FR-A800 series frequency inverters

The FR-A800 series is pure high technology. This generation of Mitsubishi Electric inverters combines innovative functions and reliable technology with maximum power, economy, and flexibility. Among many other features, like the possibility to run vector control also in LD/SLD, or a 100 % ED brake transistor up to 55 kW, Online Autotuning for outstanding speed/torque accuracy, excellent smooth running performance of a synchronous motor, built-in STO emergency stop and a large number of digital/analog inputs and outputs.

The FR-A800-E series inverter has an integrated interface for Ethernet communication, which enables monitoring of the inverter status or setting of parameters via a network.

Various frequency inverters of the FR-A800 series are operated with a separate converter unit (FR-CC2).

FR-A800-E

The FR-A800-E frequency inverters are equipped with an integrated Ethernet interface with 100 MBit/s. This enables simple integration into an existing network and offers communication via Modbus® TCP/IP or CC-Link IE Field Basic networks as standard. Multiple protocols and inverter-to-inverter communication are also supported. Due to the standard Ethernet interface, the FR-A800-E frequency inverters are equipped with one serial interface. The frequency inverters FR-A870-E have a compact design and in addition, an EMC filter and a DC choke are integrated.

FR-F840/842-E-SCM

The SCM Kit-DRIVES offers a ready-made integrated condition monitoring solution. The combination of the three powerful individual components frequency inverter, operating display and a pre-assembled vibration sensor makes this possible. The frequency inverter included in the package is your joker for all drive tasks. The system can be extended with up to two sensors. Commissioning can be carried out simply by means of an operating display, even without expert knowledge in the field of condition monitoring.

Power range:

FR-A820-E,0,4– 90 kW, 200–240 V AC,

FR-A840-E:0,4–280 kW, 380–500 V AC

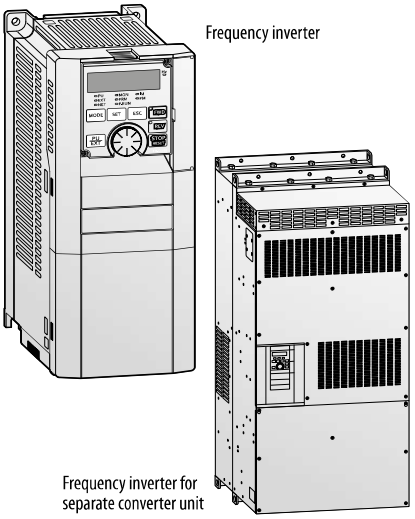
FR-A842-E: 315–500 kW, 380–500 V AC (Separated converter type)

FR-A860-E:0,75–220 kW, 525–600 V AC

FR-A862-E: 280–450 kW, 525–600 V AC (Separated converter type)

FR-A870-E:110 kW, 132 kW, 525–600 V AC

160 kW, 200 kW, 600–690 V AC



FR-A800plus – Specialists for their application

The FR-A800Plus series extends the frequency inverters of the series with optimized functions for special applications.

FR-A800plus Crane (CRN)

These frequency inverters have an integrated crane function. By using 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 an operator's input adjustment. Further additional functions are load slip avoidance and extended monitoring functions. Special parameter settings are available for the Plus functions.

Power range:

FR-A840-CRN: 0.4–280 kW, 380–500 V AC

FR-A842-CRN: 315–500 kW, 380–500 V AC (Separated converter type)

FR-A800plus Roll to Roll (R2R)

The FR-A800-R2R frequency inverters have been specially developed for winding applications. They have various special functions that enable stable winding and unwinding control independently of each other. These include the calculation of the winding diameter, the speed control via the actual position of the dancer roll (dancer feedback control) as well as the sensorless torque control for constant tension.

Power range:

FR-A840-R2R: 0.4–280 kW, 380–500 V AC

FR-A842-R2R: 315–500 kW, 380–500 V AC (Separated converter type)

FR-A800plus Liquid Cooled (LC)

This drive offers the same outstanding performance levels as the standard A800 series inverters but is liquid cooled. This opens up entirely new applications where it is difficult to dissipate the heat generated by the frequency inverter. Cooling with a liquid also means that a smaller housing is used, since the amount of heat dissipated in the housing is smaller.

Power range:

FR-A840-LC: 110–280 kW, 380–500 V AC

FR-A870-LC: 280 kW, 355 kW, 525–690 V AC

Converter unit FR-CC2-□

The converter units FR-CC2-H/FR-CC2-C/FR-CC2-P are diode rectifiers and enable the connection via a twelve-pulse rectifier, resulting in low harmonic content. They are used together with the FR-F842/FR-A842-P and FR-A862 frequency inverter. The separation of the units allows the flexible design of different systems such as parallel drives and common bus systems. This saves costs and minimizes the space required for installation.

