoothing control, traverse, auto tuning, applied motor selection, RS-485 communication, Ethernet communication*1, PID control, PID pre-charge function, cooling fan operation selection, stop selection (deceleration stop/coasting), power-failure deceleration stop function, PLC function, life diagnosis, maintenance timer, current average monitor, multiple rating, test run, 24 V power supply input for control circuit, safety stop function, self power management, BACnet communication, PID gain tuning, cleaning, load characteristics storage, emergency drive
	Output signal	Open collector output (five terminals) Relay output (two terminals)	Inverter running, Up to frequency, Instantaneous power failure/undervoltage, Overload warning, Output frequency detection, Fault The output signal can be changed using **Pr.190 to Pr.196 (output terminal function selection)**. Fault codes of the inverter can be output (4 bits) from the open collector.
		Pulse train output (FM type)	50 kpps
Indication	For meter	Pulse train output (FM type)	Max. 2.4 kHz: one terminal (output frequency) The monitored item can be changed using **Pr.54 FM/CA terminal function selection**.
		Current output (CA type)	Max. 20 mADC: one terminal (output current) The monitored item can be changed using **Pr.54 FM/CA terminal function selection**.
		Voltage output	Max. 10 VDC: one terminal (output voltage) The monitored item can be changed using **Pr.158 AM terminal function selection**.
	Operation panel (FR-DU08)	Operating status	Output frequency, output current, output voltage, frequency setting value The monitored item can be changed using **Pr.52 Operation panel main monitor selection**.
		Fault record	Fault record is displayed when a fault occurs. Past 8 fault records and the conditions immediately before the fault (output voltage/current/frequency/cumulative energization time/year/month/date/time) are saved.

Protective/warning function		**Protective function**	Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative overvoltage trip during acceleration, Regenerative overvoltage trip during constant speed, Regenerative overvoltage trip during deceleration or stop, Inverter overload trip (electronic thermal O/L relay function), Motor overload trip (electronic thermal relay function), Heatsink overheat, Instantaneous power failure, Undervoltage, Input phase loss∗2, Stall prevention stop, Loss of synchronism detection∗2, Upper limit fault detection, Lower limit fault detection, Output side earth (ground) fault overcurrent, Output short circuit, Output phase loss, External thermal relay operation∗2, PTC thermistor operation∗2, Option fault, Communication option fault, User definition error by the PLC function, Parameter storage device fault, PU disconnection, Retry count excess∗2, CPU fault, Operation panel power supply short circuit/RS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection∗2, Inrush current limit circuit fault, Communication fault, Analog input fault, USB communication fault, Safety circuit fault, Abnormal internal temperature, Internal circuit fault, Overspeed occurrence∗2, 4 mA input fault∗2, Pre-charge fault∗2, PID signal fault∗2
		Warning function	Operation panel lock∗2, Password locked∗2, Parameter write error, Copy operation error, Stall prevention (overcurrent), Stall prevention (overvoltage), Electronic thermal relay function pre-alarm, PU stop, Continuous operation during communication fault, Parameter copy, Safety stop, Maintenance timer 1 to 3∗2, USB host error, Load fault warning, Emergency drive in operation, Fan alarm, Internal fan alarm, 24 V external power supply operation, Ethernet communication fault∗1
Environment	**Surrounding air temperature**		-10°C to +40°C (non-freezing)
	Surrounding air humidity		95% RH or less (non-condensing)
	Storage temperature∗3		-20°C to +65°C
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude/vibration		Maximum 2500 m (for installation at an altitude above 1,000 m, derate the rated current 3% per 500 m.), 5.9 m/s^2 or less∗4 at 10 to 55 Hz (directions of X, Y, Z axes)

∗1 Available for the FR-F806-E only.

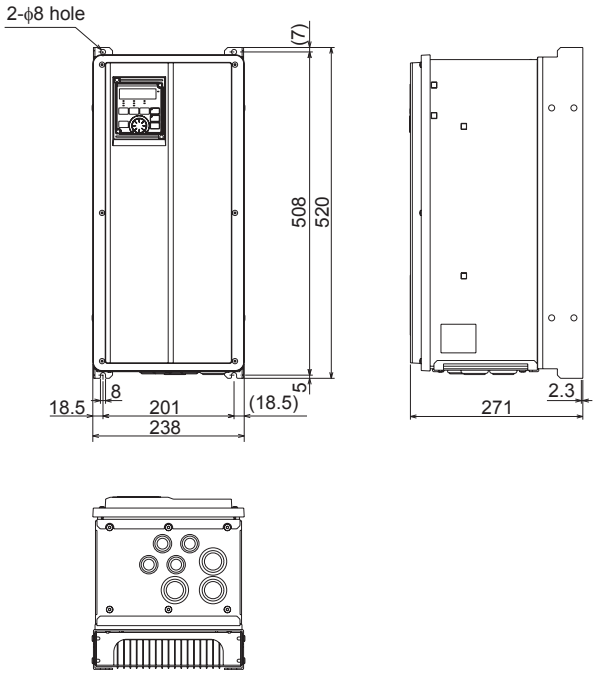
∗2 This protective function is not available in the initial status.

∗3 Temperature applicable for a short time, e.g. in transit.

∗4 2.9 m/s^2 or less for the FR-F846-01800(75K) or higher.

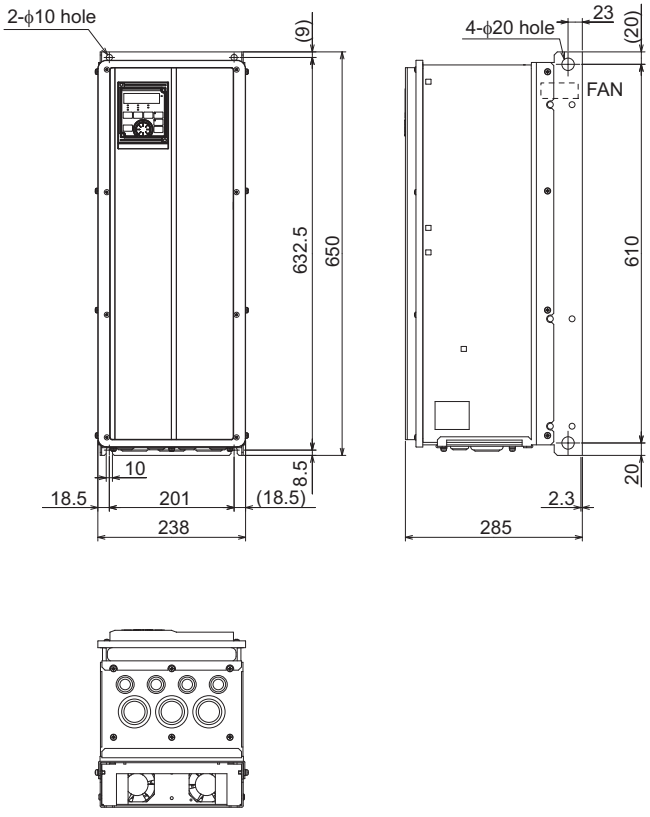
Outline Dimensions

FR-A846-00023(0.4K) to 00170(5.5K)
FR-F846-00023(0.75K) to 00170(7.5K)



