for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

New Product RELEASE No.17-9E

INVERTER
FR-A800 Plus

Liquid cooled type

FR-A800 Plus series 3rd

Release of the new liquid cooled type inverter, FR-A800-LC

Coolant is used for cooling the inside of the inverter. Liquid cooling enables new applications in the environments where heat is difficult to be dissipated.

A800 Plus

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

Features

Effective solution for downsizing of the enclosure

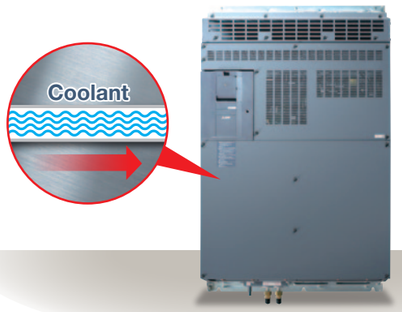
A smaller enclosure can be used since the quantity of the heat dissipated in the enclosure is reduced.

Dedicated monitoring functions

A sensor (flow switch) is attached at the inlet of coolant to send a signal to the inverter. When the coolant flow rate decreases, a warning is output, enabling quick, direct detection of system faults.

Lineup of 690 V class inverters

The power supply voltage of 690 VAC is supported. A wider range of power supply voltage is covered.

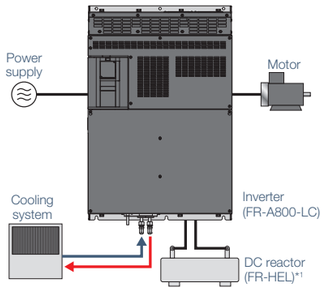


Application examples

Shield machine

Chiller

System configuration example



*1: Always connect a DC reactor appropriate to the applied motor capacity.

Model

• Inverter

A 8 4 0 - 280K - 1 - □ LC

Symbol	Voltage class
4	400 V class
7	690 V class

Voltage class	Symbol	Description
400 V class	110K to 280K	Inverter ND rated capacity (kW)
	03250 to 06830	Inverter rated current (SLD rated current of the standard FR-A800 inverter) (A)
690 V class	280K, 355K	Inverter ND rated capacity (kW)
	03590, 04560	Inverter SLD rated current (A)

Symbol	Type
1	FM
2	CA*1

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

Symbol	Function
None	Standard type
LC	Liquid cooled type

*1: For the CA type, the monitor output terminal FM/CA operates as terminal CA (analog current output: 0 to 20 mADC), not as terminal FM (pulse train output).

• DC reactor

F R - H E L - H 280K

Symbol	Voltage class
H	400 V class*1
N	690 V class

Symbol	Description
280K to 400K	Applied motor capacity (kW)

*1: For the details of the 400 V class, refer to the catalog of the FR-A800 inverter.

Specifications

• FR-A840-LC, FR-A870-LC

Inverter			FR-A840-□-LC							FR-A870-□-LC	
			110K	132K	160K	185K	220K	250K	280K	280K	355K
			03250	03610	04320	04810	05470	06100	06830	03590	04560
Applicable motor capacity (kW)*1		SLD				–				315	400
		LD	132	160	185	220	250	280	315	–	
		ND (initial setting)	110	132	160	185	220	250	280	280	355
Output	Rated capacity (kVA)*2	SLD				–				429	545
		LD	198	248	275	329	367	417	465	–	
		ND (initial setting)	165	198	248	275	329	367	417	382	484
	Rated current (A)	SLD				–				359	456
		LD	260	325	361	432	481	547	610	–	
		ND (initial setting)	216	260	325	361	432	481	547	320	405
	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							150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C	
	Rated voltage*4		Three-phase 380 to 500 V							Three-phase 525 to 690 V	
Power supply	Rated input AC voltage/frequency		Three-phase 380 to 500 V 50/60 Hz*7							Three-phase 525 to 690 V 50/60 Hz	
	Permissible AC voltage fluctuation		323 V to 550 V 50/60 Hz							525 V to 759 V 50/60 Hz	
	Permissible frequency fluctuation		±5%							±5%	
	Rated input current (A)*5	SLD				–				359	456
		LD	260	325	361	432	481	547	610	–	
		ND (initial setting)	216	260	325	361	432	481	547	320	405
	Power supply capacity (kVA)*6	SLD				–				429	545
		LD	198	248	275	329	367	417	465	–	
		ND (initial setting)	165	198	248	275	329	367	417	382	484
Protective structure (IEC 60529)			Open type (IP00)							Open type (IP00)*8	
Cooling system			Liquid cooling + forced air cooling							Liquid cooling + forced air cooling	
Operation panel			Accessory cover							FR-DU08	
Approx. mass (kg)			83	83	124	124	172	172	172	212	212
Environment	Surrounding air temperature*9		-10°C to +50°C (non-freezing) (LD and ND 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)								
	Coolant*10		Copper (C1220) is used for the inverter internal piping. Select an appropriate cooling system and a coolant to prevent corrosion.								
	Coolant temperature		1°C to 40°C (non-freezing)								
	Coolant flow rate*11		2.9 to 3.7 L/min *For the FR-A840-03250(110K) and FR-A840-03610(132K) 6.0 to 7.5 L/min *For the FR-A840-04320(160K) to FR-A840-06830(280K), FR-A870-03590(280K), and FR-A870-04560(355K)								
	Maximum permissible pressure		300 kPa								
	Storage temperature		-20°C to +65°C*12								
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)								
	Altitude		2000 m or less (For the installation at an altitude above 1000 m, consider a 3% reduction in the rated current per 500 m increase in altitude.)								
	Vibration		2.9 m/s² or less at 10 to 55 Hz (directions of X, Y, Z axes)								