Technical details FR-A840-00023 to -01160

Product line				FR-A840-□-E2-60/-2-60R2R/-E2-60CRN/SCM												
				00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		150 % overload capacity (LD)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		200 % overload capacity (ND)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
		250 % overload capacity (HD)		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
	Rated current A	120 % overload capacity (SLD)	I rated	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116
			I max. 60 s	2.1	4.2	5.7	9.1	13.9	18.7	27.5	34.1	41.8	51.7	68.2	84.7	102.3	127.6
			I max. 3 s	2.8	4.6	6.2	10.0	15.1	20.4	30.0	37.2	45.6	56.4	74.4	92.4	111.6	139.2
		150 % overload capacity (LD)	I rated	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106
			I max. 60 s	2.5	4.2	5.8	9.1	13.8	19.2	27.6	34.8	42.0	51.6	68.4	84.0	102.0	127.2
			I max. 3 s	3.2	5.3	7.2	11.4	17.3	24.0	34.5	43.5	52.5	64.5	85.5	105.0	127.5	159.0
		200 % overload capacity (ND)	I rated	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71	86
			I max. 60 s	2.3	3.8	6.0	9.0	13.5	18.0	25.5	34.5	46.5	57.0	66.0	85.5	106.5	129.0
			I max. 3 s	3.0	5.0	8.0	12.0	18.0	24.0	34.0	46.0	62.0	76.0	88.0	114.0	142.0	172.0
		250 % overload capacity (HD)	I rated	0.8	1.5	2.5	4	6	9	12	17	23	31	38	44	57	71
			I max. 60 s	1.6	3.0	5.0	8.0	12.0	18.0	24.0	34.0	46.0	62.0	76.0	88.0	114.0	142.0
			I max. 3 s	2.0	3.8	6.3	10.0	15.0	22.5	30.0	42.5	57.5	77.5	95.0	110.0	142.5	177.5
	Overload capacity ②	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics													
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics													
	Voltage ③			3-phase AC, 380–500 V to power supply voltage													
	Frequency range			0.2–590 Hz													
	Control method			U/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control													
	Brake transistor 100 % ED			Built-in													
	Maximum brake torque	Regenerative		100 % torque/2 % ED with built-in brake resistor							20 % torque/continuous						
		With FR-ABR option ⑦		100 % torque/10 %ED							100 % torque/6 %ED				—		
	Minimum brake resistance values ⑥		Ω	371	236	190	130	83	66	45	34	34	21	21	13.5	13.5	13.5
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %													
	Voltage range			323–550 V AC at 50/60 Hz (Undervoltage level is selectable by parameter.)													
	Power supply frequency			50/60 Hz ±5 %													
	Rated input current ⑧ A	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
		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
		ND		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
		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
	Power supply capacity ④ kVA	SLD		2.5	4.1	5.9	8.3	12	17	24	31	37	44	59	74	88	107
		LD		2.3	3.7	5.5	7.7	12	17	24	29	34	41	57	68	81	99
		ND		1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69	83
		HD		1.1	1.7	2.8	4.7	6.3	9.4	13	17	24	31	37	43	57	69
Others	Cooling			Self cooling			Fan cooling										
	Protective structure ⑤			Enclose type (IP20)											Open type (IP00)		
	Max. heat dissipation ⑨ kW	SLD		0.055	0.075	0.085	0.13	0.175	0.245	0.345	0.37	0.45	0.565	0.74	0.93	1.11	1.34
		LD		0.05	0.07	0.08	0.12	0.16	0.23	0.315	0.345	0.415	0.52	0.675	0.825	1.02	1.22
		ND		0.04	0.055	0.07	0.1	0.13	0.17	0.22	0.28	0.39	0.45	0.52	0.69	0.84	1.02
		HD		0.03	0.04	0.05	0.075	0.09	0.135	0.165	0.21	0.285	0.385	0.45	0.56	0.7	0.86
	Weight		kg	2,8	2,8	2,8	3,3	3,3	6,7	6,7	8,3	8,3	15	15	23	41	41
	Dimensions (WxHxD)		mm	150x260x140					220x260x170		220x300x190		250x400x190		325x550 x195	435x550x250	

Order information	Art. no.														
		Ethernet Version (E2)	297566	297567	297568	297569	297570	297571	297572	297573	297574	297575	297576	—	—	—
		Input Power frame	—	—	—	—	—	—	—	—	—	—	—	307162	307163	307164
		Control card (Ethernet)	—	—	—	—	—	—	—	—	—	—	—	307202	307202	307202
		Roll to Roll (R2R)	296422	296423	296424	296465	296466	296467	296468	296469	296470	296471	296472	296473	296474	296475
		Crane (CRN)	409257	409258	409259	409260	409261	409322	409323	409324	409325	409326	409327	409328	409329	409330
		Smart condition monitoring (SCM) kit	314568	314569	314570	314571	314572	314573	314574	314585	314586	314587	314588	314589	314590	314591

Remarks:
① The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The % value of the overload capacity indicates 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. The waiting periods can be calculated using the r.m.s. current method (I^2t), which requires knowledge of the duty.
③ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑤ FR-DU08: IP40 (except for the PU connector)
⑥ Value for the ND rating
⑦ The braking capability of the inverter can be improved with a optional brake resistor. Please do not use resistor values below the given minimum values.
⑧ The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input choke and cables) affects the rated input current.
⑨ The values displays the maximum possible heat dissipation. Please consider this values during setup of the cabinet.

Technical details FR-A840-01800 to -06830

Product line				FR-A840-□-E2-60/-2-60R2R/-E2-60CRN/SCM									
				01800	02160	02600	03250	03610	04320	04810	05470	06100	06830
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		75/90	110	132	160	185	220	250	280	315	355
		150 % overload capacity (LD)		75	90	110	132	160	185	220	250	280	315
		200 % overload capacity (ND)		55	75	90	110	132	160	185	220	250	280
		250 % overload capacity (HD)		45	55	75	90	110	132	160	185	220	250
	Rated current A	120 % overload capacity (SLD)	I rated	180	216	260	325	361	432	481	547	610	683
			I max. 60 s	198	238	286	358	397	475	529	602	671	751
			I max. 3 s	216	259	312	390	433	518	577	656	732	820
		150 % overload capacity (LD)	I rated	144	180	216	260	325	361	432	481	547	610
			I max. 60 s	173	216	259	312	390	433	518	577	656	732
			I max. 3 s	216	270	324	390	488	542	648	722	821	915
		200 % overload capacity (ND)	I rated	110	144	180	216	260	325	361	432	481	547
			I max. 60 s	165	216	270	324	390	488	542	648	722	821
			I max. 3 s	220	288	360	432	520	650	722	864	962	1094
		250 % overload capacity (HD)	I rated	86	110	144	180	216	260	325	361	432	481
			I max. 60 s	172	220	288	360	432	520	650	722	864	962
			I max. 3 s	215	275	360	450	540	650	813	903	1080	1203
	Overload capacity ②	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics									
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics									
	Voltage ③			3-phase AC, 380–500 V to power supply voltage									
	Frequency range			0.2–590 Hz									
	Control method			U/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control									
	Brake transistor 100 % ED			Built-in	FR-BU2/BU-UFS (option)								
	Maximum brake torque ⑥	Regenerative		20 % torque/ continuous	10 % torque/continuous								
		With FR-ABR option ⑦		—	—								
	Minimum brake resistance values ⑧		Ω	13.5	—								
Input	Power supply voltage			3-phase, 380–500 V AC, -15 %/+10 %									
	Voltage range			323–550 V AC at 50/60 Hz (Undervoltage level is selectable by parameter.)									
	Power supply frequency			50/60 Hz ±5 %									
	Rated input current ⑧ kVA	SLD		180	216	260	325	361	432	481	547	610	683
		LD		144	180	216	260	325	361	432	481	547	610
		ND		134	144	180	216	260	325	361	432	481	547
		HD		108	110	144	180	216	260	325	361	432	481
	Power supply capacity ④ kVA	SLD		137	165	198	248	275	329	367	417	465	521
		LD		110	137	165	198	248	275	329	367	417	465
		ND		102	110	137	165	198	248	275	329	367	417
		HD		83	84	110	137	165	198	248	275	329	367
Others	Cooling			Fan cooling									
	Protective structure ⑤			Open type (IP00)									
	Max. heat dissipation ⑨ kW	SLD		2.0	2.52	3.15	3.6	4.05	4.65	5.3	5.85	6.65	7.55
		LD		1.64	2.1	2.575	2.8	3.6	3.8	4.65	5.1	5.85	6.6
		ND		1.29	1.79	2.2	2.3	2.8	3.45	3.85	4.55	5.1	5.9
		HD		1.06	1.35	1.77	1.85	2.25	2.65	3.4	3.7	4.5	5.05
	Weight		kg	43	52	55	71	78	117	117	166	166	166
	Dimensions (WxHxD)		mm	435x550x250	465x620x300		465x740x360		498x1010x380		680x1010x380		

