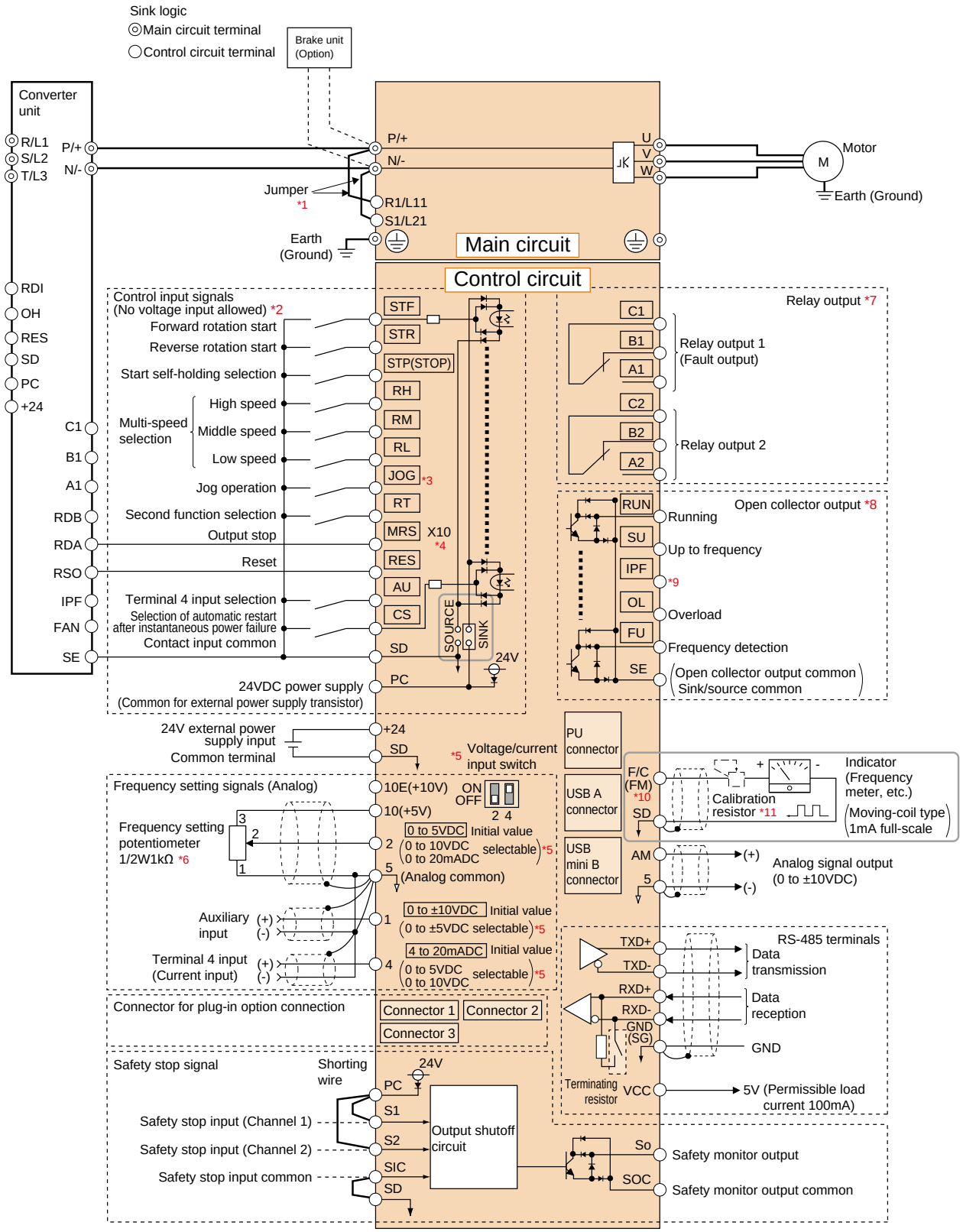
●Separated converter type

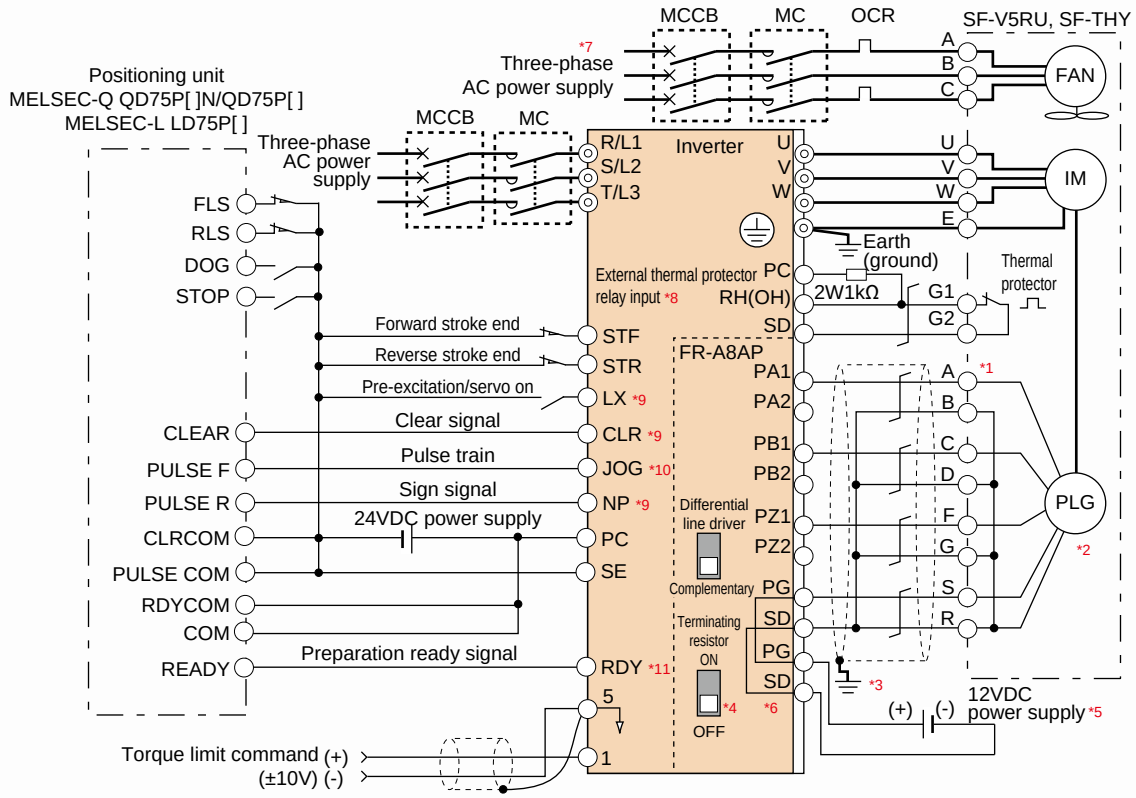
• Inverter (FM type)



*1: The terminals R1/L11 and S1/L21 are connected to the terminals P/+ and N/- with a jumper respectively. When using separate power supply for the control circuit, remove the jumpers from R1/L11 and S1/L21.
*2: The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*3: Terminal JOG is also used as the 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 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)**
*6: It is recommended to use 2W1kΩ when the frequency setting signal is changed frequently.
*7: The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*8: The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*9: No function is assigned in the initial setting. Use **Pr.192** for function assignment.
*10: The 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.

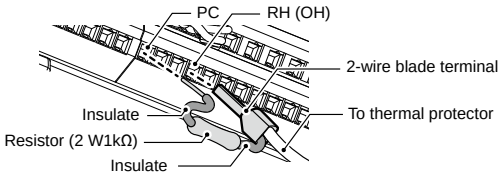
Position control

Vector control dedicated motor (SF-V5RU, SF-THY), 12 V complementary



*1: The pin number differs according to the encoder used.
Speed, control, torque control, and position control by pulse train input are available with or without the Z-phase being connected.
*2: Connect the encoder so that there is no looseness between the motor and motor shaft. Speed ratio must be 1:1.
*3: Earth (ground) the shield of the encoder cable to the enclosure using a tool such as a P-clip. (Refer to the Instruction Manual (Detailed).)
*4: For the complementary, set the terminating resistor selection switch to OFF position. (Refer to the Instruction Manual (Detailed).)
*5: A separate power supply of 5 V/12 V/15 V/24 V is necessary according to the encoder power specification.
When the encoder output is the differential line driver type, only 5 V can be input.
Make the voltage of the external power supply the same as the encoder output voltage, and connect the external power supply across PG and SD.
*6: For terminal compatibility of the FR-JCBL, FR-V7CBL, and FR-A8AP, refer to the Instruction Manual (Detailed).
*7: For the fan of the 7.5 kW or lower dedicated motor, the power supply is single phase. (200 V/50 Hz, 200 to 230 V/60 Hz)
*8: Connect the recommended 2W1kΩ resistor between the terminal PC and OH. (Recommended product: MOS2C102J 2W1kΩ by KOA Corporation)
Insert the input line and the resistor to a 2-wire blade terminal, and connect the blade terminal to the terminal OH.
Insulate the lead wire of the resistor, for example by applying a contraction tube, and shape the wires so that the resistor and its lead wire will not touch other cables. Caulk the lead wire securely together with the thermal protector input line using a 2-wire blade terminal.
(Do not subject the lead wire's bottom area to an excessive pressure.)
To use a terminal as the terminal OH, assign the OH (external thermal O/L relay input) signal to an input terminal. (Set "7" in any of **Pr.178 to Pr.189**.)
*9: Assign the function using **Pr.178 to Pr.184, Pr.187 to Pr.189 (input terminal function selection)**.
*10: When position control is selected, terminal JOG function is invalid and simple position pulse train input terminal becomes valid.
*11: Assign the function using **Pr.190 to Pr.194 (output terminal function selection)**.

When OH signal is assigned to terminal RH
(**Pr.182** = "7")



Standard models, IP55 compatible models, and Separated converter type

Type		Terminal Symbol	Terminal Name	Description	
Main circuit		R/L1, S/L2, T/L3*1	AC power input	Connect to the commercial power supply.	
		U, V, W	Inverter output	Connect a three-phase squirrel-cage motor or PM motor.	
		R1/L11, S1/L21*2	Power supply for control circuit	Connected to the AC power supply terminals R/L1 and S/L2. To retain alarm display and alarm output, apply external power to this terminal.	
		P/+, PR*1*2	Brake resistor connection	Connect an optional brake resistor across the terminals P/+ and PR. Remove the jumper across the terminals PR and PX for the inverter capacity that has the terminal PX. (FR-A820-00630 (11K) or lower, FR-A840-00380 (15K) or lower)	
		P3, PR*1*2	Brake resistor connection	Connect an optional brake resistor across the terminals P3 and PR. (FR-A820-00770 (15K) to 01250 (22K), FR-A840-00470 (18.5K) to 01800 (55K))	
		P/+, N/-	Brake unit connection	Connect the brake unit (FR-BU2), power regeneration common converter (FR-CV) or regeneration common converter (MT-RC) and high power factor converter (FR-HC2). Do not connect the DC power supply between terminals P3 and N/-. Use terminals P/+ and N/- for DC feeding. Connect the separated converter type to the terminals P/+ and N/- of the converter unit.	
		P3, N/-	Brake unit connection*3		
		P/+, P1*1	DC reactor connection	Remove the jumper across terminals P/+-P1 and connect a DC reactor. For the FR-A820-03800 (75K) or higher, the FR-A840-02160 (75K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor, which is available as an option.	
		PR, PX*1*2	Built-in brake circuit connection	When the jumper is connected across terminals PX and PR (initial status), the built-in brake circuit is valid. The built-in brake circuit is equipped in the FR-A820-00490 (7.5K) or lower and FR-A840-00250 (7.5K) or lower.	
		⏚	Earth (Ground)	For earthing (grounding) the inverter chassis. 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 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 select Jog operation (initial setting) and turn on the start signal (STF or STR) to start Jog operation.	
			Pulse train input	JOG terminal can be used as pulse train input terminal. To use as pulse train input terminal, the **Pr.291** setting needs to be changed. (maximum input pulse: 100kpulses/s)	
		RT	Second function selection	Turn on the RT signal to select second function selection When the second function such as "Second torque boost" and "Second V/F (base frequency)" are set, turning on the RT signal selects these functions.	
		MRS	Output stop	Turn on the MRS signal (2ms or more) to stop the inverter output. Use to shut off the inverter output when stopping the motor by electromagnetic brake.	
		MRS (X10)*8	Output stop (Inverter operation enable)	Connect to the terminal RDA of the converter unit (FR-CC2). When the RDA signal is turned OFF, the inverter output is shut off. The X10 signal (NC contact) is assigned to the terminal MRS in the initial setting. Use **Pr.599** to change the specification to NO contact.	
		RES	Reset	Used to reset alarm output provided when protective circuit is activated. Turn on the RES signal for more than 0.1s, then turn it off. Recover about 1s after reset is cancelled.	
		AU	Terminal 4 input selection	Terminal 4 is made valid 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	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)*4	Common terminal for the contact input terminal (sink logic) and terminal FM.	
			External transistor common (source)*5	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)*4	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)*5	Common terminal for contact input terminal (source logic).	
			24 VDC power supply	Can be used as 24 VDC 0.1 A power supply.	
	Frequency setting	10E	Frequency setting power supply	When connecting a frequency setting potentiometer at an initial status, connect it to terminal 10. Change the input specifications of terminal 2 when connecting it to 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, 4 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 from among input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 4 to 20 mA. Set the voltage/current input switch in the ON position to select current input (0 to 20 mA).	Voltage input: Input resistance 10 kΩ ± 1 kΩ Maximum permissible voltage 20 VDC Current input: Input resistance 245 Ω ± 5 Ω Maximum permissible 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 from 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) input.	Input resistance 10 kΩ ±1 kΩ Maximum permissible 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).	
	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:500 Ω to 30 kΩ (Set by **Pr.561**)

indicates that terminal functions can be selected from **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		
Control circuit/output signal	Power supply input	+24	24 V external power supply input	For connecting 24 V external power supply. If the 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
	Relay	A1, B1, C1	Relay output 1 (alarm output)	1 changeover contact output indicates that the inverter protective function has activated and the output stopped. Alarm: discontinuity across B-C (continuity across A-C), Normal: continuity across B-C (discontinuity across A-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 low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5 Hz). Switched 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 low when the output frequency reaches within the range of ±10% (initial value) of the set frequency. Switched high during acceleration/deceleration and at a stop.	Alarm code (4bit) output	
		OL	Overload alarm	Switched low when stall prevention is activated by the stall prevention function. Switched high when stall prevention is cancelled.		
		IPF	Instantaneous power failure	Switched low when an instantaneous power failure and under voltage protections are activated.		
		IPF*8	Open collector output	No function is assigned in the initial setting. The function can be assigned setting **Pr.192**.		
		FU	Frequency detection	Switched low when the inverter output frequency is equal to or higher than the preset detected frequency and high when less than the preset detected frequency.		
		SE	Open collector output common	Common terminal for terminals RUN, SU, OL, IPF, FU		
	Pulse	FM*6	For meter	Select one e.g. output frequency from monitor items. (The signal is not output during an inverter reset.) The output signal is proportional to the magnitude of the corresponding monitoring item. 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 scale1440 pulses/s	
			NPN open collector output		Signals can be output from the open collector terminals by setting **Pr.291**. (maximum output pulse: 50kpulses/s)	
	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 bit	
		CA*7	Analog current output		Output item: output frequency (initial setting), Load impedance 200 Ω to 450 Ω Output signal 0 to 20 mADC	
Communication		–	PU connector	With the PU connector, communication can be made through RS-485. (1:1 connection only) •Conforming standard: EIA-485(RS-485) •Communication speed: 4800 to 115200bps •Transmission format: Multi-drop link •Wiring length: 500 m		
	RS-485 terminals	TXD+, TXD-	Inverter transmission terminal	With the RS-485 terminals, communication can be made through RS-485. •Conforming standard: EIA-485(RS-485) •Communication speed: 300 to 115200bps •Transmission format: Multi-drop link •Overall extension: 500 m		
		RXD+, RXD-	Inverter reception terminal			
		GND (SG)	Earth (Ground)			
	–		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 Configurator2.		
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	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 (BCN-A23228-001) when the signal is switched to HIGH while both terminals S1 and S2 are open.		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.		–

*1: Terminals R/L1, S/L2, T/L3, PR, P3, P1, and PX are not provided in the separated converter type.
*2: Terminals R1/L11, S1/L21, PR, P3, and PX are not provided for the IP55 compatible model.
*3: Available for the FR-A820-00770(15K) to FR-A820-01250(22K), and the FR-A840-00470(18.5K) to FR-A840-01800(55K).
*4: The sink logic is initially set for the FM-type inverter.
*5: The source logic is initially set for the CA-type inverter.
*6: Terminal FM is provided in the FM-type inverter.
*7: Terminal CA is provided in the CA-type inverter.
*8: Function and name of the separated converter type.

Major difference from and comparison with the FR-A700 series

Item		FR-A700	FR-A800
Control method		V/F control Advanced magnetic flux vector control Real sensorless vector control Vector control (with plug-in option) PM sensorless vector control (IPM motor)	V/F control Advanced magnetic flux vector control Real sensorless vector control Vector control (with plug-in option/control terminal option) PM sensorless vector control (IPM motor/SPM motor)
Added functions		–	USB host function Safety stop function PLC function etc.
Brake transistor (brake resistor usable)		Built in for the FR-A720-0.4K to 22K Built in for the FR-A740-0.4K to 22K	Built in for the FR-A820-00046(0.4K) to 01250(22K) Built in for the FR-A840-00023(0.4K) to 01800(55K)
Maximum output frequency	V/F control	400 Hz	590 Hz
	Advanced magnetic flux vector control	120 Hz	400 Hz
	Real sensorless vector control	120 Hz	400 Hz
	vector control	120 Hz	400 Hz
	PM sensorless vector control	300 Hz	400 Hz
PID control		Turn the X14 signal ON to enable PID control.	When the X14 signal is not assigned, just set a value other than "0" in **Pr.128** to enable PID control. When the X14 signal is assigned, turn the X14 signal ON while **Pr.128** ≠ "0" to enable PID control. The PID pre-charge function and dancer control are added.
Automatic restart after instantaneous power failure		Turn the CS signal ON to enable restart.	CS signal assignment not required. (Restart is enabled with the **Pr.57** setting only.)
Number of motor poles V/F control switching		The V/F switching signal (X18) is valid when **Pr.81** = "12 to 20 (2 to 10 poles)".	**Pr.81** = "12 (12 poles)" X18 is valid regardless of the **Pr.81** setting. (The Pr.81 settings "14 to 20" are not available.)
PTC thermistor input		Input from the terminal AU (The function of the terminal AU is switched by a switch.)	Input from the terminal 2. (The function of the terminal 2 is switched by the **Pr.561** setting.)
USB connector		B connector	Mini B connector
Control circuit terminal block		Removable terminal block (screw type)	Removable terminal block (spring clamp type)
Terminal response level		The FR-A800's I/O terminals have better response level than the FR-A700's terminals. By setting **Pr.289 Inverter output terminal filter and Pr.699 Input terminal filter**, the terminal response level can be compatible with that of FR-A700. Set to approximately 5 to 8 ms and adjust the setting according to the system.	
PU		FR-DU07 (4-digit LED) FR-PU07	FR-DU08 (5-digit LED) FR-LU08 (LCD operation panel) FR-PU07 (Some functions, such as parameter copy, are unavailable.) FR-DU07 is not supported.
Plug-in option		Dedicated plug-in options (not interchangeable)	
Communication option		Connected to the connector 3	Connected to the connector 1
Installation size		For standard models, installation size is compatible for all capacities. (Replacement between the same capacities does not require new mounting holes.) For separated converter types, installation size is not compatible. (New mounting holes are required.)	
Converter		Built-in for all capacities	An optional converter unit (FR-CC2) is required for separated converter types.
DC reactor		The 75K or higher comes with a DC reactor (FR-HEL).	For the FR-A820-03800(75K) or higher, the FR-A840-02160(75K) or higher, and when a 75 kW or higher motor is used, select a DC reactor suitable for the applicable motor capacity. (A DC reactor is not included.) Separated converter types (converter unit FR-CC2) and IP55 compatible models have a built-in DC reactor.
Brake unit (75 kW or higher)		FR-BU2, MT-BU5	FR-BU2

Inverter FREQROL-A800 Plus Series for CRANES

The optimum functions for cranes are added.

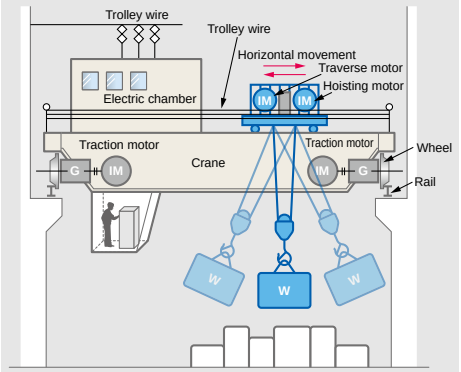
Suited for various cranes to achieve fast, robust, and smooth operations

Reduction in tact time

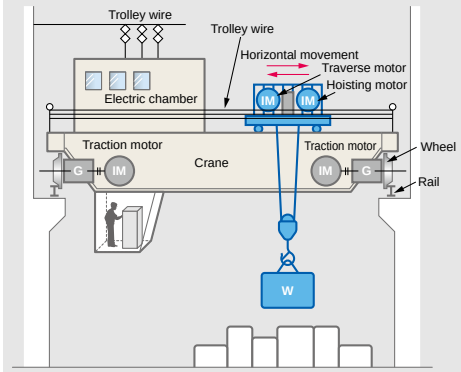
Anti-sway control

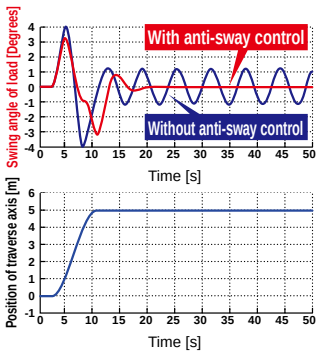
By using the Mitsubishi's original anti-sway control technology, the swinging of an object moved by a crane is suppressed at the time of stopping, even without operator's input adjustment.
This control cuts down the tact time and facilitates efficient operation.

Without anti-sway control



With anti-sway control





Load torque high-speed frequency control (mode 2)

When there is a light-load (when light loads are moved up or down by a crane), the speed will automatically be increased. This reduces the tact time and facilitates efficient operation.
The possible operation speed is set automatically according to the load.
After starting the inverter, the inverter runs at high speed with a light load.

Shortest-time torque startup function

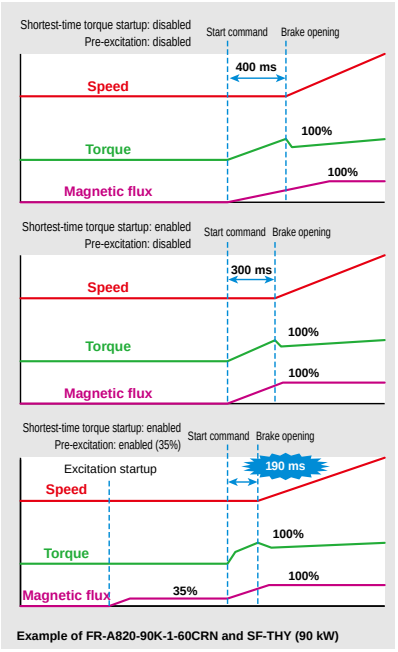
The time from the start command to when the brake opens is shortened.
This will contributes to reduction in tact time.

●Shortest-time torque startup function

The optimum distribution of the excitation current and torque current enables rapid startup of the torque.

●Magnetic flux command during pre-excitation

Decreasing the pre-excitation current during a motor stop reduces power consumption during standby, and enables rapid startup of the torque.



Example of FR-A820-90K-1-60CRN and SF-THY (90 kW)

Load slippage prevention

Brake sequence function

The highly scalable brake sequence function enables the output of a brake opening signal for the optimum brake operation calculated from the load torque or the speed.
The function enables setting of the brake opening level individually for forward rotation and reverse rotation.

Falling detection

Slippage during the start of a lift can be checked.

When the commanded direction differs from the actual motor rotation direction, the falling detection signal is output.

