Fe e-Front runners

FUJI ELECTRIC

FRENIC 5000G11S
FRENIC 5000P11S

FUJI INVERTERS

Now with dynamic torque vector control:
Optimum control for all situations.

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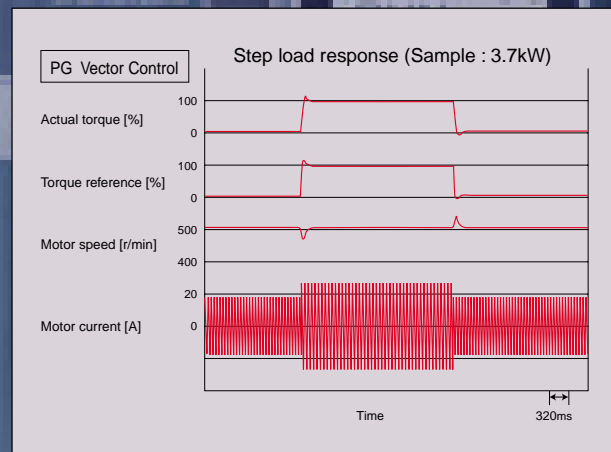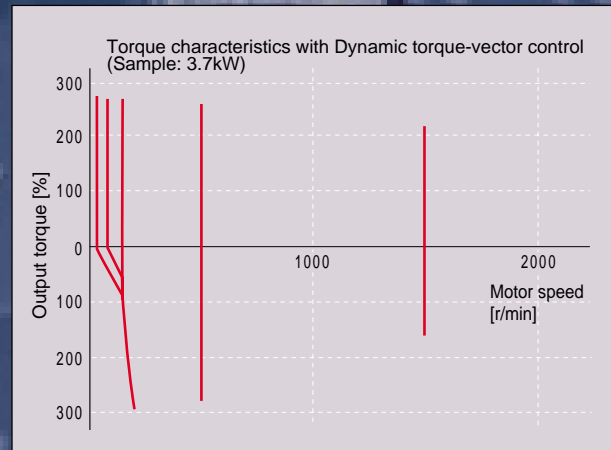TÜV Rheinland | BAUART GEPRÜFT · TYPE APPROVED

CE

I deal combination of power and multiple-function. Dynamic torque-vector control promises optimum motor control under any operating conditions.

1. Dynamic torque-vector control

Powerful

Dynamic torque-vector control system performs high-speed calculation to determine the required motor power for the load status. Our key technology is optimal control of voltage and current vectors for maximum output torque.
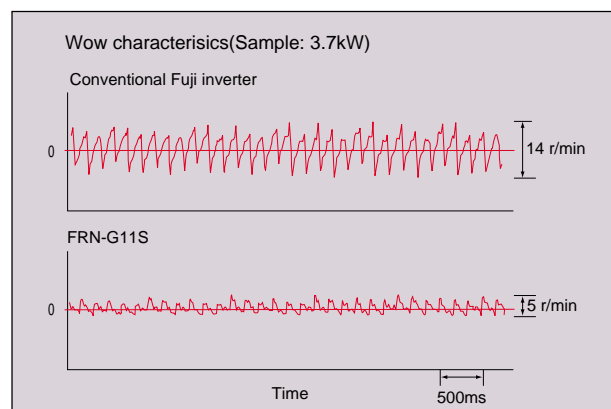
- A high starting torque of 200% at 0.5Hz.*
  * 180% for 30kW or larger models.
- Achieves smooth acceleration/ deceleration in the shortest time for the load condition.
- Using a high-speed CPU quickly responds to an abrupt load change, detects the regenerated power to control the deceleration time. This automatic decerelation function greatly reduces the inverter tripping.

- Feedback control with PG
  Enables the inverter to execute "vector control with PG" by adding an optional PG feedback card to obtain higher performance.
  - Speed control range : 1:1200
  - Speed control accuracy : ±0.02%
  - Speed control response : 40Hz

Torque characteristics with Dynamic torque-vector control
(Sample: 3.7kW)

Output torque [%]
300 / 200 / 100 / 0 / 100 / 200 / 300

Motor speed [r/min]
1000   2000

Step load response (Sample : 3.7kW)

PG Vector Control

Actual torque [%]   100 / 0

Torque reference [%]   100 / 0

Motor speed [r/min]   500 / 400

Motor current [A]   20 / 0

Time   320ms

2. Reduced motor wow at low speed

Smooth

- Motor wow at low speed (1Hz) reduced to less than 1/2 of that achieved by conventional inverters, with the dynamic torque-vector control system, in combination with the Fuji's unique digital AVR.
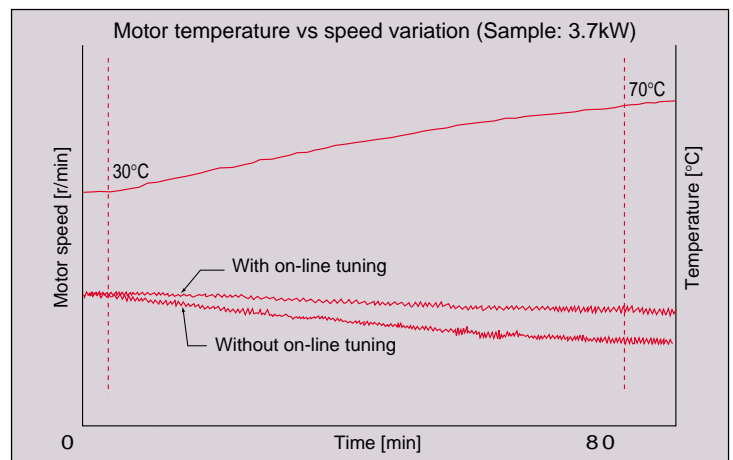
Wow characterisics(Sample: 3.7kW)

Conventional Fuji inverter

0   14 r/min

FRN-G11S

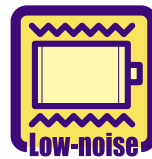0   5 r/min

Time   500ms

2

3. New on-line tuning system

- On-line tuning to continuously check for variation of motor characteristics during running for high-precision speed control.
- This tuning function also available for a second motor, which allows high-precision driving of the second motor by changeover operation between two motors.

Online tuning

Motor temperature vs speed variation (Sample: 3.7kW)

70°C

30°C

With on-line tuning

Without on-line tuning

Motor speed [r/min]

Temperature [°C]

0   Time [min]   8 0

4. Environment-friendly features

- Provided with low-noise control power supply systems which minimize noise interference on peripheral devices such as sensors.
- Equipped with terminals for connecting DC REACTOR that can suppress harmonics.
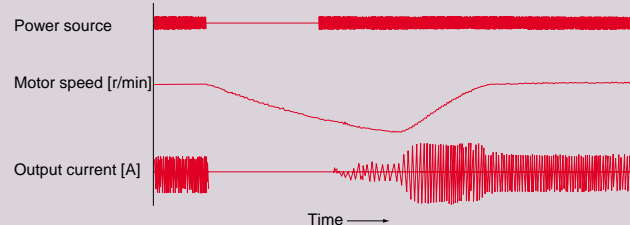- Complied with EMC Directive (Emission) when connected to optional EMC-compliance filter.

Low-noise

FRENIC
5000P11

60.00
RUN

FRENIC
5000G11

60.00
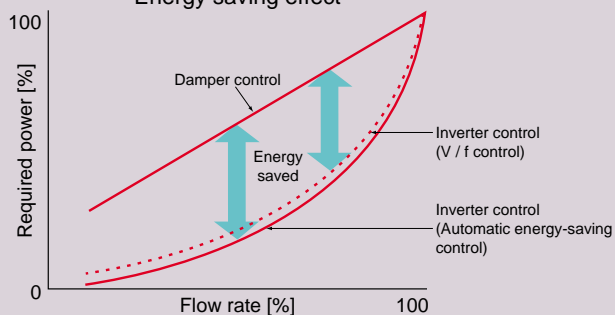RUN
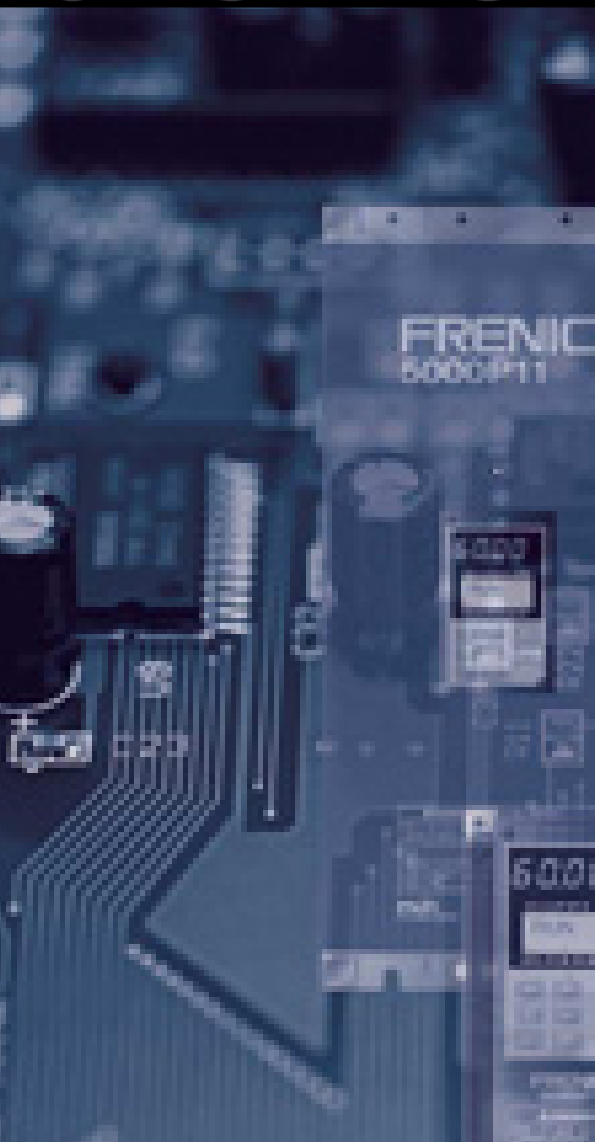
5. Advanced, convenient functions

Economical

● 16-step speed with timer control, rotating motor pick-up control for conveyance machinery

● Automatic energy-saving operation, PID control, cooling fan on/off control, line/inverter changeover operation for fans and pumps

● Rotating motor pick-up control:
Restarts motor without any shocks, by detecting motor speed where motor is coasting after momentary power failure occurs.

● Automatic energy-saving operation function:
Minimizes inverter and motor loss at light load.

Rotating motor pick-up control characteristics (Sample:3.7kW)

Power source

Motor speed [r/min]

Output current [A]

Time →

Energy saving effect

Required power [%]

Damper control

Energy saved

Inverter control (V / f control)

Inverter control (Automatic energy-saving control)

Flow rate [%]

0

100

100

6. Global products, communication

Global

● Conforms to major world safety standards: UL, cUL, TÜV (up to 22kW), EN (CE marking)

● Equipped with RS485 interface as standard.

● Connection to field bus: Profibus-DP, Interbus-S, DeviceNet, Modbus Plus (Option)

● Universal DI/DO : Monitors digital I/O signal status and transmits to a host controller, helping to simplify factory automation.

FRENIC
5000P11

60.00
RUN

60.00
RUN

FRENIC
5000G11

7. Intelligent Keypad panel

Easy

● Copy function: Easily copies function codes and data to other inverters.
● Six languages (English, French, German, Italian, Spanish, and Japanese) are available as standard.
● Jogging (inching) operation from the Keypad or external signal
● Remote operation using optional extension cable (CBIII-10R-□□□)

8. Protective functions, Maintenance

Protection

Protection

● Motors with various characteristics can be used by setting thermal time constant for the electronic thermal overload relay.
● Input phase loss protective function protects the inverter from damage caused by disconnection of power supply lines.
● Motor is protected with a PTC thermistor.
● Input terminals for auxiliary control power supply (1.5kW or larger models) : Alarm signal output will be held even if main circuit power supply has shut down.

Excellent maintainability

The items below can be monitored on the Keypad panel and making it easy to analyze the cause of trip and to take preventive measures.
● Input/output terminals check
● Life expectancy of main-circuit capacitors
● Inverter on-load factor
● Accumlated operation time
● Inverter operating condition (output current, heat sink temperature, input power, etc.)
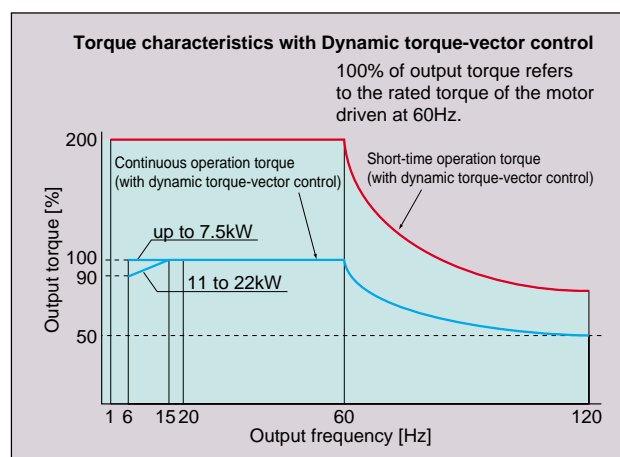● Detailed data on trip cause

9. Extensive product line

Line-up

● Two series are available: G11S series ranging from 0.2 to 400kW for general industrial machines and P11S series ranging from 5.5 to 500kW for fans and pumps.
● Totally-enclosed casing (IP40) (up to 22kW as standard).
● Optional IP20 enclosure available for 30kW or larger models.
● Water-proof models(IP65 for 7.5kW or smaller, IP54 for 11 to 22kW) as a separate series (available soon).

10. Other useful functions

● Side-by-side mounting (up to 22kW) saves space when inverters are installed in a panel.
● The uniform height (260mm) of products (up to 7.5kW) makes it easy to design panels.
● User-definable control terminals: Digital input (9 points), transistor output (4points), and relay contact output (1point).
● Active drive feature: Performs prolonged acceleration at reduced torque, monitoring the load status to prevent tripping.
● Stall prevention function is provided as standard. Active or inactive can be also selected.

Torque characteristics with Dynamic torque-vector control

100% of output torque refers to the rated torque of the motor driven at 60Hz.

Output torque [%]

Continuous operation torque (with dynamic torque-vector control)

Short-time operation torque (with dynamic torque-vector control)

up to 7.5kW

11 to 22kW

200
100
90
50

1 6 15 20   60   120
Output frequency [Hz]

* The above graph shows an example of torque characteristics when combining FRENIC5000G11S (up to 22kW at dynamic torque-vector control) with Fuji standard three-phase motor (8-type series, 4 poles). Continuous operation torque is for limits of allowable load torque for using the motor within the allowable temperature range and is not for motor output torque.
The motor output torque is shown by the short-time operation torque.

5

Easy to apply to customer systems. A consistent design concept in all models from 0.2kW to 500kW.

Nominal applied motors [kW]	FRENIC5000G11S series for general industrial machines		FRENIC5000P11S series for fans and pumps	
	400V series	200V series	400V series	200V series
0.2		FRN0.2G11S-2JE		
0.4	FRN0.4G11S-4JE	FRN0.4G11S-2JE		
0.75	FRN0.75G11S-4JE	FRN0.75G11S-2JE		
1.5	FRN1.5G11S-4JE	FRN1.5G11S-2JE		
2.2	FRN2.2G11S-4JE	FRN2.2G11S-2JE		
3.7	FRN3.7G11S-4JE	FRN3.7G11S-2JE		
5.5	FRN5.5G11S-4JE	FRN5.5G11S-2JE	FRN5.5P11S-4JE	FRN5.5P11S-2JE
7.5	FRN7.5G11S-4JE	FRN7.5G11S-2JE	FRN7.5P11S-4JE	FRN7.5P11S-2JE
11	FRN11G11S-4JE	FRN11G11S-2JE	FRN11P11S-4JE	FRN11P11S-2JE
15	FRN15G11S-4JE	FRN15G11S-2JE	FRN15P11S-4JE	FRN15P11S-2JE
18.5	FRN18.5G11S-4JE	FRN18.5G11S-2JE	FRN18.5P11S-4JE	FRN18.5P11S-2JE
22	FRN22G11S-4JE	FRN22G11S-2JE	FRN22P11S-4JE	FRN22P11S-2JE
30	FRN30G11S-4JE	FRN30G11S-2JE	FRN30P11S-4JE	FRN30P11S-2JE
37	FRN37G11S-4JE	FRN37G11S-2JE	FRN37P11S-4JE	FRN37P11S-2JE
45	FRN45G11S-4JE	FRN45G11S-2JE	FRN45P11S-4JE	FRN45P11S-2JE
55	FRN55G11S-4JE	FRN55G11S-2JE	FRN55P11S-4JE	FRN55P11S-2JE
75	FRN75G11S-4JE	FRN75G11S-2JE	FRN75P11S-4JE	FRN75P11S-2JE
90	FRN90G11S-4JE	FRN90G11S-2JE	FRN90P11S-4JE	FRN90P11S-2JE
110	FRN110G11S-4JE		FRN110P11S-4JE	FRN110P11S-2JE
132	FRN132G11S-4JE		FRN132P11S-4JE	
160	FRN160G11S-4JE		FRN160P11S-4JE	
200	FRN200G11S-4JE		FRN200P11S-4JE	
220	FRN220G11S-4JE		FRN220P11S-4JE	
280	FRN280G11S-4JE		FRN280P11S-4JE	
315	FRN315G11S-4JE		FRN315P11S-4JE	
355	FRN355G11S-4JE		FRN355P11S-4JE	
400	FRN400G11S-4JE		FRN400P11S-4JE	
450			FRN450P11S-4JE	
500			FRN500P11S-4JE	

How to read the model number

Code	Series name
FRN	FRENIC 5000 series

Code	Application range
G	General industrial machines
P	Fans and pumps

Code	Protective structure
S	Standard

Code	Version
JE	JE

FRN 0.4 G 11 S - 4 JE

Code	Nominal applied motors [kw]
0.2	0.2kW
0.4	0.4kW
0.75	0.75kW
1.5	1.5kW
to	to
500	500kW

Code	Developed inverter series
11	11 series

Code	Input power source
4	Three-phase 400V
2	Three-phase 200V

FRENIC 5000G11S/P11S can be used for almost all industrial plant and equipment areas.

