FR-A800-E Series

The FR-A800-E adds an integrated web server and 100Mbit Ethernet TCP/IP connectivity as standard to the existing network options of the FR-A800 flagship multi-use inverter. The FR-A800-E provides machine builders and systems integrators an increased ability for remote system monitoring and parameter adjustment, as well as easy integration into existing network environments.

- **High Speed Response:** With a speed response of 50Hz, FR-A800 to respond to a change in motor load. FR-A800 reacts to a speed signal much faster too – between 2 to 3 ms as opposed to 5 to 20 ms with FR-A700.
- **Wide Speed Range:** 200:1 speed range open loop, 1500:1 closed loop speed range.
- **Extended Maximum Speed:** A standard FR-A800 VFD can drive high speed motors at up to 590Hz, compared to the FR-A700's 400Hz.
- **IPM Motor Control:** Standard FR-A800 VFDs can drive the new generation IPM (Internal Permanent Magnet) motors, such as the Marathon 'SyMAX' Series.
- **Safety Stop:** FR-A800 is a SAFETY drive. "STO" capability enables SIL2 / PLd category emergency stops.
- **Compatible with USB Stick:** VFD settings can be easily uploaded or downloaded and 'black box' operating data at the time of a drive trip can be copied for diagnosis using the FR-Configurator software.
- **GOT Interface:** Automatic connectivity to GOT 2000 series GOTs without the need to change any parameters.
- **Improved PLC**: FR-A800 has a new internal PLC based around the Mitsubishi Electric 'L Series' processor. Instructions in the form of 'Function Blocks' can now be used.
- **Conformal Coating:** All FR-A800 VFDs have Conformal Coated boards as standard.
- **Separate Rectifier Stage:** For drives over 500 HP – greater system flexibility.
- **Ethernet Communications as Standard –** Communicate with Modbus TCP/IP or CC-Link IE Field Basic communications networks at a speed of 100Mbps without the need for an extra option card.
- **Automatic IP Address Detection –** Automatically detect the IP address of all connected drives, quickly enabling connection and programming using FR-Configurator2 software.
- **Multiple Protocol Capability –** Network option cards offer connection to other drive based networks and a higher level information system.
- **Drive to Drive Communications –** Utilize the internal PLC to communicate without a master PLC controller allowing the drives to work together as a team.

FR-A800-E Ratings 240V Class

Model Number	AMPS for Duty				Horsepower For Duty (NEC)				Frame Size	Weight	Cooling Method	Protective Rating	Regen. Braking Torque / Duty Using Standard Brake Resistors Where Supplied	Stocked Item
	SLD	LD	ND	HD	SLD	LD	ND	HD						
FR-A820-00046-E1N6	4.6	4.2	3	1.5	1		0.75	0.25	A	5.5	Self-Cooling	NEMA 1, UL-1, Plenum Rated (IP20)	150% torque / 3% ED	S
FR-A820-00077-E1N6	7.7	7	5	3	2		1	0.5	B	5.9				S
FR-A820-00105-E1N6	10.5	9.6	8	5	3		2	1	C	8.8	Forced Air Cooling			S
FR-A820-00167-E1N6	16.7	15.2	11	8	5		3	2	C	8.8			100% torque / 3% ED	S
FR-A820-00250-E1N6	25	23	17.5	11	7.5		5	3	C	8.8				S
FR-A820-00340-E1N6	34	31	24	17.5	10		7.5	5	D	16.7			100% torque / 2% ED	S
FR-A820-00490-E1N6	49	45	33	24	20	15	10	7.5	D	16.7				S
FR-A820-00630-E1N6	63	58	46	33	20		15	10	E	20.5			20% torque / 100% ED (Brake transistor included)	S
FR-A820-00770-E1N6	77	70.5	61	46	25		20	15	F	37.4				S
FR-A820-00930-E1N6	93	85	76	61	30		25	20	F	37.4				S
FR-A820-01250-E1N6	125	114	90	76	40		30	25	F	37.4				S
FR-A820-01540-E160	154	140	115	90	60	50	40	30	G	48.4		IP00	20% torque / 100% ED (Use FR-BU2 brake unit for higher ratings)	S
FR-A820-01870-E160	187	170	145	115	60		50/60	40	H	92.4				S
FR-A820-02330-E160	233	212	175	145	75		60	50	H	92.4				S
FR-A820-03160-E160 (*1)	316	288	215	175	125	100	75	60	K	118.8				S
FR-A820-03800-E1U6 (*1)	380	346	288	215	150	125	100	75	L	162.8				S
FR-A820-04750-E1U6 (*1)	475	432	346	288	150		125	100	L	162.8				S

Note 1: These drives must be used together with a DC Link Choke, sold separately.
SLD- 110% 60s, 120% 3s (inverse-time characteristics) at ambient temperature 40°C
LD- 120% 60s, 150% 3s (inverse-time characteristics) at ambient temperature 50°C
ND- 150% 60s, 200% 3s (inverse-time characteristics) at ambient temperature 50°C
HD- 200% 60s, 250% 3s (inverse-time characteristics) at ambient temperature 50°C

FR-HEL DC Link Chokes (sold separately)

Model Number	SLD	LD	ND	HD
FR-A820-03160-E160	FR-HEL-90K	FR-HEL-75K	-	-
FR-A820-03800-E1U6	FR-HEL-110K	FR-HEL-90K	FR-HEL-75K	-
FR-A820-04750-E1U6	FR-HEL-110K	FR-HEL-110K	FR-HEL-90K	FR-HEL-75K

FR-A800-E Ratings 480V Class

Model Number	AMPS For Duty				Horsepower For Duty (NEC)				Frame Size	Weight (lbs) (*4)	Cooling Method	Protective Rating	Regen.Braking Torque / Duty (Using Standard Brake Resistors Where Supplied)	Stocked Item
	SLD	LD	ND	HD	SLD	LD	ND	HD						
FR-A840-00023-E1N6	2.3	2.1	1.5	0.8	1	1	0.5	0.25	C	7.7	Self-Cooling	NEMA 1, UL-1, Plenum Rated (IP20)	100% torque / 2% ED	S
FR-A840-00038-E1N6	3.8	3	2.5	1.5	2	2	1	0.5		7.7				S
FR-A840-00052-E1N6	5.2	4.8	4	2.5	3	3	2	1		7.7				S
FR-A840-00083-E1N6	8.3	7.6	6	4	5	5	3	2		8.8	Forced Air Cooling			S
FR-A840-00126-E1N6	12.6	11.5	9	6	7.5	7.5	5	3		8.8				S
FR-A840-00170-E1N6	17	16	12	9	10	10	7.5	5	D	16.7				S
FR-A840-00250-E1N6	25	23	17	12	15	15	10	7.5		16.7				S
FR-A840-00310-E1N6	31	29	23	17	20	20	15	10	E	20.5			20% torque / 100% ED (Brake transistor included)	S
FR-A840-00380-E1N6	38	35	31	23	25	25	20	15		20.5				S
FR-A840-00470-E1N6	47	43	38	31	30	30	25	20	F	37.4				S
FR-A840-00620-E1N6	62	57	44	38	40	40	30	25		37.4				S
FR-A840-00770-E160	77	70	57	44	60	50	40	30	G	50.6		IP00		S
FR-A840-00930-E160	93	85	71	57	60	60	50	40	H	90.2				S
FR-A840-01160-E160	116	106	86	71	75	75	60	50		90.2				S
FR-A840-01800-E160 (*1)	180	144	110	86	150	100	75	60		94.6				S
FR-A840-02160-E1U6 (*1)	216	180	144	110	150	150	100	75	J	114.4			10% torque / 100% ED (Use FR-BU2-H for higher ratings)	S
FR-A840-02600-E1U6 (*1)	260	216	180	144	200	150	150	100		121.0				S
FR-A840-03250-E1U6 (*1)	325	260	216	180	250	200	150	150	L	156.2				S
FR-A840-03610-E1U6 (*1)	361	325	260	216	300	250	200	150		171.6				S
FR-A840-04320-E1U6 (*1)	432	361	325	260	350	300	250	200	M	257.4				S
FR-A840-04810-E1U6 (*1)	481	432	361	325	400	350	300	250		257.4				S
FR-A840-05470-E1U6 (*1)	547	481	432	361	450	400	350	300	N	365.2				S
FR-A840-06100-E1U6 (*1)	610	547	481	432	500	450	400	350		365.2				S
FR-A840-06830-E1U6 (*1)	683	610	547	481	550	500	450	400		365.2				S
FR-A842-07700-E1U6 + FR-CC2-H315K-60 (*2)	-	-	610	547	-	-	500	450	P+R	820.6				- (*3)
FR-A842-08660-E1U6 + FR-CC2-H315K-60 (*2)	-	-	-	610	-	-	-	500		820.6				- (*3)
FR-A842-07700-E1U6 + FR-CC2-H355K-60 (*2)	-	683	-	-	-	550	-	-		827.2				- (*3)
FR-A842-08660-E1U6 + FR-CC2-H355K-60 (*2)	-	-	683	-	-	-	550	-		827.2				- (*3)
FR-A842-09620-E1U6 + FR-CC2-H355K-60 (*2)	-	-	-	683	-	-	-	550	Q+R	1003.2				- (*3)
FR-A842-07700-E1U6 + FR-CC2-H400K-60 (*2)	770	-	-	-	650	-	-	-	P+S	979				- (*3)
FR-A842-08660-E1U6 + FR-CC2-H400K-60 (*2)	-	770	-	-	-	650	-	-		979				- (*3)
FR-A842-09620-E1U6 + FR-CC2-H400K-60 (*2)	-	-	770	-	-	-	650	-	Q+S	1155				- (*3)
FR-A842-10940-E1U6 + FR-CC2-H400K-60 (*2)	-	-	-	770	-	-	-	650		1155				- (*3)
FR-A842-08660-E1U6 + FR-CC2-H450K-60 (*2)	866	-	-	-	700	-	-	-	P+S	986				- (*3)
FR-A842-09620-E1U6 + FR-CC2-H450K-60 (*2)	-	866	-	-	-	700	-	-	Q+S	1162				- (*3)
FR-A842-10940-E1U6 + FR-CC2-H450K-60 (*2)	-	-	866	-	-	-	700	-		1162				- (*3)
FR-A842-12120-E1U6 + FR-CC2-H450K-60 (*2)	-	-	-	866	-	-	-	700		1162				- (*3)
FR-A842-09620-E1U6 + FR-CC2-H500K-60 (*2)	962	-	-	-	800	-	-	-		1168				- (*3)
FR-A842-10940-E1U6 + FR-CC2-H500K-60 (*2)	-	962	-	-	-	800	-	-		1168				- (*3)
FR-A842-12120-E1U6 + FR-CC2-H500K-60 (*2)	-	-	962	-	-	-	800	-		1168				- (*3)
FR-A842-10940-E1U6 + FR-CC2-H560K-60 (*2)	1094	-	-	-	900	-	-	-		1179				- (*3)
FR-A842-12120-E1U6 + FR-CC2-H560K-60 (*2)	-	1094	-	-	-	900	-	-		1179				- (*3)
FR-A842-12120-E1U6 + FR-CC2-H630K-60 (*2)	1212	-	-	-	1000	-	-	-		1181				- (*3)