Low-speed range speed control P gain

When an inverter is connected to a lift, the inverter has a load immediately after the lift brake is released. Adjusting the speed control P gain in the low-speed range improves the response at low speed, and shortens the time from startup to brake opening.

Dedicated monitoring functions

Overload detection function

By outputting an overload detection signal when too much load (overload) is applied to a crane, this information can be transmitted to the superordinate controller.
During constant speed operation, when the motor torque is equal to or higher than the torque setting for the time setting or longer, the overload detection signal is turned ON.

Start count monitor

The inverter starting times can be counted.
Confirming the starting times can be used to determinate the timing of the maintenance, or can be used as a reference for system inspection or parts replacement.

Start count monitor

Wide range applications

Compliance with ship classification standards

Using the recommended noise filter in combination with the inverter supports compliance with various countries ship classifications, such as NK, LR, DNV, ABS, BV, CCS, and KR.
The FR-A800-CRN can be used for electric deck cranes on ship.

Lineup

●Standard model

F R - A 8 2 0 - 0.4K -1 - 60 CRN

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Structure/function
0	Standard model

Capacity*1	Description
00023 to 06830	Inverter SLD rated current (A)
0.4K to 280K	Inverter ND rated capacity (kW)

Symbol	Type
-1	FM
-2	CA*2

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

Symbol	Dedicated function
CRN	Dedicated to crane

Three-phase 200 V class FR-A820-☐ *4	00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-phase 400 V class FR-A840-☐ *4	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	03250	03610	04320	04810	05470	06100	06830										
	110K	132K	160K	185K	220K	250K	280K										
	●	●	●	●	●	●	●										

●Separated converter type

F R - A 8 4 2 - 315K -1 - 60 CRN

Symbol	Voltage class
4	400 V class

Symbol	Structure/function
2	Separated converter type

Capacity*1	Description
07700 to 12120	Inverter SLD rated current (A)
315K to 500K	Inverter ND rated capacity (kW)

Symbol	Type
-1	FM
-2	CA*2

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

Symbol	Dedicated function
CRN	Dedicated to crane

Three-phase 400 V class FR-A842-☐	07700	08660	09620	10940	12120
	315K	355K	400K	450K	500K
	●	●	●	●	●

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

*2 Specification differs by the type as follows.

Symbol	Type	Motor output	Built-in EMC filter	Initial setting		
				Control logic	Rated frequency	Base frequency voltage (Pr.19)
-1	FM	Terminal FM (pulse train output) Terminal AM (analog voltage output (0 to 10 VDC))	OFF	Sink logic	60 Hz	9999 (same as the power supply voltage)
-2	CA	Terminal CA (analog current output (0 to 20 mA)) Terminal AM (analog voltage output (0 to 10 VDC))	ON	Source logic	50 Hz	8888 (95% of the power supply voltage)

*3 Available for the 5.5K or higher.

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

■Standard specifications

●Rating (Standard model)

200 V class

Model FR-A820-☐ CRN			00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
			0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
Applicable motor capacity (kW)*1		SLD	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
		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
		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
		HD	0.2*2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output	Rated capacity (kVA)*3	SLD	1.8	2.9	4	6.4	10	13	19	24	29	35	48	59	71	89	120	145	181
		LD	1.6	2.7	3.7	5.8	8.8	12	17	22	27	32	43	53	65	81	110	132	165
		ND (initial setting)	1.1	1.9	3	4.2	6.7	9.1	13	18	23	29	34	44	55	67	82	110	132
		HD	0.6	1.1	1.9	3	4.2	6.7	9.1	13	18	23	29	34	44	55	67	82	110
	Rated current (A)	SLD	4.6	7.7	10.5	16.7	25	34	49	63	77	93	125	154	187	233	316	380	475
		LD	4.2	7	9.6	15.2	23	31	45	58	70.5	85	114	140	170	212	288	346	432
		ND (initial setting)	3	5	8	11	17.5	24	33	46	61	76	90	115	145	175	215	288	346
		HD	1.5	3	5	8	11	17.5	24	33	46	61	76	90	115	145	175	215	288
	Overload current rating*4	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
	Rated voltage*5		Three-phase 200 to 240 V																
	Regenerative braking	Built-in brake transistor	Built-in											FR-BU2 (option)					
		Maximum brake torque*7	150% torque/ 3%ED*6			100% torque/ 3%ED*6		100% torque/ 2%ED*6		20% torque/continuous								10% torque/ continuous	
		FR-ABR (when the option is used)	150% torque/ 10%ED		100% torque/10%ED					100% torque/6%ED				–	–	–	–	–	–
Power supply	Rated input AC voltage/frequency		Three-phase 200 to 240 V, 50 Hz/60 Hz																
	Permissible AC voltage fluctuation		170 to 264 V, 50 Hz/60 Hz																
	Permissible frequency fluctuation		±5%																
	Rated input current (A)*8	SLD	5.3	8.9	13.2	19.7	31.3	45.1	62.8	80.6	96.7	115	151	185	221	269	316	380	475
		LD	5	8.3	12.2	18.3	28.5	41.6	58.2	74.8	90.9	106	139	178	207	255	288	346	432
		ND (initial setting)	3.9	6.3	10.6	14.1	22.6	33.4	44.2	60.9	80	96.3	113	150	181	216	266	288	346
		HD	2.3	3.9	6.3	10.6	14.1	22.6	33.4	44.2	60.9	80	96.3	113	150	181	216	215	288
	Power supply capacity (kVA)*9	SLD	2	3.4	5	7.5	12	17	24	31	37	44	58	70	84	103	120	145	181
		LD	1.9	3.2	4.7	7	11	16	22	29	35	41	53	68	79	97	110	132	165
		ND (initial setting)	1.5	2.4	4	5.4	8.6	13	17	23	30	37	43	57	69	82	101	110	132
		HD	0.9	1.5	2.4	4	5.4	8.6	13	17	23	30	37	43	57	69	82	82	110
Protective structure (IEC 60529)*10			Enclosed type (IP20)											Open type (IP00)					
Cooling system			Self-cooling		Forced air cooling														
Approx. mass (kg)			2.0	2.2	3.3	3.3	3.3	6.7	6.7	8.3	15	15	15	22	42	42	54	74	74

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2 0.2 kW motors can be used only under V/F control.
*3 The rated output capacity indicated assumes that the output voltage is 220 V.
*4 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.
*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 With the built-in brake resistor
*7 ND rating reference value
*8 The rated input current is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*9 The power supply capacity is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the power supply capacity.
*10 FR-DU08: IP40 (except for the PU connector)

400 V class

Model FR-A840-☐ CRN			00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
			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	160K	185K	220K	250K	280K
Applicable motor capacity (kW)*1		SLD	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	185	220	250	280	315	355
		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	185	220	250	280	315
		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	160	185	220	250	280
		HD	0.2*2	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	160	185	220	250
Output	Rated capacity (kVA)*3	SLD	1.8	2.9	4	6.3	10	13	19	24	29	36	47	59	71	88	137	165	198	248	275	329	367	417	465	521
		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	275	329	367	417	465
		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	248	275	329	367	417
		HD	0.6	1.1	1.9	3	4.6	6.9	9.1	13	18	24	29	34	43	54	66	84	110	137	165	198	248	275	329	367
	Rated current (A)	SLD	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116	180	216	260	325	361	432	481	547	610	683
		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	361	432	481	547	610
		ND (initial setting)	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260	325	361	432	481	547
		HD	0.8	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260	325	361	432	481
	Overload current rating*4	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																							
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
	Rated voltage*5		Three-phase 380 to 500 V																							
	Regenerative braking	Built-in brake transistor	Built-in															FR-BU2 (option)								
		Maximum brake torque*7	100% torque/ 2%ED*6							20% torque/continuous								10% torque/ continuous								
		FR-ABR (when the option is used)	100% torque/10%ED							100% torque/6%ED				–*12				–	–	–	–	–	–	–	–	–
Power supply	Rated input AC voltage/frequency		Three-phase 380 to 500 V, 50 Hz/60 Hz*11																							
	Permissible AC voltage fluctuation		323 to 550 V, 50 Hz/60 Hz																							
	Permissible frequency fluctuation		±5%																							
	Rated input current (A)*8	SLD	3.2	5.4	7.8	10.9	16.4	22.5	31.7	40.3	48.2	58.4	76.8	97.6	115	141	180	216	260	325	361	432	481	547	610	683
		LD	3	4.9	7.3	10.1	15.1	22.3	31	38.2	44.9	53.9	75.1	89.7	106	130	144	180	216	260	325	361	432	481	547	610
		ND (initial setting)	2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91	108	134	144	180	216	260	325	361	432	481	547
		HD	1.4	2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91	108	110	144	180	216	260	325	361	432	481
	Power supply capacity (kVA)*9	SLD	2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107	137	165	198	248	275	329	367	417	465	521
		LD	2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99	110	137	165	198	248	275	329	367	417	465
		ND (initial setting)	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83	102	110	137	165	198	248	275	329	367	417
		HD	1.1	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83	84	110	137	165	198	248	275	329	367
Protective structure (IEC 60529)*10			Enclosed type (IP20)											Open type (IP00)												
Cooling system			Self-cooling			Forced air cooling																				
Approx. mass (kg)			2.8	2.8	2.8	3.3	3.3	6.7	6.7	8.3	8.3	15	15	23	41	41	43	52	55	71	78	117	117	166	166	166

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2 0.2 kW motors can be used only under V/F control.
*3 The rated output capacity indicated assumes that the output voltage is 440 V.
*4 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.
*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 With the built-in brake resistor
*7 ND rating reference value
*8 The rated input current is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*9 The power supply capacity is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the power supply capacity.
*10 FR-DU08: IP40 (except for the PU connector)
*11 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection.**
*12 A commercial brake resistor can be used to improve the braking capability of the inverter built-in brake. Please contact your sales representative for details.

●Rating (Separated converter type)

400 V class

• Inverter

Model FR-A842-☐ CRN			07700	08660	09620	10940	12120
			315K	355K	400K	450K	500K
Applicable motor capacity (kW)*1		SLD	400	450	500	560	630
		LD	355	400	450	500	560
		ND (initial setting)	315	355	400	450	500
		HD	280	315	355	400	450
Output	Rated capacity (kVA)*2	SLD	587	660	733	834	924
		LD	521	587	660	733	834
		ND (initial setting)	465	521	587	660	733
		HD	417	465	521	587	660
	Rated current (A)	SLD	770	866	962	1094	1212
		LD	683	770	866	962	1094
		ND (initial setting)	610	683	770	866	962
		HD	547	610	683	770	866
	Overload current rating*3	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C				
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
	Rated voltage*4		Three-phase 380 to 500 V				
	Regenerative braking torque*5 (when the converter unit (FR-CC2) is used)	Maximum brake torque	10% torque/continuous				
Input Power	Power supply voltage		430 to 780 VDC				
	Control power supply auxiliary input		Single-phase 380 to 500 V, 50 Hz/60 Hz*7				
	Permissible control power supply auxiliary input fluctuation		Frequency ±5%, voltage ±10%				
Protective structure (IEC 60529)*6			Open type (IP00)				
Cooling system			Forced air cooling				
Approx. mass (kg)			163	163	243	243	243

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 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 √2.
*5 ND rating reference value
*6 FR-DU08: IP40 (except for the PU connector)
*7 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection.**

• Converter unit (FR-CC2)

Model FR-CC2-H☐		315K	355K	400K	450K	500K	560K	630K
Applicable motor capacity (kW)		315	355	400	450	500	560	630
Output	Overload current rating*1	200% 60 s, 250% 3 s				150% 60 s, 200% 3 s	120% 60 s, 150% 3 s	110% 60 s, 120% 3 s
	Rated voltage*2	430 to 780 VDC*4						
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50 Hz/60 Hz						
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50 Hz/60 Hz						
	Permissible frequency fluctuation	±5%						
	Rated input current (A)	610	683	770	866	962	1094	1212
	Power supply capacity (kVA)*3	465	521	587	660	733	833	924
Protective structure (IEC 60529)		Open type (IP00)						
Cooling system		Forced air cooling						
DC reactor		Built-in						
Approx. mass (kg)		210	213	282	285	288	293	294

*1 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 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 √2.
*3 The power supply capacity is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*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)

●Common specifications

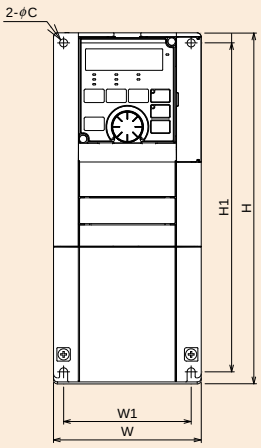
Control specifications	Control method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, vector control*1, and PM sensorless vector control
	Output frequency range		0.2 to 590 Hz (The upper frequency limit is 400 Hz under Advanced magnetic flux vector control, Real sensorless vector control, vector control*1, 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		SLD rating: 120% 0.3 Hz, LD rating: 150% 0.3 Hz, ND rating: 200%*2 0.3 Hz, HD rating: 250%*2 0.3 Hz (under Real sensorless vector control or 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 (SLD rating: 0 to 120%, LD rating: 0 to 150%, ND rating: 0 to 220%, HD rating: 0 to 280%). 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)		The following signals can be assigned to **Pr.178 to Pr.189 (input terminal function selection)**: 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
		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*3, frequency jump, rotation display, automatic restart after instantaneous power failure, electronic bypass sequence, remote setting, automatic acceleration/deceleration, intelligent mode, 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, PID control, PID pre-charge function, easy dancer control, cooling fan operation selection, stop selection (deceleration stop/coasting), power failure time deceleration-to-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, low-speed range speed control P gain, shortest-time torque startup, inching time adjustment function, brake sequence function
	Output signal	Open collector output (five terminals) Relay output (two terminals)	Inverter running, Up to frequency, Instantaneous power failure/undervoltage*3, 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 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 (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 protective function is activated. Past 8 fault records and output voltage/current/frequency/ cumulative energization time / year/month/date/time immediately before the protective function is activated are stored.
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*3, Undervoltage*3, Input phase loss*3*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, Parameter storage device fault, CPU fault, Operation panel power supply short circuit/RS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection*4, Inrush current limit circuit fault*3, Communication fault (inverter), 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, Option fault, Opposite rotation deceleration fault*4, Internal circuit fault, Magnetic pole position unknown*1
		Warning function	Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Regenerative brake pre-alarm*3*4, Electronic thermal relay function pre-alarm, PU stop, Speed limit indication*4, Parameter copy, 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
Environment	Surrounding air temperature		-10°C to +50°C (non-freezing) (LD, ND, and HD ratings) -10°C to +40°C (non-freezing) (SLD rating)
	Surrounding air humidity		95% RH or less (non-condensing) (With circuit board coating (IEC60721-3-3 3C2/3S2 compatible)) 90% RH or less (non-condensing) (Without circuit board coating)
	Storage temperature*5		-20°C to +65°C
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude/vibration		Maximum 1000 m above sea level*6, 5.9 m/s^2 or less*7 at 10 to 55 Hz (directions of X, Y, Z axes)

*1 The vector control is available only when a vector control compatible option is installed.
*2 In the initial setting for the FR-A820-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, the starting torque is limited to 150% by the torque limit level.
*3 Available only for the standard model.
*4 This protective function is not available in the initial status.
*5 Temperature applicable for a short time, e.g. in transit.
*6 For the installation in an altitude above 1000 m (up to 2500 m), derate the rated current 3% per 500 m.
*7 2.9 m/s^2 or less for the FR-A840-160K(04320) or higher.

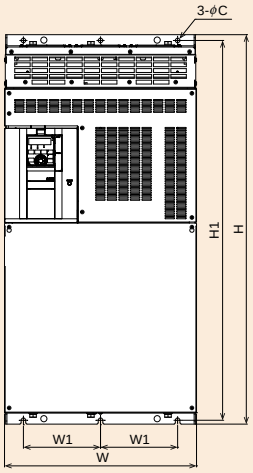
■Standard Model

Outline Dimension Drawings

●**FR-A820-00046(0.4K) to 04750(90K)**
●**FR-A840-00023(0.4K) to 03610(132K)**



●**FR-A840-04320(160K) to 06830(280K)**



(Unit: mm)

200 V class

Inverter model	W	W1	H	H1	D	C
FR-A820-00046(0.4K)	110	95	260	245	110	6
FR-A820-00077(0.75K)					125	
FR-A820-00105(1.5K)	150	125			140	
FR-A820-00167(2.2K)						
FR-A820-00250(3.7K)						
FR-A820-00340(5.5K)	220	195			170	
FR-A820-00490(7.5K)						
FR-A820-00630(11K)			300	285	190	
FR-A820-00770(15K)	250	230	400	380		10
FR-A820-00930(18.5K)						
FR-A820-01250(22K)						
FR-A820-01540(30K)	325	270	550	530	195	12
FR-A820-01870(37K)	435	380		525	250	
FR-A820-02330(45K)						
FR-A820-03160(55K)	465	410	700	675		
FR-A820-03800(75K)		400	740	715	360	
FR-A820-04750(90K)						

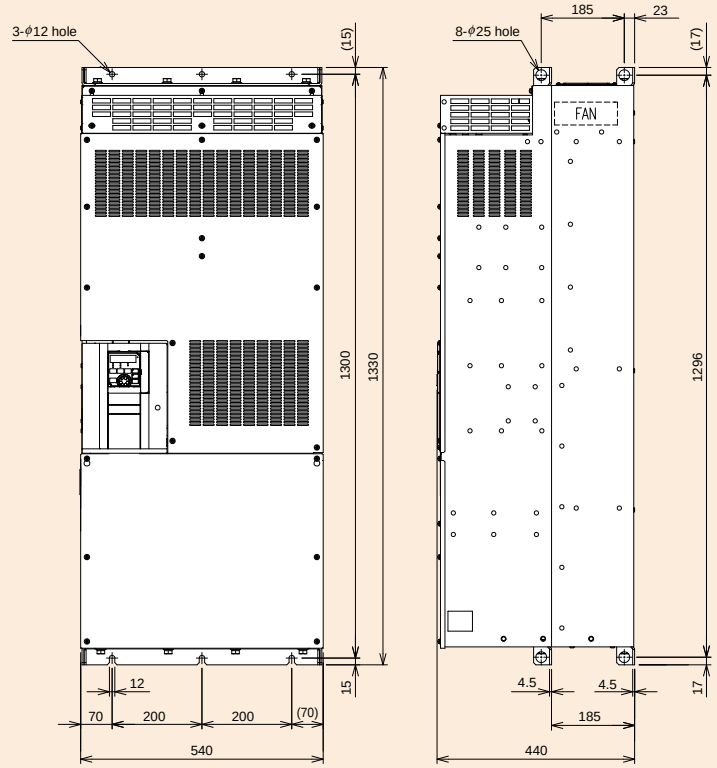
400 V class

Inverter model	W	W1	H	H1	D	C
FR-A840-00023(0.4K)	150	125	260	245	140	6
FR-A840-00038(0.75K)						
FR-A840-00052(1.5K)						
FR-A840-00083(2.2K)						
FR-A840-00126(3.7K)						
FR-A840-00170(5.5K)	220	195			170	
FR-A840-00250(7.5K)						
FR-A840-00310(11K)			300	285	190	
FR-A840-00380(15K)						
FR-A840-00470(18.5K)	250	230	400	380		10
FR-A840-00620(22K)						
FR-A840-00770(30K)	325	270	550	530	195	12
FR-A840-00930(37K)	435	380		525	250	
FR-A840-01160(45K)						
FR-A840-01800(55K)						
FR-A840-02160(75K)	465	400	620	595	300	
FR-A840-02600(90K)						
FR-A840-03250(110K)			740	715	360	
FR-A840-03610(132K)						
FR-A840-04320(160K)	498	200	1010	985	380	
FR-A840-04810(185K)						
FR-A840-05470(220K)	680	300		984		
FR-A840-06100(250K)						
FR-A840-06830(280K)						

■Separated converter type

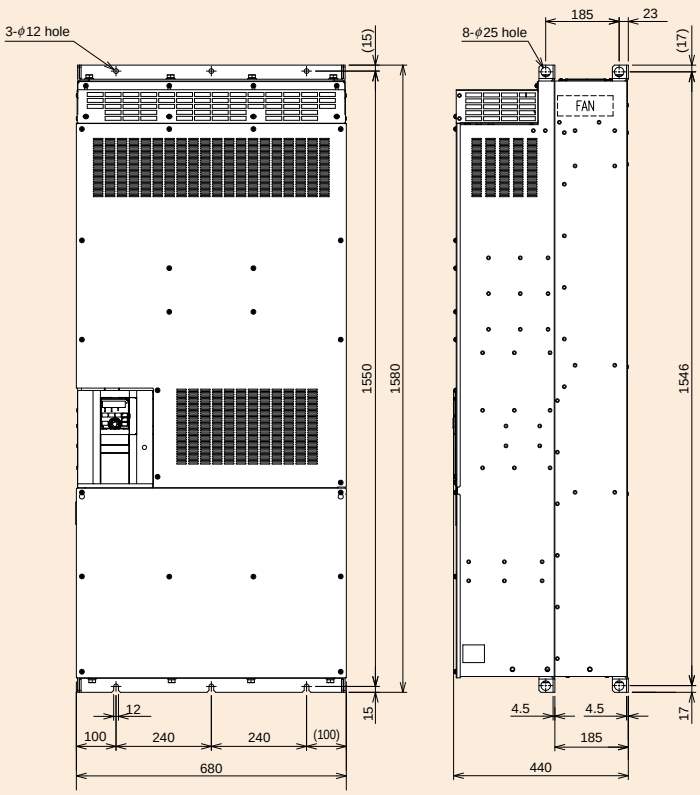
Outline Dimension Drawings

●FR-A842-07700(315K), 08660(355K)



(Unit: mm)

●FR-A842-09620(400K), 10940(450K), 12120(500K)



(Unit: mm)

MEMO

Inverter FREQROL-A800 Plus Series for Roll to Roll

The optimum functions for roll to roll applications are added.

Features

**In roll to roll applications, control is necessary for machining of elongated products such as paper, film, and thread. Processing types include printing, slitting, coating, and twisting. High productivity can be achieved by stable tension control.
The FR-A800-R2R inverter can be used in a wide variety of systems with various dedicated functions.**

Roll to roll dedicated model with functions optimum for winding/unwinding

System simplification

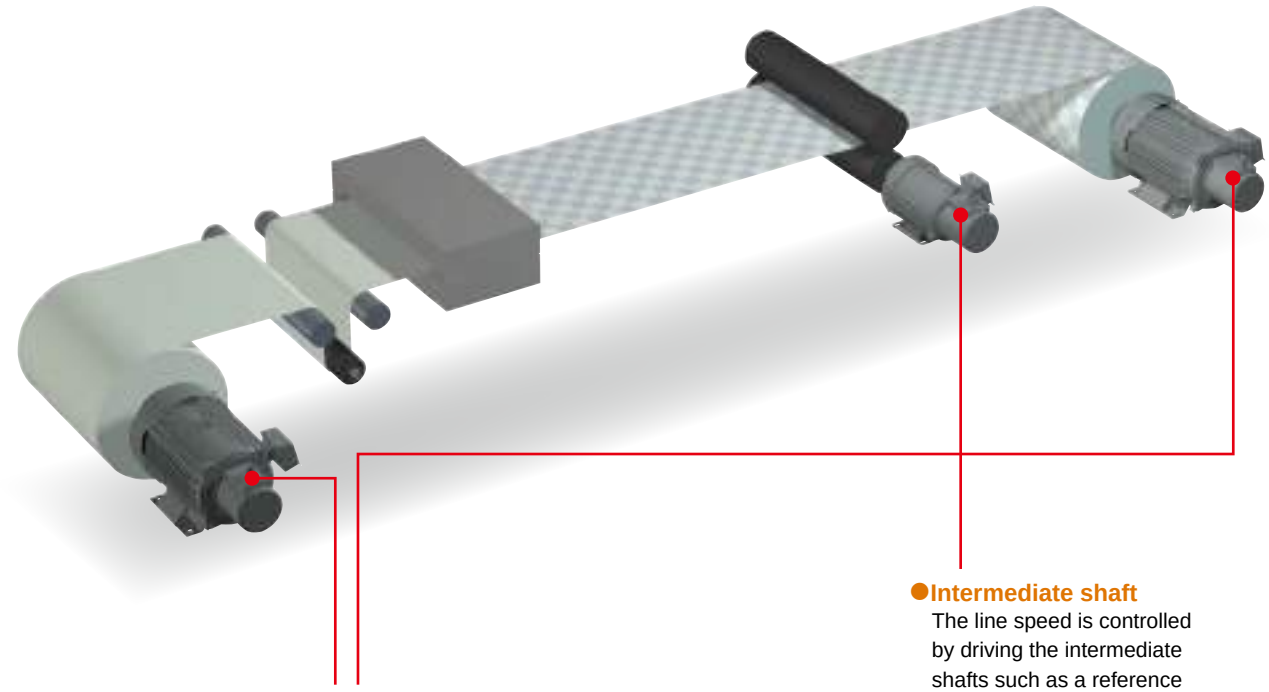
Stable winding/unwinding can be achieved by the inverter alone.

