

FR-F800 Series

The FR-F800 Series is a VFD range which has been optimized for maximum energy savings with pump and fan control. FR-F800 is equally at home in an industrial environment or in the residential / commercial sector as part of an integrated HVAC solution.

- **NEMA 1 / UL-1 rated:** FR-F800 is Plenum-Rated and can be mounted as a stand-alone unit when required – no need to provide a separate enclosure*
- **Built-in BACnet MS/TP or Modbus RTU communications:** Capability for simple integration into HVAC communication networks
- **Built-in filter:** Limits the effects of radio noise on sensitive equipment
- **Built-in PLC:** Allows the drive to be customized to individual requirements and can avoid the need to have a separate master controller
- **Optimum Excitation Control:** FR-F800 uses vector drive technology to calculate motor load and ensures maximum energy savings, even if motor loading changes
- **3 programmable skip frequencies:** Avoid points of mechanical resonance in ducting and pipework.
- **Drive settings can be uploaded or downloaded:** Using a standard USB memory stick
- **Real-time clock:** Drive trip messages are 'time stamped' for diagnostic purposes **
- **Bi-Directional Coasting Motor Restart:** FR-F800 can safely 'catch' and control a motor which is already spinning (in either direction) on start-up.
- **Advanced PID control features:**
 - 2 Independent PID loops
 - Pre-Charge Mode
 - Sleep Mode
 - Multiple Motor control (up to 4)
 - Selectable response to 'loss of signal'
- Control of high efficiency IPM motors
- **Advanced Power Monitoring Capability:** Including pulse train output
- **UL-approved rating:** For single phase operation (coming soon)
- **Out-of-range warning system:** Detects broken drive belts and other potential mechanical problems



Notes

* Drive Sizes up to 40HP

** Requires the use of the FR-LU08 keypad

FR-F800 Ratings, 240V Class

Model Number	AMPS for Duty		HP For Duty (NEC)		Frame Size	Weight (lbs)	Cooling Method	Protective Rating	Stocked Item
	SLD	LD	SLD	LD					
FR-F820-00046-3-N6	4.6	4.2	1	1	A	6	Self-Cooling	UL Type 1- Plenum Rated	S
FR-F820-00077-3-N6	7.7	7	2	2	B	6			S
FR-F820-00105-3-N6	10.5	9.6	3	3	C	9			S
FR-F820-00167-3-N6	16.7	15.2	5	5	C	9			S
FR-F820-00250-3-N6	25	23	7.5	7.5	C	9			S
FR-F820-00340-3-N6	34	31	10	10	D	17			S
FR-F820-00490-3-N6	49	45	20	15	D	17			S
FR-F820-00630-3-N6	63	58	20	20	E	20			S
FR-F820-00770-3-N6	77	70.5	25	25	F	37			S
FR-F820-00930-3-N6	93	85	30	30	F	37			S
FR-F820-01250-3-N6	125	114	40	40	F	37	Forced Air Cooling	IP00	S
FR-F820-01540-3-60	154	140	60	50	G	48			S
FR-F820-01870-3-60	187	170	60	60	H	92			S
FR-F820-02330-3-60	233	212	75	75	H	92			S
FR-F820-03160-3-60	316	288	125	100	K	119			S
FR-F820-03800-3-U6	380	346	150	125	L	163			S
FR-F820-04750-3-U6	475	432	150	150	L	163			-

Note: 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	LD	SLD
FR-F820-03160-3-60	FR-HEL-75K	FR-HEL-90K
FR-F820-03800-3-U6	FR-HEL-90K	FR-HEL-110K
FR-F820-04750-3-U6	FR-HEL-110K	FR-HEL-110K