Order information	Art. no.										
		Ethernet Version (E2)	—	—	—	—	—	—	—	—	—	—
		Input Power frame	307185	307186	307187	307188	307189	307190	307191	307192	307193	307194
		Control card (Ethernet)	307202	307203	307203	307203	307203	307203	307203	307203	307203	307203
		Roll to Roll (R2R)	296476	296477	296478	296479	296480	296481	296482	296483	296484	296485
		Crane (CRN)	409331	409332	409333	409334	409335	409336	409337	409338	409339	409340
		Smart condition monitoring (SCM) kit	314592	314593	314594	314595	314596	314597	314598	314599	314600	314601

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The % value of the overload capacity indicates 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. The waiting periods can be calculated using the r.m.s. current method (I^2t), which requires knowledge of the duty.
③ The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
④ The rated input capacity varies depending on the impedance values on the power supply side of the inverter (including the cables and input choke).
⑤ FR-DU08: IP40 (except for the PU connector)
⑥ Value for the ND rating
⑦ The braking capability of the inverter can be improved with a optional brake resistor. Please do not use resistor values below the given minimum values.
⑧ The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input choke and cables) affects the rated input current.
⑨ The values displays the maximum possible heat dissipation. Please consider this values during setup of the cabinet.

Attention: Mandatory DC choke need to be ordered seperately if 75 kW motor or bigger is connected to the FR-A840. Please select the mandatory choke on page 68.

Technical details FR-A842-07700 to -12120 and converter unit FR-CC2-H

The FR-A842 frequency inverters must be operated together with an FR-CC2 converter unit, which must be ordered separately.

Product line				FR-A842-□-E2-60/-2-60R2R/-2-60CRN				
				07700	08660	09620	10940	12120
Output	Rated motor capacity ① kW	120 % overload capacity (SLD)		400	450	500	560	630
		150 % overload capacity (LD)		355	400	450	500	560
		200 % overload capacity (ND)		315	355	400	450	500
		250 % overload capacity (HD)		280	315	355	400	450
	Rated current A	120 % overload capacity (SLD)	I rated	770	866	962	1094	1212
			I max. 60 s	847	952	1058	1203	1333
			I max. 3 s	924	1039	1154	1314	1454
		150 % overload capacity (LD)	I rated	683	770	866	962	1094
			I max. 60 s	820	924	1039	1154	1314
			I max. 3 s	1024	1155	1299	1443	1641
		200 % overload capacity (ND)	I rated	610	683	770	866	962
			I max. 60 s	915	1024	1155	1299	1443
			I max. 3 s	1220	1366	1540	1732	1924
		250 % overload capacity (HD)	I rated	547	610	683	770	866
			I max. 60 s	1094	1220	1366	1540	1732
			I max. 3 s	1367	1525	1707	1925	2165
	Rated output capacity ② kVA	SLD		587	660	733	834	924
		LD		521	587	660	733	834
		ND		465	521	587	660	733
		HD		417	465	521	587	660
	Overload capacity ③	SLD		110 % of rated motor capacity for 60 s; 120 % for 3 s (max. ambient temperature 40 °C) – inverse time characteristics				
		LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
		HD		200 % of rated motor capacity for 60 s; 250 % for 3 s (max. ambient temperature 50 °C) – inverse time characteristics				
	Voltage ④			3-phase AC, 380–500 V to power supply voltage				
	Frequency range			0.2–590 Hz				
	Control method			U/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control				
	Maximum brake torque		Regenerative	10 % torque/continuous				
Input	DC Power supply voltage			430–780 V DC				
	Control power supply voltage			1-phase, 380–500 V AC, 50/60 Hz				
	Control power supply range			Frequency ±5 %, voltage ±10 %				
Others	Cooling			Fan cooling				
	Protective structure ⑤			Open type (IP00)				
	Max. heat dissipation ⑥ kW	SLD		5.8	6.69	7.37	8.6	9.81
		LD		5.05	5.8	6.48	7.34	8.63
		ND		4.45	5.1	5.65	6.5	7.4
		HD		3.9	4.41	4.93	5.65	6.49
	Weight		kg	163	163	243	243	243
	Dimensions (WxHxD)		mm	540x1330x440		680x1580x440		

Order information ⑦	Art. no.	Ethernet Version (E2)		—	—	—	—	—
		Input Power frame		307195	307196	307197	307198	307199
		Control card (Ethernet)		307203	307203	307203	307203	307203
		Roll to Roll (R2R)		296486	296487	296488	296489	296490
		Crane (CRN)		301309	301310	301311	301312	301313
		Smart condition monitoring (SCM) kit		314602	314603	314604	314605	314606

Product line			FR-CC2-H□K-60						
			315	355	400	450	500	560	630
Output	Rated motor capacity	kW	315	355	400	450	500	560	630
	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		430–780 V DC ⑤						
	Regenerative braking torque		10 % torque/continuous						
Input	Power supply voltage		3-phase, 380–500 V AC, -15 %/+10 %						
	Voltage/frequency range		323–550 V AC at 50/60 Hz ±5 %						
	Rated input capacity ③	kVA	465	521	587	660	733	833	924
Others	Cooling		Fan cooling						
	DC chokes		Built-in						
	Protective structure ④		Open type (IP00)						
	Weight	kg	210	213	282	285	288	293	294
	Dimensions (WxHxD)	mm	600x1330x440		600x1580x440				

Order information	Art. no.	274507	274508	274509	274510	274511	279637	279638

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 440 V.
③ The % value of the overload capacity indicates 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. The waiting periods can be calculated using the r.m.s. current method (I^2t), which requires knowledge of the duty.
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 pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑤ FFR-DU08: IP40 (except for the PU connector section)
⑥ The values displays the maximum possible heat dissipation. Please consider this values during setup of the cabinet.
⑦ For the power voltage exceeding 480 V, set Pr. 977 Input voltage mode selection.
⑧ The power supply capacity is the value at the rated output current. It varies by the impedance at the power supply side (including those of the input choke and cables).
⑨ 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 x100)
⑩ 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.