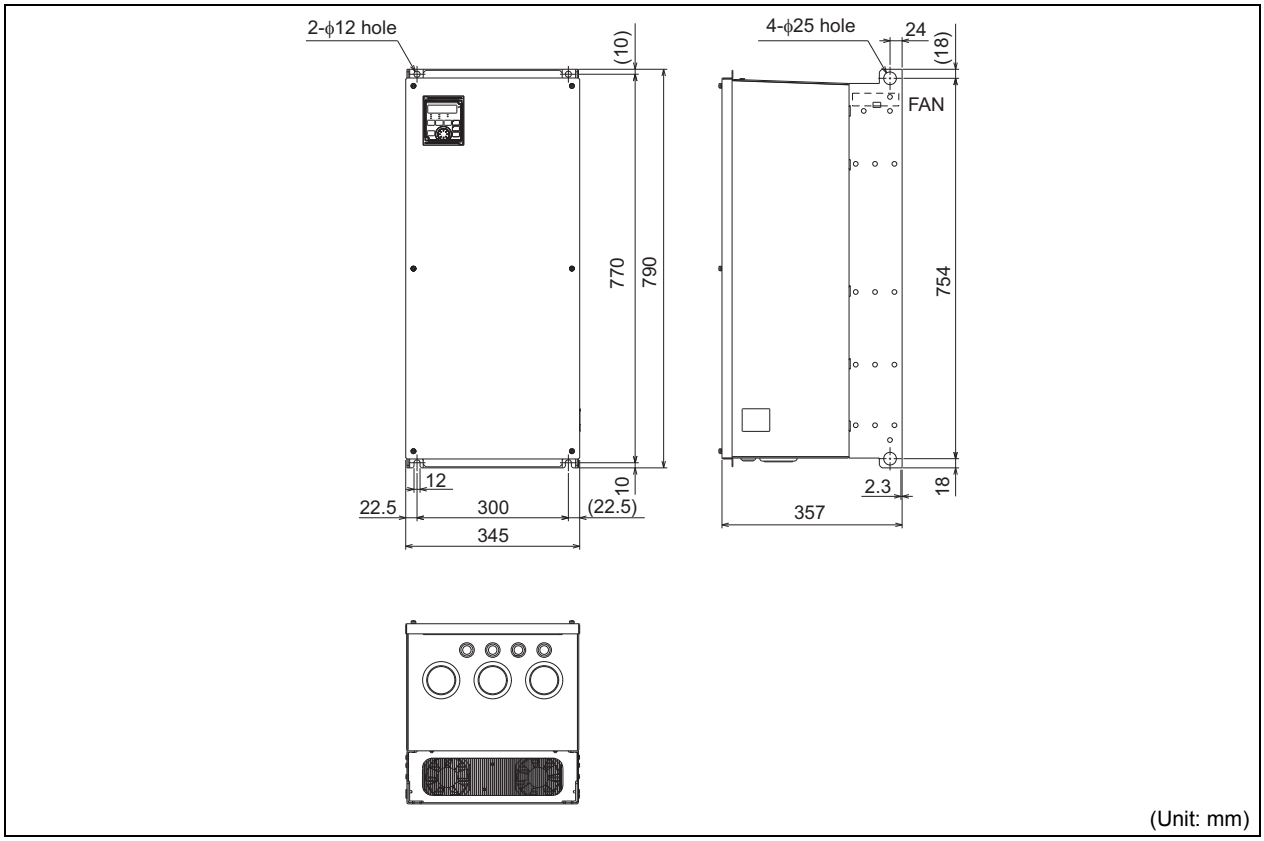
(Unit: mm)

FR-A846-00250(7.5K) to 00470(18.5K)
FR-F846-00250(11K) to 00470(22K)



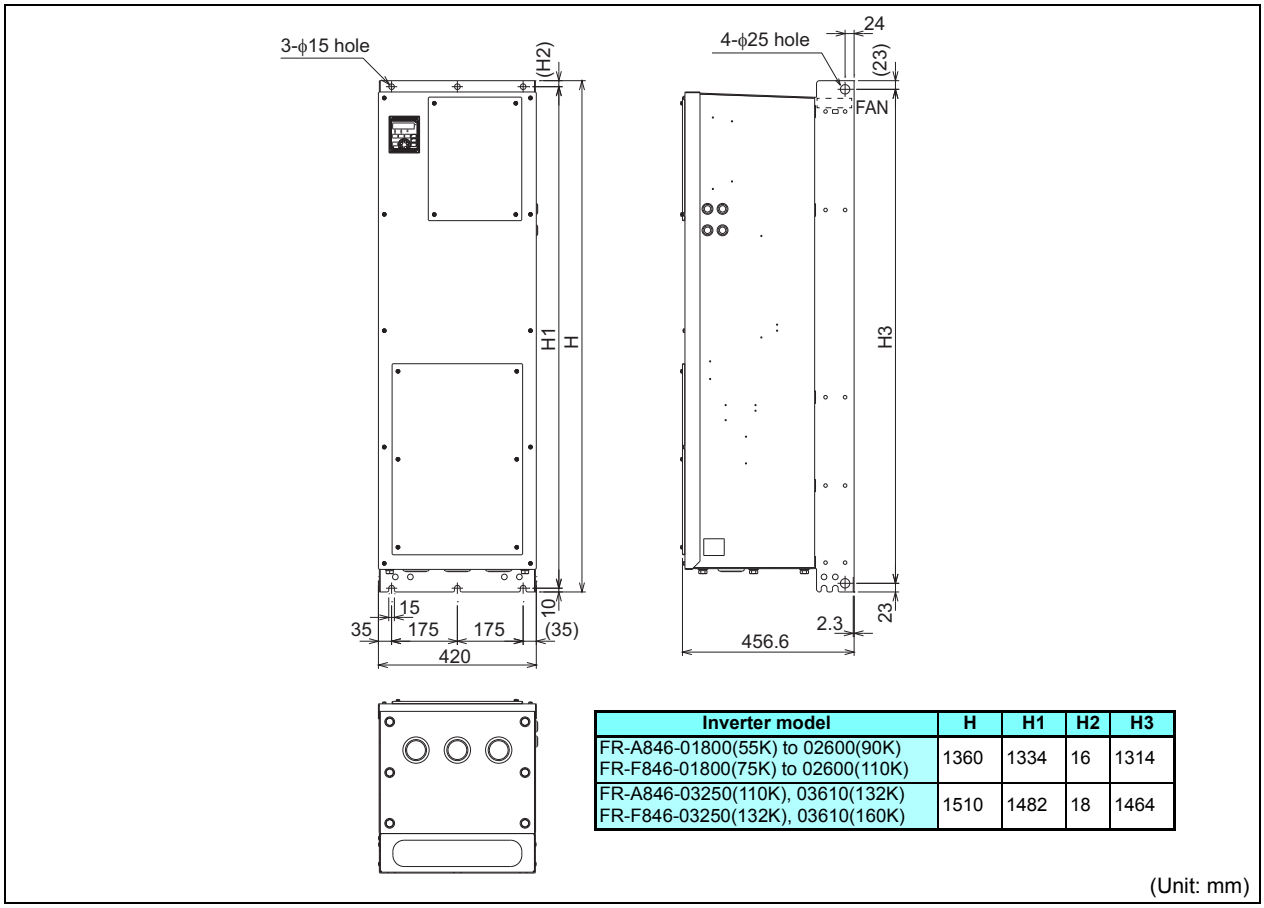
(Unit: mm)

FR-A846-00620(22K) to 01160(45K)
FR-F846-00620(30K) to 01160(55K)



(Unit: mm)

FR-A846-01800(55K) to 03610(132K)
FR-F846-01800(75K) to 03610(160K)

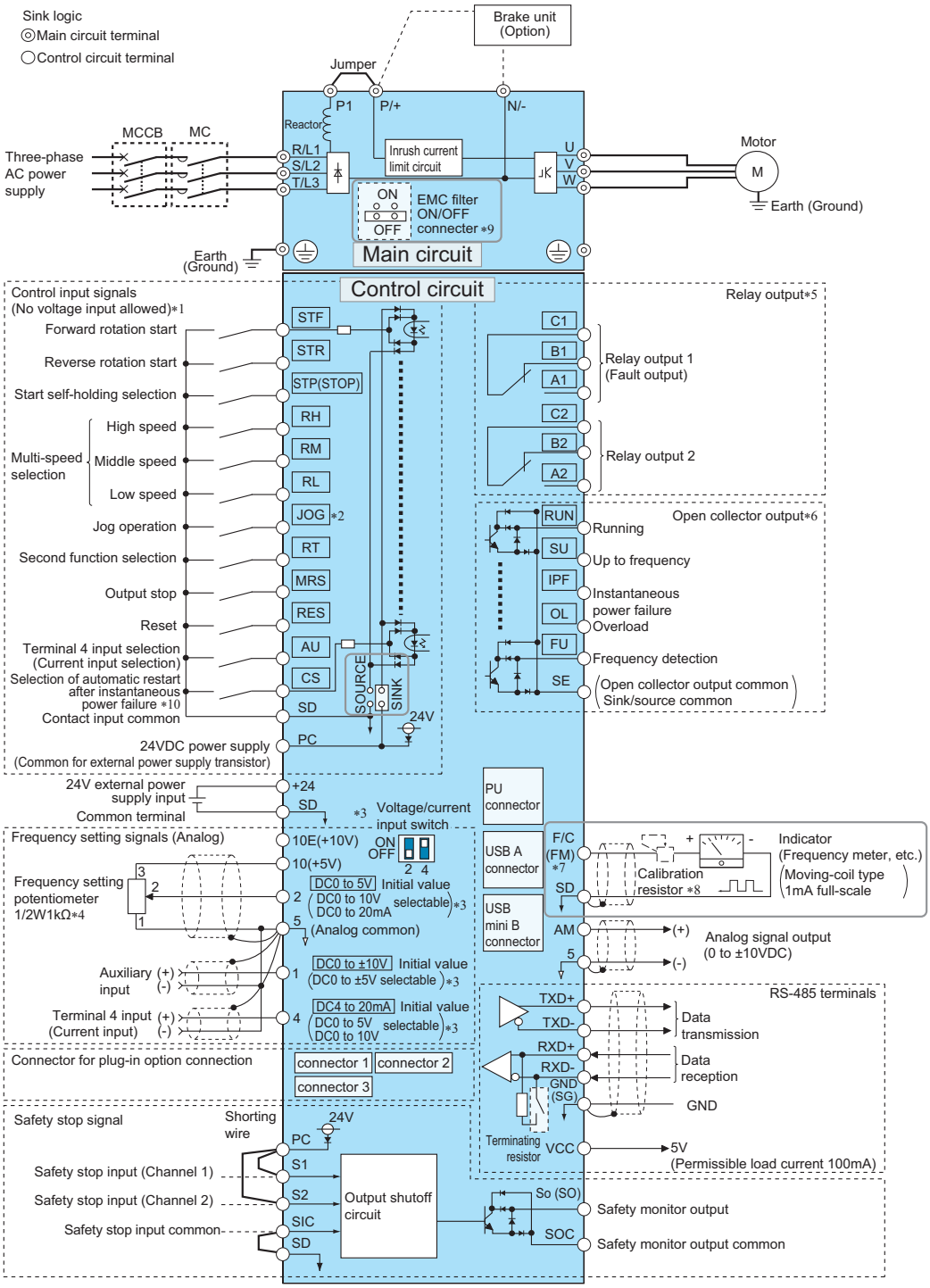


Inverter model	H	H1	H2	H3
FR-A846-01800(55K) to 02600(90K) FR-F846-01800(75K) to 02600(110K)	1360	1334	16	1314
FR-A846-03250(110K), 03610(132K) FR-F846-03250(132K), 03610(160K)	1510	1482	18	1464