Wide range of applications

The FR-A800-R2R inverter enables the use in various system applications such as winding/unwinding in the wire drawing machines and printers.

Easy startup and adjustment

Parameters can be used for mechanical adjustment according to applications.



●Winding/unwinding shaft
Tension control (speed control / torque control) is enabled by inputting the dancer roll position or the feedback from the tension sensor.
Stable control can be achieved by winding diameter calculation, even with a large difference between the maximum and minimum diameters.

●Intermediate shaft
The line speed is controlled by driving the intermediate shafts such as a reference shaft with a constant winding diameter or the feeding shaft.

System simplification

The FR-A800-R2R inverter has various dedicated functions such as winding diameter calculation, providing stable winding/unwinding control independently.

Winding diameter calculation

The present winding diameter for the winding/unwinding shaft is calculated from the actual line speed or the actual motor speed.

Line speed command input selection / actual line speed input selection

The line speed command and actual line speed required for calculating the winding diameter can be input through the analog input terminal or plug-in option.

Winding diameter calculation function selection

The winding diameter calculation method can be selected in order to improve the tension control performance.

●Actual line speed calculation method

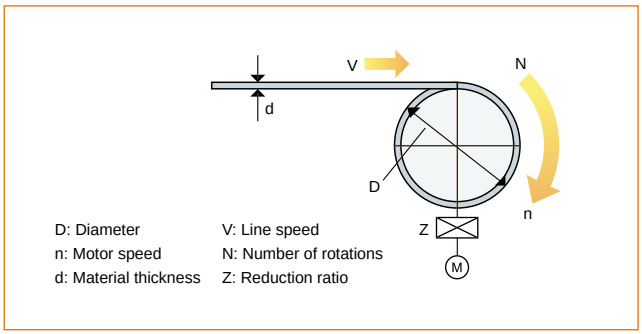
The winding diameter is calculated from the line speed and the main speed (actual motor speed).

$$D = \frac{V}{\pi \times n \times Z}$$

●Thickness calculation method

The material thickness is added up to find the overall winding diameter.

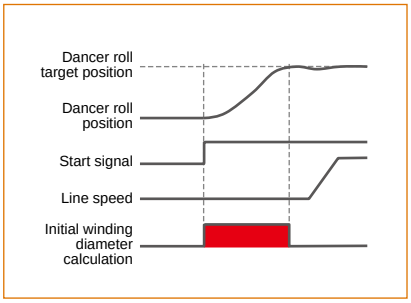
D = Initial diameter ± 2 × d × N × Z



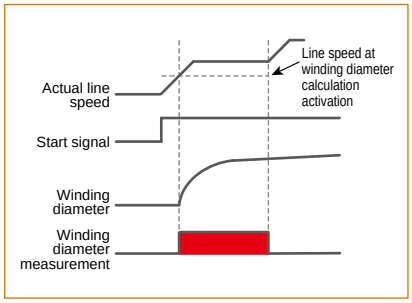
Initial winding diameter calculation

When the winding diameter changes after the material change or others, the present winding diameter is calculated in the following two ways.

●The present winding diameter is calculated based on the dancer roll movement at a start from the lower limit position to the target position.



●The present winding diameter is calculated from the line speed and the actual motor speed. (The system must be started at low speed.)



Winding diameter / winding length storage

The present value of winding diameter and winding/unwinding length can be stored.

The winding diameter and winding length values are stored in the inverter even during power-OFF.

Dancer feedback speed control / Tension sensor feedback speed control

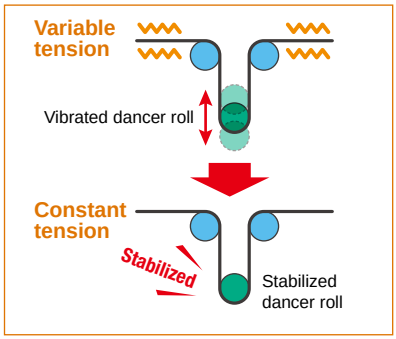
PID control is performed using feedback of the detected dancer roll position or feedback from the tension sensor.
Stable control can be achieved in combination with the winding diameter calculation.

Speed control proportional gain compensation

By adjusting the speed control proportional gain according to the winding diameter, the response level can be kept constant.

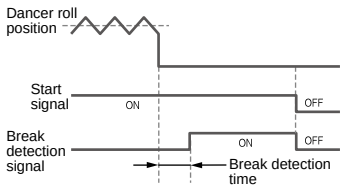
Tension PI gain tuning

By automatically adjusting the tension PI gain for PID control, time required for adjustment is significantly cut down. Anyone can start the system easily.



Dancer roll malposition detection

When material rupture (break) occurs and the sensor feedback value (dancer/ tension feedback) is held at the upper/ lower limit for a certain period of time, the break detection signal is output.



Example of dancer feedback control (winding)

Tension sensorless torque control / Tension sensor feedback torque control

The output torque of a motor is controlled so that the tension applied to a material is constant by calculating the winding diameter of a roll.

Mechanical loss compensation function

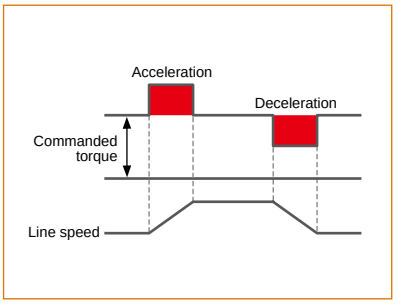
The tension applied to the material is maintained constant by raising a commanded torque to compensate mechanical loss caused by factors such as friction on the dancer roll or winding/ unwinding shaft.

Tension command cushion time

The cushion time is set for the tension command to avoid sudden change in tension.

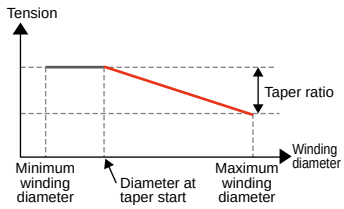
Inertia compensation function

During acceleration/deceleration, the tension applied to the material is maintained constant by adjusting the variable tension on the winding and unwinding sides.



Taper function

By adjusting the tension on the workpiece, it is possible to avoid imperfections such as wrinkles or deformation caused by the increase in diameter.

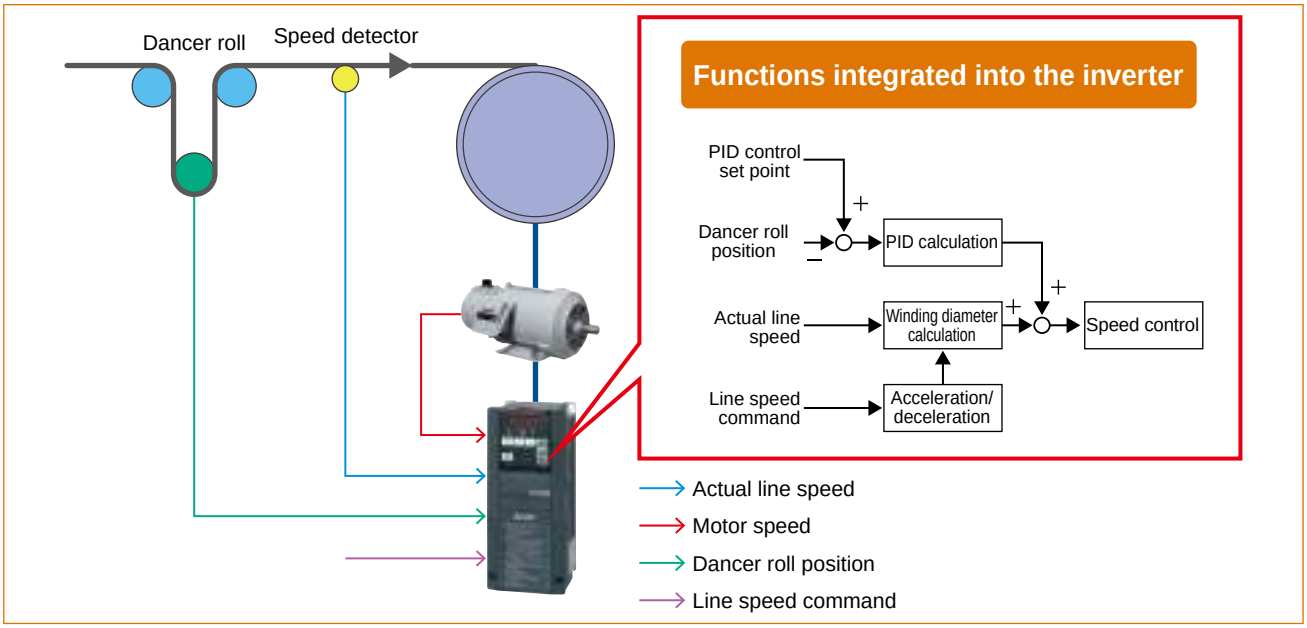


Wide range of applications

The FR-A800-R2R inverter offers four types of control functions which enable the use in various system applications such as winding/unwinding in the wire drawing machines and printers.

Dancer feedback speed control	Tension sensor feedback speed control	Tension sensorless torque control	Tension sensor feedback torque control

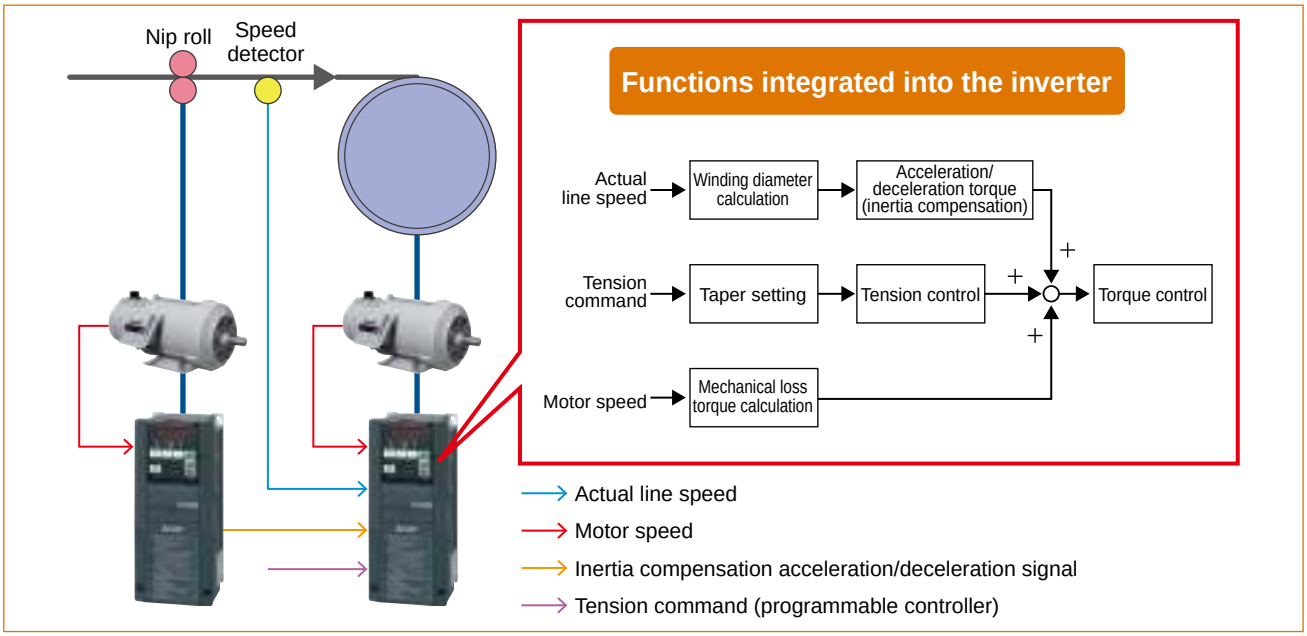
During dancer feedback speed control, speed is controlled for keeping a constant tension on the workpiece (winding/unwinding shaft) by using the dancer roll position and line speed data.
Further stable speed control is possible by performing PID control and winding diameter calculation in the inverter.
Tension sensor feedback speed control is a control function to keep the tension constant using feedback from the tension sensor, instead of the dancer roll position.



Example of dancer feedback speed control

Dancer feedback speed control	Tension sensor feedback speed control	Tension sensorless torque control	Tension sensor feedback torque control

The torque is controlled for keeping a constant tension on the workpiece (winding/unwinding shaft) by using the tension sensor and line speed information.
Further stable torque control is possible by changing the torque command according to the acceleration/deceleration torque calculation at a speed change (inertia compensation) and the mechanical loss torque compensation, as well as the compensation determined by the winding diameter calculation.
Tension sensor feedback torque control can be used when the PLC function is enabled.



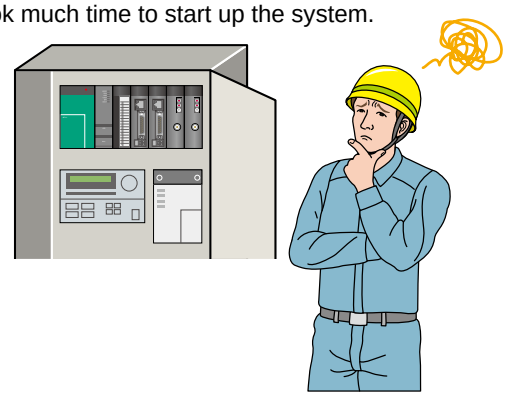
Example of tension sensorless torque control

Easy startup and adjustment

Parameters can be used for mechanical adjustment according to applications, useful for the startup and adjustment work of the system.

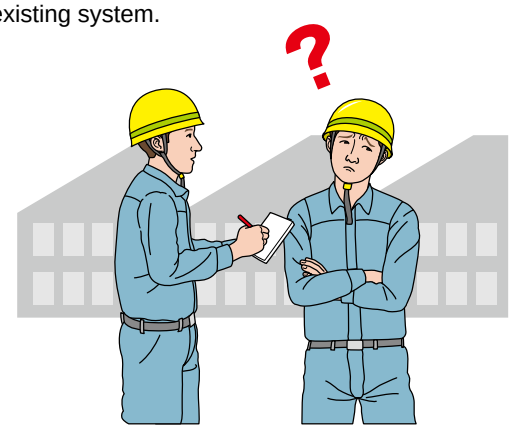
Before

Setting and adjusting multiple devices including controllers were required for dancer control, and it took much time to start up the system.



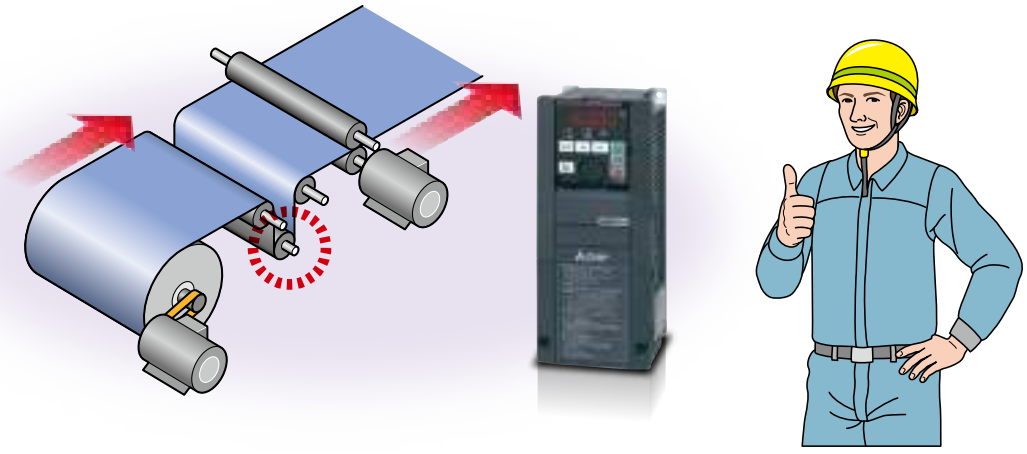
Before

There was a worry about the compatibility with the existing system.



After

- ○ Complex position control of the dancer roll can be achieved by the inverter alone by setting parameters.
- ○ By setting mechanical specifications, optimum control can be performed according to the system and the application.
- ○ Analog/pulse signal input method is selectable at the discretion of the customer. Input via communication is also available.
- ○ PID control enables and simplifies complex control using only the inverter.
- ○ Automatic tension PI gain adjustment enables easy startup. (Tension PI gain tuning)



Example of startup procedure

The following procedure shows the parameter setting example for the dancer feedback speed control.

STEP 1
Basic setting of the inverter

Perform setting according to the motor type and the control method.

STEP 2
Basic setting of mechanical specifications

Set the mechanical specifications.

STEP 3
Analog/pulse input method selection

Select the input method and the input terminal function for the line speed command.

STEP 4
PID control adjustment
(Dancer roll target position, tension PI gain tuning)

Set parameters to control the dancer roll and adjust the tension PI gain.

TEST RUN

Turn ON the X114 signal for using dancer feedback speed control and the winding diameter calculation function.

Basic parameter setting and control method selection

Set the value for each parameter according to the control method and the motor type.
(Speed control gain adjustment or offline auto tuning is required according to the control method.)

Item	Pr.	Item	Pr.	Item	Pr.
Applied motor	71	Rated motor frequency	84	Motor inertia (integer)*2	707
Electronic thermal O/L relay	9	Control method selection*1	800	Motor inertia (exponent)*2	724
Motor capacity	80	Torque limit input method selection	810	Encoder option selection	862
Number of motor poles	81	Encoder rotation direction	359		
Rated motor voltage	83	Number of encoder pulses	369		

*1: For the control method, vector control is recommended.
*2: Setting is required for a motor other than a Mitsubishi motor (the SF-PR, SF-JR, SF-HR, SF-JRCA, SF-HRCA, or SF-V5RU (1500 r/min series) motor).

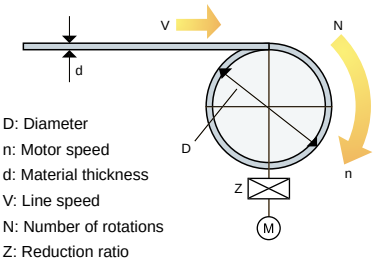
Mechanical specifications setting

Set the mechanical specifications according to application.

Pr.	Name	Intermediate shaft	Winding/unwinding shaft
1235	Maximum winding diameter 1	○	○
1236	Minimum winding diameter 1	○	○
1230	Winding/unwinding selection	—	○
645	Winding diameter storage selection	—	○
1247	Winding diameter change increment amount limit	○	○
1243	Gear ratio numerator (follower side)	○	○
1244	Gear ratio denominator (driver side)	○	○
7	Acceleration time	○	○
8	Deceleration time	○	○
394	First acceleration time for line speed command	○	○
395	First deceleration time for line speed command	○	○
101	Second deceleration time for line speed command	○	○
393	Line speed command acceleration/deceleration reference	○	○
1231	Material thickness d1	—	○
1252	Dancer lower limit position	—	○
1255	Accumulated amount	—	○

Control accuracy improvement by the winding diameter calculation

By calculating the winding diameter of the winding/unwinding shaft, the tension is always optimized even if it changes along with the winding diameter change.



D: Diameter
n: Motor speed
d: Material thickness
V: Line speed
N: Number of rotations
Z: Reduction ratio

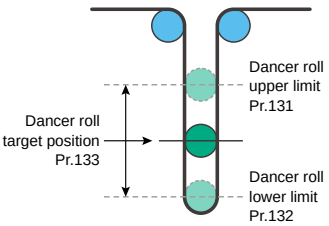
Input method selection for the line speed command, dancer signal, and actual line speed

The line speed command input method can be selected from the following: analog input through a terminal (2, 4, 1, 6, etc.), single-phase pulse train input, encoder pulse input, and input via communication (CC-Link IE Field Network communication, DeviceNet™, PROFIBUS-DPV0, etc.).

Dancer roll target position setting

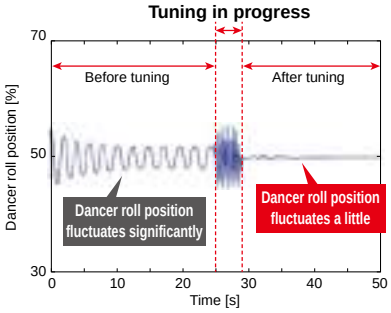
Set the target position, upper limit, and lower limit values for the dancer roll.

Item	Pr.
Set point	133
Upper limit	131
Lower limit	132
PID action selection	128



PI gain automatic adjustment

The PI gain is automatically adjusted by tension PI gain tuning. The time required for gain adjustment can be reduced.



Fluctuation of the dancer roll position before and after tension PI gain tuning

Lineup

●Standard model

F R - A 8 [2] [0] - [0.4K] [-1] - [ ] [R2R]

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Structure/function
0	Standard model

Capacity*1	Description
00023 to 06830	Inverter SLD rated current (A)
0.4K to 280K	Inverter ND rated capacity (kW)

Symbol	Type*2
-1	FM
-2	CA

Symbol	Circuit board coating (IEC60721-3-3 3C2/3S2 compatible)	Plated conductor
None	Without	Without
60	With	Without
06*3	With	With

Symbol	Dedicated function
R2R	Roll to roll dedicated model

Three-phase 200 V class FR-A820-□ *4	00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-phase 400 V class FR-A840-□ *4	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600
	0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	03250	03610	04320	04810	05470	06100	06830										
	110K	132K	160K	185K	220K	250K	280K										
	●	●	●	●	●	●	●										

●Separated converter type

F R - A 8 [4] [2] - [315K] [-1] - [ ] [R2R]

Symbol	Voltage class
4	400 V class

Symbol	Structure/function
2	Separated converter type

Capacity*1	Description
07700 to 12120	Inverter SLD rated current (A)
315K to 500K	Inverter ND rated capacity (kW)

Symbol	Type*2
-1	FM
-2	CA

Symbol	Circuit board coating (IEC60721-3-3 3C2/3S2 compatible)	Plated conductor
None	Without	Without
60	With	Without
06	With	With

Symbol	Dedicated function
R2R	Roll to roll dedicated model

Three-phase 400 V class FR-A842-□	07700	08660	09620	10940	12120
	315K	355K	400K	450K	500K
	●	●	●	●	●

*1 Models can be alternatively indicated with the inverter rated current (SLD rating).
*2 Specification differs by the type as follows.
*3 Available for the 5.5K or higher.
*4 For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.