Technical details FR-A842-09620 to -12120-□P and converter unit FR-CC2-H-□P

Product line				FR-A842-□-2-60P					
				Two in parallel			Three in parallel		
				09620	10940	12120	09620	10940	12120
Output	Rated motor capacity ① kW	150 % overload capacity (LD)		710	800	900	1065	1200	1350
		200 % overload capacity (ND)		630	710	800	945	1065	1200
	Rated current A	150 % overload capacity (LD)	I rated	1386	1539	1750	2078	2309	2626
			I max. 60 s	1663	1846	2100	2493	2770	3151
			I max. 3 s	2079	2308	2625	3117	2463	2939
		200 % overload capacity (ND)	I rated	1232	1386	1539	1848	2078	2309
			I max. 60 s	1848	2079	2308	2772	3117	3463
			I max. 3 s	2464	2772	3078	3696	4156	4618
	Rated output capacity ② kVA	LD		1056	1173	1334	1584	1759	2002
		ND		939	1056	1173	1409	1584	1759
	Overload capacity ③	LD		120 % of rated motor capacity for 60 s; 150 % for 3 s (max. ambient temperature 50 °C)					
		ND		150 % of rated motor capacity for 60 s; 200 % for 3 s (max. ambient temperature 50 °C)					
	Voltage ④			3-phase, 380–500 V					
	Frequency range		Hz	0.2–590					
	Control method			U/f; advanced magnetic flux vector, real sensorless vector (RSV), closed loop vector, PM sensorless vector control					
	Maximum brake torque		Regenerative	10 % torque/100 % ED					
Input	DC Power supply voltage			430–780 V DC					
	Control power supply voltage			1-phase, 380–500 V AC, 50/60 Hz ⑦					
	Control power supply range			Frequency ±5 %, voltage ±10 %					
Others	Cooling			Fan cooling					
	Protective structure ⑤			Open type (IP00)					
	Max. heat dissipation ⑥ kW	LD		11.7	13.2	15.5	17.5	19.8	23.3
		ND		10.2	11.7	13.3	15.3	17.6	20
	Weight ⑧		kg	486	486	486	729	729	729
	Dimensions (WxHxD)		mm	680x1580x440			680x1580x440		
Order information			Art. no.	314880	314881	314882	314880	314881	314882

Product line			FR-CC2-H□K-60P							
			Two in parallel				Three in parallel			
			400	450	500	560	400	450	500	560
Output	Rated motor capacity	kW	630	710	800	900	945	1065	1200	1350
	Overload capacity ③		150 % 60 s, 200 % 3 s							
	Voltage ⑪		430–780 V ⑩							
	Regenerative braking torque		10 % torque/100 % ED							
Input	Power supply voltage		3-phase, 380–500 V AC							
	Voltage/frequency range		323–550 V AC at 50/60 Hz ±5 %							
	Rated input capacit ⑨	kVA	939	1056	1173	1334	1409	1584	1759	2002
Others	Cooling		Fan cooling							
	DC chokes		Built-in							
	Max. heat dissipation ⑥	kW	5.5	6.1	6.8	7.9	8.2	9.2	10.3	11.9
	Protective structure ⑤		Open type (IP00)							
	Weight ⑫	kg	564	570	576	586	846	855	864	879
	Dimensions (WxHxD)	mm	600x1580x440							
Order information		Art. no.	314883	314884	314905	314906	314883	314884	314905	314906

Remarks:
① The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi Electric 4-pole standard motor. The 200 % overload capacity (ND) is the factory default setting.
② The rated output capacity indicated assumes that the output voltage is 440 V.
③ The % value of the overload capacity indicates 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. The waiting periods can be calculated using the r.m.s. current method (I^2t), which requires knowledge of the duty.
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 pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.
⑤ FFR-DU08: IP40 (except for the PU connector section)
⑥ The values displays the maximum possible heat dissipation. Please consider this values during setup of the cabinet.
⑦ For the power voltage exceeding 480 V, set Pr. 977 Input voltage mode selection.
⑧ The mass is the total mass of all frequency inverters during the parallel operation.
⑨ The power supply capacity is the value at the rated output current. It varies by the impedance at the power supply side (including those of the input choke and cables).
⑩ 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 x100)
⑪ 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.
⑫ The mass is the total mass of all frequency inverters during the parallel operation.

Common specifications FR-A800

FR-A840			Description
Control specifications	Frequency setting resolution	Analog input	0.015 Hz/0–50 Hz (terminal 2, 4: 0–10 V/12 bit) 0.03 Hz/0–50 Hz (terminal 2, 4: 0–5 V/11 bit, 0–20 mA/11 bit, terminal 1: -10–+10 V/12 bit) 0.06 Hz/0–50 Hz (terminal 1: 0–±5 V/11 bit)
		Digital input	0.01 Hz
	Frequency accuracy		0.2 % of the maximum output frequency (temperature range 25 °C ±10 °C) via analog input; ±0.01 % of the set output frequency (via digital input)
	Voltage/frequency characteristics		Base frequency adjustable from 0 to 590 Hz; selection between constant torque, variable torque or optional flexible 5-point U/f characteristics
	Starting torque		200 % 0.3 Hz (0.4–3.7 kVA), 150 % 0.3 Hz (5.5 kVA or more) (under real sensorless vector control or vector control)
	Torque boost		Manual torque boost
	Acceleration/deceleration time		0–3600 s (can be set individually), linear or S-pattern acceleration/deceleration mode, backlash measures acceleration/deceleration can be selected.
	Acceleration/deceleration characteristics		Linear or S-form course, user selectable
	DC injection brake		Operating frequency (0–120 Hz), operating time (0–10 s) and operating voltage (0–30 %) can be set individually. The DC brake can also be activated via the digital input.
	Stall prevention operation level		Operation current level can be set (0–220 % adjustable), whether to use the function or not can be selected
	Motor protection		Electronic motor protection relay (rated current user adjustable)
	Torque limit level		Torque limit value can be set (0–400 % variable)
Control signals for operation	Frequency setting values	Analog input	Terminal 2, 4: 0–5 V DC, 0–10 V DC, 0/4–20 mA Terminal 1: 0–±5 V DC, 0–±10 V DC
		Digital input	Input using the setting dial of the parameter unit Four-digit BCD or 16 bit binary (when used with option FR-A8AX)
	Start signal		Available individually for forward rotation and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected.
	Input signals	Common	Low-speed operation command, middle-speed operation command, high-speed operation command, second function selection, terminal 4 input selection, JOG operation selection, electronic bypass function ④, selection of automatic restart after instantaneous power failure ⑤, flying start ⑤, 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
		Operating status	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, 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, machine analyzer ①④, RS485 communication, PID control, PID pre-charge function, easy dancer control, cooling fan operation selection, stop selection (deceleration stop/coasting), power-failure deceleration stop function ④, 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, vibration control ⑥, swinging suppression control ⑦
	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 Fault codes of the inverter can be output (4 bits) from the open collector.
Indication	For meter	Current output	Max. 20 mA DC: one terminal (output current) The monitored item can be changed using Pr. 54 FM/CA terminal function selection.
		Voltage output	Max. ±10 V DC: 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.
Protection	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 (electronic thermal relay function), motor overload trip (electronic thermal relay function), heatsink overheat, instantaneous power failure ④, undervoltage ④, input phase loss ②④, stall prevention stop, loss of synchronism detection ②, brake transistor alarm detection ④, output side earth (ground) fault overcurrent, output short circuit ⑦, 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/RS485 terminals power supply short circuit, 24 V DC power fault, abnormal output current detection ②, inrush current limit circuit fault ④, communication fault (inverter), analog input fault, USB communication fault, safety circuit fault ⑥, overspeed occurrence ②, speed deviation excess detection ①②, signal loss detection ①②, excessive position fault ①②, brake sequence fault ②, encoder phase fault ①②, 4 mA input fault ②, pre-charge fault ②, PID signal fault ②, option fault, opposite rotation deceleration fault ②, internal circuit fault, abnormal internal temperature ③④⑥
	Warning function		Fan alarm, stall prevention (overcurrent), stall prevention (overvoltage), regenerative brake pre-alarm ②④, electronic thermal relay function pre-alarm, PU stop, speed limit indication (output during speed limit) ②, parameter copy, safety stop ⑦ maintenance signal output ②④, maintenance timer 1 to 3 ②⑤, USB host error, home position return setting error ②, home position return uncompleted ②, home position return parameter setting error ②, operation panel lock ②, password locked ②, parameter write error, copy operation error, 24 V external power supply operation, internal-circulation fan alarm ③④
Others	Surrounding air temperature		-10 °C to +50 °C
	Storage temperature ⑧		-20 °C to +65 °C