(Unit: mm)

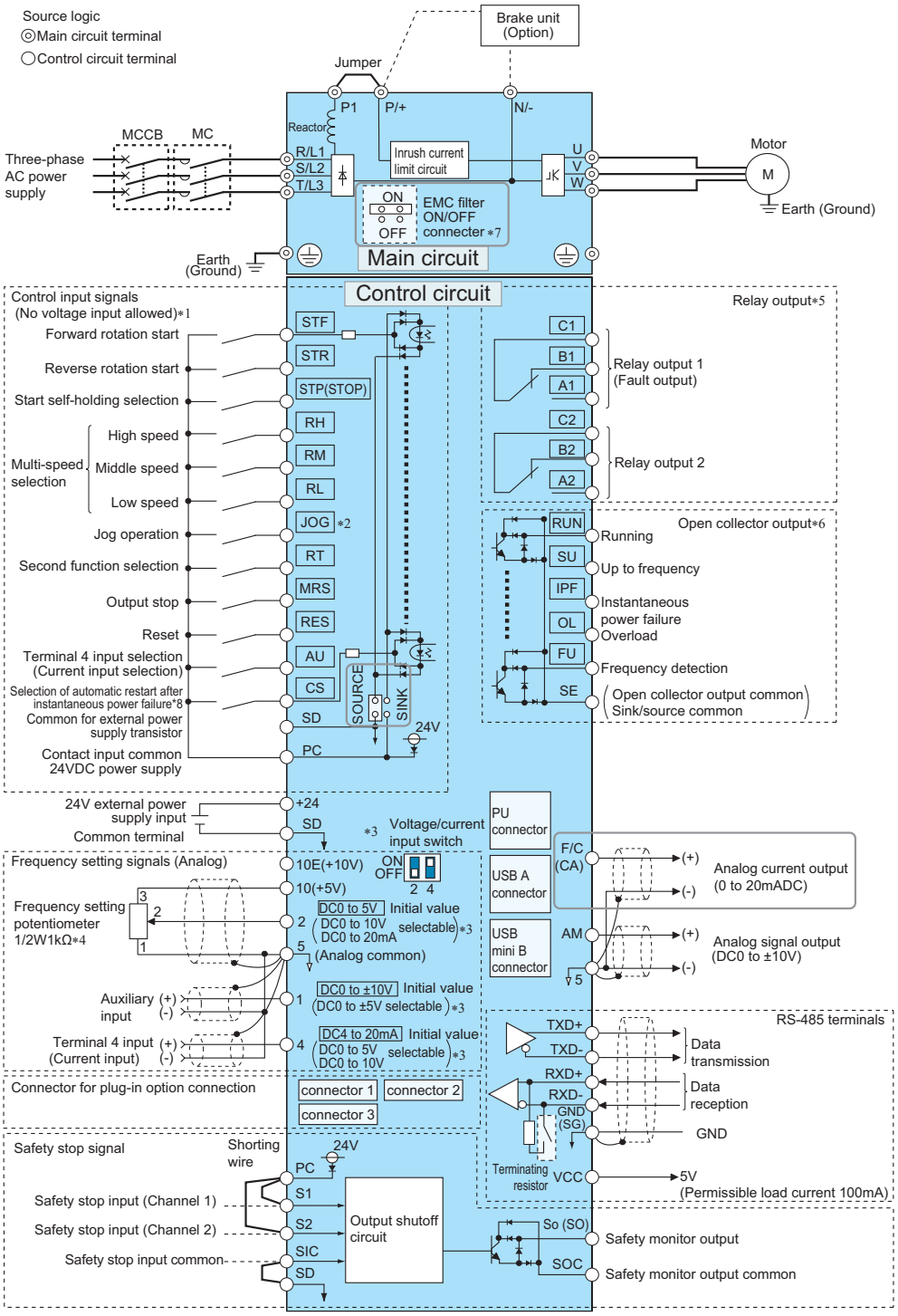
Terminal Connection Diagrams

● FM type



*1 The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*2 Terminal JOG is also used as a pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*3 Terminal input specifications can be changed by analog input specification switchover **(Pr.73, Pr.267)**. To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. **(Pr.561)**
*4 It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*5 The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*6 The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*7 The terminal FM can be used to output pulse trains as open collector output by setting **Pr.291**.
*8 Not required when calibrating the scale with the operation panel.
*9 Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter. The Class C2 compatibility condition is not satisfied with the EMC filter OFF.
The following models are not equipped with an EMC filter ON/OFF connector:
FR-A846-00250(7.5K)-C2/L2 to FR-A846-00470(18.5K)-C2/L2
FR-F846-00250(11K)-C2/L2 to FR-F846-00470(22K)-C2/L2
The EMC filter is always ON.
*10 For the FR-F800 series, this function is not assigned as default. Assign the function using **Pr.186 CS terminal function selection**.