Notes:

1. These drives must be used with DC Link Chokes (sold separately).
2. Drives are "sectional" design, used together with FR-CC2 rectifier stage.
3. Consult VFD Marketing for availability.
4. For FR-A842 and FR-CC2 combinations, the weights are COMBINED. Drives in shaded area MUST be used together with FR-HEL DC Link Choke (sold separately).

FR-HEL DC Link Chokes (sold separately)

Model Number	SLD	LD	ND	HD
FR-A840-01800-E160	FR-HEL-H110K	FR-HEL-H75K	-	-
FR-A840-02160-E1U6	FR-HEL-H110K	FR-HEL-H90K	FR-HEL-H75K	FR-HEL-H75K
FR-A840-02600-E1U6	FR-HEL-H132K	FR-HEL-H110K	FR-HEL-H90K	FR-HEL-H90K
FR-A840-03250-E1U6	FR-HEL-H160K	FR-HEL-H132K	FR-HEL-H110K	FR-HEL-H110K
FR-A840-03610-E1U6	FR-HEL-H185K	FR-HEL-H160K	FR-HEL-H132K	FR-HEL-H132K
FR-A840-04320-E1U6	FR-HEL-H220K	FR-HEL-H185K	FR-HEL-H160K	FR-HEL-H160K
FR-A840-04810-E1U6	FR-HEL-H250K	FR-HEL-H220K	FR-HEL-H185K	FR-HEL-H185K
FR-A840-05470-E1U6	FR-HEL-H280K	FR-HEL-H250K	FR-HEL-H220K	FR-HEL-H220K
FR-A840-06100-E1U6	FR-HEL-H315K	FR-HEL-H280K	FR-HEL-H250K	FR-HEL-H250K
FR-A840-06830-E1U6	FR-HEL-H355K	FR-HEL-H315K	FR-HEL-H280K	FR-HEL-H280K

FR-A800-E Ratings 600V Class

Model Number (*4)	AMPS for Duty				Horsepower for Duty (NEC)				Frame Size	Weight (lbs)	Cooling Method	Protective Rating	Regen. Braking Torque / Duty (Using Standard Brake Resistors Where Supplied
	SLD	LD	ND	HD	SLD	LD	ND	HD					
FR-A860-00027-E1N6	2.7	2.5	1.7	1	2	1.5	1	0.5	C	11.7	Self Cooling	Enclosed Type (UL-1 plenum rated) (*3)	20% Braking Torque 100% ED
FR-A860-00061-E1N6	6.1	5.6	4	2.7	5	3	3	2	C	12.8	Forced Air Cooling		
FR-A860-00090-E1N6	9	8.2	6.1	4	7.5	5	5	3	C	12.8			
FR-A860-00170-E1N6	17	16	12	9	15	10	10	7.5	D	15.4			
FR-A860-00320-E1N6	32	27	22	16	30	25	20	10	E	19.8			
FR-A860-00450-E1N6	45	41	33	24	40	40	30	20	F	37.4			
FR-A860-00680-E160	68	62	55	41	60	60	50	40	H	79.2		Open Type (IP00)	
FR-A860-01080-E160 (*1)	108	99	84	63	100	100	75	60	H	90.2			
FR-A860-01440-E160 (*1)	144	131	104	84	150	125	100	75	J	114			10% Braking Torque 100% ED (Use FR-BU2-C for higher rating)
FR-A860-01670-E160 (*1)	167	152	131	104	150	150	125	100	J	114			
FR-A860-02430-E160 (*1)	243	221	152	131	250	200	150	125	J	121			
FR-A860-02890-E160 (*1)	289	255	221	152	300	250	200	150	M	246			
FR-A860-03360-E160 (*1)	336	304	255	202	350	300	250	200	M	253			
FR-A860-04420-E160 (*1)	442	402	304	255	450	400	300	250	N	337			
FR-A862-05450-E160 + FR-CC2-C355K-60 (*2)	545	496	402	304	550	500	400	300	P+R	810			
FR-A862-06470-E160 + FR-CC2-C400K-60 (*2)	647	589	496	402	650	600	500	400	Q+S	920			
FR-A862-08500-E160 + FR-CC2-C560K-60 (*2)	850	773	663	589	850	750	650	600	Q+S	1126			

Notes:

1. These drives MUST be used with a DC Link Choke (sold separately).
2. FR-A862 Drives are inverter stage only; use together with FR-CC2-C rectifier stage. Maximum Input and Output Current of FR-CC2 modules is the value shown. COMBINED weight shown.
3. Remove the standard brake resistor (if fitted) for UL type 1. Rating is otherwise NEMA 1.
4. The FR-A860 does not include a built in parameter unit. The FR-DU08 or FR-LU08 is sold separately.

FR-HEL DC Link Chokes (sold separately)

Model Number	SLD	LD	ND	HD
FR-A860-01080-E160	FR-HEL-C75K	FR-HEL-C75K	-	-
FR-A860-01440-E160	FR-HEL-C90K	FR-HEL-C90K	FR-HEL-C75K	-
FR-A860-01670-E160	FR-HEL-C110K	FR-HEL-C110K	FR-HEL-C90K	FR-HEL-C75K
FR-A860-02430-E160	FR-HEL-C132K	FR-HEL-C132K	FR-HEL-C110K	FR-HEL-C90K
FR-A860-02890-E160	FR-HEL-C185K	FR-HEL-C185K	FR-HEL-C132K	FR-HEL-C110K
FR-A860-03360-E160	FR-HEL-C220K	FR-HEL-C220K	FR-HEL-C185K	FR-HEL-C185K
FR-A860-04420-E160	FR-HEL-C280K	FR-HEL-C280K	FR-HEL-C220K	FR-HEL-C185K

Key to Duty Code (FR-A820, FR-A840)

	Overload Rating		
	60s	3s	Ambient Temp (°C)
SLD	110%	120%	40
LD	120%	150%	50
ND	150%	200%	50
HD	200%	250%	50

Key to Duty Code (FR-A860)

	Overload Rating		Ambient Temperature by Frame Size (°C)		
	60s	3s	C	D-H	J-Q
SLD	110%	120%	30	40	40
LD	120%	150%	40	40	50
ND	150%	200%	40	40	50
HD	200%	250%	40	40	40

FR-A800-E Dimensions - Frame Size Key

	Height-in (mm)	Width-in (mm)	Depth-in (mm)
A	12.2 (310)	4.33 (110)	4.39 (112)
B	12.2 (310)	4.33 (110)	4.98 (127)
C	12.52 (318)	5.91 (150)	5.57 (142)
D	12.76 (324)	8.66 (220)	6.69 (170)
E	14.29 (363)	8.66 (220)	7.48 (190)
F	20.37(517)	9.84 (250)	7.48 (190)
G	21.67 (550)	12.80 (325)	7.68 (195)
H	21.67 (550)	17.13 (435)	9.84 (250)
J	24.41 (620)	18.31 (465)	11.81 (300)
K	27.56 (700)	18.31 (465)	9.84 (250)
L	29.13 (740)	18.31 (465)	14.17 (360)
M	39.76 (1010)	19.61 (498)	14.96 (380)
N	39.76 (1010)	26.77 (680)	14.96 (380)
P	52.4 (1330)	21.3 (540)	17.3 (440)
Q	62.2 (1580)	26.8 (680)	17.3 (440)
R	52.4 (1330)	23.6 (600)	17.3 (440)
S	62.2 (1580)	23.6 (600)	17.3 (440)