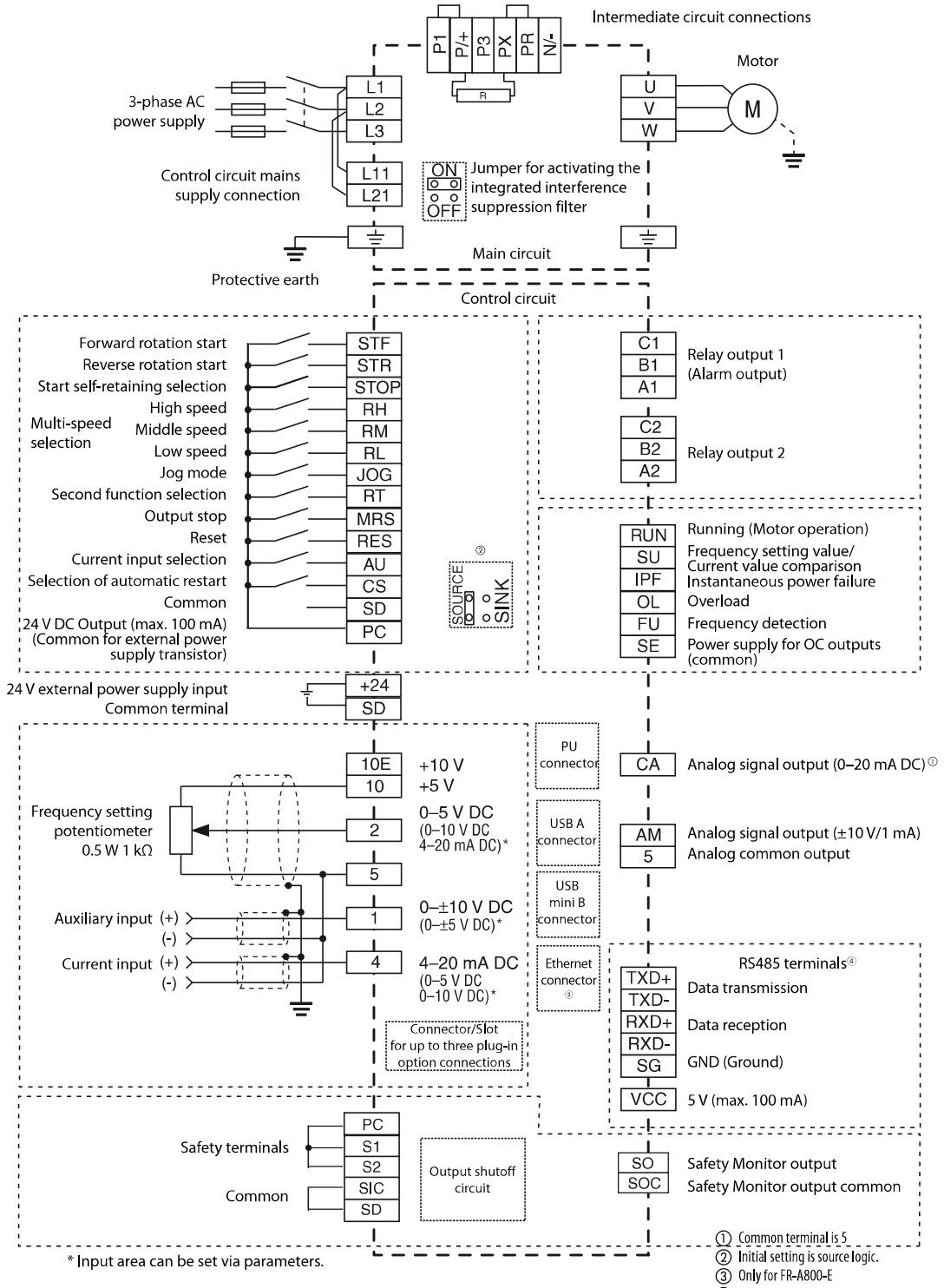
Remarks:
① Available only when the option (FR-A8AP) is mounted.
② This protective function is not available in the initial status.
③ For PM sensorless vector control.
④ Not for A842
⑤ Only for A842
⑥ Not for A860
⑦ Only for A860
⑧ Temperature applicable for a short time, e. g. in transit.