Fans
- Air-conditioning system (for factory, building, office, hospital, clean room, shop, and cattle barn)
- Dryer
- Boiler fan
- Fans for controlling furnace temperature
- Roof fans controlled as a group
- Refrigerator
- Compressor
- Built-in blower in a film-manufacturing machine
- Cooling-tower fans
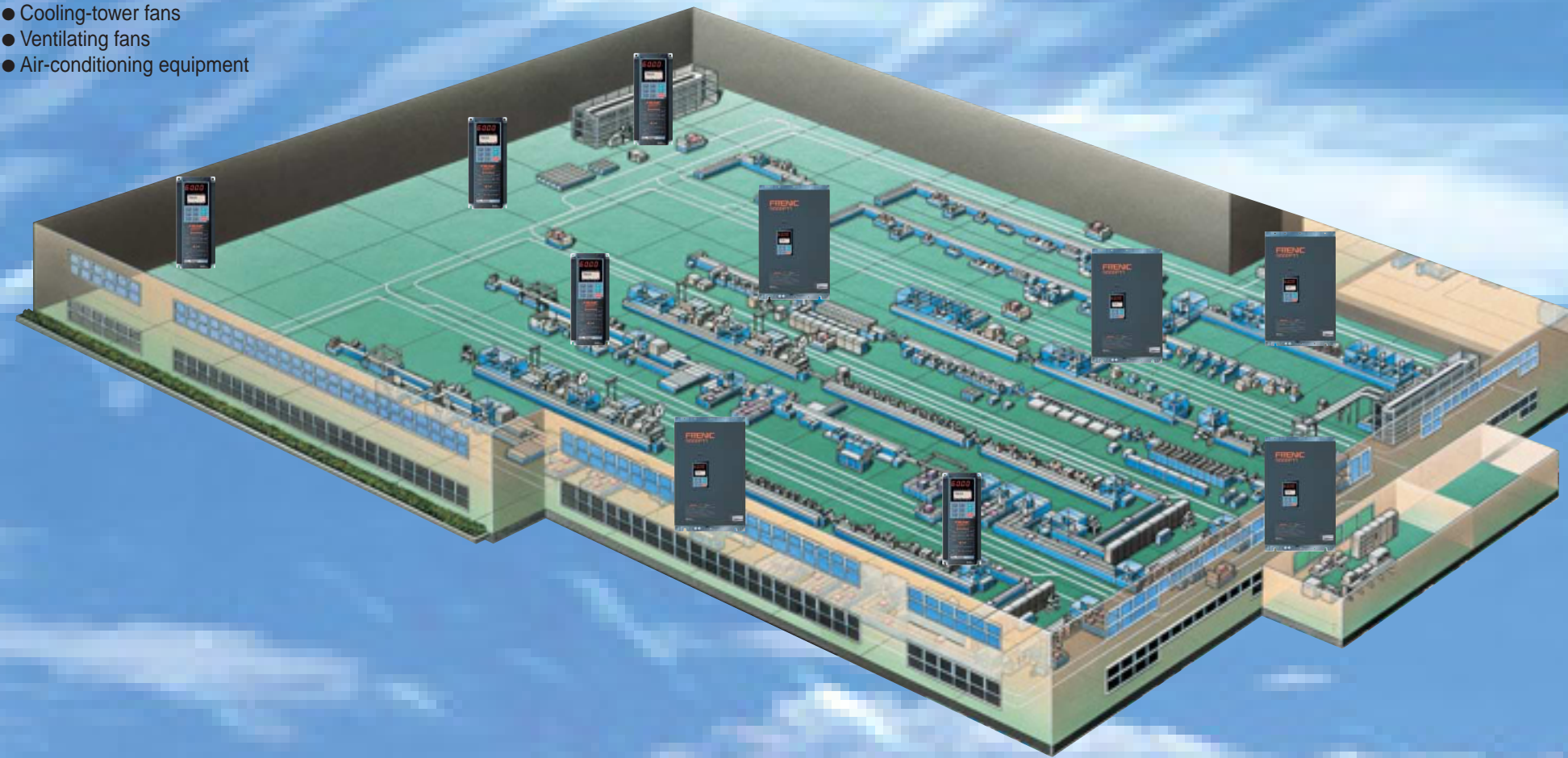- Ventilating fans
- Air-conditioning equipment

Machine tools
- Grinding machine
- Sanding machine
- Milling machine
- Lathe
- Drilling machine
- Turntable
- Work positioning machine
- PC board drilling machine
- Winding machine
- Press

Conveyance machinery
- Crane (traveling, traversing, hoisting)
- Automated warehouse
- Conveyor (belt, chain, screw, roller)
- Lift
- Car parking facility
- Elevator, escalator
- Automatic door
- Shutter equipment
- Speed-change gear

Chemical machinery/wood working machines
- Fluid mixing machine
- Extruder
- Vibrator
- Centrifugal separator
- Coating machine
- Take-up roller
- Routing machine
- Sanding machine
- Planing machine

Food processing machines
- Food mixing machine
- Food slicer
- Grain milling machine (bread, cake, noodles)
- Tea making machine
- Rice cleaning machine

Electric pumps
- Tankless water supply system
- Submersible motor pump
- Vacuum pump
- Fountain pump
- Cooling water pump
- Circulating hot water pump
- Well pump
- Agricultural storage pump
- Water treatment system
- Constant-flow pump
- Sludge pump

Packaging machinery
- Individual packaging/inner-packaging machine
- Packing machine
- Outer-packaging machine

Paper making/ textile machinery
- Spinning machine
- Knitting machine
- Textile printing machine
- Industrial sewing machine
- Synthetic fiber manufacturing plant

Other machinery
- Automated feed/medicine mixer
- Commercial-use washing machine
- Offset printing press
- Book-binding machine
- Car-washing machine
- Shredder
- Dishwasher
- Test equipment
- Crusher

Standard Specifications

FRENIC5000G11S 400V series

Type	FRN□□□G11S-4JE	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400
Nominal applied motor kW		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400
Output ratings	Rated capacity *1) kVA	1.1	1.9	2.8	4.1	6.8	9.9	13	18	22	29	34	45	57	69	85	114	134	160	192	231	287	316	396	445	495	563
	Rated voltage *2) V	3-phase 380, 400, 415V/50Hz 380, 400, 440, 460V/60Hz																									
	Rated current *3) A	1.5	2.5	3.7	5.5	9	13	18	24	30	39	45	60	75	91	112	150	176	210	253	304	377	415	520	585	650	740
	Overload capability	150% of rated current for 1min. 200% of rated current for 0.5s											150% of rated current for 1min. 180% of rated current for 0.5s														
	Rated frequency Hz	50, 60Hz																									
Input ratings	Phases, Voltage, Frequency	3-phase 380 to 480V 50/60Hz											3-phase 380 to 440V/50Hz 380 to 480V/60Hz *4)														
	Voltage / frequency variations	Voltage : +10 to −15% (Voltage unbalance *6) : 2% or less) Frequency :+5 to −5%																									
	Momentary voltage dip capability *7)	When the input voltage is 310V or more, the inverter can be operated continuously. When the input voltage drops below 310V from rated voltage, the inverter can be operated for 15ms. The smooth recovery method is selectable.																									
	Rated current *8) (with DCR) A	0.82	1.5	2.9	4.2	7.1	10.0	13.5	19.8	26.8	33.2	39.3	54	67	81	100	134	160	196	232	282	352	385	491	552	624	704
	(without DCR)	1.8	3.5	6.2	9.2	14.9	21.5	27.9	39.1	50.3	59.9	69.3	86	104	124	150	-	-	-	-	-	-	-	-	-	-	-
	Required power supply capacity *9) kVA	0.6	1.1	2.1	3.0	5.0	7.0	9.4	14	19	24	28	38	47	57	70	93	111	136	161	196	244	267	341	383	433	488
Control	Starting torque	200% (with Dynamic torque-vector control selected)											180% (with Dynamic torque-vector control selected)														
Braking	Standard Braking torque	150%			100%				20% *10)				10 to 15% *10)														
	Time s	5			5				No limit																		
	Duty cycle %	5	3	5	3	2	3	2	No limit																		
	Braking torque (Using options)	150%											100%														
	DC injection braking	Starting frequency: 0.1 to 60.0Hz Braking time: 0.0 to 30.0s Braking level: 0 to 100% of rated current																									
Enclosure (IEC 60529)		IP 40											IP 00 (IP 20 : Option)														
Cooling method		Natural cooling		Fan cooling																							
Standards		-UL/cUL -Low Voltage Directive -EMC Directive TÜV (up to 22kW) -IEC 61800-2 (Ratings, specifications for low voltage adjustable frequency a.c. power drive systems) -IEC 61800-3 (EMC product standard including specific test methods)																									
Mass kg		2.2	2.5	3.8	3.8	3.8	6.5	6.5	10	10	10.5	10.5	29	34	39	40	48	70	70	100	100	140	140	250	250	360	360

FRENIC5000G11S 200V series

Type	FRN□□□G11S-2JE	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Nominal applied motor kW		0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Output ratings	Rated capacity *1) kVA	0.57	1.1	1.9	3.0	4.1	6.4	9.5	12	17	22	28	33	43	55	68	81	107	131
	Rated voltage *2) V	3-phase 200V/50Hz 200, 220, 230V/60Hz																	
	Rated current *3) A	1.5	3.0	5.0	8.0	11	17	25	33	46	59	74	87	115	145	180	215	283	346
	Overload capability	150% of rated current for 1min. 200% of rated current for 0.5s												150% of rated current for 1min. 180% of rated current for 0.5s					
	Rated frequency Hz	50, 60Hz																	
Input ratings	Phases, Voltage, Frequency	3-phase 200 to 230V 50/60Hz												3-phase 200 to 220V/50Hz (220 to 230V/50Hz) *5) 200 to 230V/60Hz					
	Voltage / frequency variations	Voltage : +10 to −15% (Voltage unbalance *6) : 2% or less) Frequency :+5 to −5%																	
	Momentary voltage dip capability *7)	When the input voltage is 165V or more, the inverter can be operated continuously. When the input voltage drops below 165V from rated voltage, the inverter can be operated for 15ms. The smooth recovery method is selectable.																	
	Rated current *8) (with DCR) A	0.94	1.6	3.1	5.7	8.3	14.0	19.7	26.9	39.0	54.0	66.2	78.8	109	135	163	199	272	327
	(without DCR)	1.8	3.4	6.4	11.1	16.1	25.5	40.8	52.6	76.9	98.5	117	136	168	204	243	291	-	-
	Required power supply capacity *9) kVA	0.4	0.6	1.1	2.0	2.9	4.9	6.9	9.4	14	19	23	28	38	47	57	69	95	114
Control	Starting torque	200% (with Dynamic torque-vector control selected)												180% (with Dynamic torque-vector control selected)					
Braking	Standard Braking torque	150%				100%				20% *10)				10 to 15% *10)					
	Time s	10	5			5				No limit									
	Duty cycle %	10	5	3	5	3	2	3	2	No limit									
	Braking torque (Using options)	150%												100%					
	DC injection braking	Starting frequency: 0.1 to 60.0Hz Braking time: 0.0 to 30.0s Braking level: 0 to 100% of rated current																	
Enclosure (IEC 60529)		IP 40												IP 00 (IP 20 : Option)					
Cooling method		Natural cooling			Fan cooling														
Standards		-UL/cUL -Low Voltage Directive -EMC Directive TÜV (up to 22kW) -IEC 61800-2 (Ratings, specifications for low voltage adjustable frequency a.c. power drive systems) -IEC 61800-3 (EMC product standard including specific test methods)																	
Mass kg		2.2	2.2	2.5	3.8	3.8	3.8	6.1	6.1	10	10	10.5	10.5	29	36	44	46	70	115

NOTES:
*1) Inverter output capacity (kVA) at 440V in 400V series, 220V in 200V series. *2) Output voltage is proportional to the power supply voltage and cannot exceed the power supply voltage. *3) Current derating may be required in case of low impedance loads such as high frequency motor. *4) When the input voltage is 380V/50Hz or 380 to 415V/60Hz, the tap of the auxiliary transformer must be changed. *5) Order individually. *6) Refer to the IEC 61800-3(5.2.3). *7) Tested at standard load condition (85% load). *8) This value is under FUJI original calculation method. (Refer to the Technical Information.) *9) When power-factor correcting DC reactor is used. *10) With a nominal applied motor, this value is average torque when the motor decelerates and stops from 60Hz. (It may change according to motor loss.)

FRENIC5000P11S 400V series

Type FRN□□□P11S-4JE		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	450	500
Nominal applied motor	kW	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	450	500
Output ratings	Rated capacity *1) kVA	9.5	12.5	17.5	22.8	28.1	33.5	45	57	69	85	114	134	160	192	231	287	316	396	445	495	563	640	731
	Rated voltage *2) V	3-phase 380, 400, 415V/50Hz 380, 400, 440, 460V/60Hz																						
	Rated current *3) A	12.5	16.5	23	30	37	44	60	75	91	112	150	176	210	253	304	377	415	520	585	650	740	840	960
	Overload capability	110% of rated current for 1min																						
	Rated frequency Hz	50, 60Hz																						
Input ratings	Phases, Voltage, Frequency	3-phase 380 to 480V 50/60Hz 3-phase 380 to 440V/50Hz 380 to 480V/60Hz *4)																						
	Voltage / frequency variations	Voltage : +10 to –15% (Voltage unbalance *6) : 2% or less) Frequency :+5 to –5%																						
	Momentary voltage dip capability *7)	When the input voltage is 310V or more, the inverter can be operated continuously. When the input voltage drops below 310V from rated voltage, the inverter can be operated for 15ms . The smooth recovery method is selectable.																						
	Rated current *8) (with DCR)	10.0	13.5	19.8	26.8	33.2	39.3	54	67	81	100	134	160	196	232	282	352	385	491	552	624	704	792	880
	A (without DCR)	21.5	27.9	39.1	50.3	59.9	69.3	86	104	124	150	-	-	-	-	-	-	-	-	-	-	-	-	-
	Required power supply capacity *9) kVA	7.0	9.4	14	19	24	28	38	47	57	70	93	111	136	161	196	244	267	341	383	433	488	549	610
Control	Starting torque	50%																						
Braking	Standard Braking torque *10)	20%						10 to 15%																
	Standard Time s	No limit																						
	Standard Duty cycle %	No limit																						
	Braking torque (Using options)	100%						70%																
	DC injection braking	Starting frequency: 0.1 to 60.0Hz Braking time: 0.0 to 30.0s Braking level: 0 to 80% of rated current																						
Enclosure (IEC 60529)		IP 40						IP 00 (IP 20 : Option)																
Cooling method		Fan cooling																						
Standards		-UL/cUL -Low Voltage Directive -EMC Directive TÜV (up to 22kW) -IEC 61800-2 (Ratings, specifications for low voltage adjustable frequency a.c. power drive systems) -IEC 61800-3 (EMC product standard including specific test methods)																						
Mass	kg	6.1	6.1	6.1	10	10	10.5	29	29	34	39	40	48	70	70	100	100	140	140	250	250	250	360	360

FRENIC5000P11S 200V series

Type FRN□□□P11S-2JE		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Nominal applied motor	kW	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Output ratings	Rated capacity *1) kVA	8.3	11	16	20	25	29	43	55	68	81	107	131	158
	Rated voltage *2) V	3-phase 200V/50Hz 200, 220V, 230V/60Hz												
	Rated current *3) A	22	29	42	55	67	78	115	145	180	215	283	346	415
	Overload capability	110% of rated current for 1min												
	Rated frequency Hz	50, 60Hz												
Input ratings	Phases, Voltage, Frequency	3-phase 200 to 230V 50/60Hz 3-phase 200 to 220V/50Hz (220 to 230V/50Hz) *5) 200 to 230V/60Hz												
	Voltage / frequency variations	Voltage : +10 to –15% (Voltage unbalance *6) : 2% or less) Frequency :+5 to –5%												
	Momentary voltage dip capability *7)	When the input voltage is 165V or more, the inverter can be operated continuously. When the input voltage drops below 165V from rated voltage, the inverter can be operated for 15ms . The smooth recovery method is selectable.												
	Rated current *8) (with DCR)	19.7	26.9	39.0	54.0	66.2	78.8	109	135	163	199	272	327	400
	A (without DCR)	40.8	52.6	76.9	98.5	117	136	168	204	243	291	-	-	-
	Required power supply capacity *9) kVA	6.9	9.4	14	19	23	28	38	47	57	69	95	114	139
Control	Starting torque	50%												
Braking	Standard Braking torque *10)	20%					10 to 15%							
	Standard Time s	No limit												
	Standard Duty cycle %	No limit												
	Braking torque (Using options)	100%					70%							
	DC injection braking	Starting frequency: 0.1 to 60.0Hz Braking time: 0.0 to 30.0s Braking level: 0 to 80% of rated current												
Enclosure (IEC 60529)		IP 40					IP 00 (IP 20 : Option)							
Cooling method		Fan cooling												
Standards		-UL/cUL -Low Voltage Directive -EMC Directive TÜV (up to 22kW) -IEC 61800-2 (Ratings, specifications for low voltage adjustable frequency a.c. power drive systems) -IEC 61800-3 (EMC product standard including specific test methods)												
Mass	kg	5.7	5.7	5.7	10	10	10.5	29	29	36	44	46	70	115

NOTES:
*1) Inverter output capacity (kVA) at 440V in 400V series, 220V in 200V series.   *2) Output voltage is proportional to the power supply voltage and cannot exceed the power supply voltage.   *3) Current derating may be required in case of low impedance loads such as high frequency motor.   *4) When the input voltage is 380V/50Hz or 380 to 415V/60Hz, the tap of the auxiliary transformer must be changed.   *5) Order individually.   *6) Refer to the IEC 61800-3(5.2.3).   *7) Tested at standard load condition (85% load).   *8) This value is under FUJI original calculation method. (Refer to the Technical Information.)   *9) When power-factor correcting DC reactor (DCR) is used.   *10) With a nominal applied motor, this value is average torque when the motor decelerates and stops from 60Hz. (It may change according to motor loss.)