*1: The capacity is the maximum capacity applicable to each voltage.
*2: The rated output capacity indicated assumes that the output voltage is 440 V for the FR-A840-LC and 690 V for the FR-A870-LC.
*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: The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
*6: The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
*7: For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.
*8: FR-DU08: IP40 (except for the PU connector section)
*9: Condensation may occur depending on the humidity and the coolant temperature. Adjust the humidity and the coolant temperature to prevent condensation.
*10: For the composition of the coolant, refer to the Instruction Manual of the inverter.
*11: Under normal conditions, keep the flow rate between 3.1 and 3.5 L/min for the FR-A840-03610(132K) or lower, and between 6.5 and 7.0 L/min for the FR-A840-04810(160K) or higher and the FR-A870-03590(280K) or higher. For the details of coolant selection, please contact your sales representative.
*12: Temperature applicable for a short time, e.g. in transit. To store the inverter after the coolant has passed through the pipes, fill the pipes with coolant sufficiently enough that it contains antifreezing agent to prevent corrosion. Or fill the pipes with nitrogen gas after the inside of the pipes is fully dried. If any moisture remains inside the pipes, it may react with oxygen in the air to form corrosion.

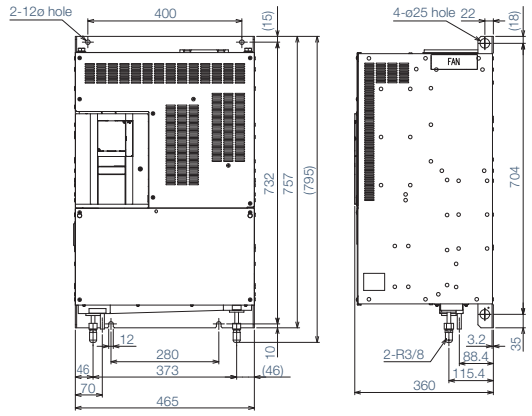
• FR-HEL-N

Power factor improving effect*13		Power supply power factor approx. 93% (at 100% load)
Power specifications		Three-phase 525 to 690 VAC 50/60 Hz
Environment	Surrounding air temperature	-10°C to + 50°C (non-freezing)
	Ambient humidity	90%RH or less (non-condensing)
	Storage temperature	-20°C to + 65°C (non-freezing)
	Atmosphere	Indoors (free from corrosive gas, flammable gas, oil mist, dust and dirt)
	Altitude/vibration	Max.1000 m, 5.9 m/s² or less

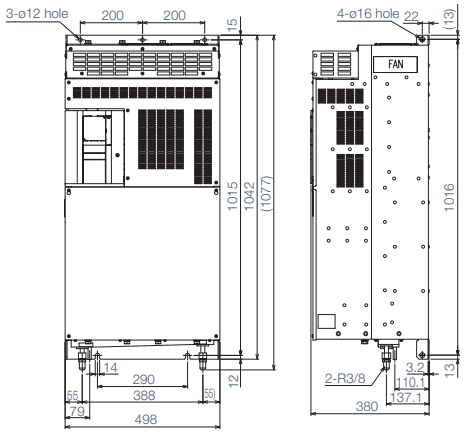
*13: The power factor is calculated on the assumption that the power impedance is 1%. The value changes according to the power supply capacity and power impedance.