Common specifications FR-CC2

FR-CC2		Description
Input signals (three terminals)		External thermal relay input, converter reset The input signal can be changed using Pr.178, Pr.187, and Pr.189 (input terminal function selection).
Operational functions		Thermal protection, DC injection brake, automatic restart after instantaneous power failure, retry function, RS485 communication, life diagnosis, maintenance timer, 24 V power supply input for control circuit
Output signal, open collector output (five terminals) Relay output (one terminal)		Inverter operation enable (positive logic, negative logic), instantaneous power failure/undervoltage, inverter reset, fan fault output, fault The output signal can be changed using Pr.190 to Pr.195 (output terminal function selection).
Operation panel (FR-DU08)	Operating status	Converter output voltage, input current, electric thermal relay function load factor The monitored item can be changed using Pr.774 to Pr.776 operation panel monitor selection 1 to 3.
	Fault record	Fault record is displayed when a fault occurs. Past 8 fault records and the conditions immediately before the fault (converter output voltage/input current/electronic thermal relay function load factor/cumulative energization time/year/month/date/time) are saved.
Protective/warning function	Protective function	Overcurrent trip, overvoltage trip, converter overload trip (electronic thermal relay function), heatsink overheat, instantaneous power failure, undervoltage, input phase loss ③, external thermal relay operation, PU disconnection ③, retry count excess ③, parameter storage device fault, CPU fault, 24 V DC power fault, inrush current limit circuit fault, communication fault (inverter), option fault, operation panel power supply short circuit RS485 terminals power supply short circuit, Internal circuit fault
	Warning function	Fan alarm, electronic thermal relay function pre-alarm, maintenance timer 1 to 3 ③, operation panel lock ③, password locked ③, parameter write error, copy operation error, 24 V external power supply operation
Environment	Surrounding air temperature	FR-CC2-H315K–H560K: -10 °C to +50 °C (non-freezing) FR-CC2-H630K: -10 °C to +40 °C (non-freezing)
	Surrounding air humidity	With IEC60721-3-3 3C2/3S2 conforming circuit board coating: 95 % RH or less (non-condensing) With standard circuit board coating: 90 % RH or less (non-condensing)
	Storage temperature ①	-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, 2.9 m/s² or less ② at 10 to 55 Hz (directions of X, Y, Z axes)

Remarks:
① Temperature applicable for a short time, e. g. in transit.
② For the installation in an altitude above 1000 m (up to 2500 m), derate the rated current 3 % per 500 m.
③ This protective function is not available in the initial status.

Block diagram FR-A800



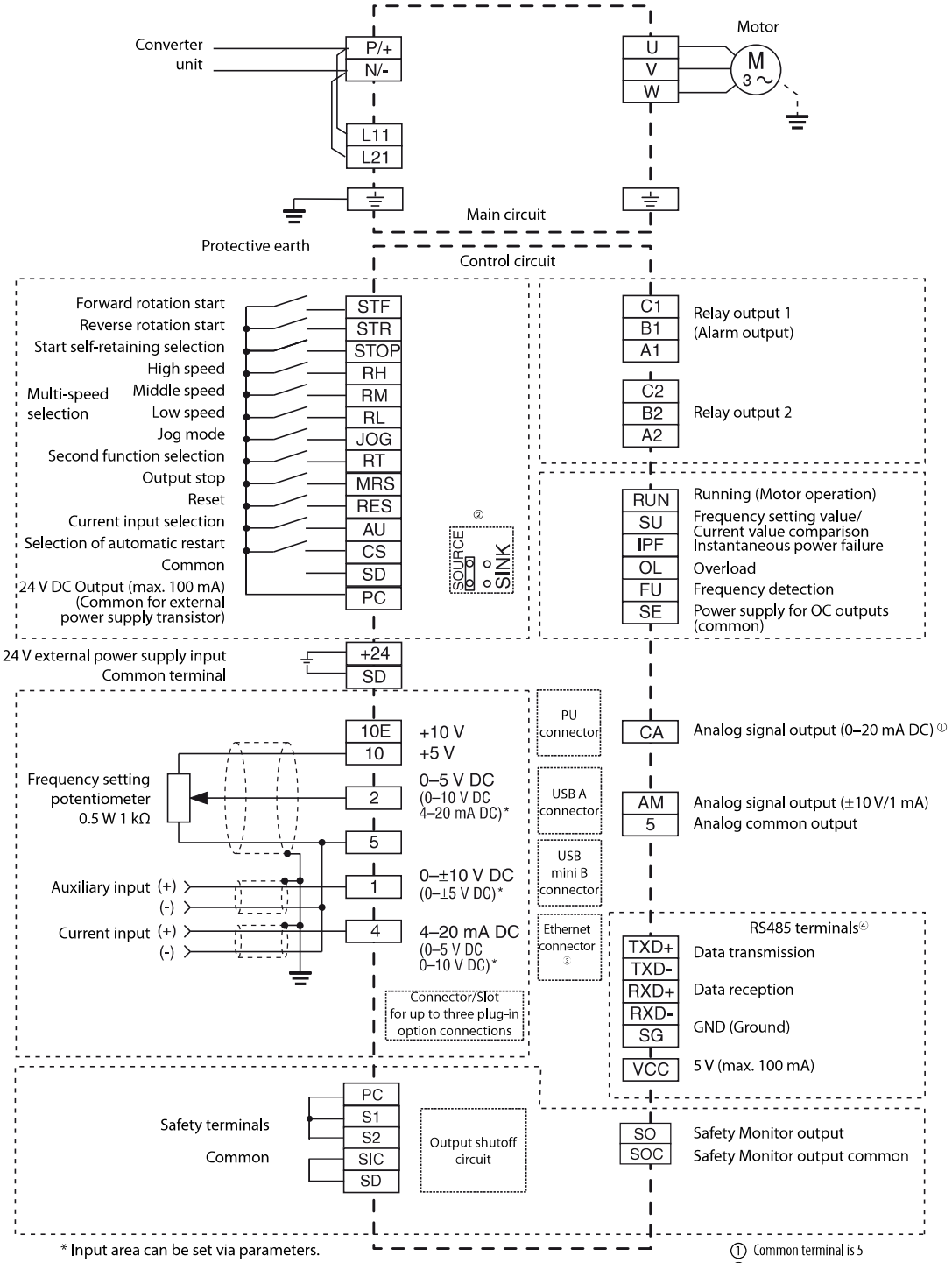
* Input area can be set via parameters.

① Common terminal is 5
② Initial setting is source logic.
③ Only for FR-A800-E
④ Not for FR-A800-E
If a 2nd serial interface is required, remove the initial installed Ethernet board and install the FR-A8ERS option board.