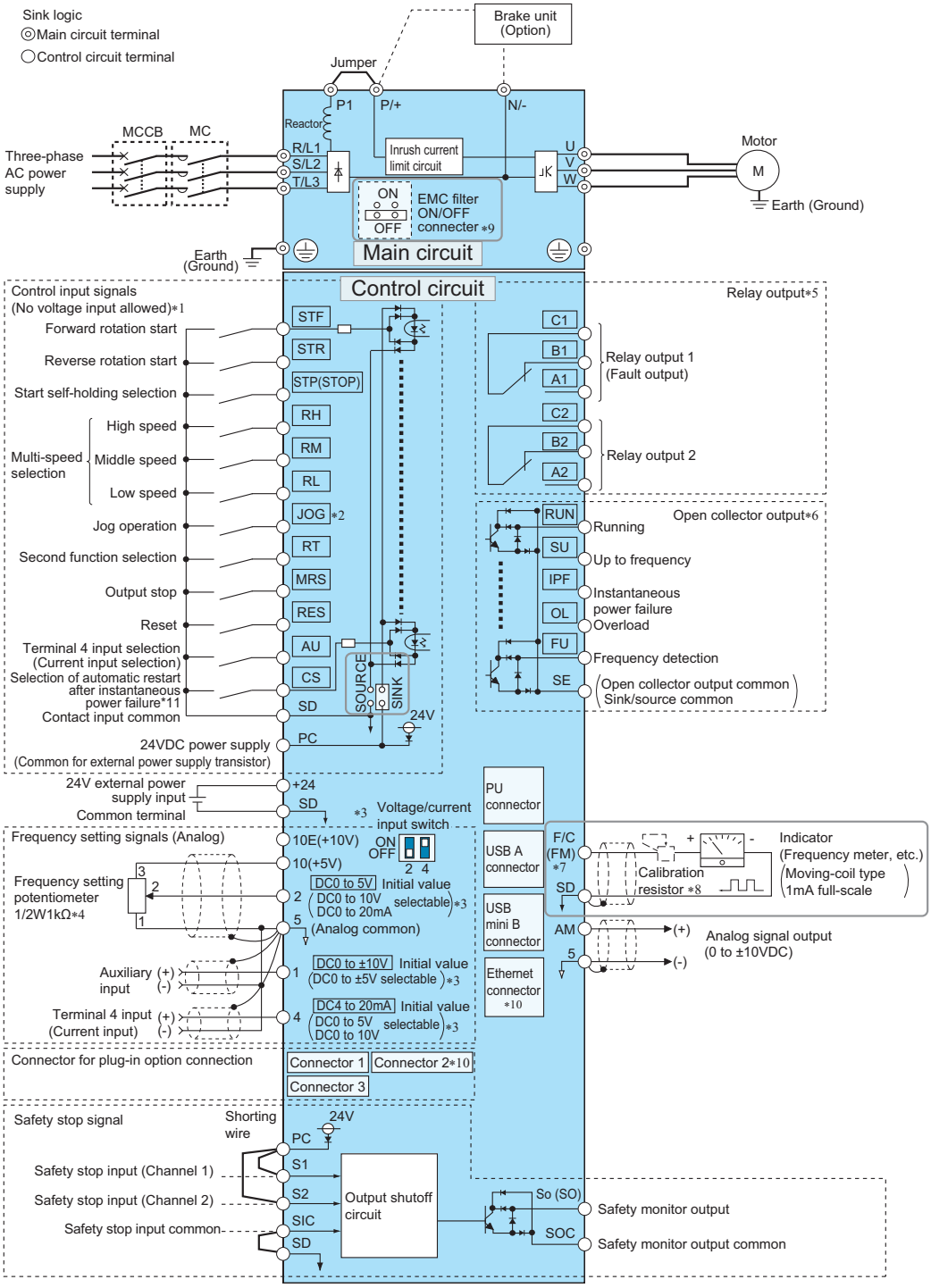
CA type



*1 The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*2 Terminal JOG is also used as a pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*3 Terminal input specifications can be changed by analog input specification switchover **(Pr.73, Pr.267)**. To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. **(Pr.561)**
*4 It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*5 The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*6 The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*7 Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter. The Class C2 compatibility condition is not satisfied with the EMC filter OFF.
The following models are not equipped with an EMC filter ON/OFF connector:
FR-A846-00250(7.5K)-C2/L2 to FR-A846-00470(18.5K)-C2/L2
FR-F846-00250(11K)-C2/L2 to FR-F846-00470(22K)-C2/L2
The EMC filter is always ON.
*8 For the FR-F800 series, this function is not assigned as default. Assign the function using **Pr.186 CS terminal function selection**.

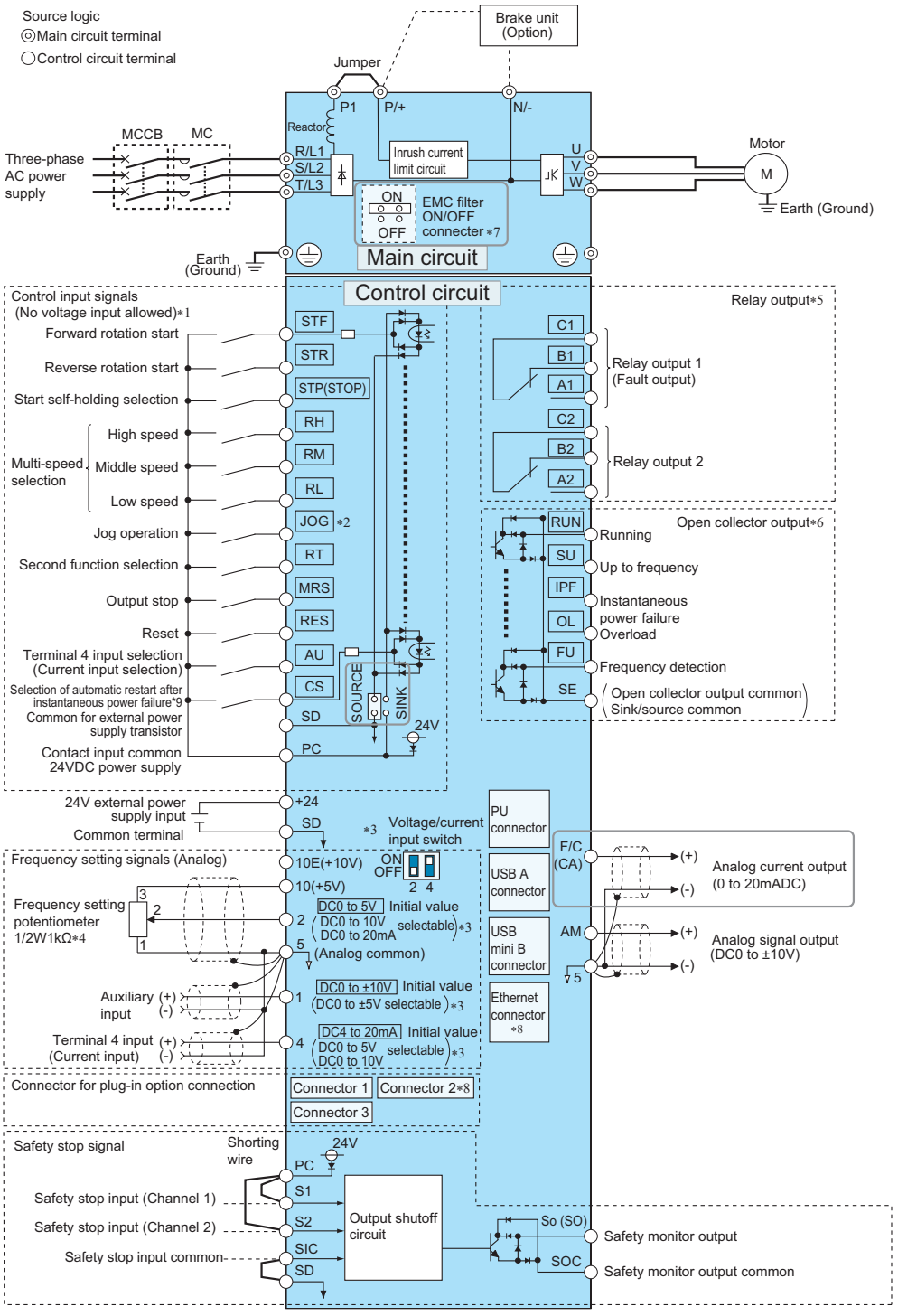
Terminal Connection Diagrams

● FM type (FR-A806-E / FR-F806-E)



*1 The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*2 Terminal JOG is also used as a pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*3 Terminal input specifications can be changed by analog input specification switchover **(Pr.73, Pr.267)**. To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. **(Pr.561)**
*4 It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*5 The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*6 The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*7 Terminal FM can be used to output pulse trains as open collector output by setting **Pr.291**.
*8 Not required when calibrating the scale with the operation panel.
*9 Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter. The Class C2 compatibility condition is not satisfied with the EMC filter OFF.
The following models are not equipped with an EMC filter ON/OFF connector:
FR-A846-00250(7.5K)-C2/L2 to FR-A846-00470(18.5K)-C2/L2
FR-F846-00250(11K)-C2/L2 to FR-F846-00470(22K)-C2/L2
The EMC filter is always ON.
*10 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.)
*11 For the FR-F800 series, this function is not assigned as default. Assign the function using **Pr.186 CS terminal function selection**.

● CA type (FR-A806-E / FR-F806-E)



*1 The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*2 Terminal JOG is also used as a pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*3 Terminal input specifications can be changed by analog input specification switchover **(Pr.73, Pr.267)**. To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. **(Pr.561)**
*4 It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*5 The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*6 The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*7 Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter. The Class C2 compatibility condition is not satisfied with the EMC filter OFF.
The following models are not equipped with an EMC filter ON/OFF connector:
FR-A846-00250(7.5K)-C2/L2 to FR-A846-00470(18.5K)-C2/L2
FR-F846-00250(11K)-C2/L2 to FR-F846-00470(22K)-C2/L2
The EMC filter is always ON.
*8 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.)
*9 For the FR-F800 series, this function is not assigned as default. Assign the function using **Pr.186 CS terminal function selection**.

Terminal Specifications

Input signal function of the terminals in [ ] can be selected by setting **Pr.178 to Pr.196 (I/O terminal function selection)**.
Terminal names and terminal functions are those of the factory set.