Dimensions of REQUIRED DC Link Chokes (sold separately)

Model Number	Height - inches (mm)	Width - inches (mm)	Depth - inches (mm)	Weight (lbs)
FR-HEL-75K	13.39 (340)	5.91 (150)	7.87 (200)	37
FR-HEL-90K	13.39 (340)	5.91 (150)	7.87 (200)	42
FR-HEL-110K	15.75 (400)	6.89 (175)	7.87 (200)	44
FR-HEL-H75K	12.60 (320)	5.51 (140)	7.28 (185)	35
FR-HEL-H90K	13.39 (340)	5.91 (150)	7.48 (190)	44
FR-HEL-H110K	13.39 (340)	5.91 (150)	7.68 (195)	48
FR-HEL-H132K	15.94 (405)	6.89 (175)	7.87 (200)	57
FR-HEL-H160K	15.94 (405)	6.89 (175)	8.07 (205)	62
FR-HEL-H185K	15.94 (405)	6.89 (175)	9.45 (240)	64
FR-HEL-H220K	15.94 (405)	6.89 (175)	9.45 (240)	66
FR-HEL-H250K	17.32 (440)	7.48 (190)	9.84 (250)	77
FR-HEL-H280K	17.32 (440)	7.48 (190)	10.04 (255)	84
FR-HEL-H315K	19.5 (495)	8.3 (210)	9.8 (250)	92
FR-HEL-H355K	19.5 (495)	8.3 (210)	9.8 (250)	101
FR-HEL-C75K	12.6 (320)	5.5 (140)	7.3 (185)	35
FR-HEL-C90K	13.3 (340)	5.9 (150)	9.4 (240)	44
FR-HEL-C110K	13.3 (340)	5.9 (150)	9.4 (240)	51
FR-HEL-C132K	15.9 (405)	6.9 (175)	7.7 (195)	53
FR-HEL-C185K	15.9 (405)	6.9 (175)	9.4 (240)	70
FR-HEL-C220K	15.9 (405)	6.9 (175)	9.4 (240)	73
FR-HEL-C280K	17.3 (440)	7.5 (190)	9.8 (250)	88

FR-A800-E Dynamic Braking

All Mitsubishi Electric VFDs have some inherent braking capability. During controlled deceleration, motor regenerative losses are dissipated in the motor, wire, and VFD circuitry. The built-in DC injection braking allows for low speed braking and stopping. When the above capabilities are inadequate for an application, it is necessary to add a power transistor brake unit and resistor unit in series across the DC bus. Motor regeneration causes the DC bus voltage to increase, and when the voltage exceeds a specified threshold, the transistor turns on to pass current through the resistor. Motor kinetic energy is converted to heat energy. VFD overcurrent and overvoltage protective circuits are active at all times, and will fault-trip the VFD if the brake size is inadequate.

Two main factors must be considered when sizing the brake, the effective duty cycle (%ED) and the short time duty rating. The effective duty cycle is increased when an external resistor is added. It is preferable to profile the effective duty cycle of the units of time. With this information, the short time duty is known and the %ED can be calculated, as shown in the following example. %ED = Braking time / total time for complete operating cycle x 100

Example: In a given application a load is accelerated for 5 seconds, runs for 60 seconds and decelerates in 3 seconds before resting for 12 seconds.

%ED = 3 / (5 + 60 + 3 + 12) x 100 = 3.6%

The tables shown assume 100% brake torque, when brake torque is represented by its percentage to the rated torque of the applied motor. Torque (kg.m) = 974 x Power (kW) / Speed (rpm).

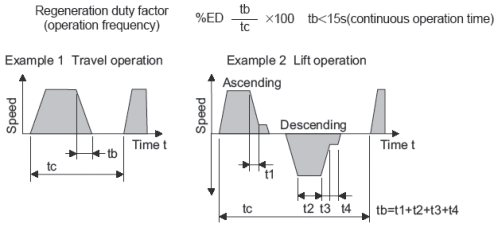
FR-A800-E Fitted with Internal Brake Resistor – Torque and Duty Cycle Figure

ND Mode kW	Drive Model Number	Internal Resistor			High Performance Brake Resistor Option			
		Brake Resistor Value (ohms)	Torque %	Duty % (ED%)	Part Ref.	Ohms	Torque %	Duty % (ED%)
3/4	FR-A820-00046-E1N6	200	150	3	FR-ABR-0.4K	200	150	10
1	FR-A820-00077-E1N6	100	150	3	FR-ABR-0.75K	100	150	10
2	FR-A820-00105-E1N6	60	150	3	FR-ABR-2.2K	60	100	10
3	FR-A820-00167-E1N6	60	100	3	FR-ABR-2.2K	60	100	10
5	FR-A820-00250-E1N6	40	100	3	FR-ABR-3.7K	40	100	10
7.5	FR-A820-00340-E1N6	25	100	2	FR-ABR-5.5K	25	100	10
10	FR-A820-00490-E1N6	20	100	2	FR-ABR-7.5K	20	100	10
15	FR-A820-00630-E1N6	-	-	-	FR-ABR-11K	13	100	6
20	FR-A820-00770-E1N6	-	-	-	(2x)FR-ABR-H15K[2P]	9	100	6
25	FR-A820-00930-E1N6	-	-	-	(2x)FR-ABR-H22K[2P]	6.5	100	6
30	FR-A820-01250-E1N6	-	-	-	(2x)FR-ABR-H22K[2P]	6.5	100	6
1/2	FR-A840-00023-E1N6	1200	100	2	FR-ABR-H0.4K	1200	100	10
1	FR-A840-00038-E1N6	700	100	2	FR-ABR-H0.75K	700	100	10
2	FR-A840-00052-E1N6	350	100	2	FR-ABR-H1.5K	350	100	10
3	FR-A840-00083-E1N6	250	100	2	FR-ABR-H2.2K	250	100	10
5	FR-A840-00126-E1N6	150	100	2	FR-ABR-H3.7K	150	100	10
7.5	FR-A840-00170-E1N6	75	100	2	FR-ABR-H5.5K	110	100	10
10	FR-A840-00250-E1N6	75	100	2	FR-ABR-H7.5K	75	100	10
15	FR-A840-00310-E1N6	-	-	-	FR-ABR-H11K	52	100	6
20	FR-A840-00380-E1N6	-	-	-	(2x)FR-ABR-H15K[2S]	36 (72)	100	6
25	FR-A840-00470-E1N6	-	-	-	(2x)FR-ABR-H15K[2S]	36 (72)	100	6
30	FR-A840-00620-E1N6	-	-	-	(2x)FR-ABR-H22K[2S]	26 (52)	100	6
40	FR-A840-00770-E160	-	-	-	(2x)FR-ABR-H22K[2S]	26 (52)	100	6
50	FR-A840-00930-E160	-	-	-	3RD PARTY RESISTOR *	13.5	115	*
60	FR-A840-01160-E160	-	-	-	3RD PARTY RESISTOR *	13.5	95	*
75	FR-A840-01800-E160	-	-	-	3RD PARTY RESISTOR *	13.5	77	*
1	FR-A860-00027-E1N6	-	-	-	3RD PARTY RESISTOR *	1000	118	*
3	FR-A860-00061-E1N6	-	-	-	3RD PARTY RESISTOR *	370	108	*
5	FR-A860-00090-E1N6	-	-	-	3RD PARTY RESISTOR *	220	108	*
10	FR-A860-00170-E1N6	-	-	-	3RD PARTY RESISTOR *	110	107	*
20	FR-A860-00320-E1N6	-	-	-	3RD PARTY RESISTOR *	60	98	*
30	FR-A860-00450-E1N6	-	-	-	3RD PARTY RESISTOR *	40	100	*
50	FR-A860-00680-E160	-	-	-	3RD PARTY RESISTOR *	24	99	*
75	FR-A860-01080-E160	-	-	-	3RD PARTY RESISTOR *	16	100	*

*Resistor wattage must be selected based on %ED (up to 100%)

Dynamic Braking Options

- Select the brake unit according to the motor capacity.
- To obtain braking torque greater than 200%, use a larger inverter capacity.
- Up to 10 FR-BU2 brake units can be connected in parallel for increased braking capacity.