FR-F800 Ratings, 480V Class

Model Number	AMPS for Duty		HP For Duty (NEC)		Frame Size	Weight (lbs) (*1)	Cooling Method	Protective Rating	Stocked Item
	SLD	LD	SLD	LD					
FR-F840-00023-3-N6	2.3	2.1	1	1	C	8	Self - Cooling	UL Type 1 – Plenum Rated	S
FR-F840-00038-3-N6	3.8	3	2	2	C	8			S
FR-F840-00052-3-N6	5.2	4.8	3	3	C	8			S
FR-F840-00083-3-N6	8.3	7.6	5	5	C	9			S
FR-F840-00126-3-N6	12.6	11.5	7.5	7.5	C	9			S
FR-F840-00170-3-N6	17	16	10	10	D	17			S
FR-F840-00250-3-N6	25	23	15	15	D	17			S
FR-F840-00310-3-N6	31	29	20	20	E	20			S
FR-F840-00380-3-N6	38	35	25	25	E	20			S
FR-F840-00470-3-N6	47	43	30	30	F	37			S
FR-F840-00620-3-N6	62	57	40	40	F	37	S		
FR-F840-00770-3-60	77	70	60	50	G	51	Forced Air Cooling	IP00	S
FR-F840-00930-3-60	93	85	60	60	H	90			S
FR-F840-01160-3-60	116	106	75	75	H	90			S
FR-F840-01800-3-60	180	144	150	100	H	95			S
FR-F840-02160-3-U6	216	180	150	150	J	114			S
FR-F840-02600-3-U6	260	216	200	150	J	121			S
FR-F840-03250-3-U6	325	260	250	200	L	156			S
FR-F840-03610-3-U6	361	325	300	250	L	172			S
FR-F840-04320-3-U6	432	361	350	300	M	257			S
FR-F840-04810-3-U6	481	432	400	350	M	257			S
FR-F840-05470-3-U6	547	481	450	400	N	365			S
FR-F840-06100-3-U6	610	547	500	450	N	365			S
FR-F840-06830-3-U6	683	610	550	500	N	365			S
FR-F842-07700-3-U6 + FR-CC2-H355K-60	-	683	-	550	P+R	827			S
FR-F842-07700-3-U6 + FR-CC2-H400K-60	770	-	650	-	P+S	979			S
FR-F842-08660-3-U6 + FR-CC2-H400K-60	-	770	-	650	P+S	979			S
FR-F842-08660-3-U6 + FR-CC2-H450K-60	866	-	700	-	P+S	986			S
FR-F842-09620-3-U6 + FR-CC2-H450K-60	-	866	-	700	Q+S	1162			S
FR-F842-09620-3-U6 + FR-CC2-H500K-60	962	-	800	-	Q+S	1168			S
FR-F842-10940-3-U6 + FR-CC2-H500K-60	-	962	-	800	Q+S	1168			S
FR-F842-10940-3-U6 + FR-CC2-H560K-60	1094	-	900	-	Q+S	1168	S		
FR-F842-12120-3-U6 + FR-CC2-H560K-60	-	1094	-	900	Q+S	1168	S		
FR-F842-12120-3-U6 + FR-CC2-H630K-60	1212	-	1000	-	Q+S	1168	S		

Note 1: Weights of the drive and the CC2 modules are COMBINED. Drives in Shaded Area MUST be used together with FR-HEL-H DC Link Choke (sold separately).

FR-F800 Ratings, 600V Class

Model Number (*3)	AMPS for Duty		Horsepower for Duty (NEC)		Frame Size	Weight (lbs)	Cooling Method	Protective Rating	Stocked Item
	SLD	LD	SLD	LD					
FR-F860-00027-3-N6	2.7	2.5	2	1.5	C	11.7	Self Cooling	Enclosed Type (UL-1 plenum rated)	S
FR-F860-00061-3-N6	6.1	5.6	5	3	C	12.8	S		
FR-F860-00090-3-N6	9	8.2	5	5	C	12.8	S		
FR-F860-00170-3-N6	17	16	15	15	D	15.4	S		
FR-F860-00320-3-N6	32	27	20	20	E	19.8	S		
FR-F860-00450-3-N6	45	41	40	40	F	37.4	S		
FR-F860-00680-3-60	68	62	60	60	H	79.2	S		
FR-F860-01080-3-60 (*1)	108	99	100	100	H	90.2	S		
FR-F860-01440-3-60 (*1)	144	131	150	125	J	114	S		
FR-F860-01670-3-60 (*1)	167	152	150	150	J	114	S		
FR-F860-02430-3-60 (*1)	242	221	250	200	J	121	S		
FR-F860-02890-3-60 (*1)	288	254	250	250	M	246	S		
FR-F860-03360-3-60 (*1)	335	303	300	300	M	253	S		
FR-F860-04420-3-60 (*1)	441	401	450	400	N	337	S		
FR-F862-05450-3-60+ FR-CC2-C355K-60 (*2)	543	494	500	500	P+R	810	S		
FR-F862-06470-3-60+ FR-CC2-C400K-60 (*2)	647	589	600	500	Q+S	920	S		
FR-F862-08500-3-60+ FR-CC2-C560K-60 (*2)	850	773	800	750	Q+S	1126	S		

Notes:

1. These drives MUST be used with a DC Link Choke (sold separately).
2. FR-F862 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. The FR-F860 does not include a built-in parameter unit. The FR-DU08 or FR-LU08 is sold separately.