Type		Terminal Symbol	Terminal Name	Description	
Main circuit		R/L1, S/L2, T/L3	AC power input	Connect these terminals to the commercial power supply. Do not connect anything to these terminals when using the high power factor converter (FR-HC2) or the power regeneration common converter (FR-CV).	
		U, V, W	Inverter output	Connect these terminals to a three-phase squirrel cage motor or a PM motor.	
		P/+, N/-	Brake unit connection	Connect the brake unit (FR-BU2, FR-BU, BU), power regeneration common converter (FR-CV), power regeneration converter (MT-RC), high power factor converter (FR-HC2), or DC power supply (under DC feeding mode).	
		P/+, P1	—	Do not remove the jumper across terminals P/+ and P1 except for connecting the power regeneration common converter (FR-CV) or the high power factor converter (FR-HC2).	
		⏚	Earth (Ground)	For earthing (grounding) the inverter chassis. This must be earthed (grounded).	
Control circuit/input signal	Contact input	STF	Forward rotation start	Turn ON the STF signal to start forward rotation and turn it OFF to stop.	When the STF and STR signals are turned ON simultaneously, the stop command is given.
		STR	Reverse rotation start	Turn ON the STR signal to start reverse rotation and turn it OFF to stop.	
		STP (STOP)	Start self-holding selection	Turn ON the STP (STOP) signal to self-hold the start signal.	
		RH, RM, RL	Multi-speed selection	Multi-speed can be selected according to the combination of RH, RM and RL signals.	
		JOG	Jog mode selection	Turn ON the JOG signal to enable JOG operation (initial setting) and turn ON the start signal (STF or STR) to start JOG operation.	
			Pulse train input	Terminal JOG is also used as a pulse train input terminal. To use as a pulse train input terminal, change the **Pr.291** setting. (maximum input pulse: 100 k pulses/s)	
		RT	Second function selection	Turn ON the RT signal to enable the second function. When the second function such as "second torque boost" and "second V/F (base frequency)" is set, turning ON the RT signal enables the selected function.	
		MRS	Output stop	Turn ON the MRS signal (20 ms or more) to stop the inverter output. Use this signal to shut off the inverter output when stopping the motor with an electromagnetic brake.	
		RES	Reset	Use this signal to reset a fault output provided when a protective function is activated. Turn ON the RES signal for 0.1 s or longer, then turn it OFF. In the initial setting, reset is set always-enabled. By setting **Pr.75**, reset can be set enabled only at fault occurrence. The inverter recovers about 1 s after the reset is released.	
		AU	Terminal 4 input selection	The terminal 4 function is available only when the AU signal is turned ON. Turning the AU signal ON makes terminal 2 invalid.	
		CS	Selection of automatic restart after instantaneous power failure*1	When the CS signal is left ON, the inverter restarts automatically at power restoration. Note that restart setting is necessary for this operation. In the initial setting, a restart is disabled.	
		SD	Contact input common (sink)*2	Common terminal for the contact input terminal (sink logic), terminal FM.	
			External transistor common (source)*3	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction by undesirable current.	
			24 VDC power supply common	Common terminal for the 24 VDC power supply (terminal PC, terminal +24) Isolated from terminals 5 and SE.	
		PC	External transistor common (sink)*2	Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the sink logic to avoid malfunction by undesirable currents.	
			Contact input common (source)*3	Common terminal for contact input terminal (source logic).	
			24 VDC power supply	Can be used as a 24 VDC 0.1 A power supply.	
	Frequency setting	10E	Frequency setting power supply	When connecting the frequency setting potentiometer at an initial status, connect it to the terminal 10. Change the input specifications of the terminal 2 using **Pr.73** when connecting it to the terminal 10E.	10 VDC Permissible load current 10 mA
		10			5 VDC Permissible load current 10 mA
		2	Frequency setting (voltage)	Inputting 0 to 5 VDC (or 0 to 10 V, 0 to 20 mA) provides the maximum output frequency at 5 V (10 V, 20 mA) and makes input and output proportional. Use **Pr.73** to switch among input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 0 to 20 mA. Set the voltage/current input switch in the ON position to select current input (0 to 20 mA).	When voltage is input: Input resistance 10 kΩ ±1 kΩ Maximum permissible voltage 20 VDC When current is input: Input resistance 245 Ω ±5 Ω Permissible maximum current 30 mA
		4	Frequency setting (current)	Inputting 4 to 20 mADC (or 0 to 5 V, 0 to 10 V) provides the maximum output frequency at 20 mA and makes input and output proportional. This input signal is valid only when the AU signal is ON (terminal 2 input is invalid). Use **Pr.267** to switch among input 4 to 20 mA (initial setting), 0 to 5 VDC, and 0 to 10 VDC. Set the voltage/current input switch in the OFF position to select voltage input (0 to 5 V/0 to 10 V). Use **Pr.858** to switch terminal functions.	
		1	Frequency setting auxiliary	Inputting 0 to ±5 VDC or 0 to ±10 VDC adds this signal to terminal 2 or 4 frequency setting signal. Use **Pr.73** to switch between input 0 to ±5 VDC and 0 to ±10 VDC (initial setting). Use **Pr.868** to switch terminal functions.	Input resistance 10 kΩ ±1 kΩ Permissible maximum voltage ±20 VDC
		5	Frequency setting common	Common terminal for frequency setting signal (terminal 2, 1 or 4) and analog output terminal AM, CA. Do not earth (ground).	
Control circuit/input signal	Thermistor	10 2	PTC thermistor input	For receiving PTC thermistor outputs. When PTC thermistor is valid (**Pr.561** ≠ "9999"), the terminal 2 is not available for frequency setting.	Applicable PTC thermistor specification Overheat detection resistance: 0.5 to 30 kΩ (Set by **Pr.561**)
	External power supply input	+24	24 V external power supply input	For connecting a 24 V external power supply. If a 24 V external power supply is connected, power is supplied to the control circuit while the main power circuit is OFF.	Input voltage 23 to 25.5 VDC Input current 1.4 A or less

Type		Terminal Symbol	Terminal Name	Description		
Control circuit/output signal	Relay	A1, B1, C1	Relay output 1 (alarm output)	1 changeover contact output that indicates that an inverter's protective function has been activated and the outputs are stopped. Fault: discontinuity across B and C (continuity across A and C), Normal: continuity across Band C (discontinuity across A and C)		Contact capacity 230 VAC 0.3 A (power factor = 0.4) 30 VDC 0.3 A
		A2, B2, C2	Relay output 2	1 changeover contact output		
	Open collector	RUN	Inverter running	Switched to LOW when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5 Hz). Switched to HIGH during stop or DC injection brake operation.		Permissible load 24 VDC (maximum 27 VDC) 0.1 A (The voltage drop is 2.8 V at maximum while the signal is ON.) LOW is when the open collector output transistor is ON (conducted). HIGH is when the transistor is OFF (not conducted).
		SU	Up to frequency	Switched to LOW when the output frequency is within the set frequency range ±10% (initial value). Switched to HIGH during acceleration/deceleration and at a stop.	Fault code (4 bits) output.	
		OL	Overload warning	Switched to LOW when stall prevention is activated by the stall prevention function. Switched to HIGH when stall prevention is canceled.		
		IPF	Instantaneous power failure	Switched to LOW when an instantaneous power failure occurs or when the undervoltage protection is activated.		
		FU	Frequency detection	Switched to LOW when the inverter output frequency is equal to or higher than the preset detection frequency, and to HIGH when it is less than the preset detection frequency.		
		SE	Open collector output common	Common terminal for terminals RUN, SU, OL, IPF, FU		
	Pulse	FM *4	For meter	Outputs a selected monitored item (such as output frequency) among several monitored items. The signal is not output during an inverter reset. The output signal is proportional to the magnitude of the corresponding monitoring item. Use **Pr.55**, **Pr.56**, and **Pr.866** to set full scales for the monitored output frequency, output current, and torque.	Output item: Output frequency (initial setting)	Permissible load current 2 mA For full scale 1440 pulses/s
			NPN open collector output		This terminal can be used for open collector outputs by setting **Pr.291**.	Maximum output pulse 50k pulses/s Permissible load current 80 mA
	Analog	AM	Analog voltage output		Output item: Output frequency (initial setting)	Output signal 0 to ±10 VDC, Permissible load current 1 mA (load impedance 10 kΩ or more) Resolution 8 bits
		CA *5	Analog current output			Load impedance 200 Ω to 450 Ω Output signal 0 to 20 mADC
Communication	RS-485	—	PU connector	With the PU connector, communication can be made through RS-485. (For connection on a 1:1 basis only) Conforming standard: EIA-485 (RS-485) Transmission format: Multidrop link Communication speed: 4800 to 115200 bps Wiring length: 500 m		
		RS-485 terminals: TXD+, TXD-	Inverter transmission terminal	The RS-485 terminals enables the communication by RS-485 (Not available for the FR-A806-E and FR-F806-E). Conforming standard: EIA-485 (RS-485) Transmission format: Multidrop link Communication speed: 300 to 115200 bps Overall length: 500 m		
		RS-485 terminals: RXD+, RXD-	Inverter reception terminal			
		RS-485 terminals: GND (SG)	Earth (Ground)			
	Ethernet	—	Ethernet connector	Communication can be made via Ethernet (Available for the FR-A806-E and FR-F806-E). Category: 100BASE-TX/10BASE-T Data transmission speed: 100 Mbps (100BASE-TX) / 10 Mbps (10BASE-T) Transmission method: Baseband Maximum segment length: 100 m between the hub and the inverter Number of cascade connection stages: Up to 2 (100BASE-TX) / up to 4 (10BASE-T) Interface: RJ-45 Number of interfaces available: 1 IP version: IPv4		
	USB	—	USB A connector	A connector (receptacle) A USB memory device enables parameter copies and the trace function.		Interface: Conforms to USB1.1 (USB2.0 full-speed compatible) Transmission speed: 12 Mbps
			USB B connector	Mini B connector (receptacle) Connected to a personal computer via USB to enable setting, monitoring, test operations of the inverter by FR Configurator 2.		
Safety stop signal		S1	Safety stop input (Channel 1)	The terminals S1 and S2 are used for the safety stop input signal for the safety relay module. The terminals S1 and S2 are used at the same time (dual channel). Inverter output is shutoff by shortening/opening between terminals S1 and SIC, or between S2 and SIC. In the initial status, terminals S1 and S2 are shorted with the terminal PC by shorting wires. The terminal SIC is shorted with the terminal SD. Remove the shorting wires and connect the safety relay module when using the safety stop function.		Input resistance 4.7 kΩ Input current 4 to 6 mADC (with 24 VDC input)
		S2	Safety stop input (Channel 2)			
		SIC	Safety stop input terminal common	Common terminal for terminals S1 and S2.		
		So (SO)	Safety monitor output (open collector output)	Indicates the safety stop input signal status. Switched to LOW when the status is other than the internal safety circuit failure. Switched to HIGH during the internal safety circuit failure status. (LOW is when the open collector output transistor is ON (conducted). HIGH is when the transistor is OFF (not conducted).) Refer to the Safety stop function instruction manual (BCNA23228-001) when the signal is switched to HIGH while both terminals S1 and S2 are open. (Please contact your sales representative for the manual.)		Permissible load 24 VDC (27 VDC at maximum) 0.1 A (The voltage drop is 3.4 V at maximum while the signal is ON.)
		SOC	Safety stop input terminal common	Common terminal for terminal So (SO).		