Common Specifications

Item			Explanation	
			G11S	P11S
Output frequency	Setting	Maximum frequency	50 to 400Hz	50 to 120Hz
		Base frequency	25 to 400Hz	25 to 120Hz
		Starting frequency	0.1 to 60Hz, Holding time: 0.0 to 10.0s	
		Carrier frequency *1)	0.75 to 15kHz (55kW or smaller) 0.75 to 10kHz (75kW or larger)	0.75 to 15kHz (22kW or smaller) 0.75 to 10kHz (30 to 75kW) 0.75 to 6kHz (90kW or larger)
	Accuracy (Stability)		• Analog setting : ±0.2% of Maximum frequency (at 25±10°C) • Digital setting : ±0.01% of Maximum frequency (at –10 to +50°C)	
	Setting resolution		• Analog setting : 1/3000 of Maximum frequency ex.) 0.02Hz at 60Hz, 0.04Hz at 120Hz, (0.15Hz at 400Hz: G11S) • Digital setting : 0.01Hz at Maximum frequency of up to 99.99Hz (0.1Hz at Maximum frequency of 100Hz and above) • LINK setting : • 1/20000 of Maximum frequency ex.) 0.003Hz at 60Hz, 0.006Hz at 120Hz, (0.02Hz at 400Hz: G11S) • 0.01Hz (Fixed)	
Control	Control method		• V/f control (Sinusoidal PWM control) • Dynamic torque-vector control (Sinusoidal PWM control) • Vector control with PG (*) (G11S only)	
	Voltage / freq. (V/f) characteristic		Adjustable at base and maximum frequency, with AVR control : 320 to 480V (400V series), 80 to 240V (200V series)	
	Torque boost		Selectable by load characteristics: Constant torque load (Auto/manual), Variable torque load (Manual)	
	Operation method		• KEYPAD operation : FWD or REV key, STOP key	
			• Digital input signal operation : FWD or REV command, Coast-to-stop command, etc.	
			• LINK operation : RS485 (Standard) T-Link (FUJI private link), Profibus-DP, Interbus-S, DeviceNet, Modbus Plus, JPCN1 (Option)	
	Frequency setting (Frequency command)		• KEYPAD operation: ∧ or ∨ key	
			• External potentiometer (*) : 1 to 5kΩ (1/2W)	
			• Analog input : 0 to +10V DC (0 to +5V DC), 4 to 20mA DC (Reversible) 0 to ±10V DC (0 to ± 5V DC) ....Reversible operation by polarized signal can be selected. (Inverse) +10 to 0V DC, 20 to 4mA DC......Inverse mode operation can be selected.	
			• UP/DOWN control : Output frequency increases when UP signal is ON, and decreases when DOWN signal is ON.	
			• Multistep frequency : Up to 16 different frequencies can be selected by digital input signal.	
			• Pulse train input (*) : 0 to 100kp/s	
			• Digital signal (parallel) (*) : 16-bit binary	
			• LINK operation : RS485 (Standard) T-Link (FUJI private link), Profibus-DP, Interbus-S, DeviceNet, Modbus Plus, JPCN1 (Option)	
			• Programmed PATTERN operation: Max. 7 stages	
	Jogging operation		FWD or REV key, FWD or REV digital input signal	
	Running status signal		Transistor output (4 points) : RUN, FAR, FDT, OL, LU, TL, etc.	
			Relay output (2 points) : • Same as transistor output • Alarm output (for any fault)	
			Analog output (1 point) : Output frequency, Output current, Output torque, etc.	
			Pulse output (1 point) : Output frequency, Output current, Output torque, etc.	
	Acceleration / Deceleration time		0.01 to 3600s : • Independently adjustable acceleration and deceleration • 4 different times are selectable.	
			Mode select : Linear, S-curve (weak), S-curve (strong), Non-linear	
	Active drive		When the acceleration time reaches 60s, the motor output torque is automatically reduced to rated torque. Then the motor operation mode is changed to torque limiting operation. The acceleration time is automatically extended up to 3 times.	
	Frequency limiter		High and Low limiter can be preset.	
	Bias frequency		Bias frequency can be preset.	
	Gain for frequency setting		Gain for frequency setting can be preset. (0.0 to 200.0%) ex.) Analog input 0 to +5V DC with 200% gain results in maximum frequency at 5V DC.	
	Jump frequency control		Jump frequency (3 points) and its common jump hysteresis width (0 to 30Hz) can be preset.	
	Rotating motor pick up (Flying start)		A rotating motor (including inverse rotating mode) can be smoothly picked up without stopping the motor (speed search method).	
	Auto-restart after momentary power failure		Automatic restart is available without stopping motor after a momentary power failure (speed search method). When "Smooth recovery" mode is selected, the motor speed drop is held minimum. (The inverter searches the motor speed, and smoothly returns to setting frequency. Even if the motor circuit is temporarily opened, the inverter operates without a hitch.)	
	Line / Inverter changeover operation		Controls the switching operation between line power and inverter. The inverter has sequence function inside.	
	Slip compensation		The inverter output frequency is controlled according to the load torque to keep motor speed constant. When the value is set at "0.00" and "Torque-vector" is set at "active", the compensation value automatically selects the Fuji standard motor.	
			Slip compensation can be preset for the second motor.	
	Droop operation		The motor speed droops in proportion to output torque (–9.9 to 0.0Hz)......G11S only.	
	Torque limiting		• When the motor torque reaches a preset limiting level, this function automatically adjusts the output frequency to prevent the inverter from tripping due to an overcurrent. • Torque limiting 1 and 2 can be individually set, and are selectable with a digital input signal.	
	Torque control		Output torque (or load factor) can be controlled with an analog input signal.....G11S only.	
	PID control		This function can control flowrate, pressure, etc. (with an analog feedback signal). • Reference • KEYPAD operation (∧ or ∨ key) : Setting freq. / Max. freq. X 100 (%) • PATTERN operation : Setting freq./Max. freq. X 100 (%) signal • Voltage input (Terminal 12) : 0 to +10V DC • DI option input (*) : • BCD, setting freq./Max. freq. X 100 (%) • Current input (Terminal C1) : 4 to 20mA DC • Binary, full scale/100 (%) • Reversible operation with polarity (Terminal 12) : 0 to ±10V DC • Multistep frequency setting : Setting freq./Max. freq. X 100 (%) • Reversible operation with polarity (Terminal 12 + V1) : 0 to ±10V DC • RS485 : Setting freq./Max. freq. X 100 (%) • Inverse mode operation (Terminal 12) : +10 to 0V DC • Inverse mode operation (Terminal C1) : 20 to 4mA DC • Feedback signal • Terminal 12 (0 to +10V DC or +10 to 0V DC) • Terminal C1 (4 to 20mA DC or 20 to 4mA DC)	
	Automatic deceleration		Torque limiter 1 (Braking) is set at "F41: 0" (Same as Torque limiter 2 (Braking)). • In deceleration : The deceleration time is automatically extended up to 3 times the setting time for tripless operation even if braking resistor not used. • In constant speed operation : Based on regenerative energy, the frequency is increased and tripless operation is active.	
	Second motor's setting		This function is used for two motors switching operation. • The second motor's V/f characteristics (base and maximum frequency) can be preset. • The second motor's circuit parameter can be preset. Torque-vector control can be applied to both motors.	
	Energy saving operation		This function minimizes inverter and motor losses at light load.	
	Fan stop operation		This function is used for silent operation or extending the fan's lifetime.	
	Universal DI		Transmits to main controller of LINK operation.	
	Universal DO		Outputs command signal from main controller of LINK operation.	
	Universal AO		Outputs analog signal from main controller of LINK operation.	
	Zero speed control (*)		The stopped motor holds its rotor angle.....G11S only.	
	Positioning control (*)		The SY option card can be used for positioning control by differential counter method.	
	Synchronized operation (*)		This function controls the synchronize operation between 2 axes with PGs.	

Note: (*) Option
*1) Inverter may automatically reduce carrier frequency, in accordance with ambient temperature or output current for protecting inverter.

Item		Explanation	
Indication	**Operation mode (Running)**	LED monitor	LCD monitor (Japanese, English, German, French, Spanish, Italian)
		• Output frequency 1 (Before slip compensation) (Hz) • Output frequency 2 (After slip compensation) (Hz) • Setting frequency (Hz) • Output current (A) • Output voltage (V) • Motor synchronous speed (r/min) • Line speed (m/min) • Load shaft speed (r/min) • Torque calculation value (%) • Input power (kW) • PID reference value • PID reference value (remote) • PID feedback value • Trip history　:Cause of trip by code (Even when main power supply is off, trip history data of the last 4 trips are retained.)	**Operation monitor & Alarm monitor** **Operation monitor** • Displays operation guidance • Bargraph: Output frequency (%), Output current (A), Output torque (%) **Alarm monitor** • The alarm data is displayed when the inverter trips. **Function setting & monitor** **Function setting** Displays function codes and its data or data code, and changes the data value.
	Stopping	Selected setting value or output value	
	Trip mode	Displays the cause of trip by codes as follows. • OC1 (Overcurrent during acceleration) • OC2 (Overcurrent during deceleration) • OC3 (Overcurrent during running at constant speed) • EF (Ground fault) • Lin (Input phase loss) • FUS (Fuse blown) • OU1 (Overvoltage during acceleration) • OU2 (Overvoltage during deceleration) • OU3 (Overvoltage running at constant speed) • LU (Undervoltage) • OH1 (Overheating at heat sink) • OH2 (External thermal relay tripped) • OH3 (Overtemperature at inside air) • dBH (Overheating at DB circuit) • OL1 (Motor 1 overload) • OL2 (Motor 2 overload) • OLU (Inverter unit overload) • OS (Overspeed) • PG (PG error) • Er1 (Memory error) • Er2 (KEYPAD panel communication error) • Er3 (CPU error) • Er4 (Option error) • Er5 (Option error) • Er6 (Operation procedure error) • Er7 (Output phase loss error, impedance imbalance) • Er8 (RS485 error)	**Operation condition** • Output frequency (Hz)　• Motor synchronous speed (r/min) • Output current (A)　• Load shaft speed (r/min) • Output voltage (V)　• Line speed (m/min) • Torque calculation value (%)　• PID reference value • Setting frequency (Hz)　• PID feedback value • Operation condition　• Driving torque limiter setting value (%) 　(FWD / REV, IL, VL / LU, TL)　• Braking togue limiter setting value (%) **Tester function (I/O check)** • Digital I/O : ■ (ON), □ (OFF) • Analog I/O: (V), (mA), (H), (p/s) **Maintenance data** • Operation time (h)　• Cooling fan operation time (h) • DC link circuit voltage (V)　• Communication error times • Temperature at inside air (°C)　 (KEYPAD,RS485, Option) • Temperature at heat sink (°C)　• ROM version • Maximum current (A)　 (Inverter, KEYPAD, Option) • Main circuit capacitor life(%) • Control PC board life (h) **Load factor calculation** • Measurement time (s)　• Average current (A) • Maximum current (A)　• Average braking power (%) **Alarm data** • Output frequency (Hz)　• Temperature at inside air (°C) • Output current (A)　• Hest sink temperature (°C) • Output voltage (V)　• Communication error times • Torque calculation value (%)　 (KEYPAD,RS485, Option) • Setting frequency (Hz)　• Digital input terminal condition • Operation condition　 (Remote, Communication) 　(FWD / REV, IL, VL / LU, TL)　• Transistor output terminal condition • Operation time (h)　• Trip history code • DC link circuit voltage (V)　• Multiple alram exist
	Charge lamp	When the DC link circuit voltage is higher than 50V, the charge lamp is ON.	
Protection	**Overload**	Protects the inverter by electronic thermal and detection of inverter temperature.	
	Overvoltage	Detects DC link circuit overvoltage,and stops the inverter.　(400V series: 800V DC, 200V series: 400V DC)	
	Undervoltage	Detects DC link circuit undervoltage,and stops the inverter.　(400V series: 400V DC, 200V series: 200V DC)	
	Input phase loss	Phase loss protection for power line input.	
	Overheating	Protects the inverter by detection of inverter temperature.	
	Short-circuit	Short-circuit protection for inverter output circuit	
	Ground fault	• Ground fault protection for inverter output circuit (3-phase current detection method) • Zero-phase current detection method (30kW or larger)	
	Motor overload	• The inverter trips,and then protects the motor. • Electronic thermal overload relay can be selected for standard motor or inverter motor • Thermal time constant　(0.5 to 75.0 minutes) can be preset for a special motor. • The second motor's electronic thermal overload relay can be preset for 2-motor changeover operation.	
	DB resistor overheating	• Prevents DB resistor overheating by internal electronic thermal overload relay (7.5kW or smaller). • Prevents DB resistor overheating by external thermal overload relay attached to DB resistor (11kW or larger). 　(The inverter stops electricity discharge operation to protect the DB resistor.)	
	Stall prevention	• Controls the output frequency to prevent OC (overcurrent) trip when the output current exceeds the limit value during acceleration. • Lowers the output frequency to hold almost constant torque when the output current exceeds the limit value during operation at constant speed. • Controls the output frequency to prevent OU (overvoltage) trip when the DC link circuit voltage exceeds the limit value during deceleration.	
	Output phase loss	When the inverter executes auto-tuning, detects each phase impedance imbalance.	
	Motor protection by PTC thermistor	When the motor temperature exceeds allowable value, the inverter trips automatically.	
	Auto reset	When the inverter is tripped, it resets automatically and restarts.	
Condition (Installation and operation)	**Installation location**	Free from corrosive gases, flammable gases, oil mist, dusts, and direct sunlight. Indoor use only.	
	Altitude	1000m or less.　Applicable to 3000m with power derating (-10%/1000m)	
	Ambient temperature	−10 to +50 °C.　For inverters of 22kW or smaller, remove the ventilation covers when operating it at a temperature of 40 °C or above.	
	Ambient humidity	5 to 95%RH (non-condensing)	
	Vibration	3mm at from 2 to less than 9Hz, 9.8m/s^2 at from 9 to less than 20Hz, 2m/s^2 at from 20 to less than 55Hz (2m/s^2 at from 9 to less than 55Hz :G11S 90kW, P11S 110kW or more) 1m/s^2 at from 55 to less than 200Hz,	
Storage condition		-Temperature : −25 to +65 °C, -Humidity : 5 to 95%RH (non-condensing)	

Terminal Functions

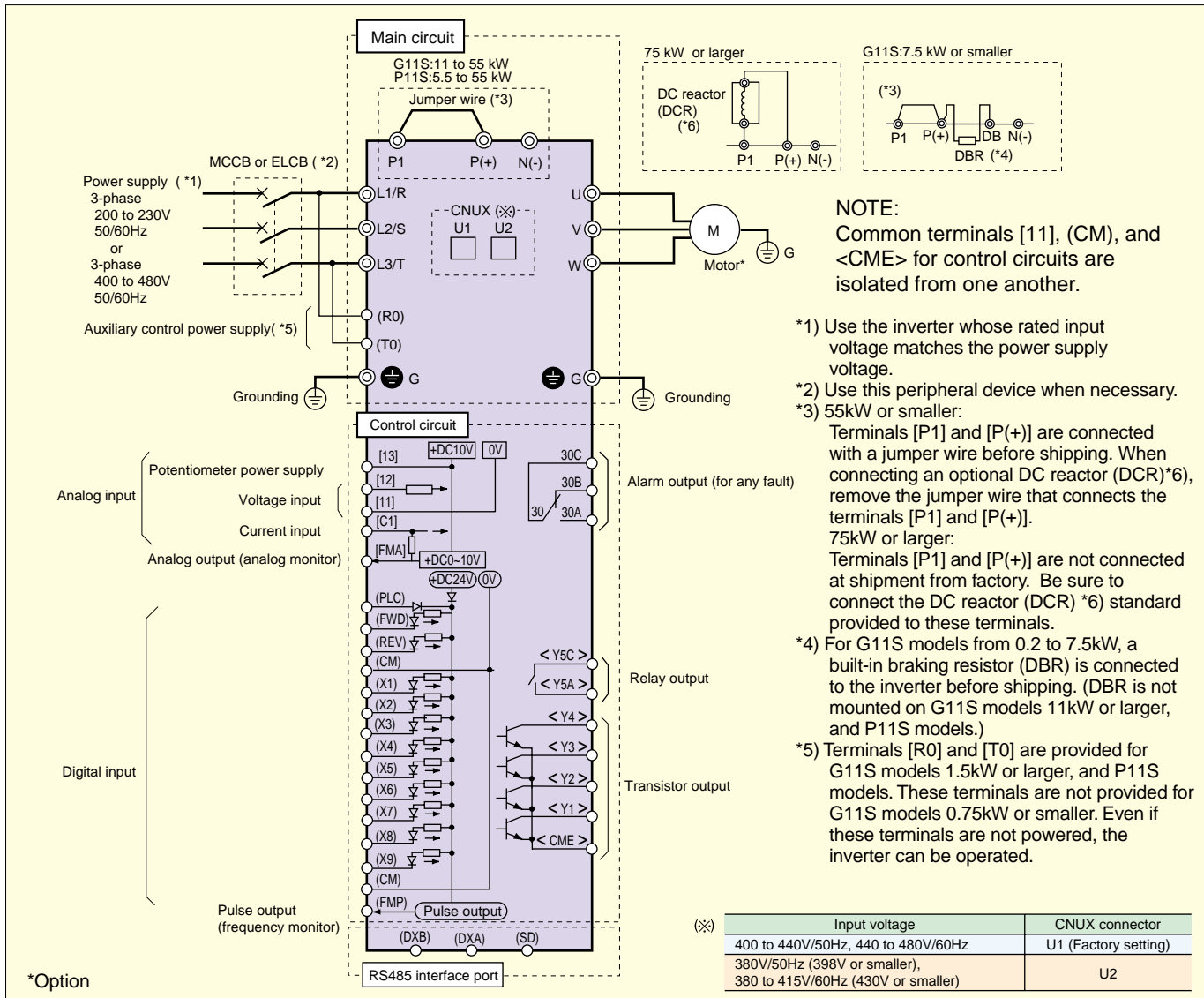|	Symbol	Terminal name	Function	Remarks
Main circuit	L1/R, L2/S, L3/T	Power input	Connect a 3-phase power supply.	
	U, V, W	Inverter output	Connect a 3-phase induction motor.	
	P1, P(+)	For DC REACTOR	Connect the DC REACTOR for power-factor correcting or harmonic current reducing.	DC REACTOR: 55kW or smaller : Option 75kW or larger : Standard
	P(+), N(-)	For BRAKING UNIT	• Connect the BRAKING UNIT (Option). • Used for DC bus connection system.	BRAKING UNIT (Option): G11S: 11kW or larger, P11S: 15kW or larger
	P(+), DB	For EXTERNAL BRAKING RESISTOR	Connect the EXTERNAL BRAKING RESISTOR (Option)	G11S : 7.5kW or smaller, P11S : 11kW or smaller
	⏚ G	Grounding	Ground terminal for inverter chassis (housing).	
	R0, T0	Auxiliary control power supply	Connect the same AC power supply as that of the main circuit to back up the control circuit power supply.	0.75kW or smaller: Not correspond
Analong input	13	Potentiometer power supply	+10V DC power supply for frequency setting POT (POT: 1 to 5kΩ)	• Allowable maximum output current : 10mA

	12	Voltage input	• 0 to +10V DC/0 to 100% (0 to +5V DC/0 to 100%)
			• Reversible operation can be selected by function setting.
			  0 to ±10V DC /0 to ±100% (0 to ±5V DC/0 to ±100%)
			• Inverse mode operation can be selected by function setting or digital input signal.
			  +10 to 0V DC/0 to 100%
				• Input impedance: 22kΩ
				• Allowable maximum input voltage: ±15V DC
				• If input voltage is 10 to 15V DC, the inverter estimates it to10V DC.