Assignment of main circuit terminals

Function	Terminal	Designation	Description
Main circuit connection	L1, L2, L3	Mains supply connection	Mains power supply of the inverters (FR-A820: 200–240 V AC, 50/60 Hz); (FR-A840: 380–500 V AC, 50/60 Hz)
	P/+, PR	Brake resistor connection FR-ABR	FR-A820-00046–00490/FR-A840-00023–00250
	P3, PR		FR-A820-00770–01250/FR-840-00470–01800
	P/+, N/-	Brake unit connection	Connect the brake unit (FR-BU, BU), power regeneration common converter (FR-CV), Harmonic Converter (FR-HC and MT-HC) or power regeneration converter (MTRC).
	P/+, P1	DC choke connection	An optional DC choke can be connected to the terminals P1 and P/+. The jumper on terminals P1 and P/+ must be removed when this optional choke is used on frequency inverter models FR-A820-03160 or lower and FR-A840-01800 or lower. When using a motor with 75 kW or higher, always connect a mandatory DC choke. The DC choke must be installed on frequency inverter models FR-A820-03800 or higher and FR-A840-02160 or higher.
	PR, PX	Built-in brake circuit connection	When the jumper is connected across terminals PR and PX (initial status), the built-in brake resistor circuit is valid.
	U, V, W	Motor connection	Voltage output of the inverter (3-phase, 0 V up to power supply voltage, 0.2–590 Hz)
	L11, L21	Power supply for control circuit	To use external power for the control circuit connect the mains power to L11/L21 (and remove jumpers L1 and L2).
	⏚	PE	Protective earth connection of inverter

Block diagram FR-A842



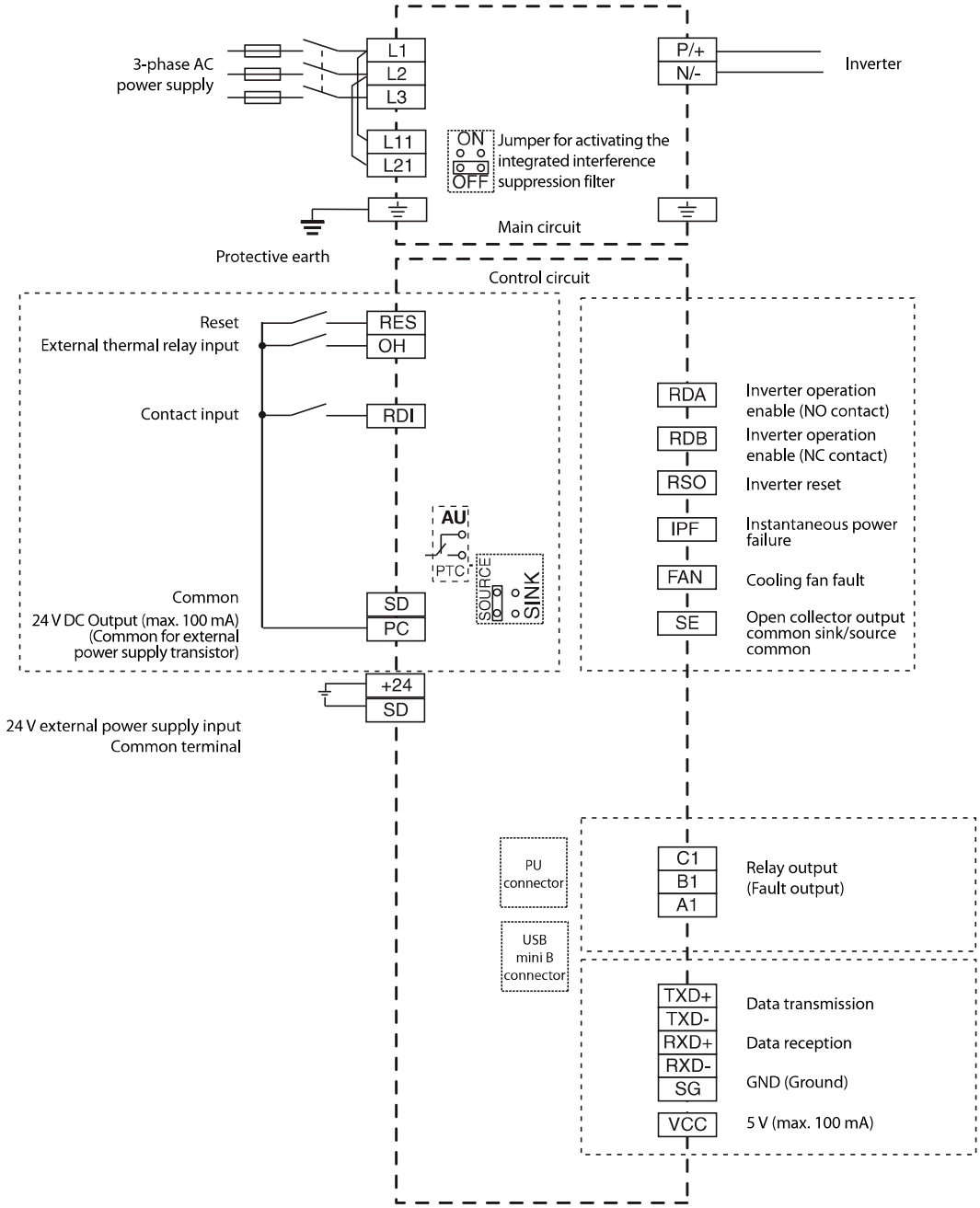
* Input area can be set via parameters.

① Common terminal is 5
② Initial setting is source logic.
③ Only for FR-A800-E
④ Not for FR-A800-E
If a 2nd serial interface is required, remove the initial installed Ethernet board and install the FR-A8ERS option board.

Assignment of main circuit terminals

Function	Terminal	Designation	Description
Main circuit connection	P/+, N/-	Converter unit connection	Connect the converter unit FR-CC2.
	U, V, W	Motor connection	Voltage output of the inverter (3-phase, 0 V up to power supply voltage, 0.2–590 Hz)
	L11, L21	Power supply for control circuit	The voltage for separate power supply of the control circuit is 380 to 480 V AC, 50/60 Hz.
	⏚	PE	Protective earth connection of inverter

Block diagram FR-CC2



Assignment of main circuit terminals

Function	Terminal	Designation	Description
Main circuit connection	L1, L2, L3	Mains supply connection	Mains power supply of the inverters (380—480 V AC, 50/60 Hz)
	L11, L21	Power supply for control circuit	To use external power for the control circuit connect the mains power to L11/L21 (and remove jumpers L1 and L2).
	P/+, N/-	Inverter connection	Connect to terminals P/+ and N/- of the inverter.
	⏚	PE	Protective earth connection of inverter

Assignment of signal terminals (FR-A800 and FR-CC2)