Type	Motor 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 ±10VDC)	OFF	Sink logic	60 Hz	9999 (same as the power supply voltage)
CA (terminal CA equipped model)	Terminal CA: analog current output (0 to 20mADC) Terminal AM: analog voltage output (0 to ±10VDC)	ON	Source logic	50 Hz	8888 (95% of the power supply voltage)

■Standard specifications

●Rating (Standard model)

200 V class

Model FR-A820-□ R2R			00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
			0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K
Applicable motor capacity (kW)*1		SLD	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
		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
		SND*2	0.75	1.5	2.2	3.7	5.5	7.5	7.5	15	18.5	22	22	30	45	45	55	90	90
		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
		HD	0.2*3	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output	Rated capacity (kVA)*4	SLD	1.8	2.9	4	6.4	10	13	19	24	29	35	48	59	71	89	120	145	181
		LD	1.6	2.7	3.7	5.8	8.8	12	17	22	27	32	43	53	65	81	110	132	165
		SND*2	1.6	2.7	3.7	5.8	8.8	12	14	22	27	32	39	48	65	72	99	132	148
		ND (initial setting)	1.1	1.9	3	4.2	6.7	9.1	13	18	23	29	34	44	55	67	82	110	132
		HD	0.6	1.1	1.9	3	4.2	6.7	9.1	13	18	23	29	34	44	55	67	82	110
	Rated current (A)	SLD	4.6	7.7	10.5	16.7	25	34	49	63	77	93	125	154	187	233	316	380	475
		LD	4.2	7	9.6	15.2	23	31	45	58	70.5	85	114	140	170	212	288	346	432
		SND*2	4.2	7	9.6	15.2	23	31	36	58	70.5	85	102	126	170	190	259	346	388
		ND (initial setting)	3	5	8	11	17.5	24	33	46	61	76	90	115	145	175	215	288	346
		HD	1.5	3	5	8	11	17.5	24	33	46	61	76	90	115	145	175	215	288
	Overload current rating*5	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
		SND*2	150% 60 s (inverse-time characteristics) at surrounding air temperature of 50°C																
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
	Rated voltage*6		Three-phase 200 to 240 V																
	Regenerative braking	Brake transistor	Built-in											FR-BU2 (option)					
		Maximum brake torque*8	150% torque/ 3%ED*7			100% torque/ 3%ED*7		100% torque/ 2%ED*7		20% torque/continuous								10% torque/ continuous	
		FR-ABR (when the option is used)	150% torque/ 10%ED		100% torque/10%ED					100% torque/6%ED				–	–	–	–	–	–
Power supply	Rated input AC voltage/frequency		Three-phase 200 to 240 V, 50 Hz/60 Hz																
	Permissible AC voltage fluctuation		170 to 264 V, 50 Hz/60 Hz																
	Permissible frequency fluctuation		±5%																
	Rated input current (A)*9	SLD	5.3	8.9	13.2	19.7	31.3	45.1	62.8	80.6	96.7	115	151	185	221	269	316	380	475
		LD	5	8.3	12.2	18.3	28.5	41.6	58.2	74.8	90.9	106	139	178	207	255	288	346	432
		SND*2	5	8.3	12.2	18.3	28.5	41.6	49	74.8	90.9	106	130	166	207	233	304	346	388
		ND (initial setting)	3.9	6.3	10.6	14.1	22.6	33.4	44.2	60.9	80	96.3	113	150	181	216	266	288	346
		HD	2.3	3.9	6.3	10.6	14.1	22.6	33.4	44.2	60.9	80	96.3	113	150	181	216	215	288
	Power supply capacity (kVA)*10	SLD	2	3.4	5	7.5	12	17	24	31	37	44	58	70	84	103	120	145	181
		LD	1.9	3.2	4.7	7	11	16	22	29	35	41	53	68	79	97	110	132	165
		SND*2	1.9	3.2	4.7	7	11	16	19	29	35	41	50	63	79	89	116	132	148
		ND (initial setting)	1.5	2.4	4	5.4	8.6	13	17	23	30	37	43	57	69	82	101	110	132
		HD	0.9	1.5	2.4	4	5.4	8.6	13	17	23	30	37	43	57	69	82	82	110
Protective structure (IEC 60529)*11			Enclosed type (IP20)											Open type (IP00)					
Cooling system			Self-cooling		Forced air cooling														
Approx. mass (kg)			2.0	2.2	3.3	3.3	3.3	6.7	6.7	8.3	15	15	15	22	42	42	54	74	74

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2 For the SND rating, the carrier frequency is always 2 kHz.
*3 The 0.2 kW motor capacity is applicable under V/F control only.
*4 The rated output capacity indicated assumes that the output voltage is 220 V for 200 V class.
*5 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.
*6 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 $\sqrt{2}$.
*7 Value for the built-in brake resistor
*8 Value for the ND rating
*9 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.
*10 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).
*11 FR-DU08: IP40 (except for the PU connector section)

400 V class

Model FR-A840-☐ R2R			00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
			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	160K	185K	220K	250K	280K
Applicable motor capacity (kW)*1		SLD	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	185	220	250	280	315	355
		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	185	220	250	280	315
		SND*2	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	55	90	90	132	160	185	220	250	280	315
		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	160	185	220	250	280
		HD	0.2*3	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	160	185	220	250
Output	Rated capacity (kVA)*4	SLD	1.8	2.9	4	6.3	10	13	19	24	29	36	47	59	71	88	137	165	198	248	275	329	367	417	465	521
		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	275	329	367	417	465
		SND*2	1.6	2.7	3.7	5.8	8.8	12	18	22	27	33	43	53	65	81	98	137	148	198	248	275	329	367	417	465
		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	248	275	329	367	417
		HD	0.6	1.1	1.9	3	4.6	6.9	9.1	13	18	24	29	34	43	54	66	84	110	137	165	198	248	275	329	367
	Rated current (A)	SLD	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116	180	216	260	325	361	432	481	547	610	683
		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	361	432	481	547	610
		SND*2	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106	129	180	194	260	325	361	432	481	547	610
		ND (initial setting)	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260	325	361	432	481	547
		HD	0.8	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86	110	144	180	216	260	325	361	432	481
	Overload current rating*5	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																							
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
		SND*2	150% 60 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																							
	Rated voltage*6		Three-phase 380 to 500 V																							
	Regenerative braking	Brake transistor	Built-in															FR-BU2 (option)								
		Maximum brake torque*8	100% torque/ 2%ED*7									20% torque/continuous						10% torque/ continuous								
		FR-ABR (when the option is used)	100% torque/10%ED									100% torque/6%ED		–*13				–	–	–	–	–	–	–	–	–
Power supply	Rated input AC voltage/frequency		Three-phase 380 to 500 V, 50 Hz/60 Hz*12																							
	Permissible AC voltage fluctuation		323 to 550 V, 50 Hz/60 Hz																							
	Permissible frequency fluctuation		±5%																							
	Rated input current (A)*9	SLD	3.2	5.4	7.8	10.9	16.4	22.5	31.7	40.3	48.2	58.4	76.8	97.6	115	141	180	216	260	325	361	432	481	547	610	683
		LD	3	4.9	7.3	10.1	15.1	22.3	31	38.2	44.9	53.9	75.1	89.7	106	130	144	180	216	260	325	361	432	481	547	610
		SND*2	3	4.9	7.3	10.1	15.1	22.3	31	38.2	44.9	53.9	75.1	89.7	106	130	154	180	194	260	325	361	432	481	547	610
		ND (initial setting)	2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91	108	134	144	180	216	260	325	361	432	481	547
		HD	1.4	2.3	3.7	6.2	8.3	12.3	17.4	22.5	31	40.3	48.2	56.5	75.1	91	108	110	144	180	216	260	325	361	432	481
	Power supply capacity (kVA)*10	SLD	2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107	137	165	198	248	275	329	367	417	465	521
		LD	2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99	110	137	165	198	248	275	329	367	417	465
		SND*2	2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99	117	137	148	198	248	275	329	367	417	465
		ND (initial setting)	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83	102	110	137	165	198	248	275	329	367	417
		HD	1.1	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83	84	110	137	165	198	248	275	329	367
Protective structure (IEC 60529)*11			Enclosed type (IP20)											Open type (IP00)												
Cooling system			Self-cooling			Forced air cooling																				
Approx. mass (kg)			2.8	2.8	2.8	3.3	3.3	6.7	6.7	8.3	8.3	15	15	23	41	41	43	52	55	71	78	117	117	166	166	166

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2 For the SND rating, the carrier frequency is always 2 kHz.
*3 The 0.2 kW motor capacity is applicable under V/F control only.
*4 The rated output capacity indicated assumes that the output voltage is 440 V for 400 V class.
*5 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.
*6 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 $\sqrt{2}$.
*7 Value for the built-in brake resistor
*8 Value for the ND rating
*9 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.
*10 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).
*11 FR-DU08: IP40 (except for the PU connector section)
*12 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**.
*13 The braking capability of the inverter built-in brake can be improved with a commercial brake resistor. For the details, please contact your sales representative.

●Rating (Separated converter type)

400 V class

• Inverter

Model FR-A842-☐ R2R			07700	08660	09620	10940	12120
			315K	355K	400K	450K	500K
Applicable motor capacity (kW)*1		SLD	400	450	500	560	630
		LD	355	400	450	500	560
		SND*2	355	400	450	500	560
		ND (initial setting)	315	355	400	450	500
		HD	280	315	355	400	450
Output	Rated capacity (kVA)*3	SLD	587	660	733	834	924
		LD	521	587	660	733	834
		SND*2	521	587	660	733	834
		ND (initial setting)	465	521	587	660	733
		HD	417	465	521	587	660
	Rated current (A)	SLD	770	866	962	1094	1212
		LD	683	770	866	962	1094
		SND*2	683	770	866	962	1094
		ND (initial setting)	610	683	770	866	962
		HD	547	610	683	770	866
	Overload current rating*4	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C				
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
		SND*2	150% 60 s (inverse-time characteristics) at surrounding air temperature of 50°C				
		ND (initial setting)	150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
		HD	200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
	Rated voltage*5		Three-phase 380 to 500 V				
	Regenerative brakingtorque*6 (When the converter unit (FR-CC2) is used)	Maximum brake torque	10% torque/continuous				
Input Power	DC power supply voltage		430 to 780 VDC				
	Control power supply auxiliary input		Single phase 380 to 500 V, 50 Hz/60 Hz*8				
	Permissible control power supply auxiliary input fluctuation		Frequency ±5%, voltage ±10%				
Protective structure (IEC 60529)*7			Open type (IP00)				
Cooling system			Forced air cooling				
Approx. mass (kg)			163	163	243	243	243

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2 For the SND rating, the carrier frequency is always 2 kHz.
*3 The rated output capacity indicated assumes that the output voltage is 440 V.
*4 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.
*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 ND rating reference value
*7 FR-DU08: IP40 (except for the PU connector section)
*8 For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**.

• Converter unit (FR-CC2)

Model FR-CC2-H☐		315K	355K	400K	450K	500K	560K	630K
Applicable motor capacity (kW)		315	355	400	450	500	560	630
Output	Overload current rating*1	200% 60 s, 250% 3 s				150% 60 s, 200% 3 s	120% 60 s, 150% 3 s	110% 60 s, 120% 3 s
	Rated voltage*2	430 to 780 VDC*4						
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 500 V, 50 Hz/60 Hz						
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V, 50 Hz/60 Hz						
	Permissible frequency fluctuation	±5%						
	Rated input current (A)	610	683	770	866	962	1094	1212
	Power supply capacity (kVA)*3	465	521	587	660	733	833	924
Protective structure (IEC 60529)		Open type (IP00)						
Cooling system		Forced air cooling						
DC reactor		Built-in						
Approx. mass (kg)		210	213	282	285	288	293	294

*1 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 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 when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*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)

●Common specifications

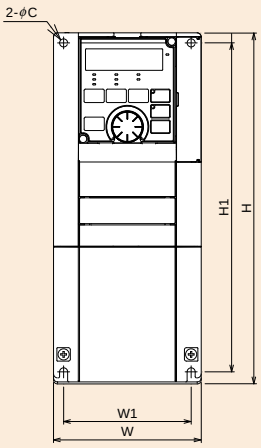
Control specifications	Control method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, and vector control*1
	Output frequency range		0.2 to 590 Hz (The upper-limit frequency is 400 Hz (200 Hz for the SND rating) under Advanced magnetic flux vector control, Real sensorless vector control, and vector control*1.)
	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		SLD Rating:120% 0.3 Hz, LD Rating:150% 0.3 Hz, SND Rating:150% 0.3 Hz, ND Rating:200% 0.3 Hz*2, HD Rating:250% 0.3 Hz*2 (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 (SLD rating: 0 to 120%, LD rating: 0 to 150%, SND rating: 0 to 220%, ND rating: 0 to 220%, HD rating: 0 to 280%). 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)
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 input signal can be changed using **Pr.178 to Pr.189 (input terminal function selection)**.
		Pulse train input	100 kpps
	Operational functions		Dancer feedback speed control, tension sensor feedback speed control, tension sensorless torque control, tension sensor feedback torque control, winding diameter calculation, initial winding diameter calculation, actual line speed detection, reduction ratio setting, maximum/minimum winding diameter setting, winding diameter / winding length storage, line speed acceleration/deceleration function, dancer roll break detection, tension PI gain tuning, speed control proportional gain compensation, reel change function, taper function, inertia compensation function, mechanical loss compensation function, 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, DC feeding*4, frequency jump, rotation display, automatic restart after instantaneous power failure, retry function, carrier frequency selection, fast-response current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, droop control, speed smoothing control, auto tuning, applied motor selection, gain tuning, RS-485 communication, dancer control, 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, speed control, torque control, pre-excitation, torque limit, test run, 24 V power supply input for control circuit, safety stop function
	Output signal	Open collector output (five terminals) Relay output (two terminals)	Inverter running, Up to frequency, Instantaneous power failure/undervoltage*4, 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	A 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 relay function), Motor overload trip (electronic thermal relay function), Heatsink overheat, Instantaneous power failure*4, Undervoltage*4, Input phase loss*3*4, Stall prevention stop, Brake transistor alarm detection*4, Output side earth (ground) fault overcurrent, Output short circuit, Output phase loss, External thermal relay operation*3, PTC thermistor operation*3, Option fault, Communication option fault, Parameter storage device fault, PU disconnection, Retry count excess*3, Parameter storage device fault, CPU fault, Operation panel power supply short circuit/ RS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection*3, Inrush current limit circuit fault*4, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence*3, Speed deviation excess detection*3, Signal loss detection*3, Encoder phase fault*3, 4 mA input fault*3, PID signal fault*3, Option fault, Opposite rotation deceleration fault*3, Internal circuit fault, Encoder pulse number setting error, Overload trip
		Warning function	Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Regenerative brake pre-alarm*3*4, Electronic thermal relay function pre-alarm, PU stop, Speed limit indication*3, Parameter copy, Safety stop, Maintenance signal output*3, USB host error, Operation panel lock*3, Password locked*3, Parameter write error, Copy operation error, 24 V external power supply operation
Environment	Surrounding air temperature		–10°C to +50°C (non-freezing) (LD, SND, ND, HD ratings) –10°C to +40°C (non-freezing) (SLD rating)
	Surrounding air humidity		95% RH or less (non-condensing) (With circuit board coating (conforming to IEC60721-3-3 3C2/3S2) 90% RH or less (non-condensing) (Without circuit board coating)
	Storage temperature*5		–20°C to +65°C
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude/vibration		Maximum 1000 m above sea level *6, 5.9 m/s² *7 or less at 10 to 55 Hz (directions of X, Y, Z axes)

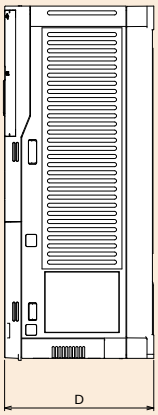
*1 Available only when a vector control compatible option is installed.
*2 In the initial setting of the FR-A820-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, it is limited to 150% by the torque limit level.
*3 This protective function is not available in the initial status.
*4 Enabled only for standard models.
*5 Temperature applicable for a short time, e.g. in transit.
*6 For the installation at an altitude above 1,000 m up to 2,500 m, derate the rated current 3% per 500 m.
*7 2.9m/s² or less for the FR-A840-04320(160K) or higher.

■Standard Model

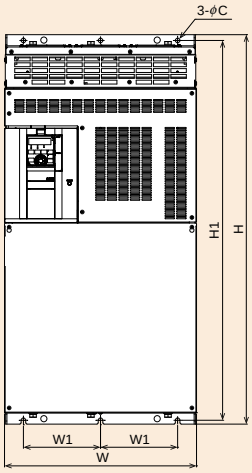
Outline Dimension Drawings

●**FR-A820-00046(0.4K) to 04750(90K)-R2R**
●**FR-A840-00023(0.4K) to 03610(132K)-R2R**





●**FR-A840-04320(160K) to 06830(280K)-R2R**



(Unit: mm)

200 V class

Inverter model	W	W1	H	H1	D	C
FR-A820-00046(0.4K)-R2R	110	95	260	245	110	6
FR-A820-00077(0.75K)-R2R					125	
FR-A820-00105(1.5K)-R2R	150	125			140	
FR-A820-00167(2.2K)-R2R						
FR-A820-00250(3.7K)-R2R						
FR-A820-00340(5.5K)-R2R	220	195			170	
FR-A820-00490(7.5K)-R2R						
FR-A820-00630(11K)-R2R			300	285	190	
FR-A820-00770(15K)-R2R	250	230	400	380		10
FR-A820-00930(18.5K)-R2R						
FR-A820-01250(22K)-R2R						
FR-A820-01540(30K)-R2R	325	270	550	530	195	12
FR-A820-01870(37K)-R2R	435	380		525	250	
FR-A820-02330(45K)-R2R						
FR-A820-03160(55K)-R2R	465	410	700	675		
FR-A820-03800(75K)-R2R		400	740	715	360	
FR-A820-04750(90K)-R2R						

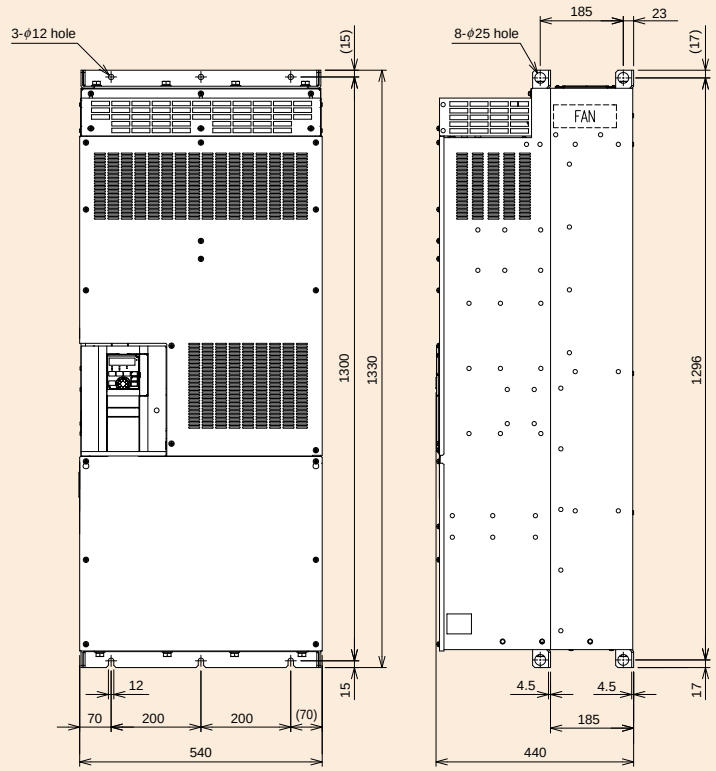
400 V class

Inverter model	W	W1	H	H1	D	C
FR-A840-00023(0.4K)-R2R	150	125	260	245	140	6
FR-A840-00038(0.75K)-R2R						
FR-A840-00052(1.5K)-R2R						
FR-A840-00083(2.2K)-R2R						
FR-A840-00126(3.7K)-R2R						
FR-A840-00170(5.5K)-R2R	220	195			170	
FR-A840-00250(7.5K)-R2R						
FR-A840-00310(11K)-R2R			300	285	190	
FR-A840-00380(15K)-R2R						
FR-A840-00470(18.5K)-R2R	250	230	400	380		10
FR-A840-00620(22K)-R2R						
FR-A840-00770(30K)-R2R	325	270	550	530	195	12
FR-A840-00930(37K)-R2R	435	380		525	250	
FR-A840-01160(45K)-R2R						
FR-A840-01800(55K)-R2R						
FR-A840-02160(75K)-R2R	465	400	620	595	300	
FR-A840-02600(90K)-R2R						
FR-A840-03250(110K)-R2R			740	715	360	
FR-A840-03610(132K)-R2R						
FR-A840-04320(160K)-R2R	498	200	1010	985	380	
FR-A840-04810(185K)-R2R						
FR-A840-05470(220K)-R2R	680	300		984		
FR-A840-06100(250K)-R2R						
FR-A840-06830(280K)-R2R						

■Separated converter type

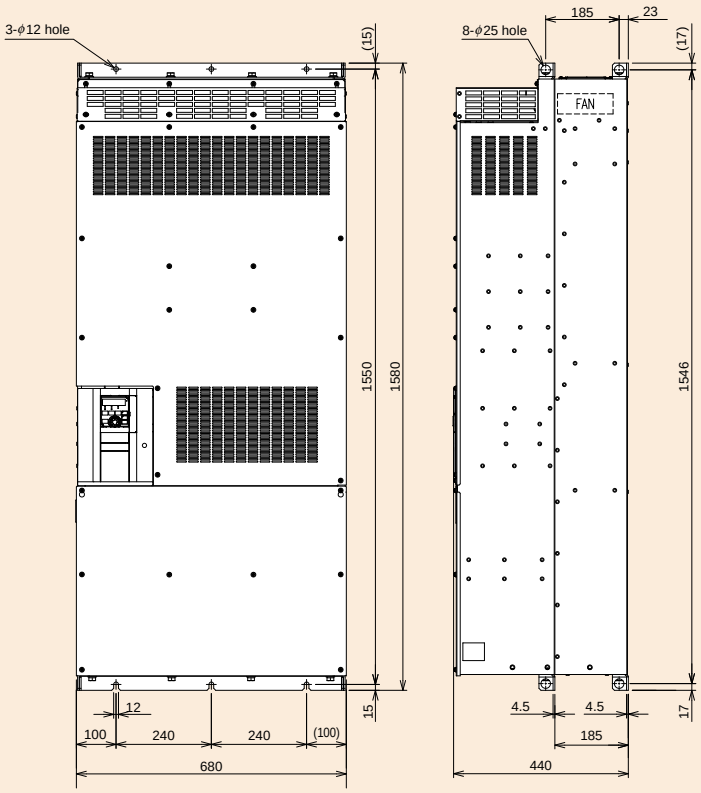
Outline Dimension Drawings

●FR-A842-07700(315K), 08660(355K)-R2R



(Unit: mm)

●FR-A842-09620(400K), 10940(450K), 12120(500K)-R2R



(Unit: mm)

MEMO

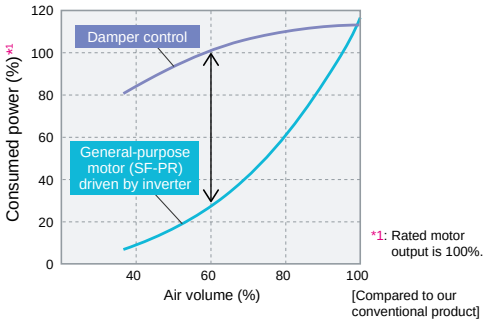
Inverter FREQROL-F800 Series

Energy Saving

Energy Saving with Inverters

The consumed power of a variable-torque load, such as fans, pumps, and blowers, is proportional to the cube of its rotation speed.
Adjusting the air volume by the inverter rotation speed control can lead to energy savings.

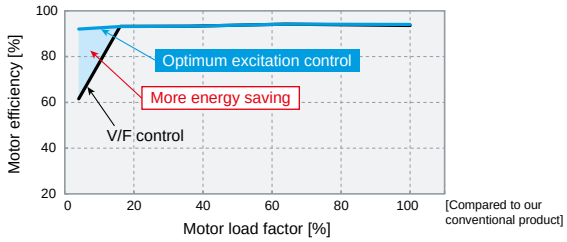
[Example of blower operation characteristic]



Utilizing the motor capability to the full

Optimum excitation control

- Optimum excitation control continuously adjusts the excitation current to an optimum level to provide the highest motor efficiency. With a small load torque, a substantial energy saving can be achieved.
  For example, at 4% motor load torque for a general-purpose motor, the motor efficiency under Optimum excitation control is about 30% higher than the motor efficiency under V/F control.