480V FR-HEL-H DC Link Chokes (sold separately)

Model Number	LD	SLD
FR-F840-01800-3-60	FR-HEL-H75K	FR-HEL-H90K
FR-F840-02160-3-U6	FR-HEL-H90K	FR-HEL-H110K
FR-F840-02600-3-U6	FR-HEL-H110K	FR-HEL-H132K
FR-F840-03250-3-U6	FR-HEL-H132K	FR-HEL-H160K
FR-F840-03610-3-U6	FR-HEL-H160K	FR-HEL-H185K
FR-F840-04320-3-U6	FR-HEL-H185K	FR-HEL-H220K
FR-F840-04810-3-U6	FR-HEL-H220K	FR-HEL-H250K
FR-F840-05470-3-U6	FR-HEL-H250K	FR-HEL-H280K
FR-F840-06100-3-U6	FR-HEL-H280K	FR-HEL-H315K
FR-F840-06830-3-U6	FR-HEL-H315K	FR-HEL-H355K

600V FR-HEL-C DC Link Chokes (sold separately)

Model Number	SLD	LD
FR-F860-01080-3-60	FR-HEL-C75K	FR-HEL-C75K
FR-F860-01440-3-60	FR-HEL-C90K	FR-HEL-C90K
FR-F860-01670-3-60	FR-HEL-C110K	FR-HEL-C110K
FR-F860-02430-3-60	FR-HEL-C132K	FR-HEL-C132K
FR-F860-02890-3-60	FR-HEL-C185K	FR-HEL-C185K
FR-F860-03360-3-60	FR-HEL-C220K	FR-HEL-C220K
FR-F860-04420-3-60	FR-HEL-C280K	FR-HEL-C280K