		(Torque control)	Used for torque control reference signal.	
		(PID control)	Used for PID control reference signal or feedback signal.	
		(PG feedback)	Used for reference signal of PG feedback control (option)	
	C1	Current input	• 4 to 20mA DC/0 to 100% • Inverse mode operation can be selected by function setting or digital input signal. 20 to 4mA DC/0 to 100%	• Input impedance:250kΩ • Allowable maximum input current: 30mA DC • If input current is 20 to 30mA DC , the inverter estimates it to20mA DC.
		(PID control)	Used for PID control reference signal or feedback signal.	
	11	Common	Common for analog signal	Isolated from terminals CME and CM.
Digital input	FWD	Forward operation command	FWD - CM: ON ..... The motor runs in the forward direction. FWD - CM: OFF ..... The motor decelerates and stops.	When FWD and REV are simultaneously ON,the motor decelerates and stops.
	REV	Reverse operation command	REV - CM: ON ..... The motor runs in the reverse direction. REV - CM: OFF ..... The motor decelerates and stops.	
	X1 X2 X3 X4 X5 X6 X7 X8 X9	Digital input 1 Digital input 2 Digital input 3 Digital input 4 Digital input 5 Digital input 6 Digital input 7 Digital input 8 Digital input 9	These terminals can be preset as follows.	• ON state maximum input voltage: 2V (maximum source current : 5mA) • OFF state maximum terminal voltage: 22 to 27V (allowable maximum leakage current: 0.5mA)
	(SS1) (SS2) (SS4) (SS8)	Multistep freq. selection	(SS1) : 2 (0, 1) different frequencies are selectable. (SS1,SS2) : 4 (0 to 3) different frequencies are selectable. (SS1,SS2,SS4) : 8 (0 to 7) different frequencies are selectable. (SS1,SS2,SS4,SS8) : 16 (0 to 15) different frequencies are selectable.	Frequency 0 is set by F01 (or C30). (All signals of SS1 to SS8 are OFF)
	(RT1) (RT2)	ACC / DEC time selection	(RT1) : 2 (0, 1) different ACC / DEC times are selectable. (RT1,RT2) : 4 (0 to 3) different ACC / DEC times are selectable.	Time 0 is set by F07/F08. (All signals of RT1 to RT2 are OFF)
	(HLD)	3-wire operation stop command	Used for 3-wire operation. (HLD) - CM: ON ..... The inverter self-holds FWD or REV signal. (HLD) - CM: OFF ..... The inverter releases self-holding.	Assigned to terminal X7 at factory setting.
	(BX)	Coast-to-stop command	(BX) - CM: ON ..... Motor will coast-to-stop. (No alarm signal will be output.)	• The motor restarts from 0Hz by turning off BX with the operation command (FWD or REV) ON. • Assigned to terminal X8 at factory setting.
	(RST)	Alarm reset	(RST) - CM: ON ..... Faults are reset. (This signal should be held for more than 0.1s.)	• During normal operating, this signal is ignored. • Assigned to X9 at factory setting.
	(THR)	Trip command (External fault)	(THR) - CM: OFF ..... "OH2 trip" occurs and motor will coast-to-stop.	This alarm signal is held internally.
	(JOG)	Jogging operation	(JOG) - CM: ON ..... JOG frequency is effective.	This signal is effective only while the inverter is stopping.
	(Hz2/Hz1)	Freq. set 2 / Freq. set 1	(Hz2/Hz1) - CM: ON ..... Freq. set 2 is effective.	If this signal is changed while the inverter is running, the signal is effective only after the inverter stops.
	(M2/M1)	Motor 2 / Motor 1	(M2/M1) - CM: ON ..... The motor circuit parameter and V/f characteristics are changed to the second motor's ones.	If this signal is changed while the inverter is running, the signal is effective only after the inverter stops.
	(DCBRK)	DC brake command	(DCBRK) - CM: ON ..... The DC injection brake is effective. (In the inverter deceleration mode)	If the operation command(FWD/REV) is input while DC braking is effective, the operation command (FWD/REV) has priority.
	(TL2/TL1)	Torque limiter 2 / Torque limiter 1	(TL2/TL1) - CM: ON ..... Torque limiter 2 is effective.	
	(SW50) (SW60)	Switching operation between line and inverter	(SW50(SW60)) - CM: ON .....The motor is changed from inverter operation to line operation. (SW50(SW60)) - CM: OFF ..... The motor is changed from line operation to inverter operation.	Main circuit changeover signals are output through Y1 to Y5 terinal.
	(UP)	UP command	(UP) - CM: ON ..... The output frequency increases.	When UP and DOWN commands are simultaneously ON,DOWN signal is effective.
	(DOWN)	DOWN command	(DOWN) - CM: ON ..... The output frequency decreases. • The output frequency change rate is determined by ACC / DEC time. • Restarting frequency can be selected from 0Hz or setting value at the time of stop.	
	(WE-KP)	Write enable for KEYPAD	(WE-KP) - CM: ON ..... The data is changed by KEYPAD.	
	(Hz/PID)	PID control cancel	(Hz/PID) - CM: ON ..... The PID control is canceled,and frequency setting by KEYPAD (▢ or ▢)is effective.	
	(IVS)	Inverse mode changeover	(IVS) - CM: ON ..... Inverse mode is effective in analog signal input.	If this signal is changed while the inverter is running, the signal is effective only after the inverter stops.
	(IL)	Interlock signal for 52-2	Connect to auxiliary contact (1NC) of 52-2.	
	(Hz/TRQ)	TRQ control cancel	(Hz/TRQ) - CM: ON ..... The torque control is canceled, and ordinary operation is effective.	
	(LE)	Link enable (RS485, Bus)	(LE) - CM: ON ..... The link opereation is effective. Used to switch operation between ordinary operation and link operation to communication.	RS485: Standard, Bus: Option
	(U-DI)	Universal DI	This signal is transmitted to main controller of LINK operation.	
	(STM)	Pick up start mode	(STM) - CM: ON ..... The "Pick up" start mode is effective.	
	(PG/Hz)	SY-PG enabled	(PG/Hz) - CM: ON ..... Synchronized operation or PG-feedback operation is effective.	Option
	(SYC)	Syuhronization command	(SYC) - CM: ON ..... The motor is controlled for synchronized operation between 2 axes with PGs.	Option
	(ZERO)	Zero speed command	(ZERO) - CM: ON ..... The motor decelerates and holds its rotor angle.	This function can be selected at PG feedback control. Option
	(STOP1)	Forced stop command	(STOP1) - CM: ON ..... The motor decelerates and stops.	
	(STOP2)	Forced stop command with Deceleration time4	(STOP2) - CM: ON ..... The motor decelerates and stops with Deceleration time4.	
	(EXITE)	Pre-exciting command:	(EXITE) - CM: ON ..... The magnetic flux can be established preliminary before starting at PG vector mode.	
	PLC	PLC terminal	Connect PLC power supply to avoid malfunction of the inveter that has SINK type digital input,when PLC power supply is off.	
	CM	Common	Common for digital signal	Isolated from terminals CME and 11.

Terminal Functions

	Symbol	Terminal name	Function	Remarks
Analog output	FMA	Analog monitor	Output voltage (0 to 10V DC) is proportional to selected function's value as follows. The proportional coefficient and bias value can be preset. • Output frequency 1 (Before slip compensation)　(0 to max. frequency) • Output frequency 2 (After slip compensation)　(0 to max. frequency) • Output current　(0 to 200%) • Output voltage　(0 to 200%) • Output torque　(0 to 200%) • Load factor　(0 to 200%) • Input power　(0 to 200%) • PID feedback value　(0 to 100%) • PG feedback value　(0 to max. speed) • DC link circuit voltage　(400V series : 0 to 1000V) 　(200V series 0 to 500V)	Allowable maximum output current: 2mA
	(11)	(Common)	• Universal AO　(0 to 100%)	
Pulse output	FMP	**Pulse rate monitor**	• Pulse rate mode : Pulse rate is proportional to selected function's value* (50% duty pulse) • Average voltage mode : Average voltage is proportional to selected function's value* 　(2670P/S pulse width control)	Allowable maximum output current : 2mA
	(CM)	(Common)	* Kinds of function to be output is same as those of analog output (FMA).	
Transistor output	Y1 Y2 Y3 Y4	**Transistor output 1** **Transistor output 2** **Transistor output 3** **Transistor output 4**	Output the selected signals from the following items.	• ON state maximum output voltage : 2V (Allowable maximum sink current : 50mA) • OFF state maximum leakage current : 0.1mA (Allowable maximum voltage : 27V)
	(RUN)	**Inverter running**	Outputs ON signal when the output frequency is higher than starting frequency.	
	(FAR)	**Frequency equivalence signal**	Outputs ON signal when the difference between output frequency and setting frequency is smaller than FAR hysteresis width.	
	(FDT1)	**Frequency level detection**	Outputs ON signal by comparison of output frequency and preset value (level and hysteresis).	
	(LU)	**Undervoltage detection signal**	Outputs ON signal when the inverter stops by undervoltage while the operation command is ON.	
	(B/D)	**Torque polarity**	Outputs ON signal in braking or stopping mode, and OFF signal in driving mode.	
	(TL)	**Torque limiting**	Outputs ON signal when the inverter is in torque-limiting mode.	
	(IPF)	**Auto-restarting**	Outputs ON signal during auto restart operation mode.(including "restart time")	
	(OL1)	**Overload early warning**	• Outputs ON signal when the electronic thermal value is higher than preset alarm level. • Outputs ON signal when the output current value is higher than preset alarm level.	
	(KP)	**KEYPAD operation mode**	Outputs ON signal when the inverter is in KEYPAD operation mode.	
	(STP)	**Inverter stopping**	Outputs ON signal when the inverter is stopping mode or in DC braking mode.	
	(RDY)	**Ready output**	Outputs ON signal when the inverter is ready for operation.	
	(SW88)	**Line/Inv changeover (for 88)**	Outputs 88's ON signal for Line/Inverter changeover operation.	
	(SW52-2)	**Line/Inv changeover (for 52-2)**	Outputs 52-2's ON signal for Line/Inverter changeover operation.	
	(SW52-1)	**Line/Inv changeover (for 52-1)**	Outputs 52-1's ON signal for Line/Inverter changeover operation.	
	(SWM2)	**Motor2/Motor1**	Outputs the motor changeover switch ON signal from motor 1 to motor 2.	
	(AX)	**Auxiliary terminal (for 52-1)**	Used for auxiliary circuit of 52-1. (Same function as AX1, AX2 terminal by FRENIC5000G9S series. (30kW or larger))	Reffer to wiring diagram example.
	(TU)	**Time-up signal**	Outputs time up signal (100ms ON pulse) at every stage end of PATTERN operation.	
	(TO)	**Cycle completion signal**	Outputs one cycle completion signal (100ms ON pulse) at PATTERN operation.	
	(STG1) (STG2) (STG4)	**Stage No indication 1** **Stage No indication 2** **Stage No indication 4**	Outputs PATTERN operation's stage No. by signals STG1, STG2 and STG4.	
	(AL1) (AL2) (AL4) (AL8)	**Alarm indication 1** **Alarm indication 2** **Alarm indication 4** **Alarm indication 8**	Outputs trip alarm No. by signals AL1, AL2, AL4, and AL8.	
	(FAN)	**Fan operation signal**	Outputs the inverter cooling fan operation status signal.	
	(TRY)	**Auto-resetting**	Outputs ON signal at auto resetting mode. (Including "Reset interval")	
	(U-DO)	**Universal DO**	Outputs command signal from main controller of LINK operation.	
	(OH)	**Overheat early warning**	Outputs ON signal when the heat sink temperature is higher than (trip level – 10℃), and outputs OFF signal when the temperature is lower than (trip level – 15℃).	
	(SY)	**Synchronization completion signal**	Synchronization completion signal for synchronized operation.	Option
	(LIFE)	**Lifetime alarm**	Outputs ON signal when the calculated lifetime is longer than preset alarm level.	
	(FDT2)	**2nd Freq. level detection**	2nd-outputs ON signal by comparison of output frequency and preset value (FDT2 level).	
	(OL2)	**2nd OL level early warning**	2nd-outputs ON signal when the output current value is larger than preset alarm level (OL2 level).	
	(C1OFF)	**Terminal C1 off signal**	Outputs ON signal when the C1 current is smaller than 2mA.	
	(DNZS)	**Speed existance signal**	Outputs ON signal at detection of motor speed when using OPC-G11S-PG/PG2/SY.	
	CME	**Common (transistor output)**	Common for transistor output signal.	Isolated from terminals CM and 11.
Relay output	30A, 30B, 30C	**Alarm relay output**	Outputs a contact signal when a protective function is activated.	• Contact rating : 250V AC, 0.3A, cosø=0.3 48V DC, 0.5A, non-inductive
			Changeable exciting mode active or non-exciting mode active by function "F36".	
	Y5A,Y5C	**Relay output**	Functions can be selected the same as Y1 to Y4.	
			Changeable exciting mode active or non-exciting mode active by function "E25".	
LINK	DXA, DXB, SD	**RS485 I/O terminal**	Connect the RS485 link signal.	

Basic Wiring Diagram

Keypad pane**l** Operation

The following diagram is for reference only. For detailed wiring diagrams, refer to the relevant instruction manual.

Main circuit

G11S:11 to 55 kW
P11S:5.5 to 55 kW
Jumper wire (*3)

P1   P(+)   N(-)

75 kW or larger
DC reactor (DCR) (*6)
P1   P(+)   N(-)

G11S:7.5 kW or smaller
(*3)
P1 P(+)   DB   N(-)
DBR (*4)

MCCB or ELCB (*2)

Power supply (*1)
3-phase
200 to 230V
50/60Hz
or
3-phase
400 to 480V
50/60Hz

L1/R
L2/S
L3/T

CNUX (⊗)
U1   U2

U
V
W

M
Motor*

G

Auxiliary control power supply(*5)
(R0)
(T0)

Grounding   G   G   Grounding

Control circuit

[13]   +DC10V 0V   30C
[12]   30B
[11]   30 30A
[C1]
[FMA] +DC0~10V
       +DC24V 0V
(PLC)
(FWD)
(REV)
(CM)   < Y5C >
(X1)   < Y5A >
(X2)
(X3)   < Y4 >
(X4)   < Y3 >
(X5)   < Y2 >
(X6)   < Y1 >
(X7)
(X8)   < CME >
(X9)
(CM)
(FMP)
       Pulse output
(DXB)   (DXA)   (SD)

RS485 interface port

Potentiometer power supply
Analog input
Voltage input
Current input
Analog output (analog monitor)

Digital input

Pulse output (frequency monitor)

Alarm output (for any fault)

Relay output

Transistor output

*Option

NOTE:
Common terminals [11], (CM), and <CME> for control circuits are isolated from one another.

*1) Use the inverter whose rated input voltage matches the power supply voltage.
*2) Use this peripheral device when necessary.
*3) 55kW or smaller:
Terminals [P1] and [P(+)] are connected with a jumper wire before shipping. When connecting an optional DC reactor (DCR)*6), remove the jumper wire that connects the terminals [P1] and [P(+)].
75kW or larger:
Terminals [P1] and [P(+)] are not connected at shipment from factory. Be sure to connect the DC reactor (DCR) *6) standard provided to these terminals.
*4) For G11S models from 0.2 to 7.5kW, a built-in braking resistor (DBR) is connected to the inverter before shipping. (DBR is not mounted on G11S models 11kW or larger, and P11S models.)
*5) Terminals [R0] and [T0] are provided for G11S models 1.5kW or larger, and P11S models. These terminals are not provided for G11S models 0.75kW or smaller. Even if these terminals are not powered, the inverter can be operated.

Input voltage	CNUX connector
400 to 440V/50Hz, 440 to 480V/60Hz	U1 (Factory setting)
380V/50Hz (398V or smaller), 380 to 415V/60Hz (430V or smaller)	U2

(⊗)

Terminal Arrangement

• Main circuit terminals

FRN0.4G11S-4JE~FRN0.75G11S-4JE / FRN0.2G11S-2JE~FRN0.75G11S-2JE

G	L1/R	L2/S	L3/T	DB	P1	P(+)	N(-)	U	V	W
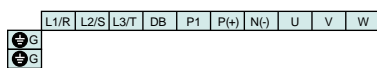
FRN1.5G11S-4JE~FRN3.7G11S-4JE / FRN1.5G11S-2JE~FRN3.7G11S-2JE

R0	T0
L1/R	L2/S	L3/T	DB	P1	P(+)	N(-)	U	V	W
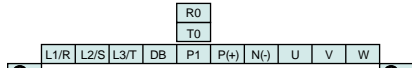
FRN5.5G11S-4JE~FRN7.5G11S-4JE / FRN5.5G11S-2JE~FRN7.5G11S-2JE
FRN5.5P11S-4JE~FRN11P11S-4JE / FRN5.5P11S-2JE~FRN11P11S-2JE

R0	T0
L1/R	L2/S	L3/T	DB	P1	P(+)	N(-)	U	V	W
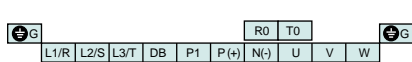
FRN11G11S-4JE~FRN22G11S-4JE / FRN11G11S-2JE~FRN22G11S-2JE
FRN15P11S-4JE~FRN22P11S-4JE / FRN15P11S-2JE~FRN22P11S-2JE

R0	T0
L1/R	L2/S	L3/T	P1	P(+)	N(-)	U	V	W
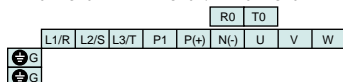
FRN30G11S-4JE~FRN110G11S-4JE / FRN30G11S-2JE~FRN55G11S-2JE
FRN30P11S-4JE~FRN132P11S-4JE / FRN30P11S-2JE~FRN75P11S-2JE

R0	T0
L1/R	L2/S	L3/T	P1	U	V	W
			P(+)			N(-)

FRN75G11S-2JE, FRN90P11S-2JE

R0	T0
L1/R	L2/S	L3/T	P1	P(+)	N(-)	U	V	W
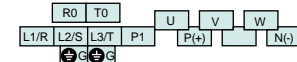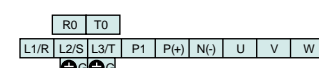
FRN132G11S-4JE~FRN220G11S-4JE / FRN90G11S-2JE
FRN160P11S-4JE~FRN280P11S-4JE / FRN110P11S-2JE

R0	T0
L1/R	L2/S	L3/T	U	V	W
			P1	P(+)	N(-)
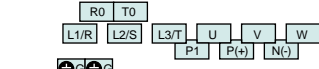
FRN280G11S-4JE~FRN315G11S-4JE
FRN315P11S-4JE~FRN400P11S-4JE

R0	T0
L1/R	L2/S	L3/T	P1	U	V	W
L1/R	L2/S	L3/T	P1	U	V	W
			P(+)	P(+)	N(-)	N(-)
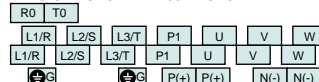
FRN355G11S-4JE~FRN400G11S-4JE
FRN450P11S-4JE~FRN500P11S-4JE

R0	T0
L1/R	L2/S	L3/T	P1	P(+)	N(-)	U	V	W
L1/R	L2/S	L3/T	P1	P(+)	N(-)	U	V	W
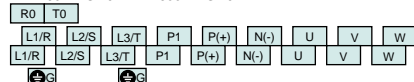
• Control circuit terminals

| 30C	30A
Y5C	30B
Y4	Y5A
Y2	Y3
CME	Y1
11	C1
12	FMA
13	FMP
CM	PLC
FWD	X1
REV	X2
CM	X3
X7	X4
X8	X5
X9	X6
DXB	
DXA	
SD	

FRENIC 5000G11

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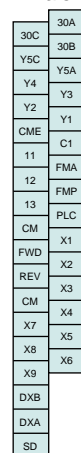
External signal input Operation

The following diagram is for reference only. For detailed wiring diagrams, refer to the relevant instruction manual.