Function	Terminal	Designation	Description
Control connection (programmable)	STF	Forward rotation start	The motor rotates forward, if a signal is applied to terminal STF.
	STR	Reverse rotation start	The motor rotates reverse, if a signal is applied to terminal STR.
	STOP	Start self-retaining selection	The start signals are self-retaining, if a signal is applied to terminal STOP.
	RH, RM, RL	Multi-speed selection	Preset of 15 different output frequencies according to the combination of the RH, RM and RL signals.
	JOG	Jog mode selection	The JOG mode is selected, if a signal is applied to this terminal (factory setting). The start signals STF and STR determine the rotation direction.
		Pulse train input	The JOG terminal can be used as pulse train input terminal (parameter 291 setting needs to be changed)
	RT	Second parameter settings	A second set of parameter settings is selected, if a signal is applied to terminal RT.
	MRS	Output stop	The inverter lock stops the output frequency without regard to the delay time.
	RES	RESET input	An activated protective circuit is reset, if a signal is applied to the terminal RES (t >0.1 s).
	OH ①	External thermal relay input	The external thermal relay input (OH) signal is used when using an external thermal relay or a thermal protector built into the motor to protect the motor from overheating. When the thermal relay is activated, the inverter trips by the external thermal relay operation (E.OHT).
	RDI ①	Contact input	No function is assigned in the initial setting. The function can be assigned by setting Pr.178.
	AU	Current input selection	The 0/4–20 mA signal on terminal 4 is enabled by a signal on the AU terminal.
		PTC input	If you connect a PTC temperature sensor you must assign the PTC signal to the AU terminal and set the slide switch on the control circuit board to the PTC position.
	CS	Automatic restart after instanta-neous power failure	The inverter restarts automatically after a power failure, if a signal is applied to the terminal CS.
Common	SD	Reference potential (0 V) for the PC terminal (24 V)	Common terminal for contact input terminal (sink logic); 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. Common terminal for the 24 V DC power supply (terminal PC, terminal +24) Isolated from terminals 5 and SE.
	PC	24 V DC output	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. Common terminal for contact input terminal (source logic). Can be used as a 24 V DC 0.1 A power supply.
	+24	24 V external power supply input	For connecting a 24 V external power supply. If a 24 V external power supply is connected, power is supplied to the control circuit while the main power circuit is OFF.
Setting value specification	10 E	Voltage output for potentiometer	Output voltage 10 V DC. Max. output current 10 mA. Recommended potentiometer: 1 kΩ, 2 W linear
	10		Output voltage 5 V DC. Max. output current 10 mA. Recommended potentiometer: 1 kΩ, 2 W linear
	2	Input for frequency setting value signal	The setting value 0–5 V DC (or 0–10 V, 0/4–20 mA) is applied to this terminal. You can switch between voltage and current setpoint values with parameter 73. The input resistance is 10 kΩ.
	5	Frequency setting common and analog outputs	Terminal 5 provides the common reference potential (0 V) for all analog set point values and for the analog output signals CA (current) and AM (voltage). The terminal is isolated from the digital circuit's reference potential (SD). This terminal should not be grounded.
	1	Auxiliary input for frequency setting value signal 0–±5 (10) V DC	An additional voltage setting value signal of 0–±5 (10) V DC can be applied to terminal 1. The voltage range is preset to 0–±10 V DC. The input resistance is 10 kΩ.
	4	Input for setting value signal	The setting value 0/4–20 mA or 0–10 V is applied to this terminal. You can switch between voltage and current setpoint values with parameter 267. The input resistance is 250 Ω. The current setting value is enabled via terminal function AU.
Signal output (programmable)	A1, B1, C1	Potential free relay output 1 (Alarm)	The alarm is output via relay contacts. The block diagram shows the normal operation and voltage free status. If the protective function is activated, the relay picks up. The maximum contact load is 200 V AC/0.3 A or 30 V DC/0.3 A.
	A2, B2, C2	Potential free relay output 2	Any of the available 42 output signals can be used as the output driver. The maximum contact load is 230 V AC/0.3 A or 30 V DC/0.3 A.
	RUN	Signal output for motor operation	The output is switched low, if the inverter output frequency is equal to or higher than the starting frequency. The output is switched high, if no frequency is output or the DC brake is in operation.
	RDA ①	Inverter operation enable (NO contact)	The contact is closed when the converter unit is ready.
	RDB ①	Inverter operation enable (NC contact)	The contact is open when the converter unit has a fault or is resetted.
	RSO ①	Inverter reset (NO contact)	The contact is closed while the converter unit is resetting.
	SU	Signal output for frequency setting value/current value comparison	The SU output supports a monitoring of frequency setting value and frequency current value. The output is switched low, once the frequency current value (output frequency of the inverter) approaches the frequency setting value (determined by the setting value signal) within a preset range of tolerance.
	IPF	Signal output for instantaneous power failure	The output is switched low for a temporary power failure within a range of 15 ms ≤tIPF ≤100 ms or for under voltage.
	FAN ①	Cooling fan fault	Switched to LOW when a cooling fan fault occurs.
	OL	Signal output for overload alarm	The OL is switched low, if the output current of the inverter exceeds the current limit preset in parameter 22 and the stall prevention is activated. If the output current of the inverter falls below the current limit preset in parameter 22, the signal at the OL output is switched high.
	FU	Signal output for monitoring output frequency	The output is switched low once the output frequency exceeds a value preset in parameter 42 (or 43). Otherwise the FU output is switched high.
	SE	Reference potential for signal outputs	The potential that is switched via open collector outputs RUN, SU, OL, IPF and FU is connected to this terminal.
	CA	Analog current output	One of 18 monitoring functions can be selected, e. g. external frequency output. CA- and AM output can be used simultaneously. The functions are determined by parameters. Output item: output frequency (initial setting), Load impedance: 200 Ω–450 Ω, output signal: 0–20 mA
	AM	Analog signal output 0–10 V DC (1 mA)	Output item: output frequency (initial setting), output signal 0–10 V DC, permissible load current 1 mA (load impedance ≥10 kΩ), resolution 8 bit
Interface	—	PU connector	A parameter unit can be connected. Communications via RS485 I/O standard: RS485, multi drop operation: max 1152 baud (overall length: 500 m)
	—	RS485 terminal (via RS485 terminal)	Communications via RS485; I/O standard: RS485, multi drop operation: max 1152 baud (overall length: 500 m)
	—	2 USB connectors (Conforms to USB1.1/USB2.0)	USB A connector: a USB memory device enables parameter copy, PLC code download and trace function. USB mini B connector: connected to a personal computer via USB to enable operations of the inverter by FR Configurator2.
Safety connection	S1, S2	Safety inputs	When the safety functions are not used, the existing jumpers between the terminals S1-PC, S2-PC and SIC-SD must not be removed, otherwise an operation of the frequency inverter is not possible.
	SIC	Reference potential for safety inputs	
	SO	Safety monitor output	
	SOC	Safety monitor output common	

① only for FR-CC2