%ED or Time at Short-Time Rating When Braking Torque is 100%

Brake Unit Model Number		Stocked Item	Brake Resistor Model Number	Stocked Item	Motor Capacity (HP)													
					1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
230V	FR-BU2-1.5K	S	BU-1500-TEIKOUKI	-	30 s	-	-	-	-	-	-	-	-	-	-	-	-	-
	FR-BU2-3.7K	S	BU-3700-TEIKOUKI	-	-	30 s	-	-	-	-	-	-	-	-	-	-	-	-
	FR-BU2-7.5K	S	BU-7.5K-TEIKOUKI	-	-	-	30 s	30 s	-	-	-	-	-	-	-	-	-	-
	FR-BU2-15K	S	FR-BR-15K-UL	S	-	-	-	-	80%	40%	15%	10%	-	-	-	-	-	-
	FR-BU2-30K	S	FR-BR-30K-UL	S	-	-	-	-	-	-	65%	30%	25%	15%	10%	-	-	-
	FR-BU2-55K	-	FR-BR-55K-UL	-	-	-	-	-	-	-	-	-	90%	60%	30%	20%	15%	10%
460V	FR-BU2-H7.5K	S	2 x BU-3700-TEIKOUKI	-	-	-	30 s	30 s	-	-	-	-	-	-	-	-	-	-
	FR-BU2-H15K	S	FR-BR-H15K-UL	S	-	-	-	-	80%	40%	15%	10%	-	-	-	-	-	-
	FR-BU2-H30K	S	FR-BR-H30K-UL	S	-	-	-	-	-	-	65%	30%	25%	15%	10%	-	-	-
	FR-BU2-H55K	S	FR-BR-H55K-UL	S	-	-	-	-	-	-	-	-	90%	60%	30%	20%	15%	10%
600V	FR-BU2-C22K	S	FR-BR-C3.7K	-	-	-	30%	10%	-	-	-	-	-	-	-	-	-	-
			FR-BR-C7.5K	-	-	-	-	40%	20%	10%	-	-	-	-	-	-	-	-
			FR-BR-C22K	-	-	-	-	-	-	85%	40%	20%	15%	10%	-	-	-	-
	2 x FR-BU2-C22K	S	2 x FR-BR-C22K	-	-	-	-	-	-	-	-	-	-	-	-	15%	-	-
	3 x FR-BU2-C22K	S	3 x FR-BR-C22K	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15%

Brake Unit Model Number		Stocked Item	Brake Resistor Model Number	Stocked Item	Motor Capacity (HP)												
					100	125	150	200	250	300	350	400	450	500	600	700	800
460V	FR-BU2-H75K	S	MT-BR5-H75K	-	10%	5%	-	-	-	-	-	-	-	-	-	-	-
	2 x FR-BU2-H75K	S	2 x MT-BR5-H75K	-	40%	25%	15%	10%	5%	-	-	-	-	-	-	-	-
	3 x FR-BU2-H75K	S	3 x MT-BR5-H75K	-	90%	60%	40%	20%	14%	10%	5%	5%	-	-	-	-	-
	4 x FR-BU2-H75K	S	4 x MT-BR5-H75K	-	-	95%	70%	40%	25%	15%	13%	10%	5%	5%	-	-	-
	5 x FR-BU2-H75K	S	5 x MT-BR5-H75K	-	-	-	-	60%	40%	25%	20%	15%	12%	10%	5%	5%	-
	6 x FR-BU2-H75K	S	6 x MT-BR5-H75K	-	-	-	-	90%	55%	40%	25%	25%	15%	14%	10%	5%	5%
	7 x FR-BU2-H75K	S	7 x MT-BR5-H75K	-	-	-	-	-	80%	55%	40%	35%	20%	15%	13%	10%	5%
	8 x FR-BU2-H75K	S	8 x MT-BR5-H75K	-	-	-	-	-	-	70%	50%	45%	30%	25%	15%	13%	10%

Braking Torque (%) at Short-Time Rating of 30 Sec. for 5HP and Less
Braking Torque (%) at Short-Time Rating of 15 Sec. for 7.5HP and Larger

Brake Unit Model Number		Stocked Item	Brake Resistor Model Number	Stocked Item	Motor Capacity (HP)												
					1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
230V	FR-BU2-1.5K	S	BU-1500-TEIKOUKI	-	100%	50%	-	-	-	-	-	-	-	-	-	-	-	-
	FR-BU2-3.7K	S	BU-3700-TEIKOUKI	-	-	100%	50%	50%	-	-	-	-	-	-	-	-	-	-
	FR-BU2-7.5K	S	BU-7.5K-TEIKOUKI	-	-	-	100%	100%	-	-	-	-	-	-	-	-	-	-
	FR-BU2-15K	S	FR-BR-15K-UL	S	-	-	-	-	280%	200%	120%	100%	80%	70%	-	-	-	-
	FR-BU2-30K	S	FR-BR-30K-UL	S	-	-	-	-	-	-	260%	180%	160%	130%	100%	80%	70%	-
	FR-BU2-55K	-	FR-BR-55K-UL	-	-	-	-	-	-	-	-	-	300%	250%	180%	150%	120%	100%
460V	FR-BU2-H15K	S	FR-BR-H15K-UL	S	-	-	-	-	280%	200%	120%	100%	80%	70%	-	-	-	-
	FR-BU2-H30K	S	FR-BR-H30K-UL	S	-	-	-	-	-	-	260%	180%	160%	130%	100%	80%	70%	-
	FR-BU2-H55K	S	FR-BR-H55K-UL	S	-	-	-	-	-	-	-	-	300%	250%	180%	150%	120%	100%
600V	FR-BU2-C22K	S	FR-BR-C3.7K	-	-	-	170%	100%	-	-	-	-	-	-	-	-	-	-
			FR-BR-C7.5K	-	-	-	340%	200%	130%	100%	-	-	-	-	-	-	-	-
			FR-BR-C22K	-	-	-	-	-	-	300%	200%	145%	120%	100%	-	-	-	-
	2 x FR-BU2-C22K	S	2 x FR-BR-C22K	-	-	-	-	-	-	-	-	-	-	-	-	120%	-	-
	3 x FR-BU2-C22K	S	3 x FR-BR-C22K	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120%

Note: FR-BU2-C22K is not UL or cUL listed for use with the FR-BR-C resistor. If UL or cUL is required, use the ASC-RES-C22K in place of FR-BR-C22K.

Brake Unit Model Number		Stocked Item	Brake Resistor Model Number	Stocked Item	Motor Capacity (HP)												
					100	125	150	200	250	300	350	400	450	500	600	700	800
460V	FR-BU2-H75K	S	MT-BR5-H75K	-	100%	80%	65%	50%	40%	30%	28%	26%	22%	20%	-	-	-
	2 x FR-BU2-H75K	-	2 x MT-BR5-H75K	-	200%	165%	135%	100%	80%	65%	55%	53%	44%	40%	33%	28%	25%
	3 x FR-BU2-H75K	-	3 x MT-BR5-H75K	-	300%	250%	200%	150%	120%	100%	85%	80%	65%	60%	50%	43%	37%
	4 x FR-BU2-H75K	-	4 x MT-BR5-H75K	-	-	300%	270%	200%	160%	135%	115%	105%	85%	80%	65%	55%	50%
	5 x FR-BU2-H75K	-	5 x MT-BR5-H75K	-	-	-	300%	250%	200%	170%	140%	130%	110%	100%	83%	70%	62%
	6 x FR-BU2-H75K	-	6 x MT-BR5-H75K	-	-	-	-	300%	240%	200%	170%	160%	130%	120%	100%	85%	75%
	7 x FR-BU2-H75K	-	7 x MT-BR5-H75K	-	-	-	-	-	280%	235%	200%	185%	155%	140%	115%	100%	85%
	8 x FR-BU2-H75K	-	8 x MT-BR5-H75K	-	-	-	-	-	-	270%	230%	210%	175%	160%	130%	110%	100%

Dynamic Braking Unit & Resistor Specifications

Brake Unit Model Number		Stocked Item	Brake Resistor Model Number	Stocked Item	Weight - kg (lbs)	Resistance (Ohms)	Rated (Watts)	Continuous Permissible Power (Watts)
230V	FR-BU2-1.5K	S	BU-1500-TEIKOUKI	-	n/a	50	300	100
	FR-BU2-3.7K	S	BU-3700-TEIKOUKI	-	n/a	30	900	300
	FR-BU2-7.5K	S	BU-7.5K-TEIKOUKI	-	n/a	20	1800	600
	FR-BU2-15K	S	FR-BR-15K-UL	S	15 (33)	8	4000	990
	FR-BU2-30K	S	FR-BR-30K-UL	S	30 (66)	4	8000	1990
	FR-BU2-55K	-	FR-BR-55K-UL	-	70 (154)	2	16000	3910
460V	FR-BU2-H7.5K	S	2 x BU-3700-TEIKOUKI	-	n/a	60	1800	600
	FR-BU2-H15K	S	FR-BR-H15K-UL	S	15 (33)	32	4000	990
	FR-BU2-H30K	S	FR-BR-H30K-UL	S	30 (66)	16	8000	1990
	FR-BU2-H55K	S	FR-BR-H55K-UL	S	70 (154)	8	16000	3910
	FR-BU2-H75K	S	MT-BR5-H75K	-	70 (154)	6.5	30000	7500

FR-A800-E Dynamic Braking Units and Resistors - UFS Series

Not UL listed. For non-UL applications only.