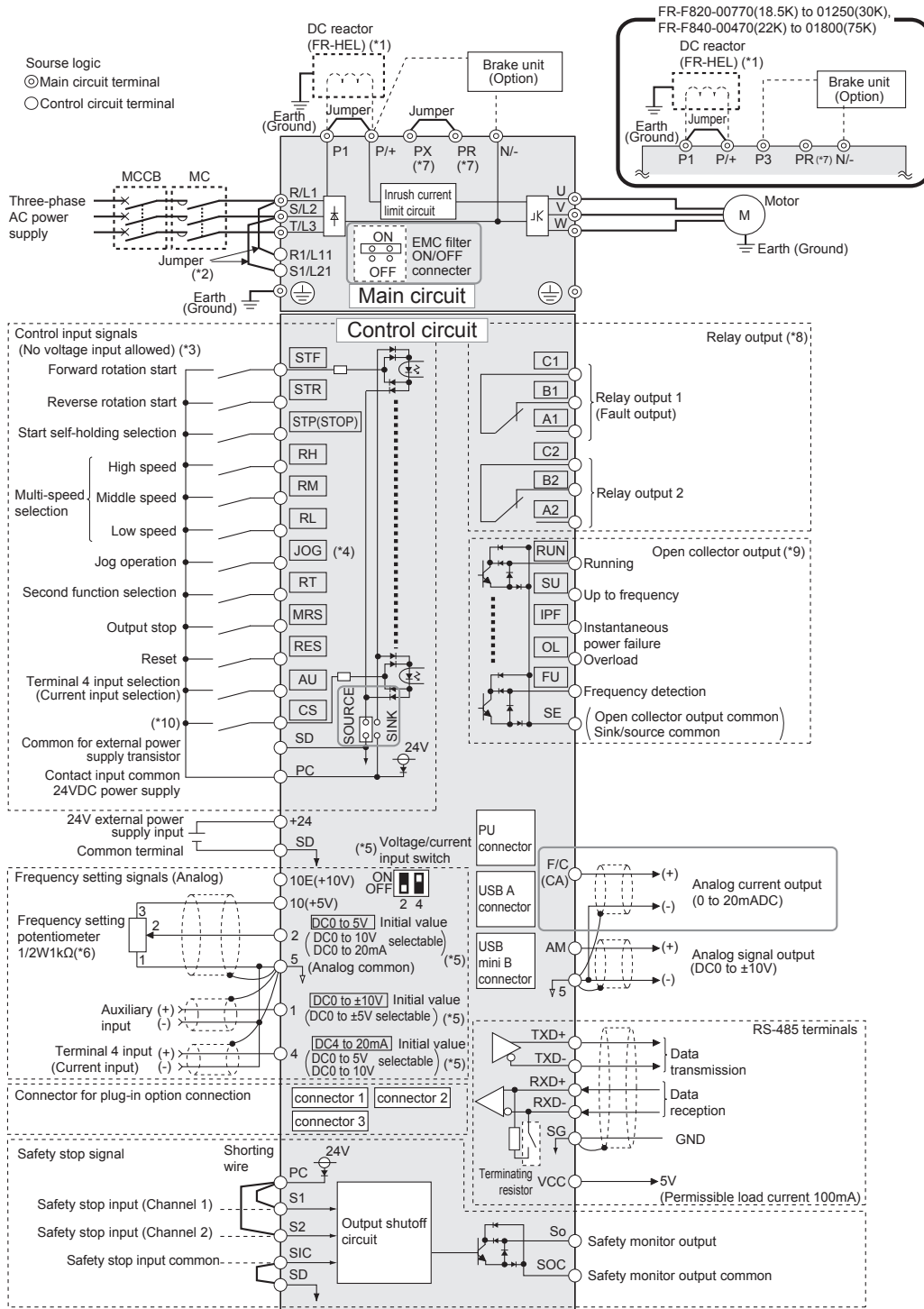
FR-F800 General Specifications

Operation 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	0.01Hz
	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)
	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		Start signal Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.	
Input Signal		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		100kpps	
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 Signals	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		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. 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	Ambient Temperature		-10°C to +50°C (non-freezing) (LD rating) -10°C to +40°C (non-freezing) (SLD rating)
	Ambient 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)

Notes:

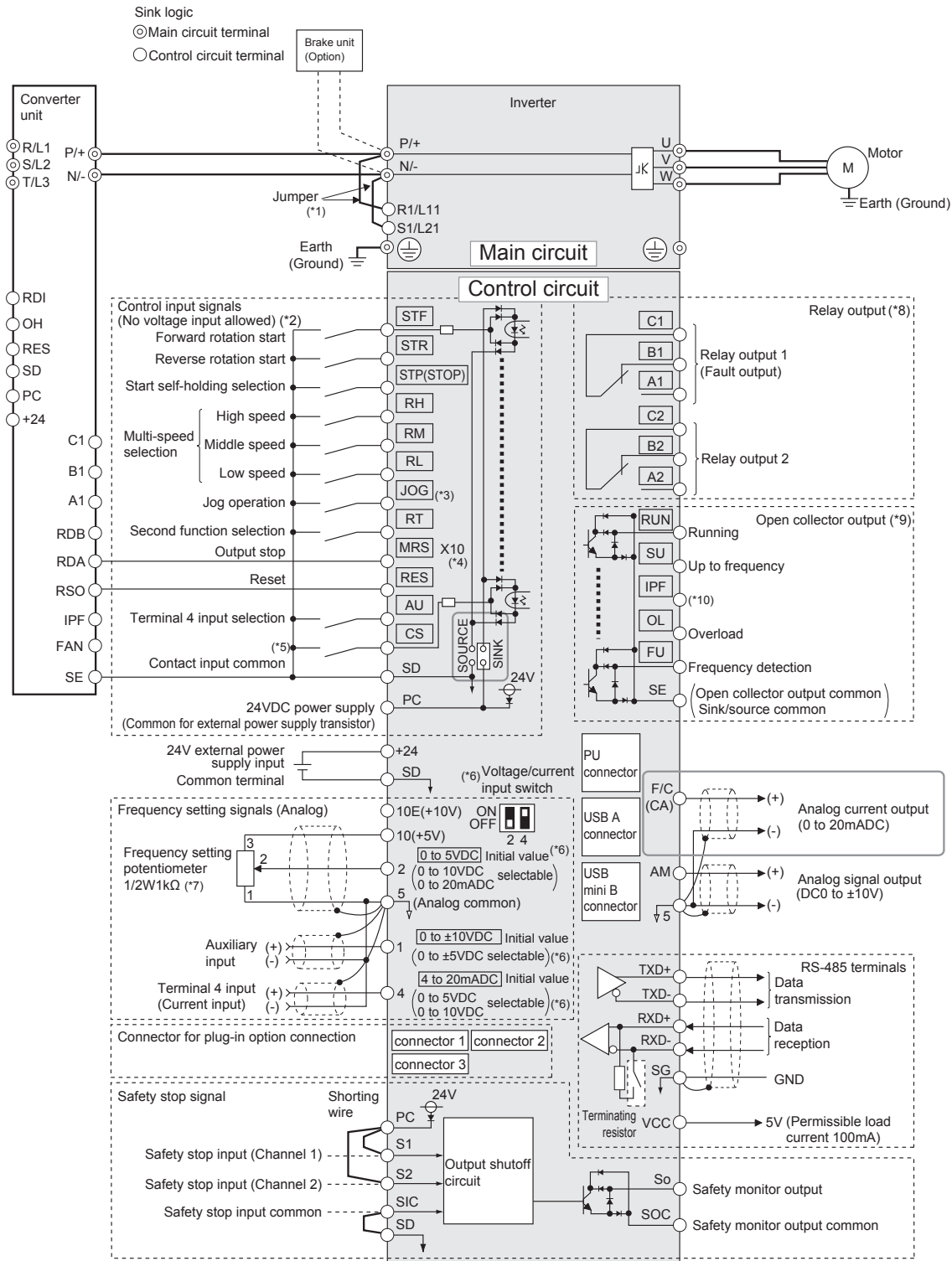
1. Available only for the standard model.
2. This protective function is not available in the initial status.
3. Temperature applicable for a short time, e.g. in transit.
4. For the installation at an altitude above 1,000 m (up to 2,500 m), derate the rated current 3% per 500 m.
5. 2.9 m/s² or less for the FR-F840-04320(185K) or higher.