G11S:11 kW or larger
P11S:5.5 kW or larger
External braking resistor (DB) (*2) (*6)

G11S:7.5 kW or smaller
External braking resistor (DB) (*2) (*6)

DC reactor (DCR) (*2) (*9)

Braking unit (*2) (*8)

Main circuit

MCCB or ELCB (*3)

Power supply (*1)
3-phase
200 to 230V
50/60Hz
or
3-phase
400 to 480V
50/60Hz

Auxiliary control power supply (*7)

Grounding

Control circuit

Potentiometer power supply (*2) (*8)

Analog input

Current input 4 to 20mA

Analog frequency meter (FM) 0 to 60Hz (*2)

Digital input

Digital frequency meter (pulse counter) (*2)

RS485 interface port

Alarm output (for any fault)

Relay output

Transistor output

Pulse output

NOTE:
Common terminals [11], (CM), and <CME> for control circuits are isolated from one another.

Motor*

Grounding
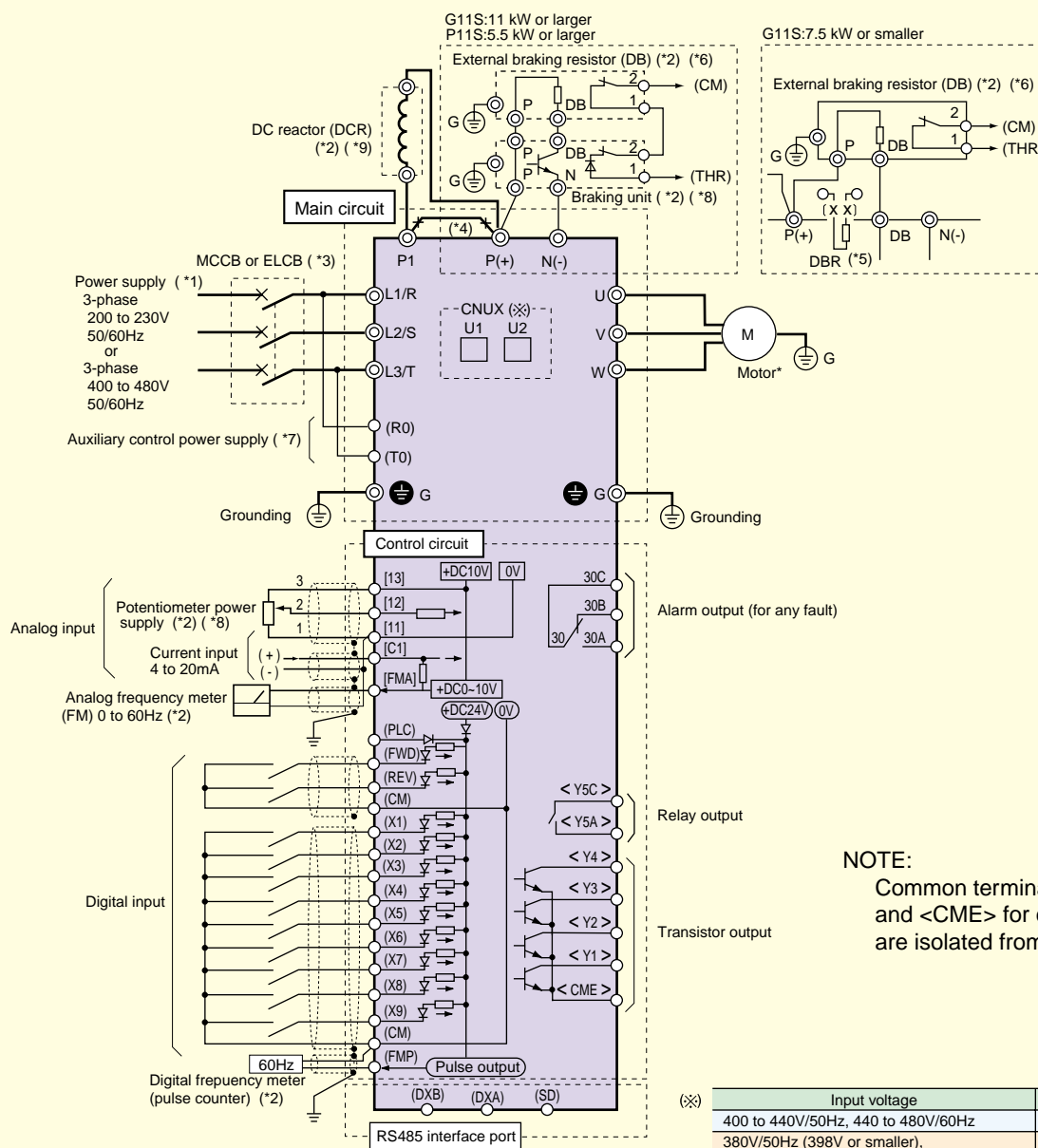
(※)	Input voltage	CNUX connector
	400 to 440V/50Hz, 440 to 480V/60Hz	U1
	380V/50Hz (398V or smaller), 380 to 415V/60Hz (430V or smaller)	U2 (Factory setting)

*Option

*1) Use the inverter whose rated input voltage matches the power supply voltage.
*2) An optional device. Use it when necessary.
*3) Use this peripheral device when necessary.
*4) 55kW or smaller:
Terminals [P1] and [P(+)] are connected with a jumper wire before shipping. When connecting an optional DC reactor (DCR) *9), remove the jumper wire that connects the terminals [P1] and [P(+)].
75kW or larger:
Terminals [P1] and [P(+)] are not connected at shipment from factory. Be sure to connect the DC reactor (DCR) *9) standard provided to these terminals.
*5) For G11S models from 0.2 to 7.5kW, a built-in braking resistor (DBR) is connected to the inverter before shipping. (DBR is not

mounted on G11S models 11kW or larger, and P11S models.) When connecting an optional external braking resistor (DB), remove the DBR connection cables from [P(+)] and [DB] terminals. The end of the removed cables (indicated with an X) must be insulated.
*6) When connecting an optional external braking resistor (DB), be sure to also use an optional braking unit *8). Connect the optional braking unit to the [P(+)] and [N(-)] terminals. Auxiliary terminals [1] and [2] have polarity.
Be sure to connect cables to these terminals correctly. (See the diagram)
*7) Terminals [R0] and [T0] are provided for G11S models 1.5kW or larger, and P11S models. These terminals are not provided for G11S models 0.75kW or smaller. Even if these terminals are not powered, the inverter can be operated.

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Keypad panel

LED monitor
In operation mode:
Displays the setting frequency, output current, voltage, motor speed, or line speed.
In trip mode:
Displays code indicating the cause of trip.

LCD monitor
In operation mode :
Displays various items of information such as operation condition and function data. Operation guidance, which can be scrolled, is displayed at the bottom.
In program mode :
Displays functions and data.

Up/Down keys
In operation mode :
Increases or decreases the frequency or speed.
In program mode :
Increases or decreases function code number and data set value.

Unit indication
Displays the unit for the information shown on the LED monitor.

Program key
Switches the display to a menu screen or to the initial screen for operation mode or alarm mode.

FWD/REV keys
In operation mode :
Starts the inverter with forward or reverse operation command.
Pressing the FWD or REV key lights the RUN lamp. Invalid when the function code F02 (Operation method) is set at 1 (External signal operation).

Shift key (Column shift)
In program mode :
Moves the cursor horizontally at data change. Pressing this key with the UP or DOWN key, the screen changes to the next function block.

Stop key
In operation mode :
Stops the inverter.
Invalid when the function code F02 (Operation method) is set at 1 (External signal operation).

Reset key
In program mode :
Cancels the current input data and shifts the screen.
In trip mode :
Releases the trip-stop state.

Function/Data Select key
In operation mode :
Changes the displayed values of LED monitor.
In program mode :
Selects the function code or stores the data.

Keypad panel operation

Perform the wiring shown in the Basic wiring diagram on page 14. Turn on inverter power, and use the [∧] or [∨] key to set an output frequency. Press the [FUNC DATA] key, then press the [FWD] or [REV] key.

The inverter starts running using the factory setting function data.

Press the [STOP] key to stop the inverter.

Procedure for selecting function codes and data codes

The following is a sample procedure for selecting a function code and changing the function data.

1 Press the [PRG] key to switch the operation monitor screen to the program menu screen.

```
RUN              FWD
PRG → PRG   MENU
F/D  → LED   SHIFT
```

2 Select "1. DATA SET", and press the [FUNC DATA] key.

```
→ 1. DATA SET
   2. DATA CHECK
   3. OPR MNTR
   4. I / O CHECK
```

3 Press the [∧] or [∨] key to select a target function code. To quickly scroll the function select screen, press [SHIFT »] key and the [∧] or [∨] key at the same time. At the target function, press [FUNC DATA] key.

```
 F00  DATA PRTC
 F01  FREQ CMD 1
 F02  OPR METHOD
 F03  MAX Hz-1
```

4 Use the [∧], [∨], and [SHIFT »] keys to change the function data to the target value. (Use the [SHIFT »] key to move the cursor when you want to enter a numerical value.)

```
 F01  FREQ CMD 1

                0
 0~11
```

5 Press the [FUNC DATA] key to store the updated function data in memory.
The screen shifts for the selection of the next function.

```
 F02  OPR METHOD
 F03  MAX Hz-1
 F04  BASE Hz-1
 F05  RATED V-1
```

6 Pressing the [PRG] key switches the screen to the operation monitor screen.

```
RUN              FWD
PRG → PRG   MENU
F/D  → LED   SHIFT
```

1) **Setting a frequency**

When the operation monitor screen is displayed, a frequency can be set by using the [∧] or [∨] key in both the operation and stop modes. When the target frequency is displayed, press the [FUNC DATA] key to enter the frequency in memory.

2) **Switching a unit indication**

During both operation and stop modes, each time the [FUNC DATA] key is pressed, the value displayed on the LED monitor changes, and the unit indication on the LCD monitor shifts from Hz to A, V, r/min, m/min, kW, and % in this order in accordance with the displayed value.

Function settings

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Fundamental Functions

Function			Setting range	Min. unit	Factory setting	
Code	Name	LCD monitor			−22kW	30kW−
Basic Functions	F00 Data protection	F00 DATA PRTC	0 : Data change enable 1 : Data protection	-	0	
	F01 Frequency command 1	F01 FREQ CMD 1	0 : KEYPAD operation (△ or ▽ key) 1 : Voltage input (terminals 12) (0 to +10V DC, 0 to +5V DC) 2 : Current input (terminal C1) (4 to 20mA DC) 3 : Voltage and current input (terminals 12 and C1) 4 : Reversible operation with polarity (terminal 12)(0 to ±10V DC) 5 : Reversible operation with polarity (terminals 12 and V1) (0 to ±10V DC) 6 : Inverse mode operation (terminals 12) (+10 to 0V DC) 7 : Inverse mode operation (terminal C1) (20 to 4mA DC) 8 : UP/DOWN control 1 (initial freq. = 0Hz) 9 : UP/DOWN control 2 (initial freq. = last value) 10 : PATTERN operation 11 : DI option or Pulse train input	-	0	
	F02 Operation method	F02 OPR METHOD	0 : KEYPAD operation (△ or ▽ or key) 1 : FWD or REV command signal operation	-	0	
	F03 Maximum frequency 1	F03 MAX Hz-1	G11S : 50 to 400Hz P11S : 50 to 120Hz	1Hz	60	
	F04 Base frequency 1	F04 BASE Hz-1	G11S : 25 to 400Hz P11S : 25 to 120Hz	1Hz	60	
	F05 Rated voltage 1 (at Base frequency 1)	F05 RATED V-1	0(Free), 320 to 480V (400V class) 0(Free), 80 to 240V (200V class)	1V	380 220	
	F06 Maximum voltage 1 (at Maximum frequency 1)	F06 MAX V-1	320 to 480V (400V class) 80 to 240V (200V class)	1V	380 220	
	F07 Acceleration time 1	F07 ACC TIME1	0.01 to 3600s	0.01s	6.00	20.00
	F08 Deceleration time 1	F08 DEC TIME1	0.01 to 3600s	0.01s	6.00	20.00
	F09 Torque boost 1	F09 TRQ BOOST1	0.0 : Automatic (for constant torque load) 0.1 to 1.9 : Manual (for variable torque load) 2.0 to 20.0 : Manual (for constant torque load)	0.1	G11S : 0.0 P11S : 0.1	
	F10 Electronic thermal overload relay for motor 1 (Select)	F10 ELCTRN OL1	0 : Inactive 1 : Active (for 4-pole standard motor) 2 : Active (for 4-pole inverter motor)	-	1	
	F11 (Level)	F11 OL LEVEL1	Approx. 20 to 135% of rated current	0.01A	*1)	
	F12 (Thermal time constant)	F12 TIME CNST 1	0.5 to 75.0 min	0.1min	5.0	10.0
	F13 Electronic thermal overload relay (for braking resistor)	F13 DBR OL	G11S [7.5kW or smaller] 0 : Inactive 1 : Active (built-in braking resistor) 2 : Active (DB***-2C / 4C external braking resistor)	-	1	
			[11kW or larger] 0 : Inactive	-	0	
			P11S [11kW or smaller] 0,1: Inactive 2 : Active (DB***-2C / 4C external braking resistor)	-	0	
			[15kW or larger] 0 : Inactive	-	0	
	F14 Restart mode after momentary power failure (operation selection)	F14 RESTART	0 : Inactive (Trip and alarm when power failure occurs.) 1 : Inactive (Trip, and alarm when power recovers.) 2 : Inactive (Deceleration stop, and alarm.) 3 : Active (Smooth recovery by continuous operation mode) 4 : Active (Momentarily stops at output frequency of before power failure) 5 : Active (Momentarily stops and restarts at starting frequency)	-	1	
	F15 Frequency limiter (High)	F15 H LIMITER	G11S : 0 to 400Hz P11S : 0 to 120Hz	1Hz	70	
	F16 (Low)	F16 L LIMITER	G11S : 0 to 400Hz P11S : 0 to 120Hz	1Hz	0	
	F17 Gain (for frequency setting signal)	F17 FREQ GAIN	0.0 to 200.0%	0.1%	100.0	
	F18 Bias frequency	F18 FREQ BIAS	G11S : −400.0 to 400.0Hz P11S : −120.0 to 120.0Hz	0.1Hz	0.0	
	F20 DC brake (Starting freq.)	F20 DC BRK Hz	0.0 to 60.0Hz	0.1Hz	0.0	
	F21 (Braking level)	F21 DC BRK LVL	G11S : 0 to 100% P11S : 0 to 80%	1%	0	
	F22 (Braking time)	F22 DC BRK t	0.0 (DC brake inactive), 0.1 to 30.0s	0.1s	0.0	
	F23 Starting frequency (Freq.)	F23 START Hz	0.1 to 60.0Hz	0.1Hz	0.5	
	F24 (Holding time)	F24 HOLDING t	0.0 to 10.0s	0.1s	0.0	
	F25 Stop frequency	F25 STOP Hz	0.1 to 60.0Hz	0.1Hz	0.2	
	F26 Motor sound (Carrier freq.)	F26 MTR SOUND	0.75 to 15kHz (G11S : 55kW or smaller, P11S : 22kW or smaller) 0.75 to 10kHz (G11S : 75kW or larger, P11S : 30 to 75kW) 0.75 to 6kHz (P11S : 90kW or larger)	1kHz	2	
	F27 (Sound tone)	F27 MTR TONE	0 : level 0 1 : level 1 2 : level 2 3 : level 3	-	0	
	F30 FMA (Voltage adjust)	F30 FMA V-ADJ	0 to 200%	1%	100	
	F31 (Function)	F31 FMA FUNC	0 : Output frequency 1 (Before slip compensation) 1 : Output frequency 2 (After slip compensation) 2 : Output current 3 : Output voltage 4 : Output torque 5 : Load factor 6 : Input power 7 : PID feedback value 8 : PG feedback value 9 : DC link circuit voltage 10 : Universal AO	-	0	
	F33 FMP (Pulse rate)	F33 FMP PULSES	300 to 6000 p/s (at full scale)	1p/s	1440	
	F34 (Voltage adjust)	F34 FMP V-ADJ	0% : (Pluse rate output: 50% duty) 1 to 200% : (Voltage adjust: 2670p/s, duty adjust)	1%	0	
	F35 (Function)	F35 FMP FUNC	0 : Output frequency 1 (Before slip compensation) 1 : Output frequency 2 (After slip compensation) 2 : Output current 3 : Output voltage 4 : Output torque 5 : Load factor 6 : Input power 7 : PID feedback value 8 : PG feedback value 9 : DC link circuit voltage 10 : Universal AO	-	0	
	F36 30RY operation mode	F36 30RY MODE	0 : The relay (30) excites on trip mode. 1 : The relay (30) excites on normal mode.	-	0	
	F40 Torque limit 1 (Driving)	F40 DRV TRQ 1	G11S : 20 to 200, 999% (999: No limit) *2) P11S : 20 to 150, 999% (999: No limit)	1%	999	
	F41 (Braking)	F41 BRK TRQ 1	G11S : 0 (Automatic deceleration control), 20 to 200, 999% (999: No limit) *2) P11S : 0 (Automatic deceleration control), 20 to 150, 999% (999: No limit)	1%	999	
	F42 Torque vector control 1	F42 TRQVECTOR1	0 : Inactive 1 : Active	-	0	

Extension Terminal Funcitons

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

	Function			Setting range	Min. unit	Factory setting −22kW	Factory setting 30kW–
	Code	Name	LCD monitor				
X1-X9 Terminal	E01	X1 terminal function	E01 X1 FUNC	Selects from the following items.	-	0	
	E02	X2 terminal function	E02 X2 FUNC		-	1	
	E03	X3 terminal function	E03 X3 FUNC		-	2	
	E04	X4 terminal function	E04 X4 FUNC		-	3	
	E05	X5 terminal function	E05 X5 FUNC		-	4	
	E06	X6 terminal function	E06 X6 FUNC		-	5	
	E07	X7 terminal function	E07 X7 FUNC	0 : ⎫ [SS1]	-	6	
	E08	X8 terminal function	E08 X8 FUNC	1 : ⎬ Multistep freq. selection (1 to 4 bit) [SS2]	-	7	
	E09	X9 terminal function	E09 X9 FUNC	2 : [SS4]	-	8	