- A more economical solution to regenerative braking applications.
- Internal Form-C relay
- Adjustable DC bus brake turn-on voltage
- Configurable master / slave brake configuration. Allows connection of up to 5 brake units (1 master / 4 slaves)

240V Series

		Motor Capacity									
Braking Torque	**Hp**	7.5	10	15	20	25	30	40	50	60	75
	kW	5.5	7.5	11	15	18.5	22	30	37	45	55
100% for 15 Secs.	**Brake Unit**	UFS22J					UFS40J		2 x UFS40J		
	Brake Resistor	RUFC15J			RUFC22J		RUFC40J		2 x RUFC40J		
Electrical Data	**Continuous Permissible Power (W)**	UFS22J - 1500W					UFS40J - 2000W		2ea x UFS40J - 4000W		
	Resistance (Overall)	RUFC15J - 24ohms			RUFC22J - 12ohms		RUFC40J - 7.5ohms		2ea x RUFC40J - 3.75ohms		
	Continuous Current (Amps)	7A			10A		14.6A		29.2A		

460V Series

		Motor Capacity								
Braking Torque	**Hp**	7.5	10	15	25	30	40	50	60	75
	kW	5.5	7.5	11	18.5	22	30	37	45	55
100% for 15 Secs.	**Brake Unit**	UFS22						UFS40		
	Brake Resistor	RUFC15/480		RUFC22/480				RUFC40/480		
Electrical Data	**Continuous Permissible Power (W)**	UFS22 - 2000W						UFS40 - 4000W		
	Resistance (Overall)	RUFC15/480 - 44ohms		RUFC22/480 - 27ohms				RUFC40/480 - 15ohms		
	Continuous Current (Amps)	6A		7.7A				14.6A		

		Motor Capacity						
Braking Torque	**Hp**	100	125	150	175	215	300	375
	kW	75	90	110	132	160	220	280
100% for 15 secs.	**Brake Unit**	UFS110				2 X UFS110		
	Brake Resistor	RUFC110/480				2 X RUFC110/480		
Electrical Data	**Continuous Permissible Power (W)**	UFS110 - 8000W				2 x UFS110 - 16000W		
	Resistance (Overall)	RUFC110/480 - 6.8ohms				2 x RUFC110/480 (1 per unit)		
	Continuous Current (Amps)	30.7A				61.4A		

Dimensions

Model Number		**Height**		**Width**		**Depth**		**Approximate Weight**		**Stocked Item**
		mm	**inches**	**mm**	**inches**	**mm**	**inches**	**kg**	**lbs**	
240V	**UFS20J**	250	9.8	100	3.9	175	6.9	2.5	5.5	S
	UFS40J									S
	RUFC15J	240	9.5			75	3	2.8	6.2	S
	RUFC22J	310	12.2					3.5	7.7	S
	RUFC40J	365	14.4					4.3	9.5	S
480V	**UFS22**	250	9.8	100	3.9	175	6.9	2.5	5.5	S
	UFS40									S
	UFS110			107	4.2	195	7.7	3.9	8.6	S
	RUFC15/480	310	12.2	100	3.9	75	3	3.5	7.7	S
	RUFC22/480	365	14.4					4.2	9.3	S
	RUFC40/480	2 x 365	2 x 14.4	2 x 100	2 x 3.9	2 x 75	2 x 3	8.7	19.2	S
	RUFC110/480	4 x 365	4 x 14.4	4 x 100	4 x 3.9	4 x 75	4 x 3	17.3	38.1	S

Maximum Dynamic Braking Values Using 3rd Party Resistors: 100% Duty Cycle (Drives with Internal Braking Transistors)

HP (ND)	Drive Model Number	Minimum Brake Resistor Value (Ohms)	Resistor Rating (kW)	Torque %
3/4	FR-A820-00046-E1N6	100	1.4	350
1	FR-A820-00077-E1N6	80	1.7	227
2	FR-A820-00105-E1N6	50	2.7	180
3	FR-A820-00167-E1N6	33	4.1	186
5	FR-A820-00250-E1N6	30	4.6	124
7.5	FR-A820-00340-E1N6	18	7.6	138
10	FR-A820-00490-E1N6	18	7.6	101
15	FR-A820-00630-E1N6	12	11.4	104
20	FR-A820-00770-E1N6	8.5	16.1	107
25	FR-A820-00930-E1N6	6.5	21.1	114
30	FR-A820-01250-E1N6	6.5	21.1	96
1/2	FR-A840-00023-E1N6	371	1.6	400
1	FR-A840-00038-E1N6	236	2.4	320
2	FR-A840-00052-E1N6	190	3	200
3	FR-A840-00083-E1N6	130	4.4	200
5	FR-A840-00126-E1N6	83	7	189
7.5	FR-A840-00170-E1N6	75	8.8	160
10	FR-A840-00250-E1N6	52	12.8	171
15	FR-A840-00310-E1N6	34	17	155
20	FR-A840-00380-E1N6	34	17	113
25	FR-A840-00470-E1N6	21	27.5	149
30	FR-A840-00620-E1N6	21	27.5	125
40	FR-A840-00770-E160	13.5	42.8	143
50	FR-A840-00930-E160	13.5	42.8	116
60	FR-A840-01160-E160	13.5	42.8	95
75	FR-A840-01800-E160	13.5	42.8	78
1	FR-A860-00027-E1N6	1000	0.9	120
3	FR-A860-00061-E1N6	370	2.4	109
5	FR-A860-00090-E1N6	220	4	108
10	FR-A860-00170-E1N6	110	8	107
15	FR-A860-00320-E1N6	60	14.7	98
30	FR-A860-00450-E1N6	40	22	100
50	FR-A860-00680-E160	24	36.7	99
75	FR-A860-01080-E160	16	55.1	100

FR-HEL DC Link Chokes (sold separately)

Model Number	HD	ND	LD	SLD
FR-A840-02160-E1U6	FR-HEL-H75K	FR-HEL-H75K	FR-HEL-H90K	FR-HEL-H110K
FR-A840-02600-E1U6	FR-HEL-H90K	FR-HEL-H90K	FR-HEL-H110K	FR-HEL-H132K
FR-A840-03250-E1U6	FR-HEL-H110K	FR-HEL-H110K	FR-HEL-H132K	FR-HEL-H160K
FR-A840-03610-E1U6	FR-HEL-H132K	FR-HEL-H132K	FR-HEL-H160K	FR-HEL-H185K
FR-A840-04320-E1U6	FR-HEL-H160K	FR-HEL-H160K	FR-HEL-H185K	FR-HEL-H220K
FR-A840-04810-E1U6	FR-HEL-H185K	FR-HEL-H185K	FR-HEL-H220K	FR-HEL-H250K
FR-A840-05470-E1U6	FR-HEL-H220K	FR-HEL-H220K	FR-HEL-H250K	FR-HEL-H280K
FR-A840-06100-E1U6	FR-HEL-H250K	FR-HEL-H250K	FR-HEL-H280K	FR-HEL-H315K
FR-A840-06830-E1U6	FR-HEL-H280K	FR-HEL-H280K	FR-HEL-H315K	FR-HEL-H355K

Dimensions FR-800-E Series Drives

Series	Frame Size	Height	Width	Depth
		Dimensions Inches (mm)		
FR-A800	A	12.2 (310)	4.3 (110)	4.4 (112)
	B	12.2 (310)	4.3 (110)	5.0 (127)
	C	12.5 (318)	5.9 (150)	5.6 (142)
	D	12.8 (324)	8.7 (220)	6.7 (170)
	E	14.3 (363)	8.7 (220)	7.5 (190)
	F	20.4 (517)	9.8 (250)	7.5 (190)
	G	21.7 (550)	12.8 (325)	7.7 (195)
	H	21.7 (550)	17.1 (435)	9.8 (250)
	J	24.4 (620)	18.3 (465)	11.8 (300)
	K	27.6 (700)	18.3 (465)	9.8 (250)
	L	29.1 (740)	18.3 (465)	14.2 (360)
	M	39.8 (1010)	19.6 (498)	15.0 (380)
	N	39.8 (1010)	26.8 (680)	15.0 (380)
FR-A842	P	52.4 (1330)	21.3 (540)	17.3 (440)
	Q	62.2 (1580)	26.8 (680)	17.3 (440)
FR-CC2	R	52.4 (1330)	23.6 (660)	17.3 (440)
	S	62.2 (1580)	23.6 (660)	17.3 (440)