(When the inverter running frequency is 60 Hz and the SF-PR 4P motor (15 kW) is used)

Improving starting torque and saving energy at the same time NEW

Advanced optimum excitation control

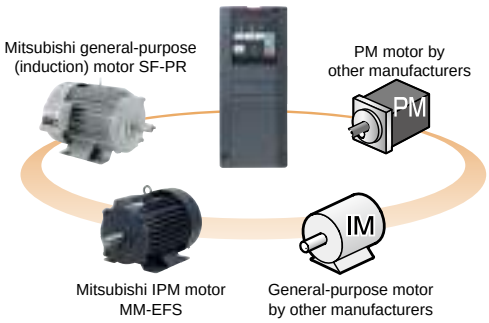
Advanced optimum excitation control, which has been newly developed, provides a large starting torque while maintaining the motor efficiency under the conventional Optimum excitation control.
Without the need of troublesome adjustment of parameters (acceleration/ deceleration time, torque boost, etc.), acceleration is done in a short time.
Also, energy saving operation with the utmost improved motor efficiency is performed during constant-speed operation.

Supporting operations of various motors NEW

Offline auto tuning

The offline auto tuning function to measure circuit constants of the motor enables optimal operation of motors even when motor constants vary, when a motor of other manufacturers is used, or when the wiring distance is long.
As well as Mitsubishi general-purpose motors, Mitsubishi PM motors (MM-EFS, MM-THE4), sensorless operation can be performed for other manufacturers' general-purpose motors*2 and other manufacturers' permanent magnet (PM) motors*2.
The tuning function enables the Advanced optimum excitation control of other manufacturers' general-purpose motors*2, which increases the use in the energy saving applications.

*2: Depending on the motor characteristics, tuning may not be available.



Energy Saving with High-Efficiency Motor

In the international context of global warming prevention, many countries in the world have started to introduce laws and regulations to mandate manufacturing and sales of high-efficiency motors. With the use of high-efficiency motors, further energy saving is achieved.

[IE code]
As an international standard of the efficiency, IEC60034-30 (energy-efficiency classes for single-speed, three-phase, cage-induction motors) was formulated in October 2008. The efficiency is classified into four classes from IE1 to IE4. The larger number means the higher efficiency.

Efficiency class IEC 60034-30	Mitsubishi motor efficiency	
	General-purpose motor	IPM motor
IE4 (super premium efficiency)*3	—	Premium high-efficiency IPM (MM-EFS/MM-THE4)
IE3 (premium efficiency)	Superline premium series (SF-PR)	—
IE2 (high efficiency)	Superline eco series (SF-HR)	—
IE1 (standard efficiency)	Superline series (SF-JR)	—
Below the class	—	—

Efficiency: High / Low

*3: The details of IE4 are specified in IEC 60034-31.

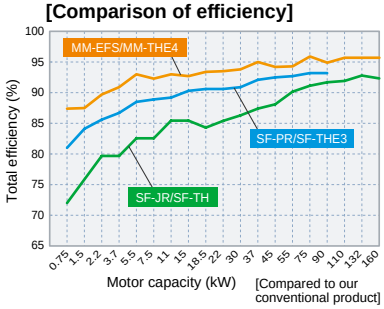
Further energy saving with the premium high-efficiency IPM motor

MM-EFS / MM-THE4

- The IPM motor, with permanent magnets embedded in the rotor, achieves even higher efficiency as compared to the general-purpose motor (SF-PR/SF-THE3).
- The IM driving setting can be switched to IPM driving setting by only one setting. ("12" (MM-EFS/MM-THE4) in the parameter [IPM].)

Do not drive an IPM motor in the induction motor control settings.

[Comparison of efficiency]

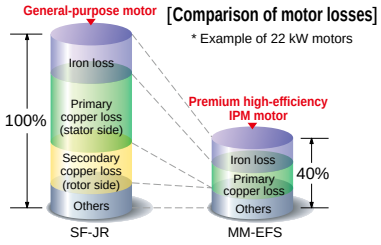


Why is an IPM motor more efficient?

- No current flows to the rotor (secondary side), and no secondary copper loss is generated.
- Magnetic flux is generated with permanent magnets, and less motor current is required.
- Embedded magnets provide reluctance torque*4, and the reluctance torque can be applied.

*4: Reluctance torque occurs due to magnetic imbalance on the rotor.

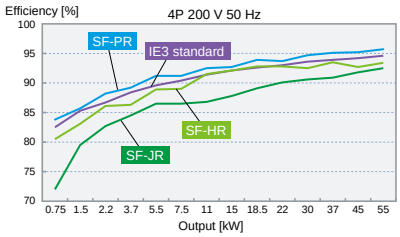
[Comparison of motor losses]
* Example of 22 kW motors



Excellent compatibility with the high-performance energy-saving motor

SF-PR

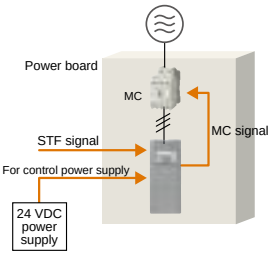
Motor constants are stored in the inverter. Energy-saving operation can be started just by setting parameters. The SF-PR motor conforms to the Japanese domestic Top Runner Standard (IE3 equivalent). Its energy-saving operation contributes reduction in the electricity charges, which in turn lowers the running cost.



Energy-Saving Functions Suitable for Various Systems

Standby power reduction NEW

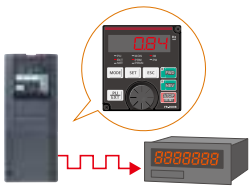
- With the 24 VDC external power supply, the input MC signal can be turned OFF after the motor is stopped, and turned ON before activating the motor. The inverter enables self power management to reduce standby power.
- The inverter cooling fan can be controlled depending on the temperature of the inverter heatsink. Also, signals can be output in accordance with the inverter cooling fan operation. When the fan is installed on the enclosure, the enclosure fan can be synchronized with the inverter cooling fan. Extra power consumption when the motor is stopped can be reduced.



Energy saving at a glance

Energy saving monitor / Pulse train output of output power

- Energy saving monitor is available. The energy saving effect can be checked using an operation panel, output terminal, or network.
- The output power amount measured by the inverter can be output in pulses. The cumulative power amount can be easily checked.



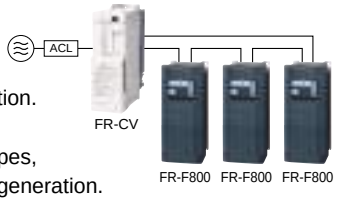
(This function cannot be used as a meter to certify electricity billings.)

Furthermore With the Mitsubishi energy measuring module, the energy saving effect can be displayed, measured, and collected.

Effective use of the regenerative energy Option

FR-CV / FR-HC2

Multiple inverters can be connected to the power regeneration common converter (FR-CV) or the high power factor converter (FR-HC2) through a common PN bus. The regenerated energy is used by another inverter, and if there is still an excess, it is returned to the power supply, saving on the energy consumption. The 355K or higher models are inverter-converter separated types, which are suitable for power regeneration.



Functions Ideal for Fans and Pumps

Optimum Inverter Capacity Selection

Multiple rating NEW

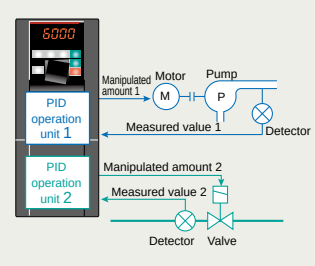
The rating can be selected between the two types (LD (light duty) or SLD (superlight duty)) depending on the load of the fan/pump to be used. The optimum inverter capacity can be selected suitable for the motor to be used.
For the 200 V class 90K or higher and the 400 V class 75K or higher, a motor with one-rank higher capacity can be combined.

Load	Rating	Overload current rating
Superlight duty	SLD rating	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40˚C
Light duty	LD rating	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50˚C

Further Enhanced PID Control

System cost reduction [PID multiple loops (two loops)] NEW

Two PID operation units are available in the inverter.
The inverter can perform PID control of the motor operation and control the external equipment at the same time.
The system cost can be reduced because no external PID controller is required for controlling the external equipment.



Direct setting of the PID set point

The PID set point can be set directly from the operation panel.
The setting can be easily changed at hand.

Visibility improvement Option NEW

With the optional LCD operation panel (FR-LU08), the unit can be changed from "%" to other easy-to-see units.
Maintenance and adjustment is facilitated by using a familiar unit of air volume, temperature, etc. for indication.

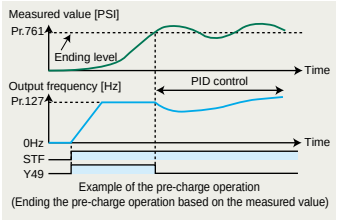
LCD operation panel (FR-LU08) (Option)

Unit conversion

Avoidance of rapid acceleration/deceleration using PID action NEW

PID pre-charge function

Before PID action, the water flow to the pipe is controlled by operating the motor at a constant speed until the measured value (pressure, etc.) reaches the set level. This function is used to avoid rapid acceleration/deceleration caused by starting the PID action while the pipe is empty, and prevent a water hammer action, etc.

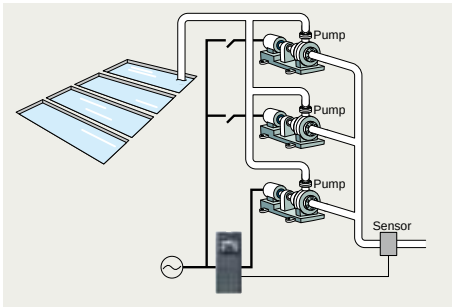


Example of the pre-charge operation
(Ending the pre-charge operation based on the measured value)

Water volume control with multiple pumps NEW

Multi-pump function

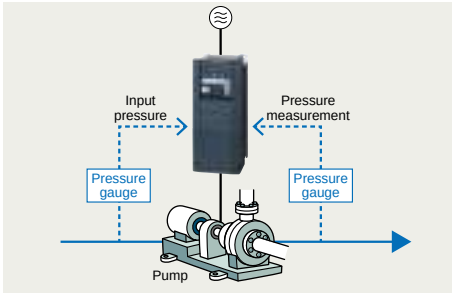
By controlling the pumps connected in parallel (up to four pumps) by the PID control by one inverter, water volume, etc. can be adjusted.
One of the connected pumps is driven by the inverter. Other pumps are driven by commercial power supply. The number of pumps to be driven by commercial power supply is automatically adjusted according to the water volume.



Pump water volume control NEW

PID input pressure control

In order to prevent air intake and cavitation inside the pump, the pump inlet pressure can be controlled so that there is no water shortage.

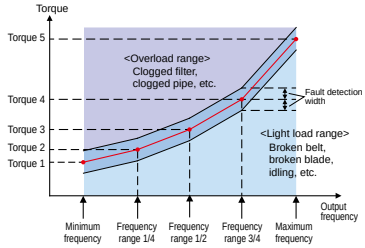


Operating Status Monitoring

Detection of mechanical faults NEW

Load characteristics measurement function

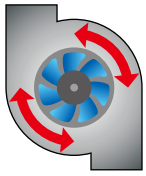
The speed/torque relationship is stored while no fault occurs. By comparing the present load status with the stored load characteristics, out-of-range warnings can be output if applicable. Mechanical faults such as clogging of the filter or breakage of the belt can be easily detected, and maintenance is facilitated.



Cleaning of fans and pumps NEW

Cleaning function

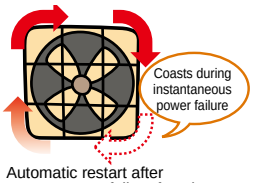
Foreign matter on the impellers or fans of pumps can be removed by repeating forward/reverse rotation and stopping of the motor. (Use this function when a back flush does not pose a problem.)
This function can be also automatically started when the result of load characteristics measurement is out of range (overload).



Smooth Restart

Automatic restart after instantaneous power failure / flying start function

After an instantaneous power failure, the operation is restartable from the coasting motor speed.
With the advanced flying start function, the operation can be smoothly started from low speed.



Automatic restart after instantaneous power failure function

Keep Running during Flying Start Operation

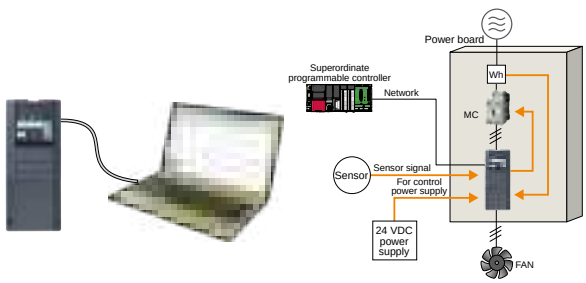
Regeneration avoidance function

The operation frequency is automatically increased to prevent the regenerative overvoltage fault from occurring. This function is useful when a load is forcibly rotated by another fan in the duct.

PLC Control with an Inverter

PLC function in the inverter NEW

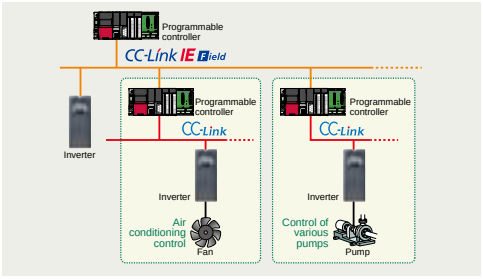
- Parameters and setting frequency can be changed at the program. Control programs can be created in sequence ladders using the inverter setup software (FR Configurator2).
- Inverter control such as inverter operations triggered by input signals, signal output based on inverter operation status, and monitor output can be freely customized based on the machine specifications.
- All machines can be controlled by the inverter alone, and control can also be dispersed.
- Time-based operation is possible by using in combination with the real-time clock function (when using an optional LCD operation panel (FR-LU08)).



Compatibility with Various Systems

Compatibility with various networks

It supports BACnet® MS/TP as standard, as well as Mitsubishi inverter protocol and MODBUS®RTU (binary) protocol. Communication options are also available for the major network protocols such as CC-Link, CC-Link IE Field, LONWORKS® (to be supported soon), FL-net remote I/O (to be supported soon), PROFIBUS-DPV0, and DeviceNet™.



Simplified external equipment

The CA-type inverters are available. For the CA type, the monitor output terminal FM/CA operates as terminal CA (analog current output 0 to 20 mA), not as terminal FM (pulse train output). An external converter is not required.
(The factory setting is different for the CA type and the FM type.)

Mechanical Resonance Suppression

Speed smoothing control

Vibration caused by mechanical resonance can be reduced. (Available with general-purpose motors)

Extended Functions

Support for up to three types of options NEW

Three types of plug-in options can be attached.
The functions of the inverter can be extended through network.
For example, additional I/O terminals can be used.

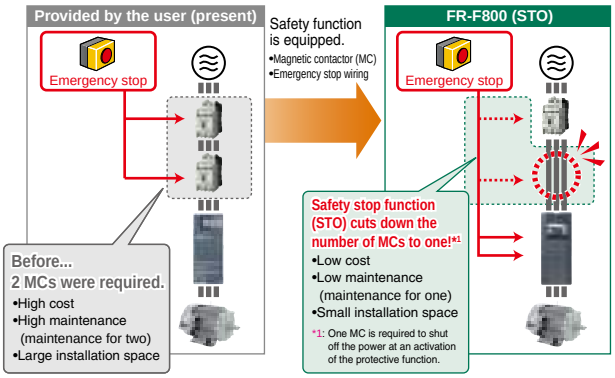
Security & Safety

Improved System Safety

Safety standards compliance NEW

Controls with safety functions can be easily performed.
PLd and SIL2 are supported as standard. (STO)

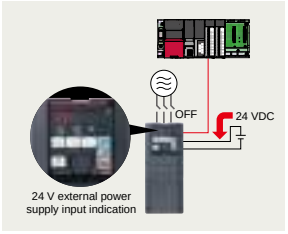
- EN ISO 13849-1 PLd / Cat.3
- EN 61508, EN61800-5-2 SIL2



Reliable and Secure Maintenance

Standard 24 VDC power supply for the control circuit NEW

In addition to the existing power supply input terminals (R1 and S1) of the control circuit, 24 VDC input is equipped as standard.
The 24 VDC power supplied from outside can be fed to the control circuit locally.
The parameter setting and communication operation can be done without turning ON the main power.



Prevention of trouble with temperature monitoring NEW

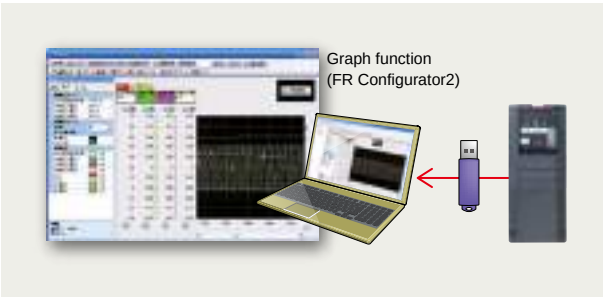
The inverter is equipped with an internal temperature sensor, which outputs a signal when the internal temperature is high. This facilitates the detection of rises in temperature inside the inverter following cooling fan malfunction, or rises in the surrounding air temperature due to inverter operating conditions.

Quick Reaction to Troubles

Easy fault diagnosis NEW

- The operating status (output frequency, etc.) immediately before the protection function activates can be stored in the inverter built-in RAM with the trace function. Stored data (trace data) can be copied to a USB memory device, facilitating easy trouble analysis at a separate location by reading into FR Configurator2.

Trace data stored in the built-in RAM is deleted when the power is turned OFF or the inverter is reset.



- Clock setting is now available in addition to the already-available cumulative energization time. The time and date at a protective function activation are easily identified.
(The clock is reset at power-OFF.) The date and time are also saved with the trace data, making the fault analysis easier.
By using the real-time clock function with the optional LCD operation panel (FR-LU08) (when using battery), the time is not reset even when the power supply is turned OFF.

FR-LU08 (LCD type)
(Option)

Protection of Critical Parameter Settings

Misoperation prevention by setting a password

- Setting a 4-digit password can restrict parameter reading/writing.

Long Life Components and Life Check Function

Long life components

- The service life of the cooling fans is now 10 years*1. The service life can be further extended by ON/OFF control of the cooling fan.
- Capacitors with a design life of 10 years*1*2 are adapted.
- Life indication of life components

Components	Estimated lifespan of the FR-F800 *1	Guideline of JEMA *3
Cooling fan	10 years	2 to 3 years
Main circuit smoothing capacitor	10 years*2	5 years
Printed board smoothing capacitor	10 years*2	5 years

*1: Surrounding air temperature: Annual average of 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt).
The design life is a calculated value from the LD rating and is not a guaranteed product life.
*2: Output current: 80% of the inverter rating
*3: Excerpts from "Periodic check of the transistorized inverter" of JEMA (Japan Electrical Manufacturer's Association).

Enhanced life check function NEW

- An internal thermal sensor is equipped to all inverters as standard, which enables monitoring of the installation environment. Use this function as a guide for the life diagnosis.
- Maintenance timers are available for up to three peripheral devices, such as a motor and bearings.

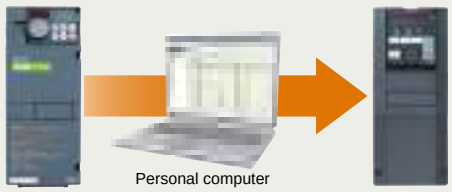
"Maintenance 1 output" warning

Renewal Assurance

Compatibility with existing models

- The inverter installation method is the same as that for the FR-F700(P) series, eliminating any concerns over replacement (except for some capacity models). Furthermore, the FR-F700(P) series control circuit terminal blocks can be installed with the use of an option (FR-A8TAT).

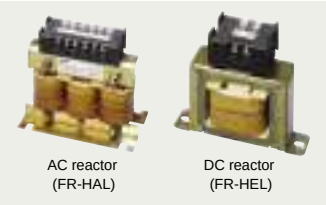
- The terminal response adjustment function allows a user to adjust the response speed in accordance with the existing facility. (The response time is shorter for the FR-F800 series.)
- In addition to the FR-F700(P) series' parameter settings, the FR-F500 series parameter settings (to be supported soon) can be easily copied to the FR-F800 series by using the conversion function of FR Configurator2. NEW



FR-F700 (P) FR-F800

Compatibility with the Environment

Suppression of Outgoing Harmonic Current and EMI



AC reactor (FR-HAL) DC reactor (FR-HEL)

- Harmonic current may adversely affect the power supply. To suppress such harmonic current, the power-factor-improving compact AC reactor (FR-HAL) and the DC reactor (FR-HEL) are available. (For the 75K or higher inverter, always connect a DC reactor. Select a DC reactor according to the applied motor capacity.)
- By attaching the EMC filter connector to the ON or OFF position, the built-in EMC filter can be set enabled/disabled*1*2. When it is enabled, the inverter conforms to the EMC Directive (EN61800-3/2nd Environment Category C3*3) by itself.

*1: Enabling the EMC filter increases leakage current.
*2: The input side common mode choke, which is built in the 55K or lower inverter, is always enabled regardless of the EMC filter ON/OFF connector setting.
*3: Refer to the EMC Installation Guidelines for the required specifications.

	Capacitive filter	Common mode choke	DC reactor
55K or lower	Standard (built-in)	Standard (built-in)	Option (sold separately)
75K or higher	Standard (built-in)	Option (sold separately)	Option (sold separately)

- The F800 series inverters are equipped with built-in capacitive filters (capacitors) and common mode chokes (55K or lower). By installing a DC reactor (FR-HEL), which is available as an option, they can confirm to the Architectural Standard Specifications (Electric Installation) and the Architectural Standard Specifications (Machinery Installation) (2013 revision) supervised by the Ministry of Land, Infrastructure, Transport and Tourism of Japan.
- With a high power factor converter (FR-HC2), the inverter is equivalent to a self-excitation three-phase bridge circuit in the "Harmonic Suppression Guidelines for Specific Consumers" in Japan, and realizes the equivalent capacity conversion coefficient K5=0. For the 355K or higher, the converter is separated. Therefore, installation space can be saved when connecting the FR-HC2.

Protected in Hazardous Environments

Inverters with circuit board coating (IEC60721-3-3 3C2/3S2) and plated conductors are available for improved environmental resistance. ("-60" or "-06" is affixed to the end of the inverter model name.)

Global Compatibility

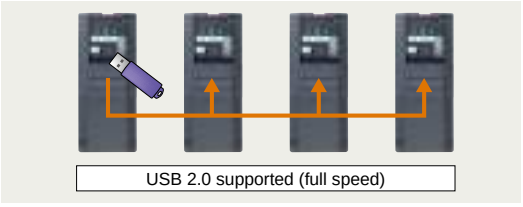
- Complies with UL, cUL, and EC Directives (CE marking), and the Radio Waves Act (South Korea) (KC marking).
- Being RoHS compliant, the FR-F800 inverters are friendly to people and the environment.

Easy Setup & Operation

Streamlining the Startup Process

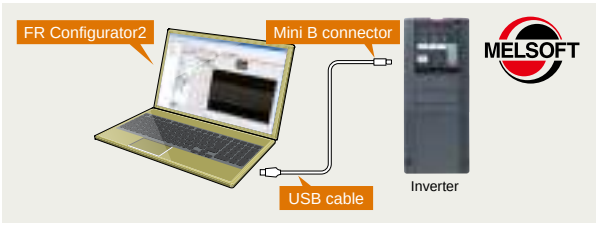
Parameter copy with a USB memory device NEW

A USB host connecter (A type), which allows external device connections, has been added.
Parameters can be copied to commercial USB memory devices.



Easy setup with FR Configurator2 NEW

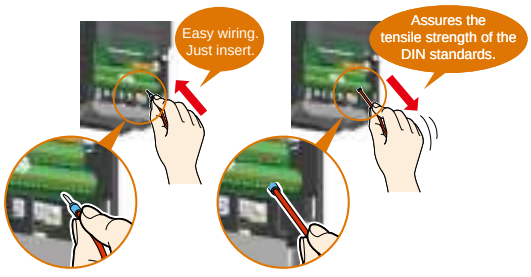
- With the sense of unity with other Mitsubishi FA products with common MELSOFT design and operability, the software is easy to use.
- Easy plug-and-play connection is available to the USB terminal equipped as standard.



- A free trial version, which contains start-up functions, is available. It can be downloaded at Mitsubishi Electric FA Global Website.

Easy wiring to the control circuit NEW

Spring clamp terminals have been adopted for control circuit terminals.
Wires can be protected against loosening under vibrations during transportation of the inverter. Ten additional terminals are used as compared to the FR-F700(P) series.
Round crimping terminals can also be used by employing a control terminal option (FR-A8TR).