Outline dimensions (Unit: mm)

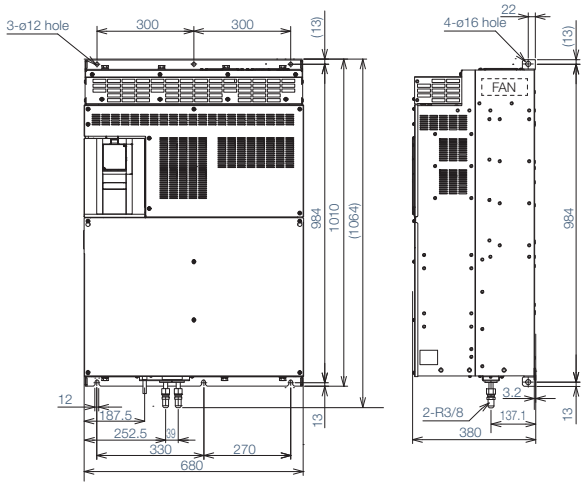
• FR-A840-03250(110K), 03610(132K)-LC



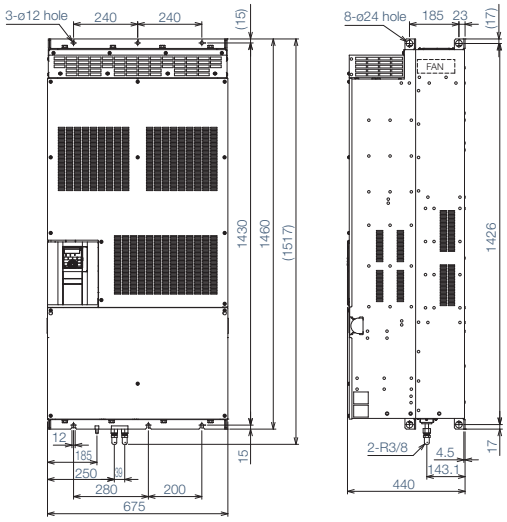
• FR-A840-04320(160K), 04810(185K)-LC



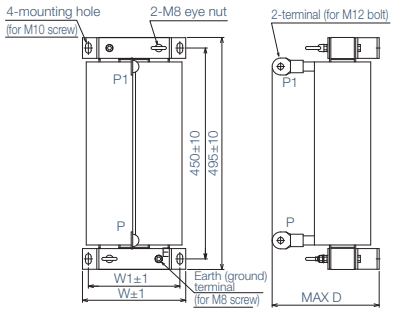
• FR-A840-05470(220K), 06100(250K), 06830(280K)-LC



• FR-A870-03590(280K), 04560(355K)-LC



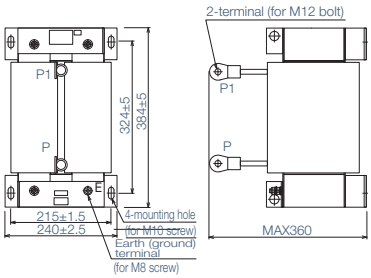
• FR-HEL-N280K, N315K



* Remove the eye nut after installation of the product.

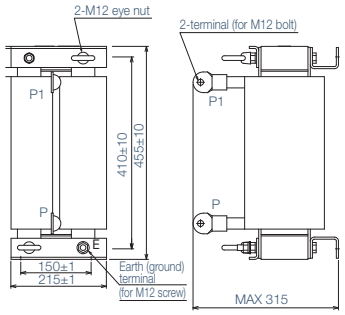
Model	Motor capacity	W	W1	D	Mass (kg)
FR-HEL-N280K	280 kW	210	185	215	45
FR-HEL-N315K	315 kW	220	195	230	50

• FR-HEL-N355K



Model	Motor capacity	Mass (kg)
FR-HEL-N355K	355 kW	76

• FR-HEL-N400K



* Remove the eye nut after installation of the product.

Model	Motor capacity	Mass (kg)
FR-HEL-N400K	400 kW	76

Release schedule

October 2017

MITSUBISHI ELECTRIC CORPORATION

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