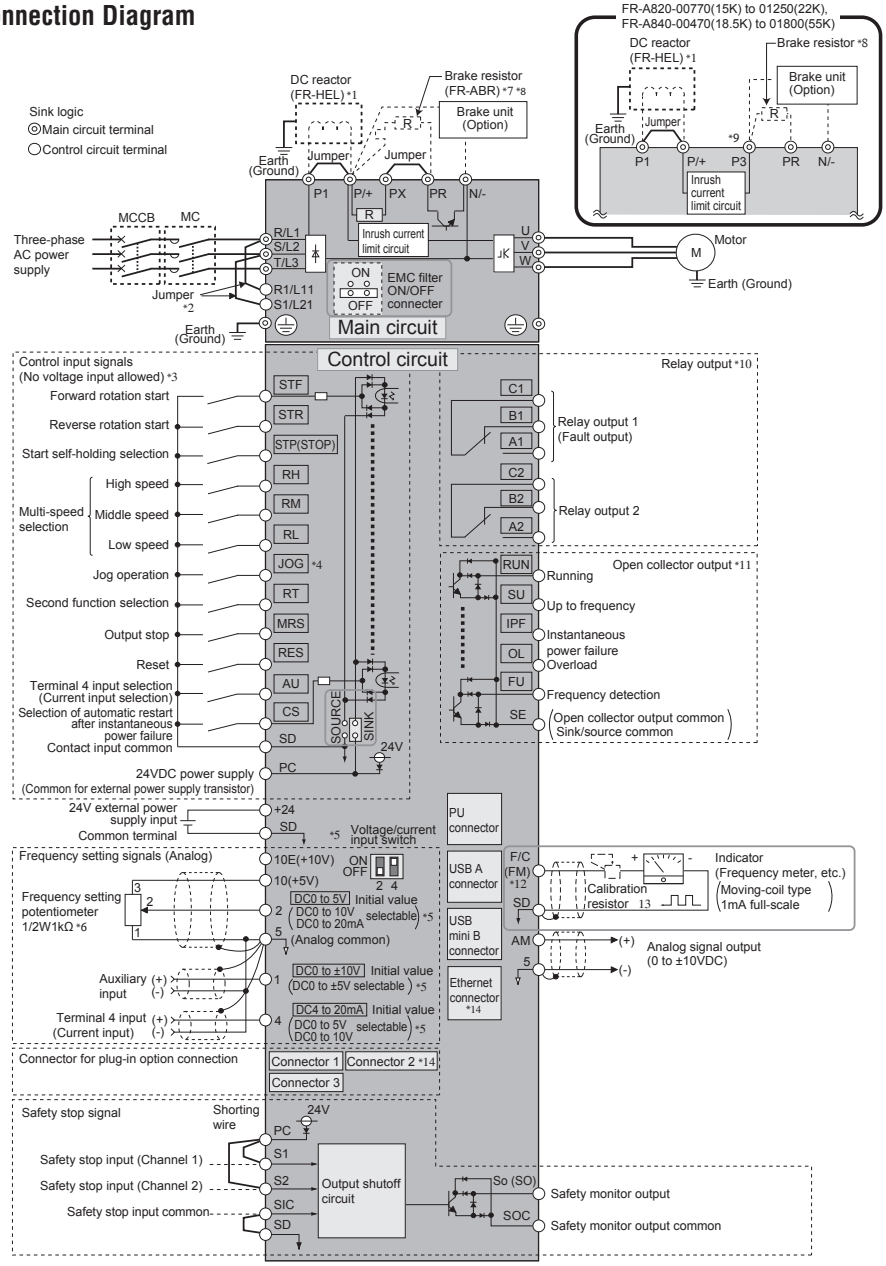
FR-A800-E General Specifications

Operation Specifications	Control Method		Soft-PWM control, high carrier frequency PWM control (selectable among V/F control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, vector control (*1), and PM sensorless vector control
	Output Frequency Range		0.2 to 590 Hz (The upper-limit frequency is 400 Hz under Advanced magnetic flux vector control, Real sensorless vector control, vector control (*1) and PM sensorless vector control.)
	Frequency Setting Resolution	Analog Input	0.015 Hz/60 Hz (0 to 10 V/12 bits for terminals 2 and 4) 0.03 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1) 0.06 Hz/60 Hz (0 to ±5 V/11 bits for terminal 1)
		Digital Input	0.01 Hz
	Frequency Accuracy	Analog Input	Within ±0.2% of the max. output frequency (25°C ± 10°C)
		Digital Input	Within 0.01% of the set output frequency
	Voltage / Frequency Characteristics		Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/F can be selected.
	Starting Torque (*2)		SLD Rating: 120% 0.3 Hz, LD Rating:150% 0.3 Hz, ND Rating: 200% 0.3 Hz (*3), HD Rating: 250% 0.3 Hz (*3) (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%, 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)
	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		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 (*4) , frequency jump, rotation display, automatic restart after instantaneous power failure, electronic bypass sequence, remote setting, automatic acceleration/deceleration, retry function, carrier frequency selection, fast-response current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, droop control, load torque high-speed frequency control, speed smoothing control, traverse, auto tuning, applied motor selection, gain tuning, RS-485 communication, Ethernet communication, PID control, PID precharge function, easy dancer control, cooling fan operation selection, stop selection (deceleration stop/coasting), powerfailure deceleration stop function, stop-on-contact control, PLC function, life diagnosis, maintenance timer, current average monitor, multiple rating, orientation control (*1), speed control, torque control, position control, pre-excitation, torque limit, test run, 24 V power supply input for control circuit, safety stop function, anti-sway control.
	Output Signals 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		50 kpps
Indication	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	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 Functions			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 (*4), Undervoltage (*4), Input phase loss (*4, *5), Stall prevention stop, Loss of synchronism detection (*5), Brake transistor alarm detection (*6), Output side earth (ground) fault overcurrent, Output short circuit, Output phase loss, External thermal relay operation (*5), PTC thermistor operation (*5), Option fault, Communication option fault, Parameter storage device fault, PU disconnection, Retry count excess (*5), CPU fault, Operation panel power supply short circuit, 24 VDC power fault, Abnormal output current detection (*5), Inrush current limit circuit fault (*4), Ethernet communication fault (*5), Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence (*5), Speed deviation excess detection (*1, *5), Signal loss detection (*1, *5), Excessive position fault (*1, *5), Brake sequence fault (*5), Encoder phase fault (*1, *5), 4 mA input fault (*5), Pre-charge fault (*5), PID signal fault (*5), Option fault, Opposite rotation deceleration fault (*5), Internal circuit fault, Abnormal internal temperature (*7), Magnetic pole position unknown (*1)
Warning Functions			Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Regenerative brake pre-alarm (*5, *6), Electronic thermal relay function pre-alarm, PU stop, Speed limit indication (*5), Parameter copy, Safety stop, Maintenance timer 1 to 3 (*5), USB host error, Home position return setting error (*5), Home position return uncompleted (*5), Home position return parameter setting error (*5), Operation panel lock (*5), Password locked (*5), Parameter write error, Copy operation error, 24 V external power supply operation, Internal fan alarm (*7), Continuous operation during communication fault, Ethernet communication fault
Environment	Ambient Temperature		-10°C to +50°C (non-freezing) (LD, ND, HD ratings) -10°C to +40°C (non-freezing) (SLD rating, IP55 compatible model)
	Ambient Humidity		95% RH or less (non-condensing) (With circuit board coating (conforming to IEC60721-3-3 3C2/3S2), IP55 compatible model) 90% RH or less (non-condensing) (Without circuit board coating)
	Storage Temperature (*8)		-20°C to +65°C (*2)
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude / Vibration		1000 m or lower (*9), 5.9 m/s2 (*10) or less at 10 to 55 Hz (directions of X, Y, Z axes)

Notes:

1. Available only when a vector control compatible option is installed.
2. For PM sensorless vector control, refer to the Instruction Manual (Detailed) of the FR-A800 inverter.
3. 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.
4. Enabled only for standard models and IP55 compatible models.
5. This protective function is not available in the initial status.
6. Enabled only for standard models.
7. Available for the IP55 compatible model only.
8. Temperature applicable for a short time, e.g. in transit.
9. For the installation at an altitude above 1000 m (up to 2500 m), consider a 3% reduction in the rated current per altitude increase of 500 m.
10. 2.9 m/s² or less for the FR-A840-04320(160K) or higher.