Setting range items (X1-X9):

```
0 :  ⎫                                          [SS1]
1 :  ⎬ Multistep freq. selection (1 to 4 bit)   [SS2]
2 :  ⎪                                          [SS4]
3 :  ⎭                                          [SS8]
4 :  ⎫ ACC / DEC time selection (1 to 2 bit)    [RT1]
5 :  ⎭                                          [RT2]
6  : 3-wire operation stop command              [HLD]
7  : Coast-to-stop command                      [BX]
8  : Alarm reset                                [RST]
9  : Trip command (External fault)              [THR]
10 : Jogging operation                          [JOG]
11 : Freq. set. 2 / Freq. set. 1                [Hz2/Hz1]
12 : Motor 2 / Motor 1                          [M2/M1]
13 : DC brake command                           [DCBRK]
14 : Torque limiter 2 / Torque limiter 1        [TL2/TL1]
15 : Switching operation between line and inverter (50Hz) [SW50]
16 : Switching operation between line and inverter (60Hz) [SW60]
17 : UP command                                 [UP]
18 : DOWN command                               [DOWN]
19 : Write enable for KEYPAD                     [WE-KP]
20 : PID control cancel                          [Hz/PID]
21 : Inverse mode changeover (terminals 12 and C1 ) [IVS]
22 : Interlock signal for 52-2                   [IL]
23 : TRQ control cancel                          [Hz/TRQ]
24 : Link enable (Bus,RS485)                     [LE]
25 : Universal DI                                [U-DI]
26 : Pick up start mode                          [STM]
27 : SY-PG enable                                [PG/Hz]
28 : Synchronization command                     [SYC]
29 : Zero speed command                          [ZERO]
30 : Forced stop command                         [STOP1]
31 : Forced stop command with Deceleration time 4 [STOP2]
32 : Pre-exciting command                        [EXITE]
33 : Line speed control Cancellation             [Hz/LSC]
34 : Line speed frequency memory                 [LSC-HLD]
35 : Frequency setting 1 / Frequency setting 2   [Hz1/Hz2]
```

	Function			Setting range	Min. unit	Factory setting −22kW	Factory setting 30kW–
ACC 2,3,4 DEC 2,3,4	E10	Acceleration time 2	E10 ACC TIME2	0.01 to 3600s	0.01s	6.00	20.00
	E11	Deceleration time 2	E11 DEC TIME2		0.01s	6.00	20.00
	E12	Acceleration time 3	E12 ACC TIME3		0.01s	6.00	20.00
	E13	Deceleration time 3	E13 DEC TIME3		0.01s	6.00	20.00
	E14	Acceleration time 4	E14 ACC TIME4		0.01s	6.00	20.00
	E15	Deceleration time 4	E15 DEC TIME4		0.01s	6.00	20.00
	E16	Torque limit 2 (Driving)	E16 DRV TRQ 2	G11S : 20 to 200%, 999% (999: No limit) *2) P11S : 20 to 150%, 999% (999: No limit)	1%	999	
	E17	(Braking)	E17 BRK TRQ 2	G11S : 0 (Automatic deceleration control), 20 to 200%, 999% (999: No limit) *2) P11S : 0 (Automatic deceleration control), 20 to 150%, 999% (999: No limit)	1%	999	
Y1-Y5C Terminal	E20	Y1 terminal function	E20 Y1 FUNC	Selects from the following items.	-	0	
	E21	Y2 terminal function	E21 Y2 FUNC		-	1	
	E22	Y3 terminal function	E22 Y3 FUNC		-	2	
	E23	Y4 terminal function	E23 Y4 FUNC		-	7	
	E24	Y5A,Y5C terminal function	E24 Y5 FUNC		-	10	

Setting range items (Y1-Y5C):

```
0  : Inverter running                            [RUN]
1  : Frequency equivalence signal                [FAR]
2  : Frequency level detection                   [FDT1]
3  : Undervoltage detection signal               [LU]
4  : Torque polarity                             [B/D]
5  : Torque limiting                             [TL]
6  : Auto-restarting                             [IPF]
7  : Overload early warning                      [OL1]
8  : KEYPAD operation mode                       [KP]
9  : Inverter stopping                           [STP]
10 : Ready output                                [RDY]
11 : Line/Inv changeover ( for 88)    [SW88]  ⎫
12 : Line/Inv changeover ( for 52-2)  [SW52-2] ⎬ For Line / Inverter changeover operation
13 : Line/Inv changeover ( for 52-1)  [SW52-1] ⎭
14 : Motor 2 / Motor 1                           [SWM2]
15 : Auxiliary terminal (for 52-1)               [AX]
16 : Time-up signal                   [TU]  ⎫
17 : Cycle completion signal          [TO]  ⎪
18 : Stage No. indication 1           [STG1] ⎬ For PATTERN operation
19 : Stage No. indication 2           [STG2] ⎪
20 : Stage No. indication 4           [STG4] ⎭
21 : Alarm indication 1               [AL1] ⎫
22 : Alarm indication 2               [AL2] ⎬ For Alarm signal output
23 : Alarm indication 4               [AL4] ⎪
24 : Alarm indication 8               [AL8] ⎭
25 : Fan operation signal                        [FAN]
26 : Auto-resetting                              [TRY]
27 : Universal DO                                [U-DO]
28 : Overheat early warning                      [OH]
29 : Synchronization completion signal           [SY]
30 : Life expectancy detection signal            [LIFE]
31 : 2nd Freq. level detection                   [FDT2]
32 : 2nd OL level early warning                  [OL2]
33 : Terminal C1 off signal                      [C1OFF]
34 : Speed existance signal                      [DNZS]
35 : Speed agreement signal                      [DSAG]
36 : PG error signal                             [PG-ABN]
37 : Torque limiting (Signal with delay)         [TL2]
```

	Function			Setting range	Min. unit	Factory setting
	E25	Y5 RY operation mode	E25 Y5RY MODE	0 : Inactive (Y5 Ry excites at "ON signal" mode.) 1 : Active (Y5 Ry excites at "OFF signal" mode.)		
	E30	FAR function signal (Hysteresis)	E30 FAR HYSTR	0.0 to 10.0 Hz	0.1Hz	2.5
	E31	FDT1 function signal (Level)	E31 FDT1 LEVEL	G11S : 0 to 400 Hz P11S : 0 to 120 Hz	1Hz	60
	E32	(Hysteresis)	E32 FDT HYSTR	0.0 to 30.0 Hz	0.1Hz	1.0
	E33	OL1 function signal (Mode select)	E33 OL1 WARNING	0 : Thermal calculation 1 : Output current	-	0
	E34	(Level)	E34 OL1 LEVEL	G11S : Approx. 5 to 200% of rated current P11S : Approx. 5 to 150% of rated current	0.01A	*1
	E35	(Timer)	E35 OL TIMER	0.1 to 60.0s	0.1s	10.0
	E36	FDT2 function (Level)	E36 FDT2 LEVEL	G11S : 0 to 400 Hz P11S : 0 to 120 Hz	1Hz	60
	E37	OL2 function (Level)	E37 OL2 LEVEL	G11S : Approx. 5 to 200% of rated current P11S : Approx. 5 to 150% of rated current	0.01A	*1

Function settings

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Extension Terminal Functions (cont'd)

Function				Setting range	Min. unit	Factory setting	
	Code	Name	LCD monitor			−22kW	30kW−
LED & LCD Monitor	E40	Display coefficient A	E40 COEF A	−999.00 to 999.00	0.01	0.01	
	E41	Display coefficient B	E41 COEF B	−999.00 to 999.00	0.01	0.00	
	E42	LED Display filter	E42 DISPLAY FL	0.0 to 5.0s	0.1s	0.5	
	E43	LED Monitor (Function)	E43 LED MNTR	0 : Output frequency 1 (Before slip compensation) (Hz) 1 : Output frequency 2 (After slip compensation) (Hz) 2 : Setting frequency (Hz) 3 : Output current (A) 4 : Output voltage (V) 5 : Motor synchronous speed (r/min) 6 : Line speed (m/min) 7 : Load shaft speed (r/min) 8 : Torque calculation value (%) 9 : Input power 10 : PID reference value 11 : PID reference value (remote) 12 : PID feedback value	-	0	
	E44	(Display at STOP mode)	E44 LED MNTR2	0 : Setting value 1 : Output value	-	0	
	E45	LCD Monitor (Function)	E45 LCD MNTR	0 : Displays operation guidance 1 : Bar graph (Output freq.,Output current,and Output torque)	-	0	
	E46	Language	E46 LANGUAGE	0 : Japanese 1 : English 2 : German 3 : French 4 : Spanish 5 : Italian	-	1	
	E47	LCD Monitor (Contrast)	E47 CONTRAST	0(Soft) to 10(Hard)	-	5	

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Control Functions of Frequency

Function				Setting range	Min. unit	Factory setting	
	Code	Name	LCD monitor			−22kW	30kW−
Jump Hz Control	C01	Jump frequency (Jump freq. 1)	C01 JUMP Hz 1	G11S : 0 to 400Hz P11S : 0 to 120Hz	1Hz	0	
	C02	(Jump freq. 2)	C02 JUMP Hz 2		1Hz	0	
	C03	(Jump freq. 3)	C03 JUMP Hz 3		1Hz	0	
	C04	(Hysteresis)	C04 JUMP HYSTR	0 to 30Hz	1Hz	3	
Multi-Hz Control	C05	Multistep frequency setting (Freq. 1)	C05 MULTI Hz-1	G11S : 0.00 to 400.00Hz P11S : 0.00 to 120.00Hz	0.01Hz	0.00	
	C06	(Freq. 2)	C06 MULTI Hz-2		0.01Hz	0.00	
	C07	(Freq. 3)	C07 MULTI Hz-3		0.01Hz	0.00	
	C08	(Freq. 4)	C08 MULTI Hz-4		0.01Hz	0.00	
	C09	(Freq. 5)	C09 MULTI Hz-5		0.01Hz	0.00	
	C10	(Freq. 6)	C10 MULTI Hz-6		0.01Hz	0.00	
	C11	(Freq. 7)	C11 MULTI Hz-7		0.01Hz	0.00	
	C12	(Freq. 8)	C12 MULTI Hz-8		0.01Hz	0.00	
	C13	(Freq. 9)	C13 MULTI Hz-9		0.01Hz	0.00	
	C14	(Freq.10)	C14 MULTI Hz10		0.01Hz	0.00	
	C15	(Freq.11)	C15 MULTI Hz11		0.01Hz	0.00	
	C16	(Freq.12)	C16 MULTI Hz12		0.01Hz	0.00	
	C17	(Freq.13)	C17 MULTI Hz13		0.01Hz	0.00	
	C18	(Freq.14)	C18 MULTI Hz14		0.01Hz	0.00	
	C19	(Freq.15)	C19 MULTI Hz15		0.01Hz	0.00	
	C20	JOG frequency	C20 JOG Hz	G11S : 0.00 to 400.00Hz P11S : 0.00 to 120.00Hz	0.01Hz	5.00	
PATTERN Operation	C21	PATTERN operation (Mode select)	C21 PATTERN	0 : Active (Mono-cycle operation, and then stops.) 1 : Active (Continuous cyclic operation while operation command is effective.) 2 : Active (Mono-cycle operation,and after continues at the latest setting frequency.)	-	0	
	C22	(Stage 1)	C22 STAGE 1	• Operation time: 0.00 to 6000s	0.01s	0.00	F1
	C23	(Stage 2)	C23 STAGE 2	• F1 to F4 and R1 to R4	0.01s	0.00	F1
	C24	(Stage 3)	C24 STAGE 3	Code FWD / REV ACC / DEC	0.01s	0.00	F1
	C25	(Stage 4)	C25 STAGE 4	F1 : FWD ACC1 / DEC1	0.01s	0.00	F1
	C26	(Stage 5)	C26 STAGE 5	F2 : FWD ACC2 / DEC2	0.01s	0.00	F1
	C27	(Stage 6)	C27 STAGE 6	F3 : FWD ACC3 / DEC3	0.01s	0.00	F1
	C28	(Stage 7)	C28 STAGE 7	F4 : FWD ACC4 / DEC4	0.01s	0.00	F1
		*Setting for operation time, FWD/REV rotation and ACC/DEC time select.		R1 : REV ACC1 / DEC1 R2 : REV ACC2 / DEC2 R3 : REV ACC3 / DEC3 R4 : REV ACC4 / DEC4			
	C30	Frequency command 2	C30 FREQ CMD 2	0 : KEYPAD operation (△ or ∨ key) 1 : Voltage input (terminal 12) (0 to +10V DC, 0 to +5V DC) 2 : Current input (terminal C1) (4 to 20mA DC) 3 : Voltage and current input (terminals 12 and C1) 4 : Reversible operation with polarity (terminal 12) (0 to ±10V DC) 5 : Reversible operation with polarity (terminal 12 and V1) (0 to ±10V DC) 6 : Inverse mode operation (terminal 12) (+10 to 0V DC) 7 : Inverse mode operation (terminal C1) (20 to 4mA DC) 8 : UP/DOWN control 1 (initial freq. = 0Hz) 9 : UP/DOWN control 2 (initial freq. = last value) 10 : PATTERN operation 11 : DI option or Pulse train input	-	2	
	C31	Offset (Terminal 12)	C31 OFFSET 12	−5.0 to +5.0%	0.1%	0.0	
	C32	(Terminal C1)	C32 OFFSET C1	−5.0 to +5.0%	0.1%	0.0	
	C33	Analog setting signal filter	C33 REF FILTER	0.00 to 5.00s	0.01s	0.05	

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Motor Parameters

Function			Setting range	Min. unit	Factory setting	
Code	Name	LCD monitor			–22kW	30kW–
Motor 1	P01 Number of motor 1 poles	P01 M1 POLES	2 to 14	2	4	
	P02 Motor 1 (Capacity)	P02 M1-CAP	22kW or smaller : 0.01 to 45.00 kW 30kW or larger : 0.01 to 500.00 kW	0.01kW	*1)	
	P03 (Rated current)	P03 M1-Ir	0.00 to 2000 A	0.01A	*1)	
	P04 (Tuning)	P04 M1 TUN1	0 : Inactive 1 : Active (One time tuning of %R1 and %X (on motor stopping mode)) 2 : Active (One time tuning of %R1, %X and Io (on motor running mode))	-	0	
	P05 (On-line Tuning)	P05 M1 TUN2	0 : Inactive 1 : Active (Real time tuning of %R2)	-	0	
	P06 (No-load current)	P06 M1-Io	0.00 to 2000 A	0.01A	*1)	
	P07 (%R1 setting)	P07 M1-%R1	0.00 to 50.00 %	0.01%	*1)	
	P08 (%X setting)	P08 M1-%X	0.00 to 50.00 %	0.01%	*1)	
	P09 (Slip compensation control 1)	P09 SLIP COMP1	0.00 to +15.00	0.01Hz	0.00	

High Performance Functions

Function			Setting range	Min. unit	Factory setting	
	Code Name	LCD monitor			–22kW	30kW–
High Performance Functions	H03 Data initializing (Data reset)	H03 DATA INIT	0 : Manual set value 1 : Return to factory set value	-	0	
	H04 Auto-reset (Times)	H04 AUTO-RESET	0 (Inactive), 1 to 10 times	1	0	
	H05 (Reset interval)	H05 RESET INT	2 to 20s	1s	5	
	H06 Fan stop operation	H06 FAN STOP	0 : Inactive 1 : Active (Fan stops at low temperature mode)	-	0	
	H07 ACC/DEC (Mode select) pattern	H07 ACC PTN	0 : Inactive (linear acceleration and deceleration) 1 : S-shape acceleration and deceleration (mild) 2 : S-shape acceleration and deceleration (variable) 3 : Curvilinear acceleration and deceleration	-	0	
	H08 Rev. phase sequence lock	H08 REV LOCK	0 : Inactive 1 : Active	-	0	
	H09 Start mode (Rotating motor pick up)	H09 START MODE	0 : Inactive 1 : Active (Only Auto-restart after momentary power failure mode) 2 : Active (All start modes)	-	0	
	H10 Energy-saving operation	H10 ENERGY SAV	0 : Inactive 1 : Active (Only when torque boost "F09" is set at manual setting mode.)	-	G11S : 0 P11S : 1	
	H11 DEC mode	H11 DEC MODE	0 : Normal (according to "H07" mode) 1 : Coast-to-stop	-	0	
	H12 Instantaneous overcurrent limiting	H12 INST CL	0 : Inactive 1 : Active	-	1	
	H13 Auto-restart (Restart time)	H13 RESTART t	0.1 to 10.0s	0.1s	0.5	
	H14 (Freq. fall rate)	H14 FALL RATE	0.00 to 100.00Hz/s	0.01Hz/s	10.00	
	H15 (Holding DC voltage)	H15 HOLD V	400 to 600V (400V class) 200 to 300V (200V class)	1V	470V 235V	
	H16 (OPR command selfhold time)	H16 SELFHOLD t	0.0 to 30.0s, 999s (999s : The operation command is held while DC link circuit voltage is larger than 50V.)	0.1s	999	
	H18 Torque control	H18 TRQ CTRL	G11S 0 : Inactive (Frequency control) 1 : Active (Torque control by terminal 12 (Driving)) (0 to +10V/0 to 200%) 2 : Active (Torque control by terminal 12 (Driving & Braking) (0 to ±10V/0 to ±200%)	-	0	
			P11S 0 : Inactive (Fixed)	-	0	
	H19 Active drive	H19 AUT RED	0 : Inactive 1 : Active	-	0	
PID Control	H20 PID control (Mode select)	H20 PID MODE	0 : Inactive 1 : Active (PID output 0 to 100% / Frefuency 0 to max.) 2 : Active (Inverse operation mode : PID output 0 to 100% / Frefuency max. to 0)	-	0	
	H21 (Feedback signal)	H21 FB SIGNAL	0 : Terminal 12 (0 to +10V) 1 : Terminal C1 (4 to 20mA) 2 : Terminal 12 (+10 to 0V) 3 : Terminal C1 (20 to 4mA)	-	1	
	H22 (P-gain)	H22 P-GAIN	0.01 to 10.00	0.01	0.10	
	H23 (I-gain)	H23 I-GAIN	0.0 : Inactive 0.1 to 3600.0s	0.1s	0.0	
	H24 (D-gain)	H24 D-GAIN	0.00 : Inactive 0.01 to 10.0s	0.01s	0.00	
	H25 (Feedback filter)	H25 FB FILTER	0.0 to 60.0s	0.1s	0.5	
Y1-Y5C Terminal	H26 PTC thermistor (Mode select)	H26 PTC MODE	0 : Inactive 1 : Active	-	0	
	H27 (level)	H27 PTC LEVEL	0.00 to 5.00V	0.01V	1.60	
	H28 Droop operation	H28 DROOP	G11S : –9.9 to 0.0Hz P11S : 0.0 (Fixed)	0.1Hz	0.0	
Serial Link	H30 Serial link (Function select)	H30 LINK FUNC	(Code) (Monitor) (Frequency command) (Operation command) 0 : X - - × : Valid 1 : X X - - : Invalid 2 : X - X 3 : X X X	-	0	
	H31 RS 485 (Address)	H31 485ADDRESS	1 to 31	1	1	
	H32 (Mode select on no response error)	H32 MODE ON ER	0 : Trip and alarm (Er8) 1 : Operation for H33 timer, and alarm (Er8) 2 : Operation for H33 timer,and retry to communicate. * If the retry fails, then the inverter trips("Er 8"). 3 : Continuous operation	-	0	
	H33 (Timer)	H33 TIMER	0 to 60.0s	0.1s	2.0	
	H34 (Baud rate)	H34 BAUD RATE	0 : 19200 bit/s 1 : 9600 2 : 4800 3 : 2400 4 : 1200	-	1	
	H35 (Data length)	H35 LENGTH	0 : 8 bit 1 : 7 bit	-	0	
	H36 (Parity check)	H36 PARITY	0 : No checking 1 : Even parity 2 : Odd parity	-	0	
	H37 (Stop bits)	H37 STOP BITS	0 : 2 bit 1 : 1 bit	-	0	
	H38 (No response error detection time)	H38 NO RES t	0 (No detection), 1 to 60s	1s	0	
	H39 (Response interval)	H39 INTERVAL	0.00 to 1.00s	0.01s	0.01	