*1 For the FR-F800 series, this function is not assigned as default. Assign the function using **Pr.186 CS terminal function selection**.
*2 Sink logic is initially set for the FM-type inverter.
*3 Source logic is initially set for the CA-type inverter.
*4 Terminal FM is provided in the FM-type inverter.
*5 Terminal CA is provided in the CA-type inverter.

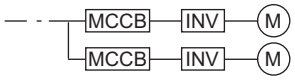
Peripheral Devices

● Molded case circuit breaker, magnetic contactor, cable gauge

Voltage	Motor output (kW)*1	Applicable inverter model	Molded case circuit breaker (MCCB)*2 or earth leakage circuit breaker (ELB) (NF, NV type)	Input side magnetic contactor*3	Recommended cable gauge (mm^2)*4	
					R/L1, S/L2, T/L3	U, V, W
400 V class	0.4	FR-A846-00023(0.4K)	5A	S-T10	2	2
	0.75	FR-A846-00038(0.75K) FR-F846-00023(0.75K)	5A	S-T10	2	2
	1.5	FR-A846-00052(1.5K) FR-F846-00038(1.5K)	10A	S-T10	2	2
	2.2	FR-A846-00083(2.2K) FR-F846-00052(2.2K)	10A	S-T10	2	2
	3.7	FR-A846-00126(3.7K) FR-F846-00083(3.7K)	15A	S-T10	2	2
	5.5	FR-A846-00170(5.5K) FR-F846-00126(5.5K)	20A	S-T12	2	2
	7.5	FR-A846-00250(7.5K) FR-F846-00170(7.5K)	30A	S-T21	3.5	3.5
	11	FR-A846-00310(11K) FR-F846-00250(11K)	40A	S-T21	5.5	5.5
	15	FR-A846-00380(15K) FR-F846-00310(15K)	50A	S-T21	5.5	5.5
	18.5	FR-A846-00470(18.5K) FR-F846-00380(18.5K)	60A	S-T35	8	8
	22	FR-A846-00620(22K) FR-F846-00470(22K)	75A	S-T35	14	14
	30	FR-A846-00770(30K) FR-F846-00620(30K)	100A	S-T50	22	22
	37	FR-A846-00930(37K) FR-F846-00770(37K)	100A	S-T50	22	22
	45	FR-A846-01160(45K) FR-F846-00930(45K)	125A	S-T65	38	38
	55	FR-A846-01800(55K) FR-F846-01160(55K)	150A	S-T100	60	60
	75	FR-A846-02160(75K) FR-F846-01800(75K)	200A	S-T100	60	60
	90	FR-A846-02600(90K) FR-F846-02160(90K)	225A	S-N150	60	60
	110	FR-A846-03250(110K) FR-F846-02600(110K)	225A	S-N180	80	80
	132	FR-A846-03610(132K) FR-F846-03250(132K)	350A	S-N220	100	100
	160	FR-F846-160K(03610)	400A	S-N300	125	125

*1 Assumes the use of a Mitsubishi Electric 4-pole standard motor with the power supply voltage of 400 VAC 50 Hz.

*2 Select an MCCB according to the power supply capacity.
Install one MCCB per inverter.
For use in the United States or Canada, provide the appropriate UL and cUL listed fuse or UL489 molded case circuit breaker (MCCB) that is suitable for branch circuit protection. (Refer to the Instruction Manual (Hardware).)



*3 Magnetic contactor is selected based on the AC-1 class. The electrical durability of magnetic contactor is 500,000 times. When the magnetic contactor is used for emergency stops during motor driving, the electrical durability is 25 times.
If using an MC for emergency stop during motor driving, select an MC regarding the inverter input side current as JEM1038-AC-3 class rated current. When providing an MC on the inverter output side for switching to commercial power supply during general-purpose motor operation, select an MC regarding the rated motor current as JEM1038-AC-3 class rated current.

*4 For the FR-A846-01800(55K) or lower and FR-F846-01800(75K) or lower, the cable should have a continuous maximum permissible temperature rating of 75°C. (600 V heat-resistant PVC insulated HIV cable, etc.) It is assumed that the surrounding air temperature is 50°C or lower and the length of the wiring is within 20 m.
For the FR-A846-02160(75K) or higher and FR-F846-02160(90K) or higher, the cable should have a continuous maximum permissible temperature rating of 90°C. (heat resistant flexible cross-linked polyethylene insulated LMFC cable, etc.) It is assumed that the surrounding air temperature is 50°C or lower.

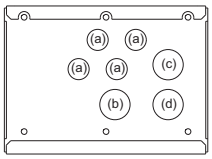
NOTE

- When the inverter capacity is larger than the motor capacity, select an MCCB and a magnetic contactor according to the inverter model, and select cables and reactors according to the motor output.
- When the breaker on the inverter's input side trips, check for the wiring fault (short circuit), damage to internal parts of the inverter etc. The cause of the trip must be identified and removed before turning ON the power of the breaker.

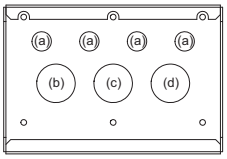
Cable glands and nuts

For wiring of the IP55 compatible model, fix the cables using a cable gland and a nut, according to the diameter of the holes of the wiring cover.
For the details such as wiring cover hole diameters and recommended cable glands, refer to the following table.

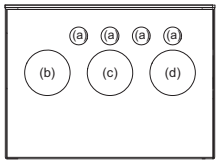
FR-A846-00023(0.4K) to 00170(5.5K)
FR-F846-00023(0.75K) to 00170(7.5K)



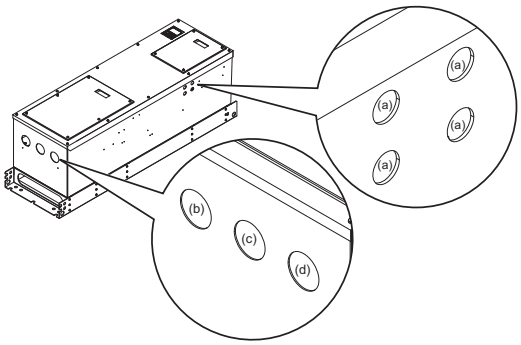
FR-A846-00250(7.5K) to 00470(18.5K)
FR-F846-00250(11K) to 00470(22K)



FR-A846-00620(22K) to 01160(45K)
FR-F846-00620(30K) to 01160(55K)



FR-A846-01800(55K) to 03610(132K)
FR-F846-01800(75K) to 03610(160K)



Inverter capacity	Symbol	Recommended layout example	Hole diameter (mm)	Recommended cable gland (Manufactured by LAPP KABEL)	Recommended nut (Manufactured by LAPP KABEL)
FR-A846-00023(0.4K) to 00170(5.5K) **FR-F846-00023(0.75K) to 00170(7.5K)**	(a)	Control circuit wiring	20.3	SKINTOP MS-SC-M20 53112630 *1 SKINTOP MS-M20 53112020 *2	SKINDICHT SM-M20 52103020
	(b)	AC power input wiring	32.3	SKINTOP MS-SC-M32 53112650 *1 SKINTOP MS-M32 BRUSH 53112677 *1 SKINTOP MS-M32 53112040 *2	SKINDICHT SM-M32 52103040
	(c)	Brake unit connection wiring			
	(d)	Inverter output wiring			
FR-A846-00250(7.5K) to 00470(18.5K) **FR-F846-00250(11K) to 00470(22K)**	(a)	Control circuit wiring	20.3	SKINTOP MS-SC-M20 53112630 *1 SKINTOP MS-M20 53112020 *2	SKINDICHT SM-M20 52103020
	(b)	AC power input wiring	40.4	SKINTOP MS-SC-M40 53112660 *1 SKINTOP MS-M40 BRUSH 53112678 *1 SKINTOP MS-M40 53112050 *2	SKINDICHT SM-M40 52103050
	(c)	Brake unit connection wiring			
	(d)	Inverter output wiring			
FR-A846-00620(22K) to 02600(90K) **FR-F846-00620(30K) to 02600(110K)**	(a)	Control circuit wiring	20.3	SKINTOP MS-SC-M20 53112630 *1 SKINTOP MS-M20 53112020	SKINDICHT SM-M20 52103020
	(b)	AC power input wiring	63	SKINTOP MS-M63 BRUSH 53112680 *1 SKINTOP MS-M63 53112070 *2	SKINDICHT SM-M63 52103070
	(c)	Brake unit connection wiring			
	(d)	Inverter output wiring			
FR-A846-03250(110K) to 03610(132K) **FR-F846-03250(132K), 03610(160K)**	(a)	Control circuit wiring	20.3	SKINTOP MS-SC-M20 53112630 *1 SKINTOP MS-M20 53112020 *2	SKINDICHT SM-M20 52103020
	(b)	AC power input wiring	63	SKINTOP MS-M63 BRUSH PLUS 53112681 *1 SKINTOP MS-M63 PLUS 53112080 *2	SKINDICHT SM-M63 52103070
	(c)	Brake unit connection wiring			
	(d)	Inverter output wiring			