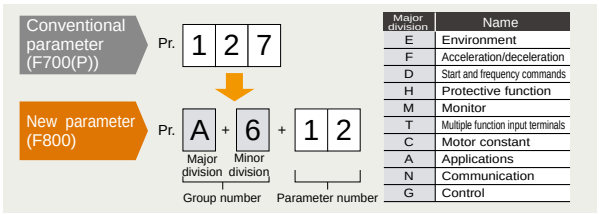
Easy-to-follow Display Improves the Operability

Easy operation with GOT NEW

- Automatic communication is possible without specifying any parameter settings simply by connecting to the GOT2000 series.
- The PLC function device monitor can be displayed at the GOT2000 series.
  Batch control of multiple inverter device monitors is possible with a single GOT unit.
- The sample screen data for the FR-F800 can be found in the screen design software of the GOT2000 series. For the latest version of the screen design software, please contact your local sales office.

Easy-to-follow parameter configuration NEW

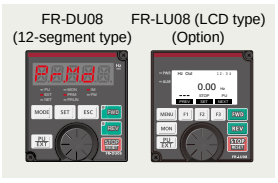
With the parameter setting mode selection of the operation panel, the group parameter mode can be selected to provide intuitive and simple parameter settings. (The conventional parameter setting mode is selected by default.)



Major division	Name
E	Environment
F	Acceleration/deceleration
D	Start and frequency commands
H	Protective function
M	Monitor
T	Multiple function input terminals
C	Motor constant
A	Applications
N	Communication
G	Control

Easy-to-read operation panel NEW

A5-digit, 12-segment display has been adopted for the operation panel (FR-DU08) for a more natural character display. Furthermore, an optional operation panel (FR-LU08) adopting an LCD panel capable of displaying text and menus is also available.



To Aid with Maintenance

Reduced wiring check time

Split-type covers are adapted for all capacity models. Maintenance is now easy because all an operator has to do is to remove the cover for the target wiring area.

Maintenance and control of multiple inverters Option NEW

Serial number reading is possible using the optional LCD operation panel (FR-LU08) or the inverter setup software (FR Configurator2). Administration of different inverters has become much more simple.

Wide range of lineup

•Standard model

F R - F 8 2 0 - 0.75K - 1 - ☐

Symbol	Voltage class
2	200 V class
4	400 V class

Symbol	Structure, functionality
0	Standard model

Symbol*1	Description
0.75K to 315K	LD rated inverter capacity (kW)

Symbol	Type
1	FM
2	CA*2

Symbol	Circuit board coating (IEC60721-3-3 3C2/3S2 compatible)	Plated conductor
None	Without	Without
60	With	Without
06*3	With	With

Three-phase 200 V class FR-F820-☐*4	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K	110K
	00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-phase 400 V class FR-F840-☐*4	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K	110K
	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	132K	160K	185K	220K	250K	280K	315K										
	03250	03610	04320	04810	05470	06100	06830										
	●	●	●	●	●	●	●										

•Separated converter type

F R - F 8 4 2 - 355K - 1 - ☐

Symbol	Voltage class
4	400 V class

Symbol	Structure, functionality
2	Separated converter type

Symbol*1	Description
355K to 560K	LD rated inverter capacity (kW)

Symbol	Type
1	FM
2	CA*2

Symbol	Circuit board coating (IEC60721-3-3 3C2/3S2 compatible)	Plated conductor
None	Without	Without
60	With	Without
06	With	With

Three-phase 400 V class FR-F842-☐*5	355K	400K	450K	500K	560K
	07700	08660	09620	10940	12120
	●	●	●	●	●

*1: Models can be alternatively indicated with the inverter rated current (SLD rating).
*2: Specification differs by the type as follows.

Type	Motor output	Initial setting				
		Built-in EMC filter	Control logic	Rated frequency	Pr.19 Base frequency voltage	Pr.570 Multiple rating setting
FM (terminal FM equipped model)	Terminal FM (pulse train output) Terminal AM (analog voltage output (0 to ±10 VDC))	OFF	Sink logic	60 Hz	9999 (same as the power supply voltage)	1 (LD rating)
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)	0 (SLD rating)

*3: Available for the 7.5K or higher.
*4: For the 75K or higher inverter, always connect a DC reactor (FR-HEL), which is available as an option.
Select a DC reactor according to the applied motor capacity.
*5: Always install the converter unit (FR-CC2). (Not required when a high power factor converter (FR-HC2) is used)

Converter unit

F R - C C 2 - H 355K - 60

Symbol	Voltage class
H	400 V class

Symbol	Description
355K to 630K	Applicable motor capacity (kW)

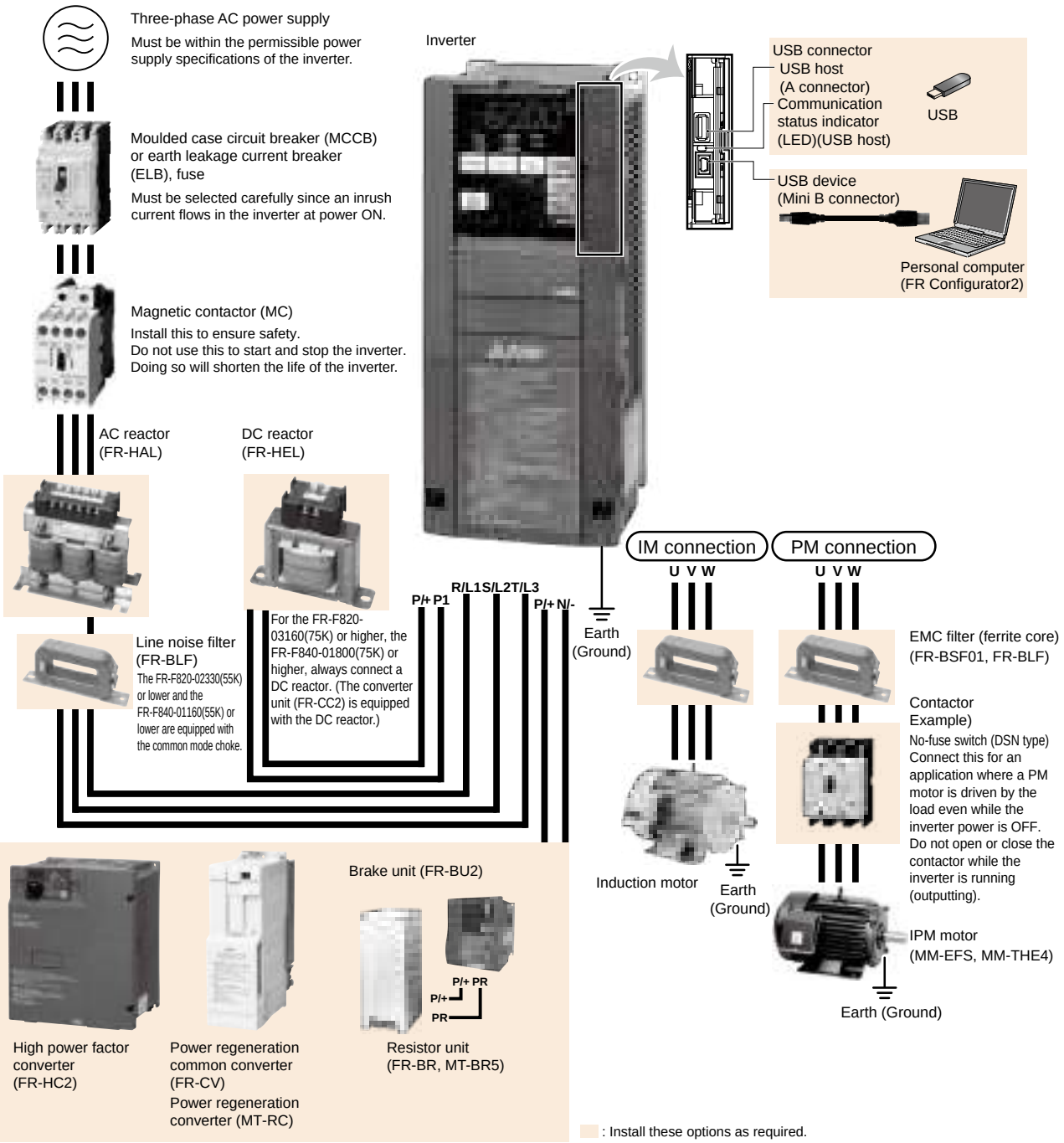
Symbol	Circuit board coating (IEC60721-3-3 3C2/3S2 compatible)	Plated conductor
60	With	Without
06	With	With

Three-phase 400 V class FR-CC2-H☐ (with the built-in DC reactor)	355K	400K	450K	500K	560K	630K
	●	●	●	●	●	●

●: Released model

Connection Example

• Connection example for standard models



■Standard Specifications

●Rating (Standard model)

200 V class

Model FR-F820-☐			0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K	30K	37K	45K	55K	75K	90K	110K
			00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330	03160	03800	04750
Applicable motor capacity (kW)*1		SLD	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
		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
Output	Rated capacity (kVA)*2	SLD	1.8	2.9	4	6.4	10	13	19	24	29	35	48	59	71	89	120	145	181
		LD	1.6	2.7	3.7	5.8	8.8	12	17	22	27	32	43	53	65	81	110	132	165
	Rated current (A)	SLD	4.6	7.7	10.5	16.7	25	34	49	63	77	93	125	154	187	233	316	380	475
		LD	4.2	7	9.6	15.2	23	31	45	58	70.5	85	114	140	170	212	288	346	432
	Overload current rating*3	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C																
	Rated voltage*4		Three-phase 200 to 240 V																
Power supply	Rated input AC voltage/ frequency		Three-phase 200 to 240 V 50 Hz/60 Hz																
	Permissible AC voltage fluctuation		170 to 264 V 50 Hz/60 Hz																
	Permissible frequency fluctuation		±5%																
	Rated input current (A)*5	SLD	5.3	8.9	13.2	19.7	31.3	45.1	62.8	80.6	96.7	115	151	185	221	269	316	380	475
		LD	5	8.3	12.2	18.3	28.5	41.6	58.2	74.8	90.9	106	139	178	207	255	288	346	432
	Power supply capacity (kVA)*6	SLD	2	3.4	5	7.5	12	17	24	31	37	44	58	70	84	103	120	145	181
		LD	1.9	3.2	4.7	7	11	16	22	29	35	41	53	68	79	97	110	132	165
Protective structure (IEC 60529)*7			Enclose type (IP20)										Open type (IP00)						
Cooling system			Self-cooling		Forced air cooling														
Approx. mass (kg)			1.9	2.1	3.0	3.0	3.0	6.3	6.3	8.3	15	15	15	22	42	42	54	74	74

*1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2: The rated output capacity indicated assumes that the output voltage is 220 V for 200 V class.
*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: FR-DU08: IP40 (except for the PU connector section)

400 V class

Model FR-F840-☐			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	185K	220K	250K	280K	315K
			00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160	01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
Applicable motor capacity (kW)*1		SLD	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	185	220	250	280	315	355
		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	185	220	250	280	315
Output	Rated capacity (kVA)*2	SLD	1.8	2.9	4	6.3	10	13	19	24	29	36	47	59	71	88	137	165	198	248	275	329	367	417	465	521
		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	275	329	367	417	465
	Rated current (A)	SLD	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116	180	216	260	325	361	432	481	547	610	683
		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	361	432	481	547	610
	Overload current rating*3	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C																							
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°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*8																							
	Permissible AC voltage fluctuation		323 to 550 V 50 Hz/60 Hz																							
	Permissible frequency fluctuation		±5%																							
	Rated input current (A)*5	SLD	3.2	5.4	7.8	10.9	16.4	22.5	31.7	40.3	48.2	58.4	76.8	97.6	115	141	180	216	260	325	361	432	481	547	610	683
		LD	3	4.9	7.3	10.1	15.1	22.3	31	38.2	44.9	53.9	75.1	89.7	106	130	144	180	216	260	325	361	432	481	547	610
	Power supply capacity (kVA)*6	SLD	2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107	137	165	198	248	275	329	367	417	465	521
		LD	2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99	110	137	165	198	248	275	329	367	417	465
Protective structure (IEC 60529)*7			Enclose type (IP20)											Open type (IP00)												
Cooling system			Self-cooling			Forced air cooling																				
Approx. mass (kg)			2.5	2.5	2.5	3.0	3.0	6.3	6.3	8.3	8.3	15	15	23	41	41	43	52	55	71	78	117	117	166	166	166

*1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
*2: The rated output capacity indicated assumes that the output voltage is 440 V for 400 V class.
*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: FR-DU08: IP40 (except for the PU connector section)
*8: For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection**.

●Rating (separated converter type)

400 V class

•Inverter

Model FR-F842-☐			355K	400K	450K	500K	560K
			07700	08660	09620	10940	12120
Applicable motor capacity (kW)*1		SLD	400	450	500	560	630
		LD	355	400	450	500	560
Output	Rated capacity (kVA)*2	SLD	587	660	733	834	924
		LD	521	587	660	733	834
	Rated current (A)	SLD	770	866	962	1094	1212
		LD	683	770	866	962	1094
	Overload current rating*3	SLD	110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C				
		LD	120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C				
	Rated voltage*4		Three-phase 380 to 500 V				
	Regenerative braking torque*5 (When the converter unit (FR-CC2) is used)	Maximum brake torque	10% torque/continuous				
Input power	DC power supply voltage		430 to 780 VDC				
	Control power supply auxiliary input		Single phase 380 to 500 V 50 Hz/60 Hz*7				
	Permissible control power supply auxiliary input fluctuation		Frequency ±5%, voltage ±10%				
Protective structure (IEC 60529)*6			Open type (IP00)				
Cooling system			Forced air cooling				
Approx. mass (kg)			163	163	243	243	243

*1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 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: LD rating reference value
*6: FR-DU08: IP40 (except for the PU connector section)
*7: For the power voltage exceeding 480 V, set **Pr.977 Input voltage mode selection.**

•Converter unit (FR-CC2)

Model FR-CC2-H☐		355K	400K	450K	500K	560K	630K
Applicable motor capacity (kW)		355	400	450	500	560	630
Output	Overload current rating*1	200% 60 s, 250% 3 s			150% 60 s, 200% 3 s	120% 60 s, 150% 3 s	110% 60 s, 120% 3 s
	Rated voltage*2	430 to 780 VDC*4					
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 500 V 50 Hz/60 Hz					
	Permissible AC voltage fluctuation	Three-phase 323 to 550 V 50 Hz/60 Hz					
	Permissible frequency fluctuation	±5%					
	Rated input current (A)	683	770	866	962	1094	1212
	Power supply capacity (kVA)*3	521	587	660	733	833	924
Protective structure (IEC 60529)		Open type (IP00)					
Cooling system		Forced air cooling					
DC reactor		Built-in					
Approx. mass (kg)		213	282	285	288	293	294

*1: 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 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 when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
*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)

●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 (SLD rating: 0 to 120%, LD rating: 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*1, 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, 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*1
	Output signal	Open collector output (five terminals) Relay output (two terminals)	Inverter running, Up to frequency, Instantaneous power failure/undervoltage*1, 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 relay function), Motor overload trip (electronic thermal relay function), Heatsink overheat, Instantaneous power failure*1, Undervoltage*1, Input phase loss*1*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, 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*1, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence*2, 4 mA input fault*2, Pre-charge fault*2, PID signal fault*2, Internal circuit fault, User definition error in the PLC function
		Warning function	Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Electronic thermal relay function pre-alarm, PU stop, Parameter copy, Safety stop, Maintenance timer 1 to 3*2, USB host error, Operation panel lock*2, Password locked*2, Parameter write error, Copy operation error, 24 V external power supply operation, Load fault warning, Emergency drive in operation*1
Environment	Surrounding air temperature		-10°C to +50°C (non-freezing) (LD rating) -10°C to +40°C (non-freezing) (SLD rating)
	Surrounding air humidity		With circuit board coating (conforming to IEC60721-3-3 3C2/3S2): 95% RH or less (non-condensing) Without circuit board coating: 90% 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 1000 m above sea level*4, 5.9 m/s^2 or less*5 at 10 to 55 Hz (directions of X, Y, Z axes)

*1: Available only for the standard model.
*2: This protective function is not available in the initial status.
*3: Temperature applicable for a short time, e.g. in transit.
*4: For the installation at an altitude above 1,000 m (up to 2,500 m), derate the rated current 3% per 500 m.
*5: 2.9 m/s^2 or less for the FR-F840-04320(185K) or higher.

●PLC function specifications

Item			F800 PLC function specifications
Control method			Repeated operation (by stored program)
I/O control mode			Refresh
Programming language			Relay symbolic language (ladder) Function block
No. of instructions	Sequence instructions		25
	Basic instructions		84
	Application instructions		37
Processing speed			Sequence instructions 1.9 μs to 12 μs/step*1
Number of I/O device points			128 (input: 64 points, output: 64 points) 19 points built-in (input: 12 points, output: 7 points)*2 FR-A8AX (input: 16 points) FR-A8AY (output: 7 points) FR-A8AR (output: 3 points)
Number of analog I/O points			3 input points built-in (Terminals 1, 2, and 4) 2 output points built-in (Terminals FM/CA and AM), FR-A8AY: 2 output points (AM0 and AM1)
Pulse train I/O	Input		Terminal JOG maximum input pulse: 100k pulses/s*3
	Output		Terminal FM maximum output pulse: 50k pulses/s*3
Watchdog timer			10 to 2000 ms
Program capacity			6K steps (24k bytes) (0 to 6144 steps can be set) Contained in one program
Device	Internal relay (M)		128 (M0 to M127)
	Latch relay (L)		Not used (Can be set with parameters but will not latch)*4
	Timer (T)	Number of points	16 (T0 to T15)
		Specifications	100 ms timer: 0.1 to 3276.7 s can be set 10 ms timer: 0.01 to 327.67 s can be set 100 ms retentive timer: 0.1 to 3276.7 s can be set
	Counter (C)	Number of points	16 (C0 to C15)
		Specifications	Normal counter: Setting range 1 to 32767 Interrupt program counter: Not used
	Data register (D)		256 (D0 to D255)
	Special relay (SM)		2048 (SM0 to SM2047) with limited functions
	Special register (SD)		2048 (SD0 to SD2047) with limited functions

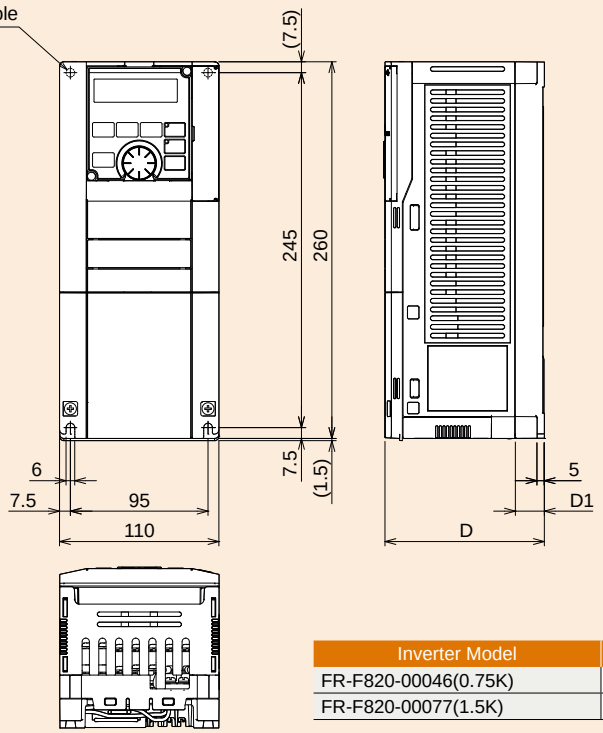
*1: The scan time is approximately 40 ms for 1K steps as inverter control is also performed in actual operations.
*2: The signals same as the ones assigned to the inverter I/O terminals are used.
One point is always required for a sequence start (RUN/STOP).
*3: **Pr.291 Pulse train I/O selection** must be set.
*4: There is no device latch function for power failures.
Use the **Pr.1150 to Pr.1199 PLC function user parameters 1 to 50** (D206 to D255) to store device values in the EEPROM.

[**NOTE**]
・There is no buffer memory.

■Standard model

Outline Dimension Drawings

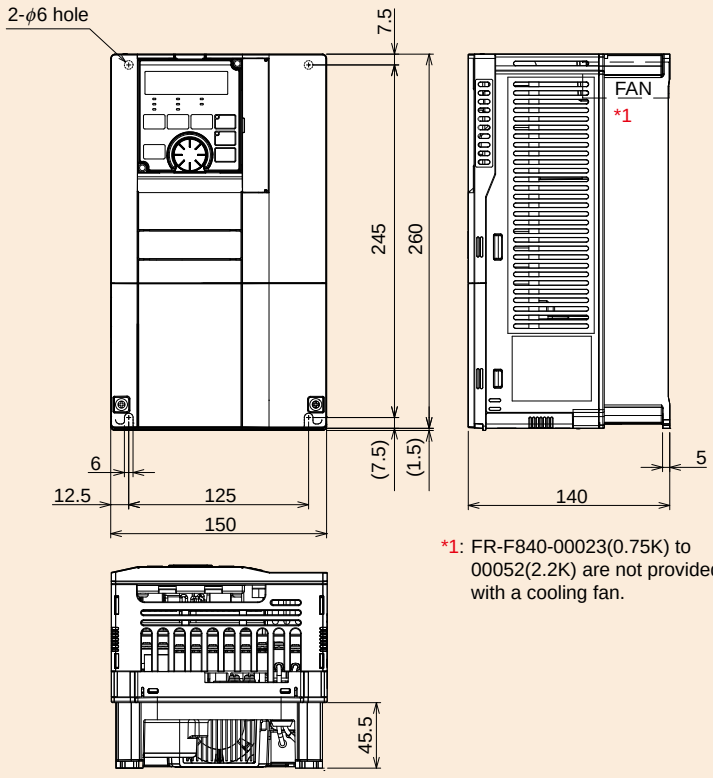
●FR-F820-00046(0.75K), FR-F820-00077(1.5K)



Inverter Model	D	D1
FR-F820-00046(0.75K)	110	20
FR-F820-00077(1.5K)	125	35

(Unit: mm)

●FR-F820-00105(2.2K), 00167(3.7K), 00250(5.5K)
●FR-F840-00023(0.75K), 00038(1.5K), 00052(2.2K), 00083(3.7K), 00126(5.5K)

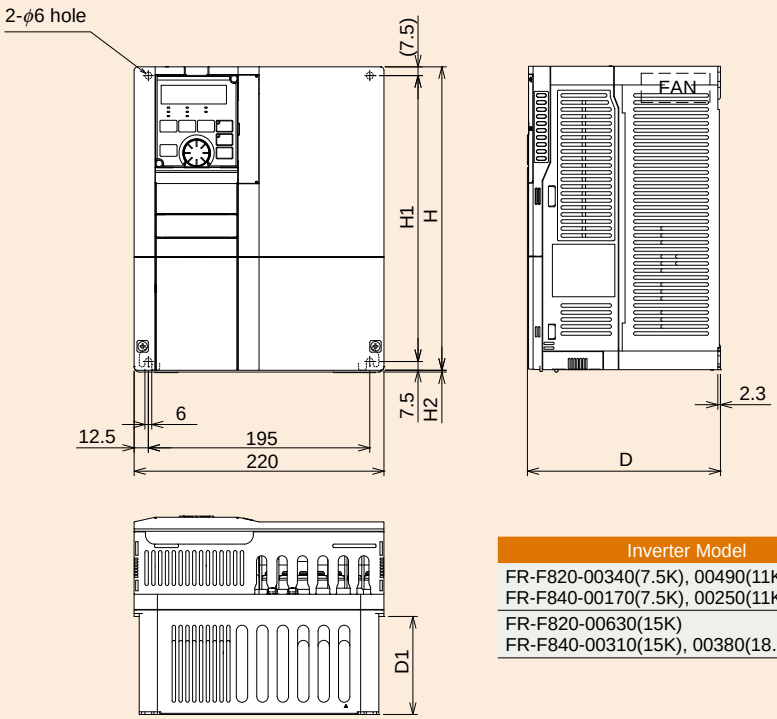


*1: FR-F840-00023(0.75K) to 00052(2.2K) are not provided with a cooling fan.