Function Settings

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Alternative Motor Parameters

	Function			Setting range		Min. unit	Factory setting	
	Code	Name	LCD monitor				−22kW	30kW–
Motor 2	A01	Maximum frequency 2	A01 MAX Hz-2	G11S : 50 to 400Hz	P11S : 50 to 120Hz	1Hz	60	
	A02	Base frequency 2	A02 BASE Hz-2	G11S : 25 to 400Hz	P11S : 25 to 120Hz	1Hz	60	
	A03	Rated voltage 2 (at Base frequency 2)	A03 RATED V-2	0 (Free), 320 to 480V (400V class) 0 (Free), 80 to 240V (200V class)		1V	380 220	
	A04	Maximum voltage 2 (at Maximum frequency 2)	A04 MAX V-2	320 to 480V (400V class) 80 to 240V (200V class)		1V	380 220	
	A05	Torque boost 2	A05 TRQ BOOST2	0.0 : Automatic (for constant torque load) 0.1 to 1.9 : Manual (for variable torque load) 2.0 to 20.0 : Manual (for constant torque load)		-	G11S : 0.0 P11S : 0.1	
	A06	Electronic (Select) thermal overload relay	A06 ELCTRN OL2	0 : Inactive 1 : Active (for 4-pole standard motor) 2 : Active (for 4-pole inverter motor)		-	1	
	A07	for motor 2 (Level)	A07 OL LEVEL2	Approx. 20 to 135% of rated current		0.01A	*1)	
	A08	(Thermal time constant)	A08 TIME CNST2	0.5 to 75.0 min		0.1min	5.0	10.0
	A09	Torque vector control 2	A09 TRQVECTOR2	0 : Inactive 1 : Active		-	0	
	A10	Number of motor 2 poles	A10 M2 POLES	2 to 14		2	4	
	A11	Motor 2 (Capacity)	A11 M2-CAP	22kW or smaller : 0.01 to 45.00 kW 30kW or larger : 0.01 to 500.00 kW		0.01kW	*1)	
	A12	(Rated current)	A12 M2-Ir	0.00 to 2000 A		0.01A	*1)	
	A13	(Tuning)	A13 M2 TUN1	0 : Inactive 1 : Active (One time tuning of %R1 and %X (on motor stopping mode)) 2 : Active (One time tuning of %R1, %X and Io (on motor running mode))		-	0	
	A14	(On-line Tuning)	A14 M2 TUN2	0 : Inactive 1 : Active (Real time tuning of %R1 and %X)		-	0	
	A15	(No-load current)	A15 M2-Io	0.00 to 2000 A		0.01A	*1)	
	A16	(%R1 setting)	A16 M2-%R1	0.00 to 50.00 %		0.01%	*1)	
	A17	(%X setting)	A17 M2-%X	0.00 to 50.00 %		0.01%	*1)	
	A18	Slip compensation control 2	A18 SLIP COMP2	0.00 to +15.00 Hz		0.01Hz	0.00	

NOTES :

*1) Typical value of standard Fuji 4P motor.
*2) Percent shall be set according to FUNCTION CODE : P02 or A11, Motor capacity.
    Torque referenced here may not be obtainable when DATA CODE : 0 is selected for FUNCTION CODE : P02 or A11.

The functions in the yellow boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

User Functions

	Function			Setting range	Min. unit	Factory setting	
	Code	Name	LCD monitor			−22kW	30kW–
	U01	Maximum compensation frequency during braking torque limit	U01 USER 01	0 to 65535	1	75	
	U02	1st S-shape level at acceleration	U02 USER 02	1 to 50%	1	10	
	U03	2nd S-shape level at acceleration	U03 USER 03	1 to 50%	1	10	
	U04	1st S-shape level at deceleration	U04 USER 04	1 to 50%	1	10	
	U05	2nd S-shape level at deceleration	U05 USER 05	1 to 50%	1	10	
	U08	Main DC link (Initial value)	U08 USER 08	0 to 65535	1	XXXX	
	U09	capacitor (Measured value)	U09 USER 09	0 to 65535	1	0	
	U10	PC board capacitor powered on time	U10 USER 10	0 to 65535h	1	0	
	U11	Cooling fan operating time	U11 USER 11	0 to 65535h	1	0	
	U13	Magnetize current vibration damping gain	U13 USER 13	0 to 32767	1	819	410
	U15	Slip compensation filter time constant	U15 USER 15	0 to 32767	1	556	546
	U23	Integral gain of continuous operation at power failure	U23 USER 23	0 to 65535	1	1738	1000
	U24	Proportional gain of continuous operation at power failure	U24 USER 24	0 to 65535	1	1024	1000
	U48	Input phase loss protection	U48 USER 48	0, 1, 2	-	−55kW 0	75kW– 1
	U49	RS485 protocol selection	U49 USER 49	0, 1	-	0	
	U56	Speed agreement (Detection width)	U56 USER 56	0 to 50%	1	10	
	U57	/PG error (Delection timer)	U57 USER 57	0.0 to 10.0s	0.1	0.5	
	U58	PG error selection	U58 USER 58	0, 1	-	1	
	U59	Braking-resistor function select	U59 USER 59	00 to A8 (HEX)	1	00	
	U60	Regeneration avoidance at deceleration	U60 USER 60	0, 1	-	0	
	U61	Voltage detect offset and gain adjustment	U61 USER 61	−22kW : 0 (Fixed.) 30kW– : 0, 1, 2	-	0	

Function	Description			LED monitor
Overcurrent protection (Short-circuit) (Ground fault)	• Stops running to protect inverter from an overcurrent resulting from overload. • Stops running to protect inverter from an overcurrent due to a short-circuit in the output circuit. • Stops running to protect inverter from an overcurrent due to a ground fault in the output circuit. • Stops running to protect inverter from an overcurrent resulting from ground fault in the output circuit by detecting zero-phase current.	• 30kW or larger model only	During acceleration	*OC1*
			During deceleration	*OC2*
			While running at constant speed	*OC3*
			Groung fault	*EF*
Overvoltage protection	• The inverter stops when it detects an overvoltage in the DC link circuit.	• 400V series : 800V DC or more 200V series : 400V DC or more • Protection is not assured if excess AC line voltage is applied inadvertently.	During acceleration	*OU1*
			During deceleration	*OU2*
			While running at constant speed	*OU3*
Incoming surge protection	• Protects the inverter against surge voltage between the main circuit power line and ground. • Protects the inverter against surge voltage in the main circuit power line.	• The inverter may be tripped by some other protective function.		

Undervoltage protection	• Stops the inverter when the DC link circuit voltage drops below undervoltage level.	• 400V series : 360V DC (22kW or smaller),
		                        375V DC (30kW or larger)
		• 200V series : 180V DC (22kW or smaller),
		                        186V DC (30kW or larger)
				LU

Input phase loss protection	• The inverter is protected from being damaged when open-phase fault occurs.			*Lin*
Overheat protection	• Stops the inverter when it detects excess heat sink temperature in case of cooling fan failure or overload.			*OH1*
	• Stops the inverter when it detects an abnormal rise in temperature in the inverter unit caused by insufficient ventilation in cubicles or an abnormal ambient temperature. • Stops the inverter when it detects an abnormal rise in temperature inside the inverter.			*OH3*
	• When the built-in braking resistor overheats, the inverter stops discharging and running. • Function data appropriate for the resistor type (built-in/external) must be set.	• G11S : 7.5kW or smaller model only		*dbH*
Electronic thermal overload relay (Motor protection)	• This function stops the inverter by detecting an inverter overload.			*OLU*
	• This function stops the inverter by detecting an overload in a standard motor or inverter motor.		Motor 1 overload	*OL1*
			Motor 2 overload	*OL2*
Fuse blown	• When a blown fuse is detected, the inverter stops running.	• 30kW or larger model only		*FUS*
Stall prevention (Momentary overcurrent limitation)	• When an output current exceeds the limit during acceleration, this function lowers output frequency to prevent the occurrence of an OC1 trip.	• The stall prevention function can be disabled.		
Active drive	• During running in which acceleration is 60s or longer, this function increases the acceleration time to prevent the occurrence of an OLU trip.	• The acceleration time can be prolonged up to three times the preset time.		
External alarm input	• The inverter stops on receiving external alarm signals.	• Use THR terminal function (digital input).		*OH2*
Overspeed protection	• Stops the inverter when the output frequency exceeds the rated maximum frequency by 20%.			*OS*
PG error	• If disconnection occurs in pulse generator circuits, the inverter issues an alarm.			*PG*
Alarm output (for any fault)	• The inverter outputs a relay contact signal when the inverter issued an alarm and stopped.	• Output terminals: 30A, 30B, and 30C • Use the RST terminal function for signal input. • Even if main power input is turned off, alarm history and trip-cause data are retained.		
Alarm reset command	• An alarm-stop state of the inverter can be cleared with the RESET key or by a digital input signal (RST).			
Alarm history memory	• Store up to four instances of previous alarm data.			
Storage of data on cause of trip	• The inverter can store and display details of the latest alarm history data.			
Memory error	• The inverter checks memory data after power-on and when the data is written. If a memory error is detected, the inverter stops.			*Er1*
KEYPAD panel communication error	• If an error is detected in communication between the inverter and KEYPAD when the Keypad panel is being used, the inverter stops.	• When operated by external signals, the inverter continues running. The alarm output (for any fault) is not output. Only Er2 is displayed.		*Er2*
CPU error	• If the inverter detects a CPU error caused by noise or some other factor, the inverter stops.			*Er3*
Option communication error	• If a checksum error or disconnection is detected during communication, the inverter issues an alarm.			*Er4*
Option error	• If a linkage error or other option error is detected, the inverter issues an alarm.			*Er5*
Operation procedure error	• Er6 is indicated only when the inverter is forcedly stopped by [STOP 1] or [STOP 2] operation in E01to E09 (Set value: 30 or 31).			*Er6*
Output phase loss error	• If an unbalance of output circuits is detected during auto-tuning, this function issues an alarm (and stops the inverter).			*Er7*
RS485 communication error	• If an RS485 communication error is detected, the inverter issues an alarm.			*Er8*

NOTES :
1)Retaining alarm signal when auxiliary controll power supply is not used :
   If the inverter power supply is cut off while an internal alarm signal is being output, the alarm signal cannot be retained.
2)To issue the RESET command, press the [RESET] key on the KEYPAD panel or connect terminals RST and CM and disconnect them afterwards.
3)Fault history data is stored for the past four trips.

External Dimensions

Fig. 1

FRN0.4G11S-4JE, FRN0.75G11S-4JE
FRN0.2G11S-2JE to FRN0.75G11S-2JE
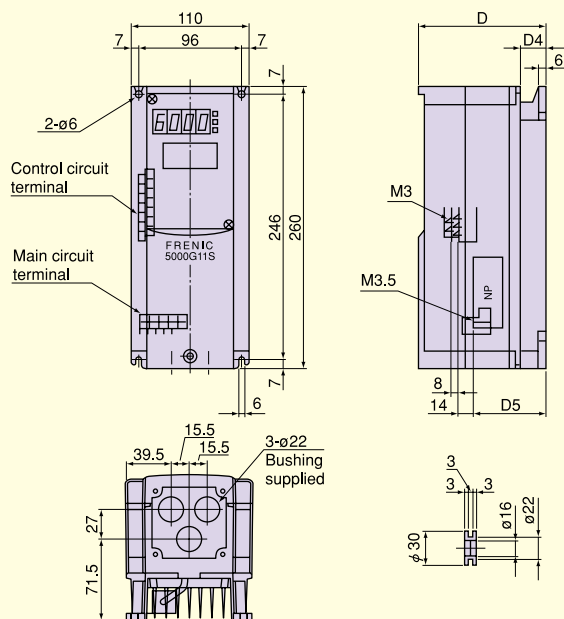
Type	D	D4	D5
FRN0.4G11S-4JE FRN0.2G11S-2JE FRN0.4G11S-2JE	130	36.5	80
FRN0.75G11S-4JE FRN0.75G11S-2JE	145	51.5	95

Fig. 2

FRN1.5G11S-4JE to FRN3.7G11S-4JE
FRN1.5G11S-2JE to FRN3.7G11S-2JE
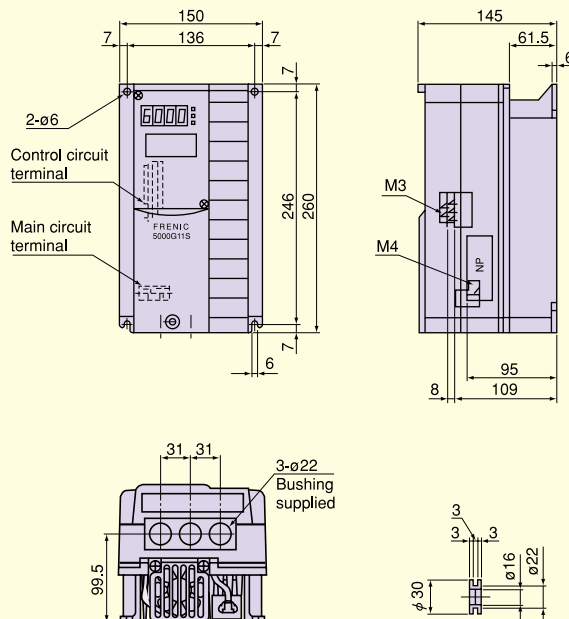
Fig. 3

FRN5.5G11S-4JE, FRN7.5G11S-4JE
FRN5.5G11S-2JE, FRN7.5G11S-2JE
FRN5.5P11S-4JE to FRN11P11S-4JE
FRN5.5P11S-2JE to FRN11P11S-2JE
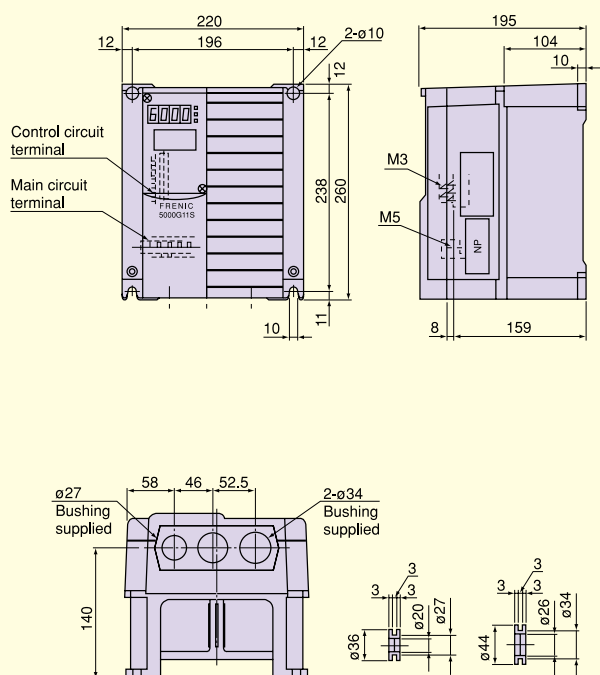
Fig. 4

FRN11G11S-4JE to FRN22G11S-4JE
FRN11G11S-2JE to FRN22G11S-2JE
FRN15P11S-4JE to FRN22P11S-4JE
FRN15P11S-2JE to FRN22P11S-2JE
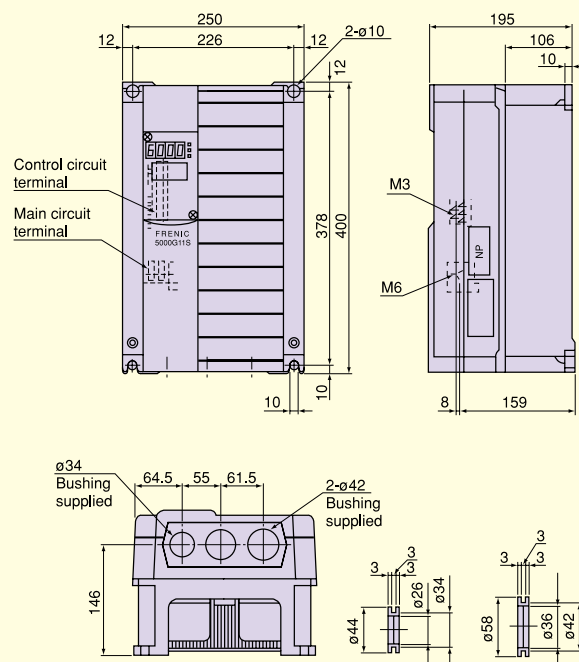
Fig. 5

FRN30G11S-4JE to FRN220G11S-4JE
FRN30G11S-2JE to FRN90G11S-2JE
FRN30P11S-4JE to FRN280P11S-4JE
FRN30P11S-2JE to FRN110P11S-2JE
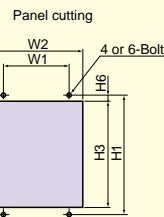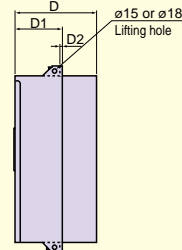
Internal mounting type   External cooling type

Fig. 6

FRN280G11S-4JE to FRN400G11S-4JE   **FRN315P11S-4JE to FRN500P11S-4JE**

Internal mounting type   External cooling type

Fig. 7

KEYPAD panel
(Common for all models)
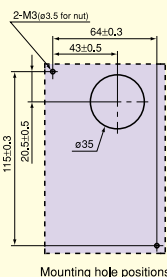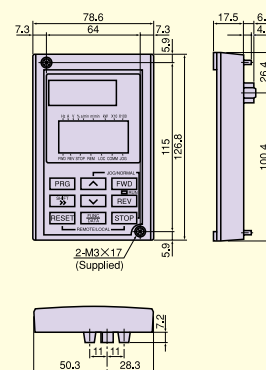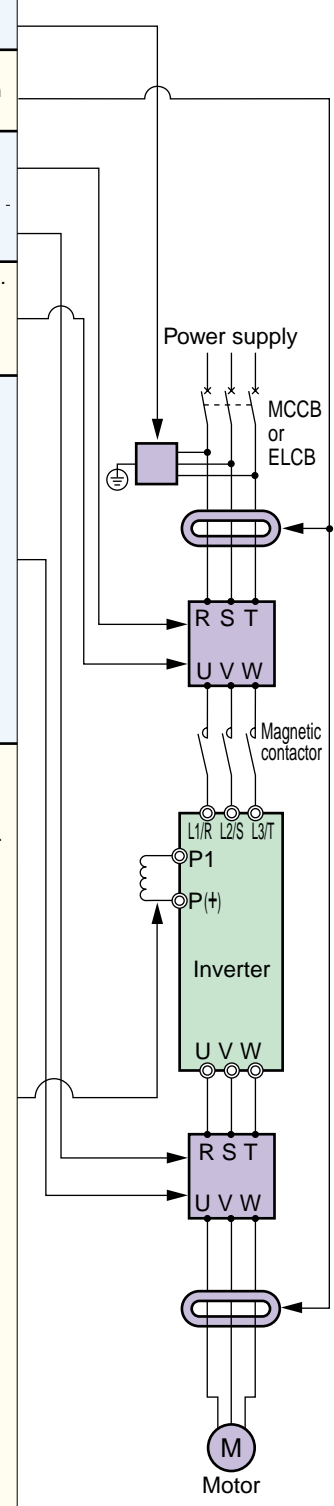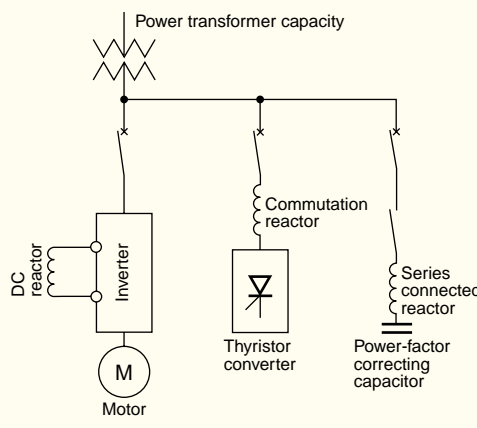
Mounting hole positions