FR-A800-E Terminal Connection Diagram



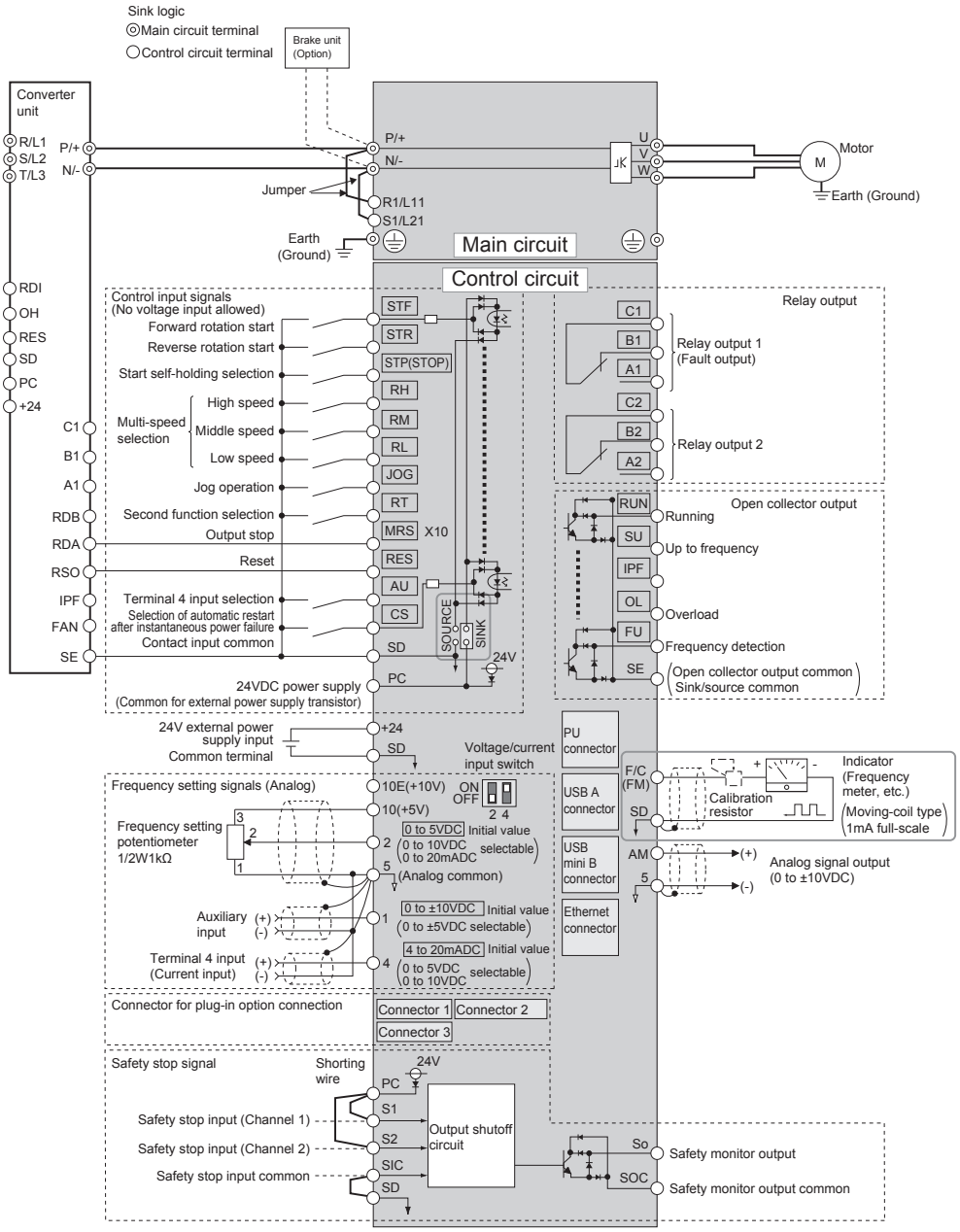
Notes:

1. 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 (FR-HEL), which is available as an option. (To select a DC reactor, refer to page 26, and select one according to the applicable motor capacity.) When a DC reactor is connected to the FR-A820-03160(55K) or lower or the FR-A840-01800(55K) or lower, if a jumper is installed across 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) (Refer to the FR-A800 Instruction Manual (Detailed).)
6. It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
7. If connecting a brake resistor, remove the jumper between PR and PX (FR-A820-00046(0.4K) to 00490(7.5K), FR-A840-00023(0.4K) to 00250(7.5K)).
8. Connect a brake resistor across terminals P/+ (P3) and PR. (Terminal PR is equipped in FR-A820-00046(0.4K) to 01250(22K), FR-A840-00023(0.4K) to 01800(55K).) Install a thermal relay to prevent overheating and damage of discharging resistors. (Refer to the FR-A800 Instruction Manual (Detailed).)
9. Do not connect the DC power supply (under DC feeding mode) to terminal P3.
10. The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).
11. The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).
12. Terminal F/C (FM) can be used to output pulse trains as open collector output by setting Pr.291.
13. Not required when calibrating the scale with the operation panel.
14. The option connector 2 cannot be used because the Ethernet board is installed in the initial status. The Ethernet board must be removed to install a plug-in option to the option connector 2. (However, Ethernet communication is disabled in that case.)

ADDITIONAL NOTES

- To prevent a malfunction due to noise, keep the signal cables 10 cm or more away from the power cables. Also, separate the main circuit cables at the input side from the main circuit cables at the output side.
- After wiring, wire offcuts must not be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take caution not to allow chips and other foreign matter to enter the inverter.
- Set the voltage/current input switch correctly. Incorrect setting may cause a fault, failure or malfunction.

FR-A802 Terminal Connection Diagram



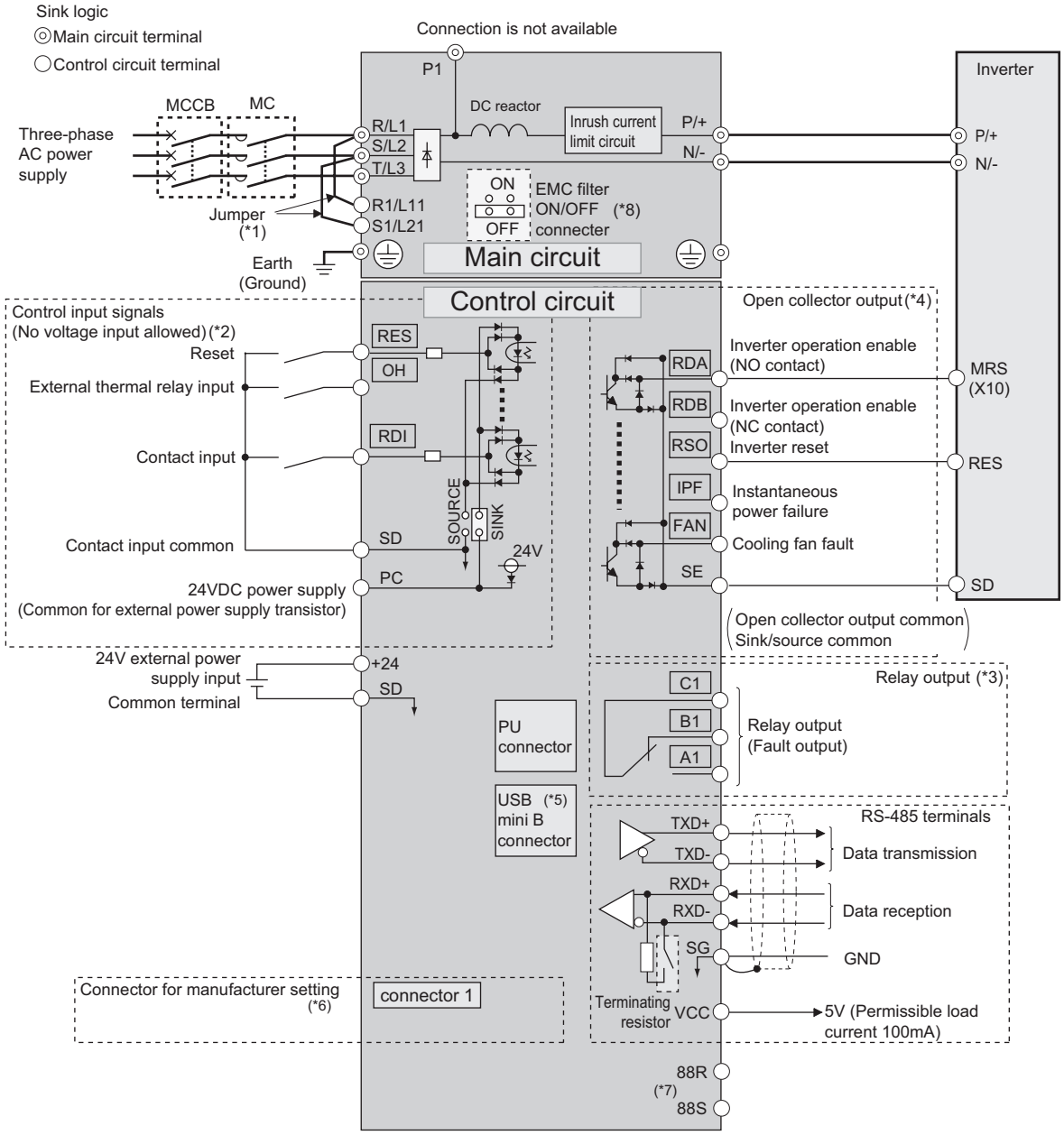
Notes:

1. Terminals R1/L11 and S1/L21 are connected to 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 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 (0 to 5 V/0 to 10 V), set the voltage/current input switch OFF. To input a current (4 to 20 mA), set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. (Pr.561)
6. It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
7. The function of these terminals can be changed 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. Terminal FM can be used to output pulse trains as open collector output by setting Pr.291.
11. Not required when calibrating the scale with the operation panel.
12. The option connector 2 cannot be used because the Ethernet board is installed in the initial status. The Ethernet board must be removed to install a plug-in option to the option connector 2. (However, Ethernet communication is disabled in that case.)

ADDITIONAL NOTES

- To prevent a malfunction due to noise, keep the signal cables 10 cm or more away from the power cables. Also, separate the main circuit cables at the input side from the main circuit cables at the output side.
- After wiring, wire offcuts must not be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take caution not to allow chips and other foreign matter to enter the inverter.
- Set the voltage/current input switch correctly. Incorrect setting may cause a fault, failure or malfunction.

FR-CC2-H, FR-CC2-C Diode Converter Stage Terminal Connection Diagram



Notes:

1. 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, Pr.187, Pr.189).
3. The function of these terminals can be changed with the output terminal assignment (Pr.195).
4. The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).
5. The connector is for manufacturer setting. Do not use.
6. Plug-in options cannot be used.
7. For manufacturer setting. Do not use.
8. For the FR-CC2-H400K or higher, two EMC filter ON/OFF connectors are provided.