*1 EMC-compliant cable gland
*2 General-purpose cable gland

Precautions

Waterproof and dustproof performances

- The inverter is rated with an IPX5*1 waterproof rating and an IP5X*2 dustproof rating when the operation panel (FR-DU08-01), the front cover, the wiring cover, and the cable glands are securely fixed with screws.
- The items enclosed with the inverter such as the Instruction Manual or CD are not rated with the IPX5 waterproof or IP5X dustproof ratings.
- Although the inverter is rated with the IPX5 waterproof and IP5X dustproof ratings, it is not intended for use in water. Also, the ratings do not guarantee protection of the inverter from needless submersion in water or being washed under strong running water such as a shower.
- Do not pour or apply the following liquids over the inverter: water containing soap, detergent, or bath additives; sea water; swimming pool water; warm water; boiling water; etc.
- The inverter is intended for indoor*4 installation and not for outdoor installation. Avoid places where the inverter is subjected to direct sunlight, rain, sleet, snow, or freezing temperatures.
- If the operation panel (FR-DU08-01) is not installed, if the screws of the operation panel are not tightened, or if the operation panel is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the operation panel, ask for an inspection and repair.
- If the screws of the front cover or the wiring cover are not tightened, if any foreign matter (hair, sand grain, fiber, etc.) is stuck between the inverter and the gasket, if the gasket is damaged, or if the front cover or the wiring cover is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the front cover, wiring cover, or the gasket of the inverter, ask for an inspection and repair.
- Cable glands are important components to maintain the waterproof and dustproof performances. Be sure to use cable glands of the recommended size and shape or equivalent. The standard protective bushes cannot sufficiently maintain the IPX5 waterproof performance and the IP5X dustproof performance.
- If a cable gland is damaged or deformed, the IPX5 waterproof performance and the IP5X dustproof performance are impaired. If any abnormalities are found on the cable glands, ask the manufacturer of the cable glands for an inspection and repair.
- To maintain the waterproof and dustproof performances of the inverter, daily and periodic inspections are recommended regardless of the presence or absence of abnormalities.

*1 IPX5 refers to protection of the inverter functions against water jets from any direction when about 12.5-liter water*3 is injected from a nozzle with an inside diameter of 6.3 mm from the distance of about 3 m for at least 3 minutes.
*2 IP5X refers to protection of the inverter functions and maintenance of safety when the inverter is put into a stirring device containing dust of 75 μm or smaller in diameter, stirred for 8 hours, and then removed from the device.
*3 Water here refers to fresh water at room temperature (5 to 35°C).
*4 Indoor here refers to the environments that are not affected by climate conditions.

● Major differences between the standard model and the IP55 compatible model

◆ FR-A800 series

Item		FR-A840 (Standard model)	FR-A846 (IP55 compatible model)
Protective structure		Enclose type (IP20): FR-A840-00620(22K) or lower Open type (IP00): FR-A840-00770(30K) or higher	Dust-proof and waterproof type (IP55): All capacities
DC reactor		Optional	Built-in
Internal air circulation fan		Without	With
Protective function		–	Internal fan alarm (FN2), Abnormal internal temperature (E.IAH)
Circuit board coating (conforming to IEC60721-3-3: 1994 3C2/3S2)		With / Without (Selectable)	With
Environment	Surrounding air temperature	LD, ND, HD rating: -10°C to +50°C (non-freezing) SLD rating: -10°C to +40°C (non-freezing)	LD, ND rating: -10°C to +40°C (non-freezing)
	Surrounding air humidity	With circuit board coating: 95% RH or less (non-condensing) Without circuit board coating: 90% RH or less (non-condensing)	95% RH or less (non-condensing)
Brake transistor (usable brake resistor)		Built-in for the FR-A820-00046(0.4K) to 01250(22K) Built-in for the FR-A840-00023(0.4K) to 01800(55K)	Without (Brake resistor is not applicable.)
Multiple rating (Pr.570 Multiple rating setting)		SLD, LD, ND (initial setting), HD rating (Setting range: "0 to 3")	LD, ND (initial setting) rating (Setting range: "1 or 2")
Pr.30 Regenerative function selection		Setting range: "0 to 2, 10, 11, 20, 21, 100, 101, 110, 111, 120, or 121"	Setting range: "0, 2, 10, 20, 100, 110, or 120"
Pr.70 Special regenerative brake duty		Available	Not available
Regenerative brake duty (Pr.52, Pr.54, Pr.158, Pr.774 to Pr.776, Pr.992, Pr.1027 to Pr.1034 setting "9")		Available (can be set)	Not available (cannot be set)
Operation panel		FR-DU08: PU/EXT key	FR-DU08-01: HAND/AUTO key
Radio Waves Act (South Korea) (KC mark)		Compliant	Not compliant

◆ FR-F800 series

Item		FR-F840 (Standard model)	FR-F846 (IP55 compatible model)
Protective structure		Enclose type (IP20): FR-F840-00620(30K) or lower Open type (IP00): FR-F840-00770(37K) or higher	Dust- and water-proof type (IP55): all capacities
DC reactor		Optional	Built-in
Internal air circulation fan		Without	With
Protective function		–	Internal fan alarm (FN2), Abnormal internal temperature (E.IAH)
Circuit board coating (conforming to IEC60721-3-3: 1994 3C2/3S2)		With / Without (Selectable)	With
Environment	Surrounding air temperature	LD rating: -10°C to +50°C (non-freezing) SLD rating: -10°C to +40°C (non-freezing)	-10°C to +40°C (non-freezing)
	Surrounding air humidity	With circuit board coating: 95% RH or less (non-condensing) Without circuit board coating: 90% RH or less (non-condensing)	95% RH or less (non-condensing)
Multiple rating (Pr.570 Multiple rating setting)		SLD, LD (initial setting) rating (Setting range “0, 1”)	Not applicable (LD rating equivalent) (None (setting unavailable))
Pr.30 Regenerative function selection		Setting range “0 to 2, 10, 11, 20, 21, 100 to 102, 110, 111, 120, 121”	Setting range “0, 2, 10, 20, 100, 102, 110, 120”
Pr.71 Applied motor		Setting range “0 to 6, 13 to 16, 20, 23, 24, 40, 43, 44, 50, 53, 54, 70, 73, 74, 210, 213, 214, 240, 243, 244, 8090, 8093, 8094, 9090, 9093, 9094”	Setting range “0 to 6, 13 to 16, 20, 23, 24, 40, 43, 44, 50, 53, 54, 70, 73, 74, 8090, 8093, 8094, 9090, 9093, 9094”
Pr.255 Life alarm status display		Setting range (reading only) “0 to 15”	Setting range (reading only) “0 to 31”
Pr.998 PM parameter initialization		Setting range “0, 12, 14, 112, 114, 8009, 8109, 9009, 9109”	Setting range “0, 8009, 8109, 9009, 9109”
Operation panel		FR-DU08: PU/EXT key	FR-DU08-01: HAND/AUTO key
Radio Waves Act (South Korea) (KC mark)		Compliant	Not compliant

For details including common functions, options, and precautions, refer to the FR-A800 inverter catalog (L(NA)06075ENG) or FR-F800 inverter catalog (L(NA)06085ENG).

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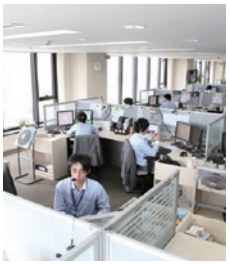
PT.MITSUBISHI
ELECTRIC INDONESIA

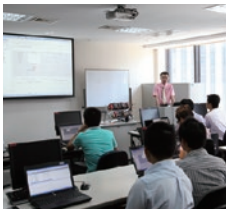
India Bangalore FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Bangalore Branch

India Chennai FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Chennai Branch

Available services



Technical consultation (engineering)
Our Japanese and/or local staff offer technical advice, and can also propose the best products and systems for a customer's specific application needs.