(Unit: mm)

Outline Dimension Drawings

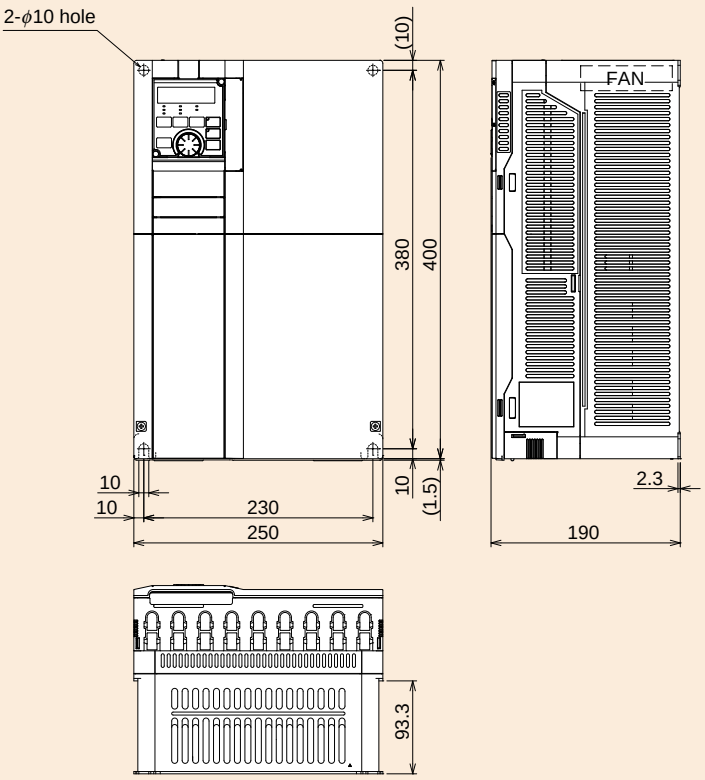
- FR-F820-00340(7.5K), 00490(11K), 00630(15K)
- FR-F840-00170(7.5K), 00250(11K), 00310(15K), 00380(18.5K)



Inverter Model	H	H1	H2	D	D1
FR-F820-00340(7.5K), 00490(11K) FR-F840-00170(7.5K), 00250(11K)	260	245	1.5	170	84
FR-F820-00630(15K) FR-F840-00310(15K), 00380(18.5K)	300	285	3	190	101.5

(Unit: mm)

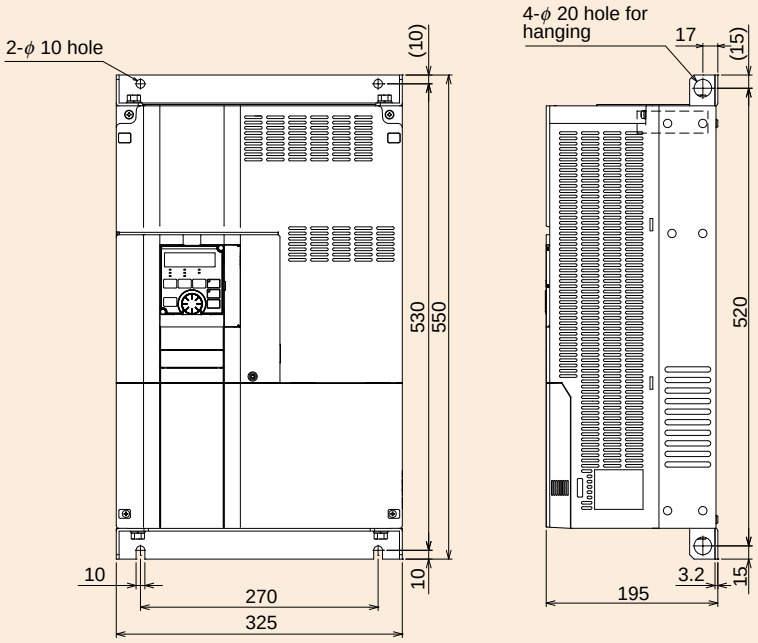
- FR-F820-00770(18.5K), 00930(22K), 01250(30K)
- FR-F840-00470(22K), 00620(30K)



(Unit: mm)

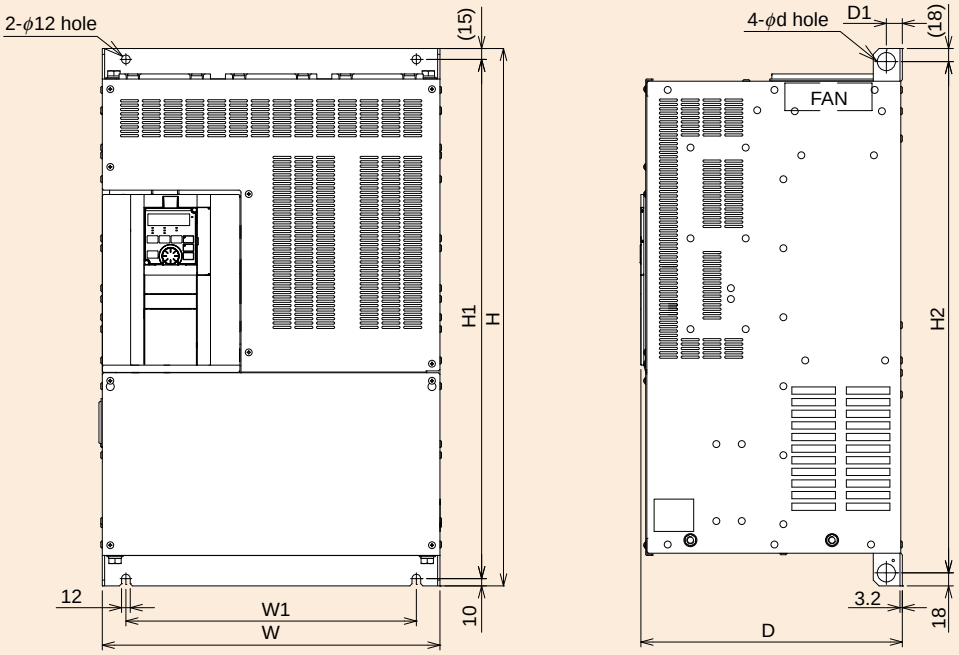
Outline Dimension Drawings

- FR-F820-01540(37K)
- FR-F840-00770(37K)



(Unit: mm)

- FR-F820-01870(45K), 02330(55K), 03160(75K), 03800(90K), 04750(110K)
- FR-F840-00930(45K), 01160(55K), 01800(75K), 02160(90K), 02600(110K), 03250(132K), 03610(160K)



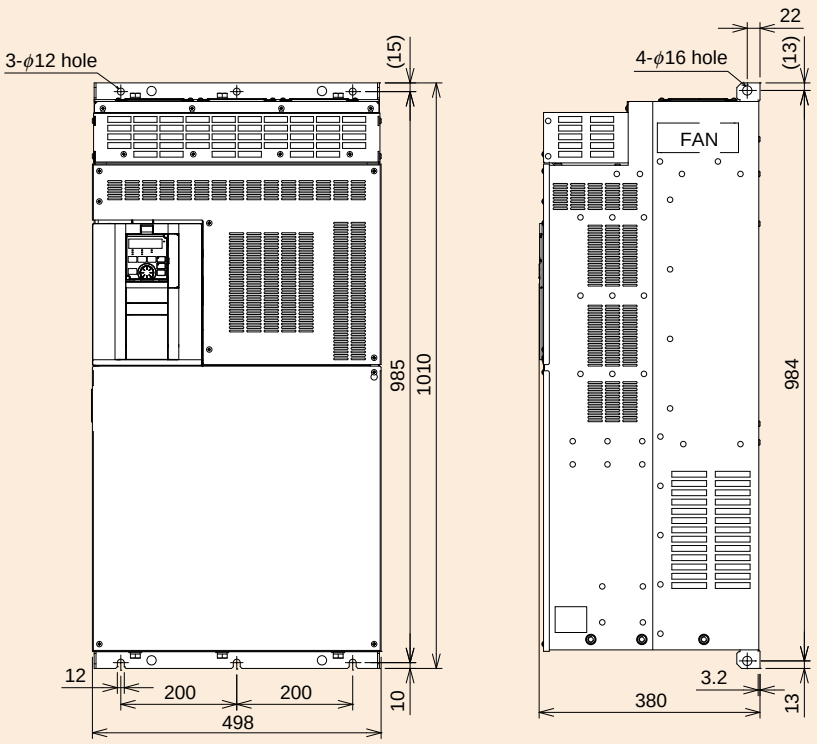
Inverter Model	W	W1	H	H1	H2	d	D	D1
FR-F820-01870(45K), 02330(55K) FR-F840-00930(45K), 01160(55K), 01800(75K)*2	435	380	550	525	514	25	250	24
FR-F820-03160(75K)*2	465	410	700	675	664	25	250	22
FR-F820-03800(90K)*2, 04750(110K)*2	465	400	740	715	704	24	360	22
FR-F840-02160(90K)*2, 02600(110K)*2	465	400	620	595	584	24	300	22
FR-F840-03250(132K)*2, 03610(160K)*2	465	400	740	715	704	25	360	22

*2: Always connect a DC reactor (FR-HEL), which is available as an option.

(Unit: mm)

Outline Dimension Drawings

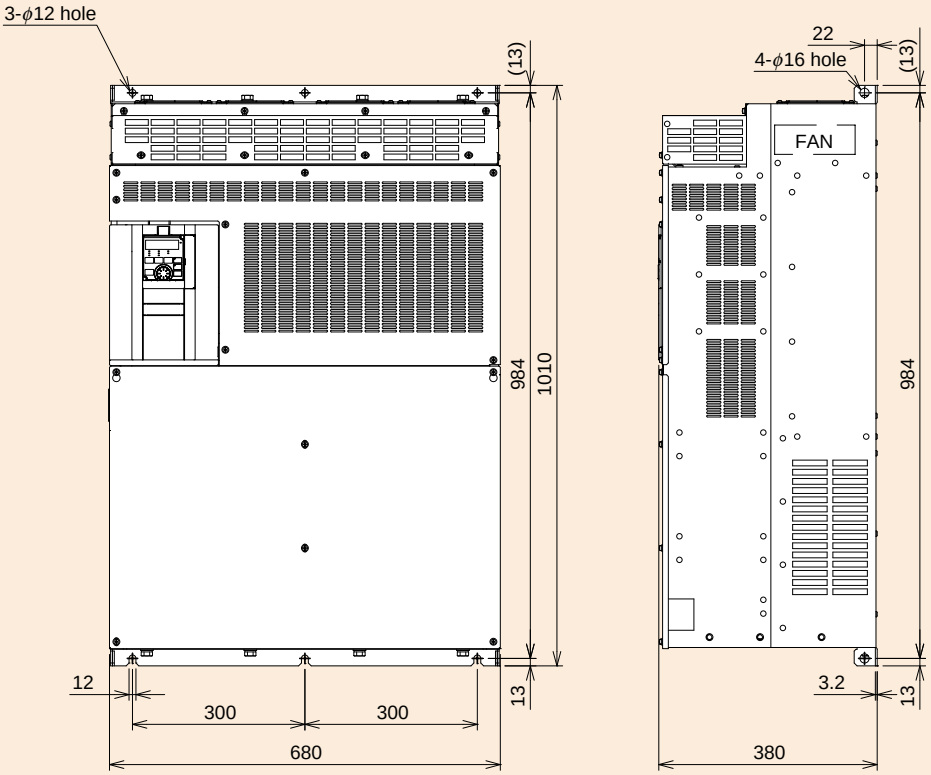
●FR-F840-04320(185K), 04810(220K)



Always connect a DC reactor (FR-HEL), which is available as an option.

(Unit: mm)

●FR-F840-05470(250K), 06100(280K), 06830(315K)



Always connect a DC reactor (FR-HEL), which is available as an option.

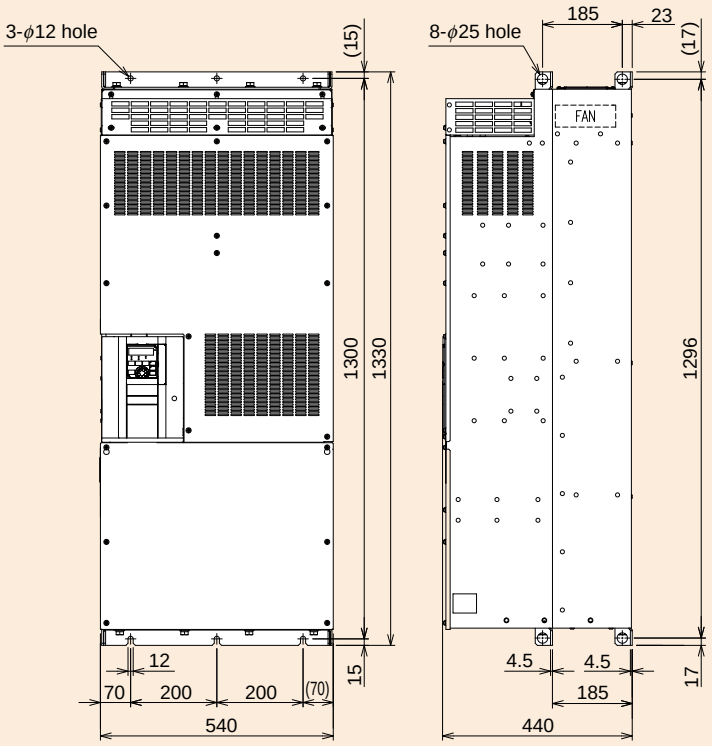
(Unit: mm)

■Separated converter type

Outline Dimension Drawings

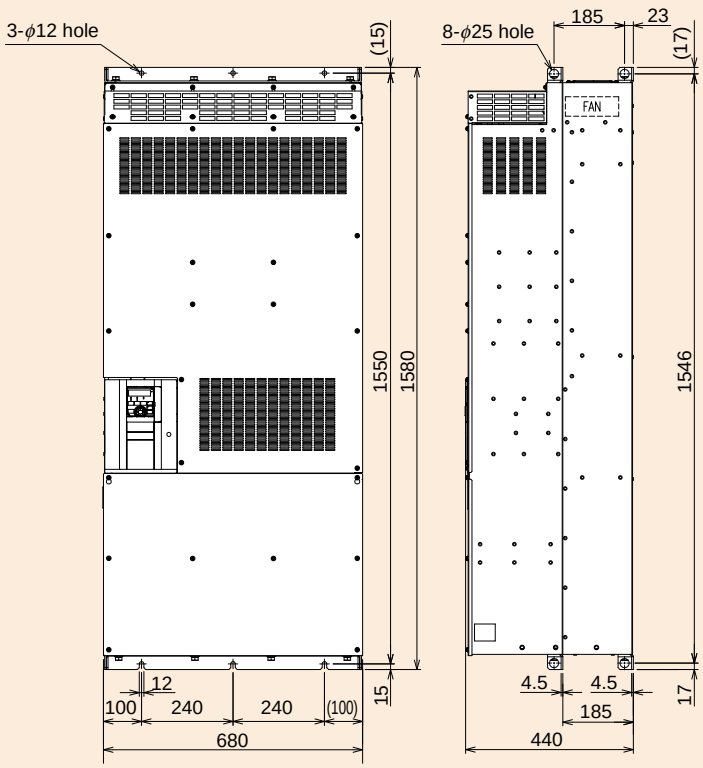
• Inverter

●FR-F842-07700(355K), 08660(400K)



(Unit: mm)

●FR-F842-09620(450K), 10940(500K), 12120(560K)

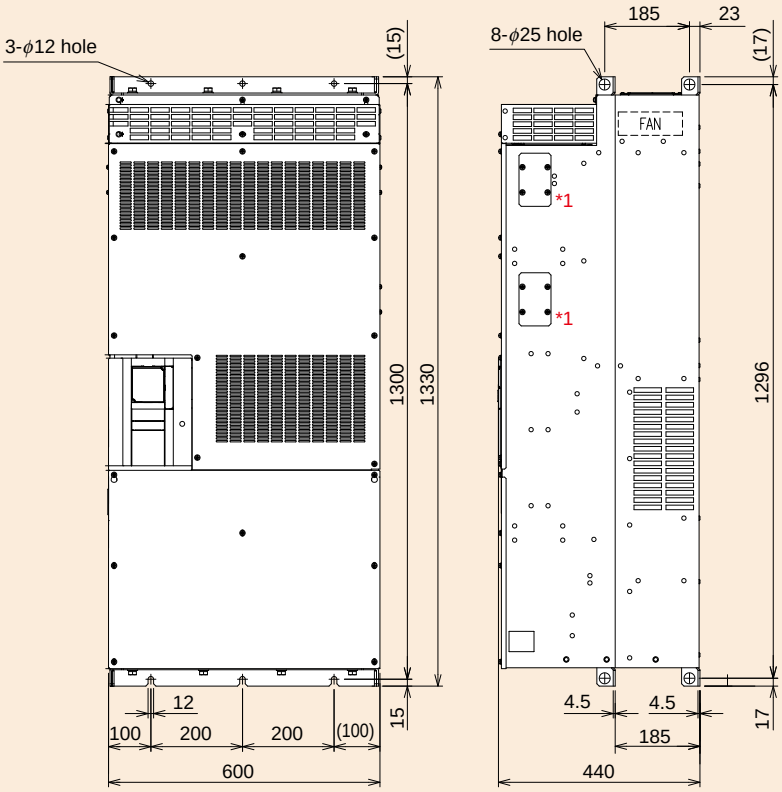


(Unit: mm)

Outline Dimension Drawings

• Converter unit

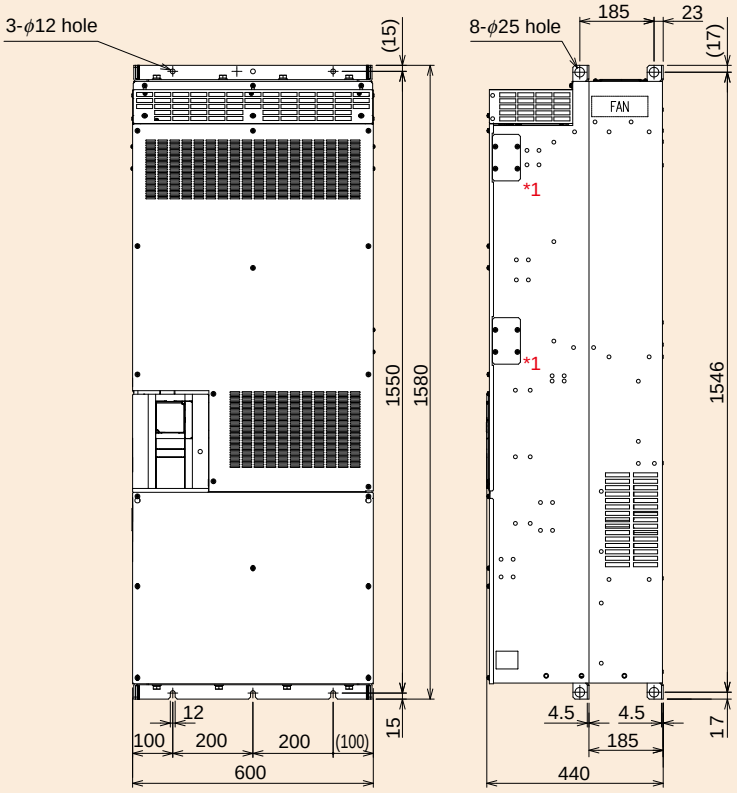
●FR-CC2-H355K



Equipped with a DC reactor.

(Unit: mm)

●FR-CC2-H400K, H450K, H500K, H560K, H630K



Equipped with a DC reactor.

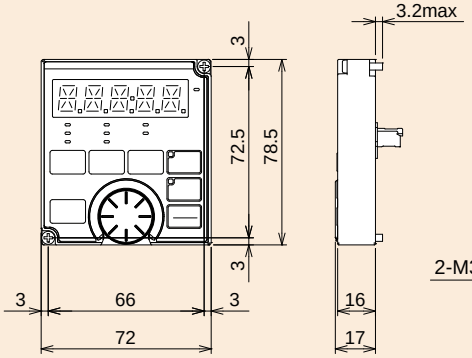
(Unit: mm)

*1: Do not remove the cover on the side of the converter unit.

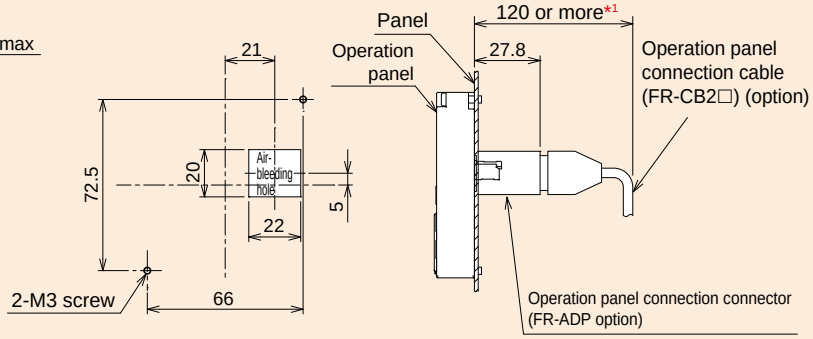
■Operation panel (FR-DU08, FR-LU08)

Outline Dimension Drawings

<Outline dimensions>



<Enclosure cut dimensions>



*1: Denotes the space required to connect an optional operation panel connection cable (FR-CB2□). When using another cable, leave the space required for the cable specification.

(Unit: mm)

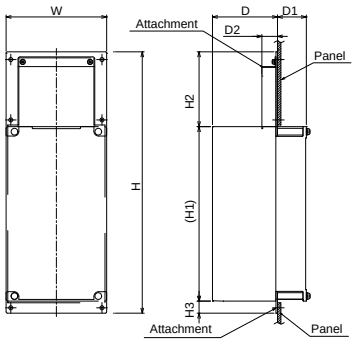
●Protruding the heatsink through the panel

When encasing the inverter or the converter unit in an enclosure, the heat generated in the enclosure can be greatly reduced by protruding the heatsink of the inverter or the converter unit. When installing the inverter in a compact enclosure, etc., this installation method is recommended. For the FR-F840-04320(185K) or higher, a heatsink can be protruded outside the enclosure without using an attachment.

◆When using a panel through attachment (FR-A8CN)

For the FR-F820-00105(2.2K) to FR-F820-04750(110K) and FR-F840-00023(0.75K) to FR-F840-03610(160K), a heatsink can be protruded outside the enclosure using a panel through attachment (FR-A8CN). Refer to the instruction manual of the panel through attachment (FR-A8CN) for details.