FR-A800-E Options and Accessories

Model Number	Description	Comments	Stocked Item
FR-A8AP	Encoder Feedback Card	Provides 1500:1 speed range and positioning control in Vector Mode	S
FR-A8AL	Encoder Feedback Card, Orient, Vector Position Control and Encoder Dividing Output	Multi function feedback option – includes 1500:1 speed range and positioning control in vector mode, Ideal for spindle orient and machine tool	S
FR-A8TP	Vector Control Terminal Block	Enables encoder feedback on I/O terminal block instead of option card slot, combine with FR-A8AP for orient control	S
FR-A8ERS-60	A/F800 Series RS485 Option Card		S
FR-A8AX	16 Bit Digital Input Card	BCD or Binary input	S
FR-A8AY	Digital Output / Extended Analog Output Card	2 extra 0-20 mA or 0-10V output signals	S
FR-A8AR	Relay Output Card	3 extra independent type 'C' relays	S
FR-A8AZ	High Res. Analog / Thermistor input Card		-
FR-A8AC	A/F800 120V Control Option		S
FR-A8AN	F/A800 4-20mA I/O Card		S
FR-A8APR	Resolver Interface / Orientation Card		-
FR-A8APS	Absolute Encoder Option	EnDat 2.x Interface	S
FR-A8NC	CC-Link Communications Card	A6CON-L5P / A6CON-TR11N connectors not included with Option card (Sold Separately)	S
FR-A8ND	DeviceNet Communications Card		S
FR-A8NP	Profibus DPV0 Communications Card		S
A8NDPV1	Profibus DPV1 Communications Card		S
FR-A8NF	FL-Net Communications Card		S
A8N-XLT	Muli-protocol RS485 Communications Card	(BACnet® MS/TP), Siemens FLN (P1), Metasys® N2	S
FR-A8NS	SSCNET III / F Communications Card		-
A8NEIP-2P	EtherNET IP™ Communications Card		S
A8NPRT-2P	PROFINET® Communications Card		S
FR-A8NCN	ControlNet™ Communications Card		S
FR-A8NCE	CC-Link® IE Communications Card		S
FR-A8NCA	CanOpen Communication Card		-
FR-A8NL	LonWorks Communication Card		S
A8NECT-2P	EtherCAT® Communications Card		S
A8NETH-2P	Multi-protocol EtherNET Communications Card	EtherNET IP, Modbus TCP/IP, Profinet, BACnet IP	S
FR-LU08	Liquid Crystal Operation Panel	Mount on VFD or panel	S
FR-PU07, FR-PU07-01	Parameter Unit	Mount on panel only. FR-PU07-1 is for HVAC	S
FR-PU07BB-L	Parameter Unit with Battery Back-up	Hand held. Can program unpowered drives	S
FR-CB20_ (_ = 1, 3 or 5)	Parameter Unit Connection Cable	1, 3 or 5 meter lengths	S
FR-ADP	Keypad Adaptor Unit	Connect FR-DU08 or FR-LU08 to FR-CB2	S
FR-A8TAT	Control Terminal Block Adaptor	Use A500 or A700 terminal block with A800	S
FR-A8TR	Screw Terminal Block Option	Screw Terminal Block Option	S
FR-ABR	High Duty Brake Resistor	Use with drives 30HP or below (ND rating)	S
FR-BR	Brake Resistor	Use with drives 75HP or below (ND rating)	S
MT-BR5	Brake Resistor	Use with drives 100HP or below (ND rating)	S
FR-CV, FR-CVL	Regenerative Controller	Use with drives 75HP or below (ND rating)	S
MT-RC	Regenerative Controller	Use with drives 100HP or ABOVE (ND rating)	-
FR-HC2	Zero Harmonic Controller	Available for all sizes	S
FR-HEL, FR-HEL-H, FR-HEL-C	DC Link Choke	Use in accordance with selection guide	S
FR-CONFIGURATOR2	Software Setup Utility for FR-800 Series		S

External Heatsink Attachment

Drive Model F/A820	Drive Model F/A840	Model Number	Stocked Item
00105, 00167, 00250	00023, 00038, 00052, 00083, 00126	FR-A8CN01	S
00340, 00490	00170, 00250	FR-A8CN02	S
00630	00310, 00380	FR-A8CN03	S
00770, 00930, 01250	00470, 00620	FR-A8CN04	S
01540	00770	FR-A8CN05	S
01870, 02330	00930, 01160, 01800	FR-A8CN06	S
03160	-	FR-A8CN07	S
03800, 04750	03250, 03610	FR-A8CN08	S
-	02160, 02600	FR-A8CN09	S

NEMA 1 Conduit Mounting Kits for A and FR-F800 Series Drives

Kits have provision for DC link choke installation (Drives in frame sizes A to F do not require a separate kit)

Model Number	A/F820	A/F840	Frame Size
AF8FN-G	01540	00770	G
AF8FN-H	01870	00930	H
	02330	01160	
	-	01800	
AF8FN-J	-	02160	J
	-	02600	
AF8FN-K	03160	-	K
AF8FN-L	03800	03250	L
	04750	03610	
AF8FN-M	-	04320	M
	-	04810	
AF8FN-N	-	05470	N
	-	06100	
	-	06830	

FR-A800 Plus Program

FR-A800 Plus takes the outstanding performance and functionality of the regular FR-A800 VFD and combines it with special firmware to make a drive dedicated to specific industry sectors. For main specifications please refer to the standard FR-A800 section. Note that FR-A800 Plus is not currently available as a 600V version.

FR-A800CRN Crane Control version of FR-A800 includes:

- **Anti-Sway Control –** Eliminates swinging loads caused by speed changes during load handling, ensuring smoother operation and reduced 'tact' time
- **Shortest Time Start-up Feature –** Adapts to changing load masses
- **Dedicated Sequencing System –** Interface with mechanical brakes during raising and lowering
- **Falling Load Detection –** Detects unexpected load dropping
- **Hoist and Travel Control –** Coordinates lifting and traveling operations

FR-A800R2R Roll-to-Roll version of FR-A800 for wind/unwind and tension control applications includes:

- **Diameter Calculation Capability –** Detects initial roll diameter and calculates diameter change during operation
- **Dedicated PI Control System –** Ensures smooth tension control
- **Process Compensation –** Adjusts for load inertia during speed changes
- **Break Detection –** Detects a breakage in material between rolls
- **Taper Function –** Allows a gradual change in tension to avoid wrinkling or stretching of films as the load diameter changes
- **SND Rating –** An extra duty rating which allows higher operating current than ND rating while still allowing 150% motor current overload for 60 seconds (short time overload is removed)

Part Number System

The basic part numbering system is the same as for the standard drives but includes a suffix at the end.

A ❶ - ❷ -1- ❸

❶ Max Load Capacity

Symbol	Voltage Class
820	240V Class
840	480V Class
842	480V Class

*Inverter stage only. Use in conjunction with FR-CC2.

❷ Capacity

Symbol
See FR-A800 section for available capacities.

❸ Control

Symbol	Control
N6CRN	Class Crane Control
60CRN	Class Crane Control
U6CRN	Class Crane Control*
N6R2R	Class Roll-toRoll Control
60R2R	Class Roll-toRoll Control
U6R2R	Class Roll-toRoll Control*

FR-A846 - NEMA 12 Version of FR-A800

FR-A846 takes the performance and high specification of the regular FR-A840 VFD and packages it in a robust NEMA 12 (IP55) enclosure that makes it as simple to install as a stand-alone VFD in dirty or damp environments. Drives are available in sizes from 1 to 200HP (250HP for pumping applications).

- Simple to install close to the motor – reduces stress on windings and bearings
- Supplied complete with DC link chokes for improved power quality
- EMC filter built-in to ensure low levels of radio noise
- Special waterproof keypad included for easy set-up in the field
- Compatible with all FR-A800 option cards
- Robust gland plate design for easy cable connection

Model Number	Amps for Duty		HP for Duty		Frame Size (H x W x D) mm	Protective Rating	Stocked Item
	LD	ND	LD	ND			
A846-00023-1-60C3	2.1	1.5	1	0.5	A (508 x 238 x 271)	NEMA 12, UL-12, IP55	-
A846-00038-1-60C3	3	2.5	2	1			S
A846-00052-1-60C3	4.8	4	3	2			-
A846-00083-1-60C3	7.6	6	5	3			-
A846-00126-1-60C3	11.5	9	7.5	5			S
A846-00170-1-60C3	16	12	10	7.5			-
A846-00250-1-60C3	23	17	15	10	B (650 x 238 x 285)		S
A846-00310-1-60C3	29	23	20	15			-
A846-00380-1-60C3	35	31	25	20			S
A846-00470-1-60C3	43	38	30	25			S
A846-00620-1-60C3	57	44	40	30	C (790 x 345 x 357)		-
A846-00770-1-60C3	70	57	50	40			-
A846-00930-1-60C3	85	71	60	50			-
A846-01160-1-60C3	106	86	75	60			-
A846-01800-1-60C3	144	110	100	75	D (1360 x 420 x 456.6)		-
A846-02160-1-60C3	180	144	150	100			-
A846-02600-1-60C3	216	180	150	150			-
A846-03250-1-60C3	260	216	200	150	E (1510 x 420 x 456.6)		-
A846-03610-1-60C3	325	260	250	200			-