Training
From basic operations to applied programming, our training schools offer regular courses that use actual machines. We also offer customized training programs and onsite training sessions.

Showrooms
The latest automation technologies, including programmable controllers, HMIs, inverters, servo systems, and industrial automation machinery such as electrical-discharge machines, laser processing machines, CNCs, and industrial robots can be seen at Mitsubishi Electric showrooms.

Technical support
Our FA centers and service shops work together to provide repairs, onsite engineering support, and spare parts.

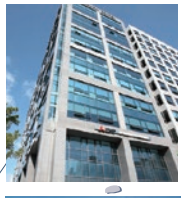
Repairs
Handle repairs of our FA products.

Service bases are established around the world to provide the same services as in Japan globally.
Overseas bases are opening one after another to support our customers' business expansion.

Area	Our overseas	FA centers
EMEA	26	7
China	17	4
Asia	31	13
Americas	15	6
Others	1	0
Total	90	30

·As of July 2017

Thailand FA Center
MITSUBISHI ELECTRIC FACTORY AUTOMATION(THAILAND) CO.,LTD



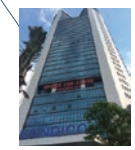
Korea FA Center
MITSUBISHI ELECTRIC AUTOMATION KOREA CO.,LTD.

MITSUBISHI ELECTRIC CORPORATION
Factory Automation Systems Group

Taichung FA Center
MITSUBISHI ELECTRIC TAIWAN CO.,LTD

Taipei FA Center
SETSUYO ENTERPRISE CO.,LTD

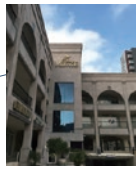
Ho Chi Minh FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED



Hanoi FA center
Mitsubishi Electric Vietnam Company Limited
Hanoi Branch

ASEAN FA Center
MITSUBISHI ELECTRIC ASIA PTE.LTD.

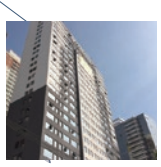
North America FA Center
MITSUBISHI ELECTRIC AUTOMATION,INC.



Mexico Monterrey FA Center
Monterrey Office, Mitsubishi Electric Automation, Inc.

Mexico FA Center
Querétaro Office, Mitsubishi Electric Automation, Inc.

Mexico City FA Center
Mexico FA Center
Mexico Branch, Mitsubishi Electric Automation, Inc.



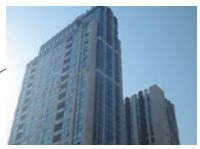
Brazil FA Center
Mitsubishi Electric do Brasil Comércio e Serviços Ltda.

Brazil Votorantim FA Center
MELCO CNC do Brasil Comércio e Serviços S.A.

China

Beijing FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA)LTD.

Tianjin FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA)LTD.



Shanghai FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.

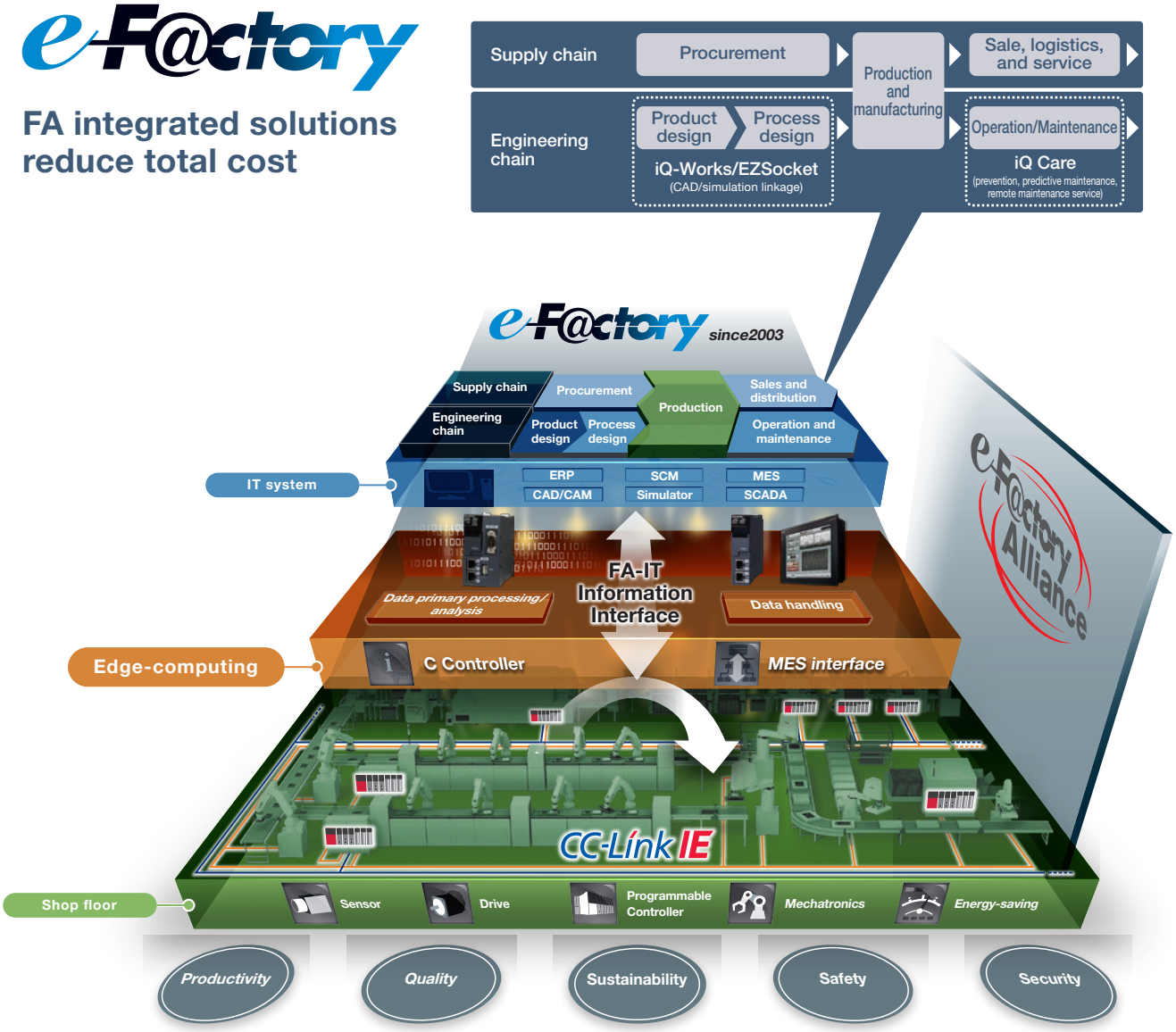
Guangzhou FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA)LTD.

This solution solves customers' issues and concerns by enabling visualization and analysis that lead to improvements and increase availability at production sites.

Utilizing our FA and IT technologies and collaborating with e-F@ctory Alliance partners, we reduce the total cost across the entire supply chain and engineeringchain, and support the improvement initiatives and one-step-ahead manufacturing of our customers.

e-F@ctory

FA integrated solutions reduce total cost

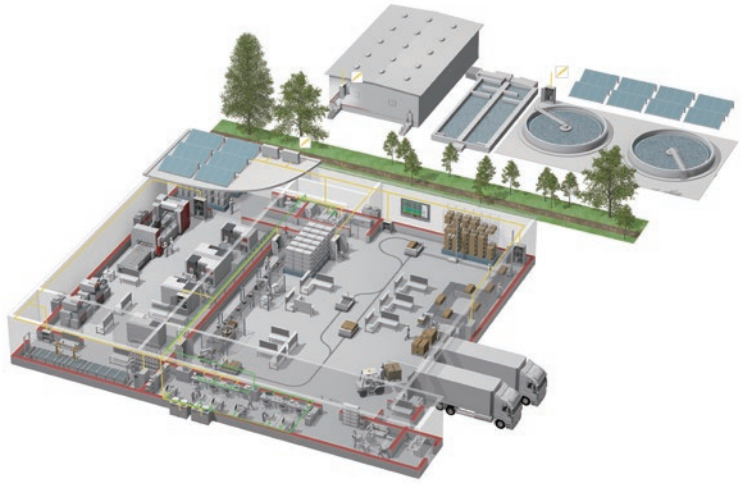


Overall production information is captured in addition to energy information, enabling the realization of efficient production and energy use (energy savings).

⚠Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

YOUR SOLUTION PARTNER



Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

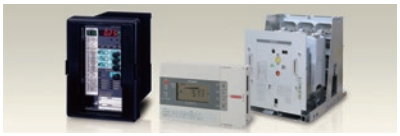
The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.

Low voltage: MCCB, MCB, ACB



Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualisation: HMIs

Numerical Control (NC)

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Transformers, Air conditioning, Photovoltaic systems

* Not all products are available in all countries.

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