・Drawing after attachment installation (when used with the FR-A8CN)

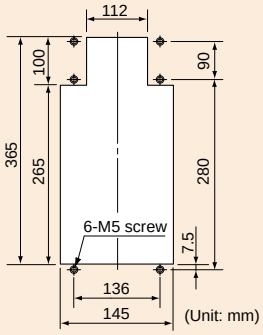


Type	W	H	H1	H2	H3	D	D1	D2
FR-A8CN01	150	389.5	260	111.5	18	97	43	24.3
FR-A8CN02	245	408.5	260	116.5	32	86	84	21.3
FR-A8CN03	245	448.5	300	116.5	32	89	101	21.3
FR-A8CN04	280	554	400	113.5	32	96.7	93.3	40.6
FR-A8CN05	357	654	480	130	44	130.8	64.2	105
FR-A8CN06	478.2	650	465	145	40	96	154	55
FR-A8CN07	510.2	805	610	150	45	130	120	105
FR-A8CN08	510.2	845	650	150	45	176.5	183.5	40
FR-A8CN09	510.2	725	530	150	45	152.3	147.7	65

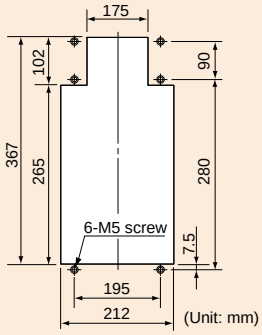
(Unit: mm)

■Enclosure cut dimensions (when used with the FR-A8CN)

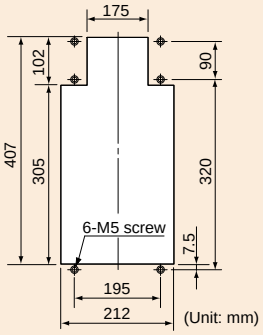
FR-A8CN01



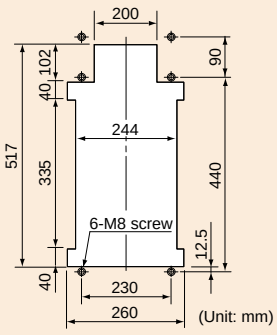
FR-A8CN02



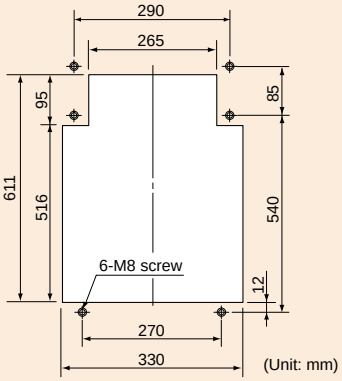
FR-A8CN03



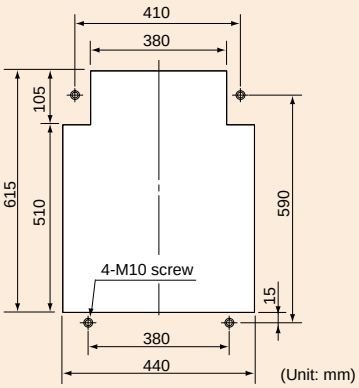
FR-A8CN04



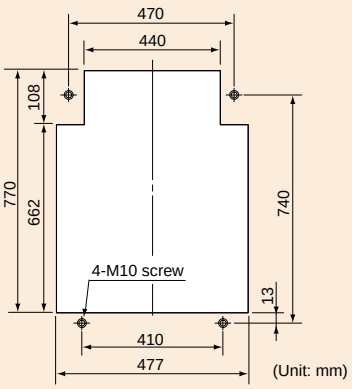
FR-A8CN05



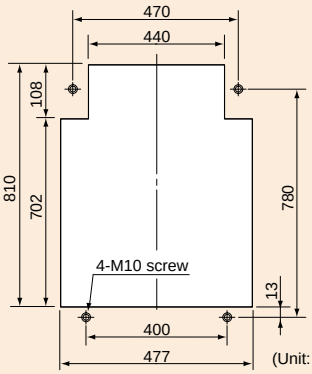
FR-A8CN06



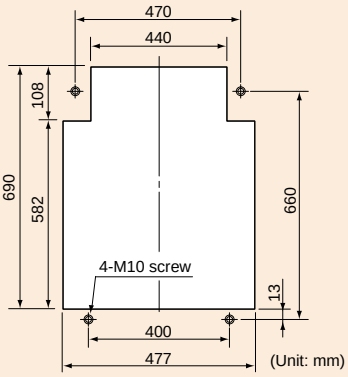
FR-A8CN07



FR-A8CN08



FR-A8CN09

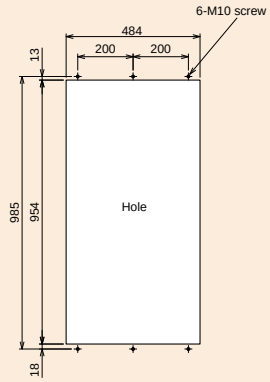


For a compatibility table between the attachment and the inverter.

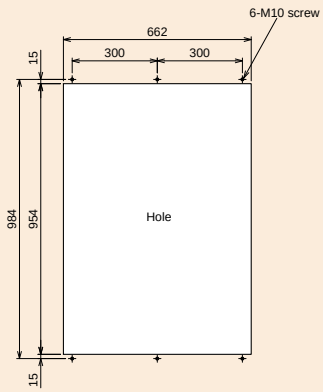
■Heatsink protrusion through the panel for the FR-F840-04320(185K) or higher

•Enclosure cutting
Cut an enclosure according to the capacity of the inverter or the converter unit.

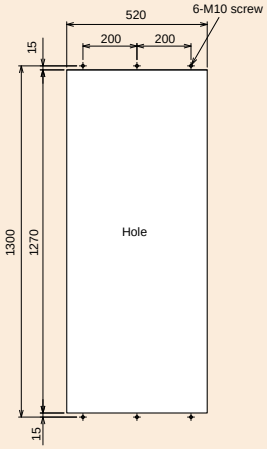
FR-F840-04320(185K)
FR-F840-04810(220K)



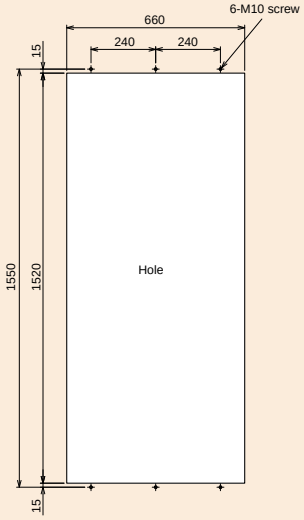
FR-F840-05470(250K)
FR-F840-06100(280K)
FR-F840-06830(315K)



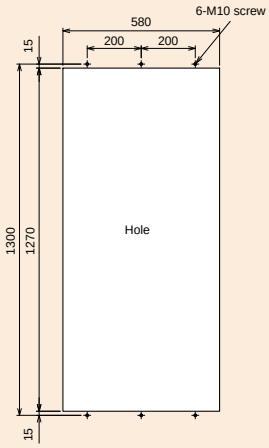
FR-F842-07700(355K)
FR-F842-08660(400K)



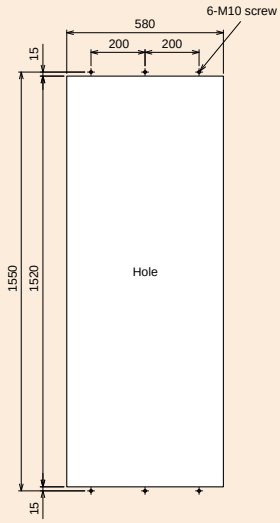
FR-F842-09620(450K)
FR-F842-10940(500K)
FR-F842-12120(560K)



FR-CC2-H355K



FR-CC2-H400K
FR-CC2-H450K
FR-CC2-H500K
FR-CC2-H560K
FR-CC2-H630K

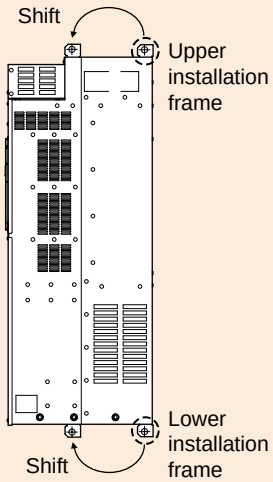


(Unit: mm)

・Shift and removal of a rear side installation frame

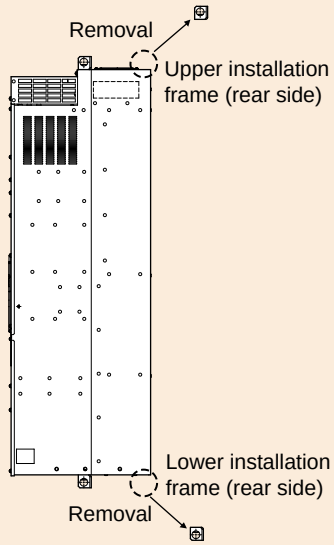
For the FR-F840-04320(185K) to FR-F840-06830(315K)

One installation frame is attached to each of the upper and lower parts of the inverter. Change the position of the rear side installation frame on the upper and lower sides of the inverter to the front side as shown below. When changing the installation frames, make sure that the installation orientation is correct.



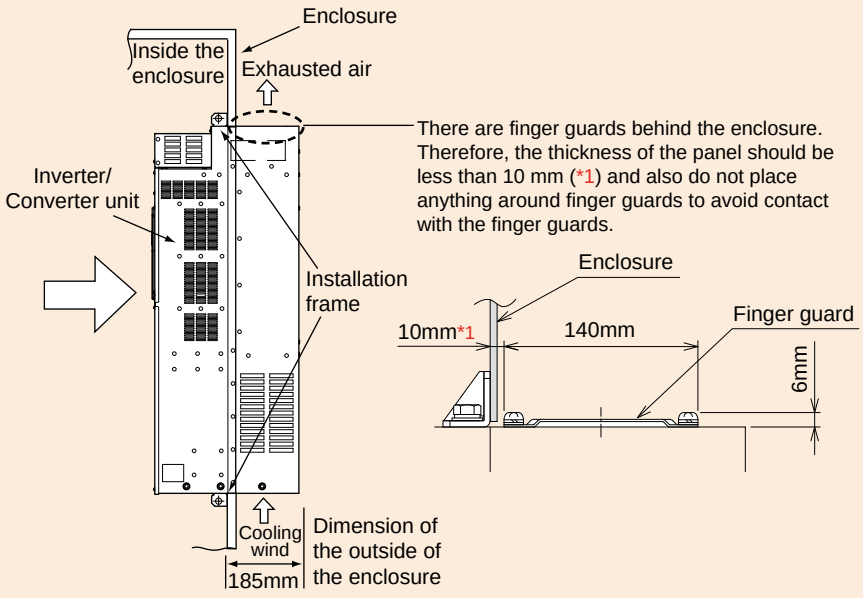
For the FR-F842-07700(355K) to FR-F842-12120(560K), FR-CC2-H355K to FR-CC2-H630K

Two installation frames are attached to each of the upper and lower parts of the inverter or the converter unit. Remove the rear side installation frame on the upper and lower sides of the inverter or the converter unit as shown below.



・Installation of the inverter or the converter unit

Push the inverter heatsink portion outside the enclosure and fix the enclosure and the inverter or the converter unit with upper and lower installation frame.



[**NOTE**]

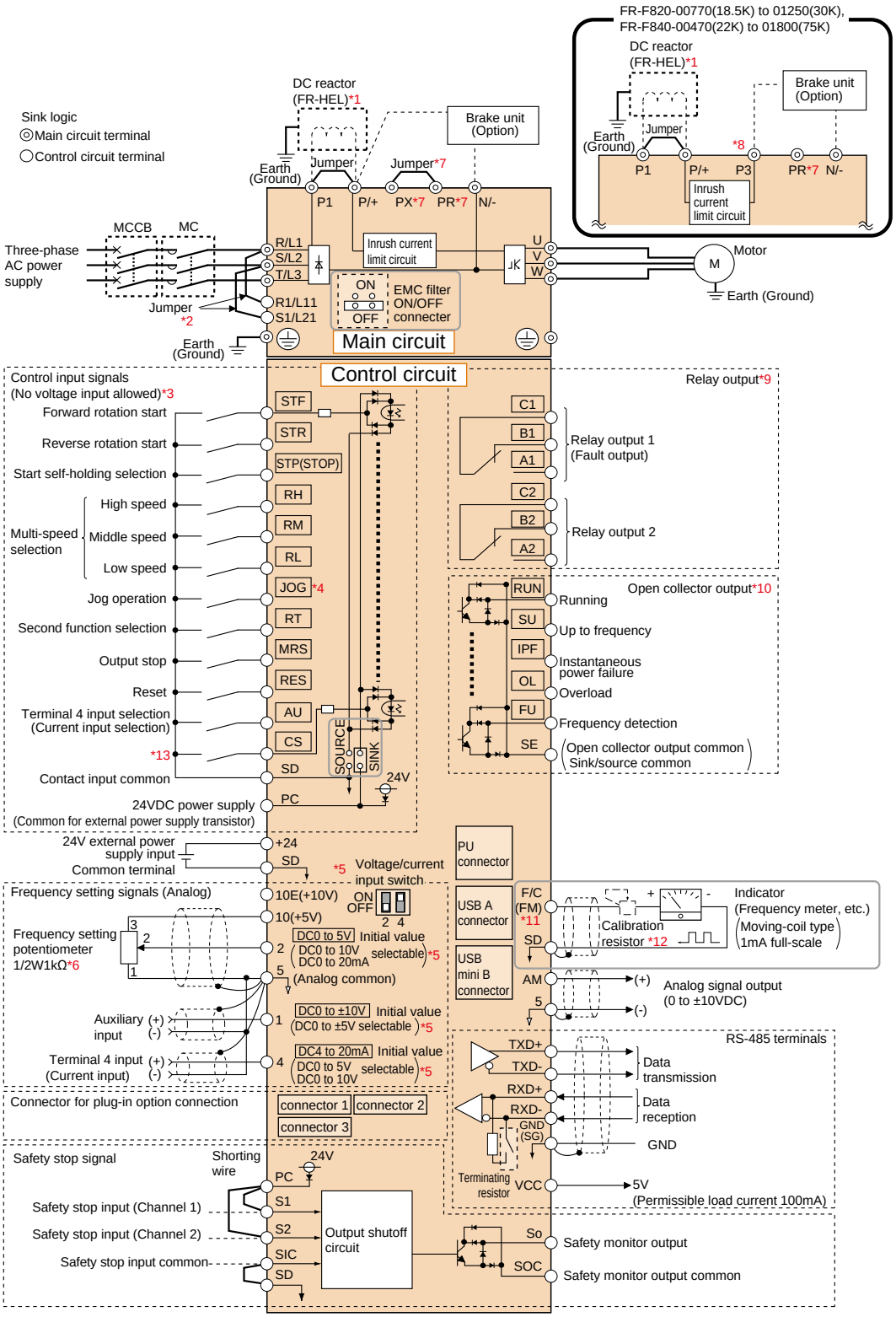
・Having a cooling fan, the cooling section which comes out of the enclosure cannot be used in the environment of water drops, oil, mist, dust, etc.

・Be careful not to drop screws, dust etc. into the inverter or the converter unit and the cooling fan section.

・The FR-A7CN panel through attachment cannot be installed on the FR-F800 series.

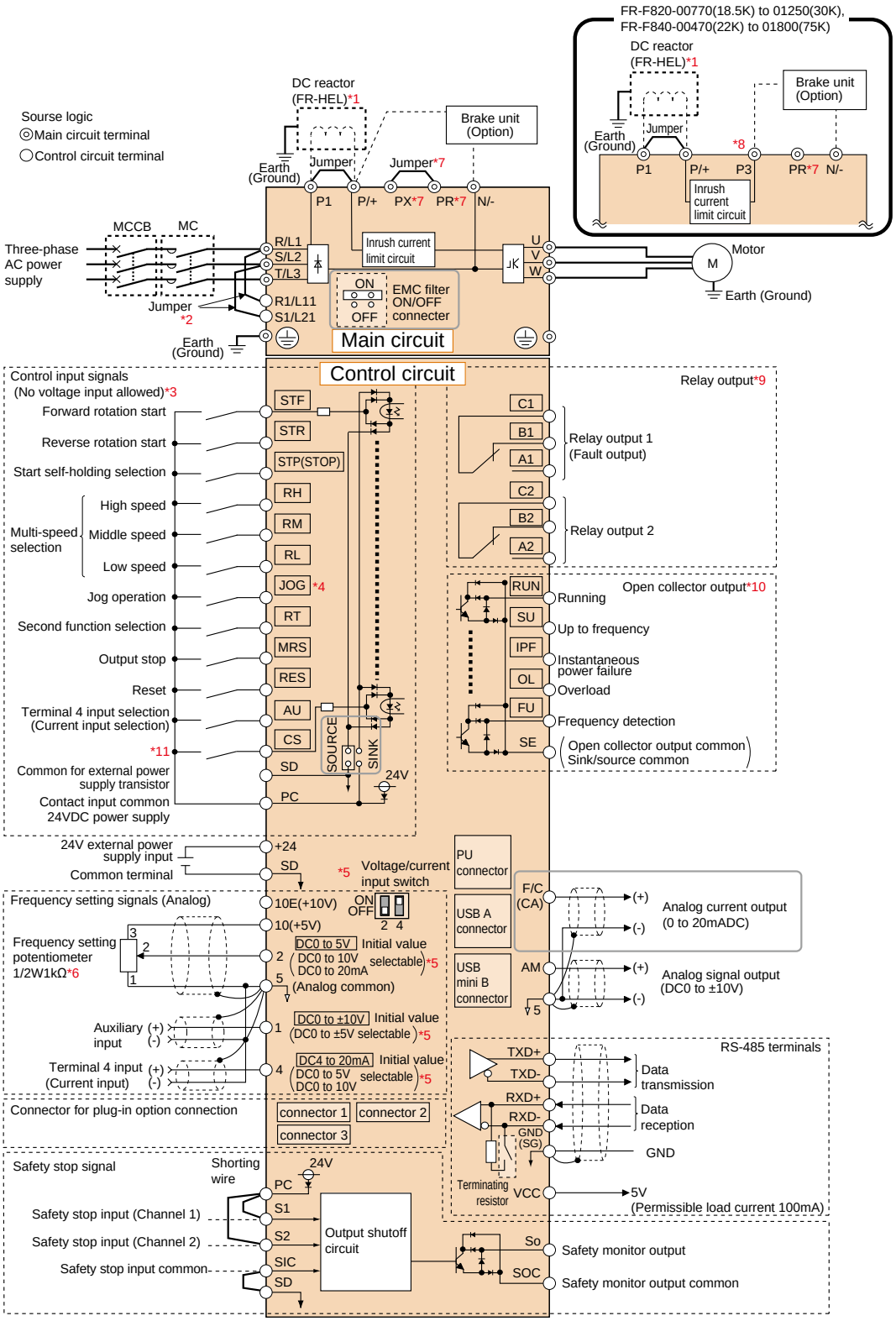
■Standard models

●FM type



*1: For the FR-F820-03160(75K) or higher, the FR-F840-01800(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option.
(To select a DC reactor and select one according to the applicable motor capacity.)
When a DC reactor is connected to the FR-F820-02330(55K) or lower or the FR-F840-01160(55K) or lower, if a jumper is installed across the terminals P1 and P/+, remove the jumper before installing the DC reactor.
*2: When using separate power supply for the control circuit, remove the jumper between R1/L11 and S1/L21.
*3: The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*4: Terminal JOG is also used as the pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*5: 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)**
*6: It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*7: Do not use terminals PR and PX. The jumper may or may not be attached depending on the inverter. (Refer to the Instruction Manual (Startup).)
*8: Do not connect the DC power supply (under DC feeding mode) to terminal P3.
*9: The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*10: The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*11: The terminal F/C (FM) can be used to output pulse trains as open collector output by setting **Pr.291**.
*12: Not required when calibrating the scale with the operation panel.
*13: No function is assigned in the initial status. Assign the function using **Pr.186 CS terminal function selection**.

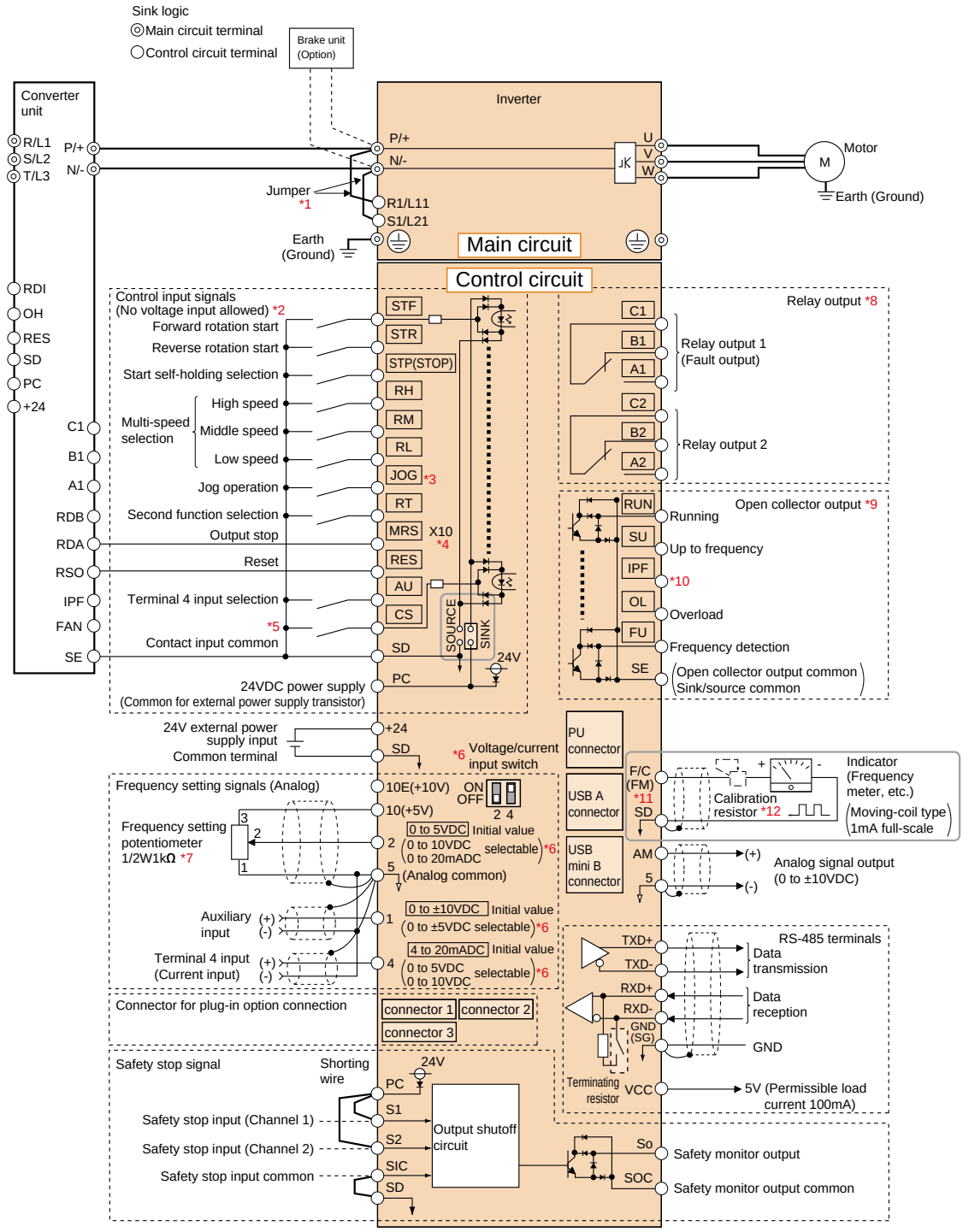
●CA type



*1: For the FR-F820-03160(75K) or higher, the FR-F840-01800(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option.
(To select a DC reactor and select one according to the applicable motor capacity.)
When a DC reactor is connected to the FR-F820-02330(55K) or lower or the FR-F840-01160(55K) or lower, if a jumper is installed across the terminals P1 and P/+, remove the jumper before installing the DC reactor.
*2: When using separate power supply for the control circuit, remove the jumper between R1/L11 and S1/L21.
*3: The function of these terminals can be changed with the input terminal assignment **(Pr.178 to Pr.189)**.
*4: Terminal JOG is also used as the pulse train input terminal. Use **Pr.291** to choose JOG or pulse.
*5: 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)**
*6: It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*7: Do not use terminals PR and PX. The jumper may or may not be attached depending on the inverter. (Refer to the Instruction Manual (Startup).)
*8: Do not connect the DC power supply (under DC feeding mode) to terminal P3.
*9: The function of these terminals can be changed with the output terminal assignment **(Pr.195, Pr.196)**.
*10: The function of these terminals can be changed with the output terminal assignment **(Pr.190 to Pr.194)**.
*11: No function is assigned in the initial status. Assign the function using **Pr.186 CS terminal function selection**.

■Separated converter type

●Inverter (FM type)



*1: The terminals R1/L11 and S1/L21 are connected to the terminals P/+ and N/- with a jumper respectively. When using separate power supply for the control circuit, remove the jumpers from R1/L11 and S1/L21.
*2: The function of these terminals can be changed with the input terminal assignment (**Pr.178 to Pr.189**).
*3: Terminal JOG is also used as the 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: No function is assigned in the initial setting. Use **Pr.186** for function assignment.
*6: 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**)
*7: It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
*8: The function of these terminals can be changed with the output terminal assignment (**Pr.195**, **Pr.196**).
*9: The function of these terminals can be changed with the output terminal assignment (**Pr.190 to Pr.194**).
*10: No function is assigned in the initial setting. Use **Pr.192** for function assignment.
*11: The terminal F/C (FM) can be used to output pulse trains as open collector output by setting **Pr.291**.
*12: Not required when calibrating the scale with the operation panel.