FR-F800 Series Terminal Connection Diagram (Version with 0-20mA Analog Output Signal) CA Type



- Notes:**
- 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.
 - When using separate power supply for the control circuit, remove the jumper between R1/L11 and S1/L21.
 - The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.189).
 - Terminal JOG is also used as the pulse train input terminal. Use Pr.291 to choose JOG or pulse.
 - 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)
 - It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
 - Do not use terminals PR and PX. Do not remove the jumper connected to terminals PR and PX.
 - The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).
 - The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).
 - No function is assigned in the initial status. Assign the function using Pr.186 CS terminal function selection.

FR-F802 Series Terminal Connection Diagram (Version with 0-20mA Analog Output Signal)



Notes:

- 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.
- The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.189).
- Terminal JOG is also used as the pulse train input terminal. Use Pr.291 to choose JOG or pulse.
- 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.
- No function is assigned in the initial setting. Use Pr.186 for function assignment.
- 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)
- It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.
- The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).
- The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).
- No function is assigned in the initial setting. Use Pr.192 for function assignment.
- The terminal F/C (FM) can be used to output pulse trains as open collector output by setting Pr.291.
- Not required when calibrating the scale with the operation panel.

FR-F800 Dimensions – Frame Size Key Dimensions, 230V and 480V Drives

Series		Height mm (in)	Width mm (in)	Depth mm (in)
FR-F800	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 (141.6)
	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)
	FR-F842	P	52.4 (1330)	21.3 (540)
Q		62.2 (1580)	26.8 (680)	17.3 (440)
FR-CC2-H	R	52.4 (1330)	23.6 (600)	17.3 (440)
	S	62.2 (1580)	23.6 (600)	17.3 (440)

FR-F800 Series Options and Accessories

Model Number	Description	Comments	Stocked Item
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-A8AC	A/F800 120V Control Option		S
FR-A8AN	F/A800 4-20mA I/O Card		S
FR-A8NC	CC-Link® Communications Card		S
A8NC-CON	CC-Link® Communications Card and Connectors		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	Multi-protocol RS-485 Communications Card	(BACnet MS/TP), Siemens FLN (P1), Metasys N2	S
A8NEIP-2P	EtherNET™ IP Communications Card		S
A8NPRT-2P	Profinet® Communications Card		S
FR-A8NCE	CC-Link® IE Communications 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 FR-A500 or FR-A700 terminal block with FR-A800	S
FR-A8TR	Screw Terminal Block Option	Screw Terminal Block Option	S
FR-HC2	Zero Harmonic Controller	Available for all sizes	S
FR-HEL, FR-HEL-H, FR-HEL-C	DC Link Chokes	Use in accordance with selection guide	S
FR-CONFIGURATOR2	Software setup utility for 800 Series		S

Dimensions of REQUIRED DC Link Chokes (sold separately)

Model Number	Height in (mm)	Width in (mm)	Depth in (mm)	Weight (lbs)
FR-HEL-75K	13.39 (340)	5.91 (150)	7.87 (200)	37.4
FR-HEL-90K	13.39 (340)	5.91 (150)	7.87 (200)	41.8
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)	35.2
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)	48.4
FR-HEL-H132K	15.94 (405)	6.89 (175)	7.87 (200)	57.2
FR-HEL-H160K	15.94 (405)	6.89 (175)	8.07 (205)	61.6
FR-HEL-H185K	15.94 (405)	6.89 (175)	9.45 (240)	63.8
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)	83.6
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