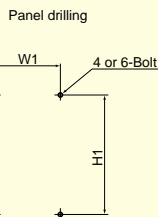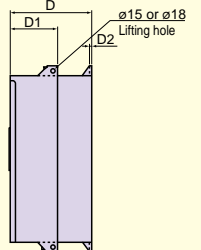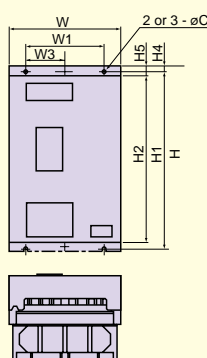| Power supply voltage	Nominal applied motor (kW)	Type G11S series	Type P11S series	Fig	W	W1	W2	W3	W4	W5	H	H1	H2	H3	H4	H5	H6	H7	D	D1	D2	C	Mtg. Bolt
400V	30	FRN30G11S-4JE	FRN30P11S-4JE	5	340	240	326				550	530	500	512					255				
	37	—	FRN37P11S-4JE																				
	37	FRN37G11S-4JE	—													12	25	9		145		10	M8
	45	—	FRN45P11S-4JE		375	275	361				675	655	625	637					270				
	45	FRN45G11S-4JE	—																				
	55	FRN55G11S-4JE	FRN55P11S-4JE																				
	75	—	FRN75P11S-4JE								740	720	690	702								4	
	75	FRN75G11S-4JE	—																				
	90	—	FRN90P11S-4JE	5							740	710	675	685									
	90	FRN90G11S-4JE	—																				
	110	FRN110G11S-4JE	FRN110P11S-4JE		530	430	510				740	710	675	685					315	175			
	132	—	FRN132P11S-4JE																				
	132	FRN132G11S-4JE	—																				
	160	FRN160G11S-4JE	FRN160P11S-4JE								1000	970	935	945		32.5	12.5						
	200	—	FRN200P11S-4JE																360	220			
	200	FRN200G11S-4JE	—												15.5								
	220	FRN220G11S-4JE	FRN220P11S-4JE																			15	M12
	280	—	FRN280P11S-4JE		680	580	660	290															
	280	FRN280G11S-4JE	—																				
	315	FRN315G11S-4JE	FRN315P11S-4JE							610													
	355	—	FRN355P11S-4JE	6																			
	355	FRN355G11S-4JE	—		880	780	860	260	260	810	1400	1370	1330	1340	1335	35	14.5		450	285	6.4		
	400	—	FRN400P11S-4JE		680	580	660	290	—	610													
	400	FRN400G11S-4JE	—																				
	450	—	FRN450P11S-4JE		880	780	860	260	260	810													
	500	—	FRN500P11S-4JE																				
200V	30	FRN30G11S-2JE	FRN30P11S-2JE		340	240	326				550	530	500	512					255				
	37	—	FRN37P11S-2JE																				
	37	FRN37G11S-2JE	—								615	595	565	577									
	45	—	FRN45P11S-2JE													12	25	9		145		10	M8
	45	FRN45G11S-2JE	—		375	275	361												270				
	55	FRN55G11S-2JE	FRN55P11S-2JE	5							740	720	690	702								4	
	75	—	FRN75P11S-2JE																				
	75	FRN75G11S-2JE	—																				
	90	—	FRN90P11S-2JE		530	430	510				750	720	685	695					285	145			
	90	FRN90G11S-2JE	—													15.5	32.5	12.5				15	M12
	110	—	FRN110P11S-2JE		680	580	660	290			880	850	815	825					360	220			

NOTE :
For 75kW or larger models, DC reactor is provided as standard (separately installed). For the outline dimensions, see page 27.

Options

Reactor, Filter, and Other Accessories

Name (Type)	Function	Mounting position
Arrester **(CN23232) (CN2324E)**	Suppresses induced lightning surges from power source , thus protecting all equipment connected the power source.	
Ferrite ring for reducing radio noise **(ACL-40B) (ACL-74B)**	Reduces radio frequency noise. If the wiring between motor and inverter is shorter than 20m, use the ferrite ring in the power supply side. If longer than 20m, use it in the output side.	
Power filter **(FHF-TA/□□/250)** **(FHF-TA/□□/500)** **(FHF-TB/□□/250)** **(FHF-TB/□□/500)**	Prevents the noise generated from the inverter. - Supresses radiation noise and induction noise generated from the output side wiring.	
EMC compliance filter **(EFL-□□□SP-2)** **(EFL-□□□G11-4)** **(RF3□□□-F11)**	This is a special filter which complies with the European EMC (Emission) Directive. This filter should be used together with a ferrite core. *Note: Other prerequisites must be fulfilled to ensure compliance with EMC Directives.* *Refer to this filters operation manual for details.*	

Output circuit filter
(OFL-□□□-□)
(OFL-□□□-4A)
	Connected to the output circuit of inverters under low-noise operation with carrier frequency from 8 to 15kHz, 6kHz or higher for 30kW or larger inverters (OFL-□□□-□), 0.75 to 15kHz, 0.75 to 10kHz for 75kW or larger inverters (OFL-□□□-4A). This filter has the following functions:
	① Suppressing fluctuation of motor terminal voltage.
	   Protects the motor insulation from being damaged by surge voltage. (400V series)
	② Suppressing leakage current from output side wiring. (OFL-□□□-□ only)
	   Reduces the leakage current caused when several motors are operated in parallel or connected with long wiring.
	   * Total wiring length should be less than 400m.
	③ Suppressing radial noise or inductive noise from output side wiring.
	   Effective noise suppression device for long wiring applications such as plant.
	Note: When connecting OFL-□□□-□, be sure to set the carrier frequency F26 at 8kHz or over.	

DC REACTOR(DCR) **(DCR4-□□□)** **(DCR2-□□□)**	[Use the DCR to normalize the power supply in the following cases.] ① The power transformer capacity is 500kVA or over and exceeds the inverter rated capacity by 10 times. ② The inverter and a thyristor converter are connected with the same transformer. * Check if the thyristor converter uses a commutation reactor. If not, AC reactor must be connected to the power supply side. ③ Overvoltage trip occurs due to open/close of the phase-advancing capacitor for the power supply lines. ④ The voltage unbalance exceeds 2%. $$\text{Voltage unbalance (\%)} = \frac{\text{Max. voltage [V]} - \text{Min. Voltage [V]}}{\text{Three-phase average voltage [V]}} \times 67$$ - [For improving input power-factor, reducing harmonics] • Used to reduce input harmonic current (correcting power-factor) • For the resultant effects, refer to the appended guidelines.	
Surge absorber **(Surge suppressor)** **(S2-A-0)** **(S1-B-0)**	S2-A-0: for magnetic contactor S1-B-0: for mini control relay, or timer	
Frequency meter **(TRM-45)** **(FM-60)**	Analog frequency meter TRM-45: 45mm square FM-60 : 60mm square	
Frequency setting device **(RJ-13) (WA3W-1kΩ)**	Frequency setting potentiometer (mounted externally)	

Dc reactor

Fig. A

Fig. B

Fig. C

Fig. D

*Provided with as standard (separately installed) for inverters of 75kW or larger capacity.

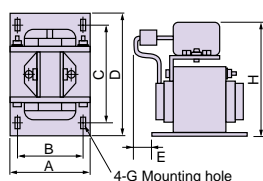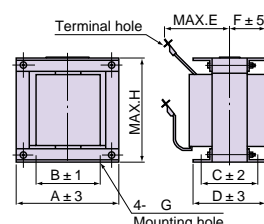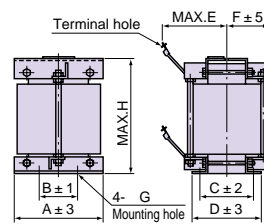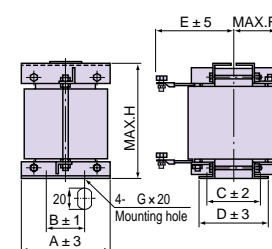| Power supply voltage	Nominal applied motor (kW)	Inverter type	Reactor type	Fig	Dimensions, mm									Mass (kg)
					A	B	C	D	E	F	G	H	Terminal screw	
Three-phase 400V	0.4	FRN0.4G11S-4JE	DCR4-0.4	A	66	56	72	90	15	-	5.2×8	94	M4	1.0
	0.75	FRN0.75G11S-4JE	DCR4-0.75	A	66	56	72	90	20	-	5.2×8	94	M4	1.4
	1.5	FRN1.5G11S-4JE	DCR4-1.5	A	66	56	72	90	20	-	5.2×8	94	M4	1.6
	2.2	FRN2.2G11S-4JE	DCR4-2.2	A	86	71	80	100	15	-	6×9	110	M4	2.0
	3.7	FRN3.7G11S-4JE	DCR4-3.7	A	86	71	80	100	20	-	6×9	110	M4	2.6
	5.5	FRN5.5G11S/P11S-4JE	DCR4-5.5	A	86	71	80	100	20	-	6×9	110	M4	2.6
	7.5	FRN7.5G11S/P11S-4JE	DCR4-7.5	A	111	95	80	100	24	-	7×11	130	M5	4.2
	11	FRN11G11S/P11S-4JE	DCR4-11	A	111	95	80	100	24	-	7×11	130	M5	4.3
	15	FRN15G11S/P11S-4JE	DCR4-15	A	146	124	96	120	15	-	7×11	171	M5	5.9
	18.5	FRN18.5G11S/P11S-4JE	DCR4-18.5	A	146	124	96	120	25	-	7×11	171	M6	7.2
	22	FRN22G11S/P11S-4JE	DCR4-22A	A	146	124	96	120	25	-	7×11	171	M6	7.2
	30	FRN30G11S/P11S-4JE	DCR4-30B	B	152	90	115	157	100	78	8	130	M8	13
	37	FRN37G11S/P11S-4JE	DCR4-37B	B	171	110	110	150	100	75	8	150	M8	15
	45	FRN45G11S/P11S-4JE	DCR4-45B	B	171	110	125	165	110	82	8	150	M8	18
	55	FRN55G11S/P11S-4JE	DCR4-55B	B	171	110	130	170	110	85	8	150	M8	20
	75	FRN75G11S/P11S-4JE	DCR4-75B	C	190	160	115	151	100	75	10	240	M10	20
	90	FRN90G11S/P11S-4JE	DCR4-90B	C	190	160	125	161	120	80	10	250	ø12	23
	110	FRN110G11S/P11S-4JE	DCR4-110B	C	190	160	125	161	120	80	10	250	ø12	25
	132	FRN132G11S/P11S-4JE	DCR4-132B	C	200	170	135	171	120	85	10	260	ø12	28
	160	FRN160G11S/P11S-4JE	DCR4-160B	C	210	180	135	171	120	85	12	290	ø12	32
	200	FRN200G11S/P11S-4JE	DCR4-200B	C	210	180	135	171	140	90	12	295	ø12	35
	220	FRN220G11S/P11S-4JE	DCR4-220B	C	220	190	135	171	140	90	12	300	ø15	40
	280	FRN280G11S/P11S-4JE	DCR4-280B	C	220	190	145	181	150	95	12	320	ø15	45
	315	FRN315G11S/P11S-4JE	DCR4-315B	D	220	190	145	181	150	95	12	320	ø15	52
	355	FRN355G11S/P11S-4JE	DCR4-355B	D	220	190	145	181	160	95	12	320	ø15	55
	400	FRN400G11S/P11S-4JE	DCR4-400B	D	240	210	145	181	170	95	12	340	ø15	60
	450	FRN450P11S-4JE	DCR4-450B	D	260	225	145	181	170	95	12	340	ø15	67
	500	FRN500P11S-4JE	DCR4-500B	D	260	225	145	181	185	100	12	340	ø15	70
Three-phase 200V	0.2	FRN0.2G11S-2JE	DCR2-0.2	A	66	56	72	90	5	-	5.2×8	94	M4	0.8
	0.4	FRN0.4G11S-2JE	DCR2-0.4	A	66	56	72	90	15	-	5.2×8	94	M4	1.0
	0.75	FRN0.75G11S-2JE	DCR2-0.75	A	66	56	72	90	20	-	5.2×8	94	M4	1.4
	1.5	FRN1.5G11S-2JE	DCR2-1.5	A	66	56	72	90	20	-	5.2×8	94	M4	1.6
	2.2	FRN2.2G11S-2JE	DCR2-2.2	A	86	71	80	100	10	-	6×11	110	M4	1.8
	3.7	FRN3.7G11S-2JE	DCR2-3.7	A	86	71	80	100	20	-	6×11	110	M4	2.6
	5.5	FRN5.5G11S/P11S-2JE	DCR2-5.5	A	111	95	80	100	20	-	7×11	130	M5	3.6
	7.5	FRN7.5G11S/P11S-2JE	DCR2-7.5	A	111	95	80	100	23	-	7×11	130	M5	3.8
	11	FRN11G11S/P11S-2JE	DCR2-11	A	111	95	80	100	24	-	7×11	137	M6	4.3
	15	FRN15G11S/P11S-2JE	DCR2-15	A	146	124	96	120	15	-	7×11	171	M6	5.9
	18.5	FRN18.5G11S/P11S-2JE	DCR2-18.5	A	146	124	96	120	25	-	7×11	180	M8	7.4
	22	FRN22G11S/P11S-2JE	DCR2-22A	A	146	124	96	120	25	-	7×11	180	M8	7.5
	30	FRN30G11S/P11S-2JE	DCR2-30B	B	152	90	116	156	115	78	8	130	M10	12
	37	FRN37G11S/P11S-2JE	DCR2-37B	B	171	110	110	151	115	75	8	150	M10	14
	45	FRN45G11S/P11S-2JE	DCR2-45B	B	171	110	125	166	120	86	8	150	M10	16
	55	FRN55G11S/P11S-2JE	DCR2-55B	C	190	160	90	131	100	65	8	210	M12	16
	75	FRN75G11S/P11S-2JE	DCR2-75B	C	200	170	100	141	110	70	10	210	M12	18
	90	FRN90G11S/P11S-2JE	DCR2-90B	C	180	150	110	151	140	75	10	240	ø15	20
	110	FRN110P11S-2JE	DCR2-110B	C	190	160	120	161	150	80	10	270	ø15	25

The reactors in the blue boxes are provided as standard (separately installed).

Braking unit, Braking resistor

Power supply voltage	G11S Motor (kW)	G11S Inverter type	P11S Motor (kW)	P11S Inverter type	Braking unit Type	Braking unit Q'ty	Braking resistor Type	Braking resistor Q'ty	G11S Max. braking torque (%)	G11S Braking time (s)	G11S Discharging capability (kWs)	G11S Duty cycle (%)	G11S Average loss (kW)	P11S Max. braking torque (%)	P11S Braking time (s)	P11S Discharging capability (kWs)	P11S Duty cycle (%)	P11S Average loss (kW)
Three-phase 400V	0.4	FRN0.4G11S-4JE	—	—	—	—	DB0.75-4	1	150%	45	9	22	0.044	—	—	—	—	—
	0.75	FRN0.75G11S-4JE						1		45	17	18	0.068					
	1.5	FRN1.5G11S-4JE					DB2.2-4	1		45	34	10	0.075					
	2.2	FRN2.2G11S-4JE						1		30	33	7	0.077					
	3.7	FRN3.7G11S-4JE	5.5	FRN5.5P11S4JE	—	—	DB3.7-4	1		20	37	5	0.093	100%	15	37	3.5	0.093
	5.5	FRN5.5G11S-4JE	7.5	FRN7.5P11S-4JE	—	—	DB5.5-4	1		20	55	5	0.138		15	55	3.5	0.138
	7.5	FRN7.5G11S-4JE	11	FRN11P11S-4JE	—	—	DB7.5-4	1		10	38	5	0.188		7	38	3.5	0.188
	11	FRN11G11S-4JE	15	FRN15P11S-4JE	BU3-220-4	1	DB11-4	1		10	55	5	0.275		7	55	3.5	0.275
	15	FRN15G11S-4JE	18.5	FRN18.5P11S-4JE		1	DB15-4	1		10	75	5	0.375		8	75	4	0.375
	18.5	FRN18.5G11S-4JE	22	FRN22P11S-4JE		1	DB18.5-4	1		10	93	5	0.463		8	93	4	0.463
	22	FRN22G11S-4JE	30	FRN30P11S-4JE		1	DB22-4	1		8	88	5	0.55		6	88	3	0.55
	30	FRN30G11S-4JE	37	FRN37P11S-4JE	BU37-4C	1	DB30-4C	1	100%	10	150	10	1.5	75%	8	150	8	1.5
	37	FRN37G11S-4JE	45	FRN45P11S-4JE		1	DB37-4C	1		10	185	10	1.85		8	185	8	1.85
	45	FRN45G11S-4JE	55	FRN55P11S-4JE	BU55-4C	1	DB45-4C	1		10	225	10	2.25		8	225	8	2.25
	55	FRN55G11S-4JE	75	FRN75P11S-4JE		1	DB55-4C	1		10	275	10	2.75		7	275	7	2.75
	75	FRN75G11S-4JE	90	FRN90P11S-4JE	BU90-4C	1	DB75-4C	1		10	375	10	3.75		8	375	8	3.75
	90	FRN90G11S-4JE	110	FRN110P11S-4JE		1	DB90-4C	1		10	450	10	4.5		8	450	8	4.5
	110	FRN110G11S-4JE	132	FRN132P11S-4JE	BU132-4C	1	DB110-4C	1		10	550	10	5.5		8	550	8	5.5
	132	FRN132G11S-4JE	160	FRN160P11S-4JE		1	DB132-4C	1		10	665	10	6.65		8	665	8	6.65
	160	FRN160G11S-4JE	200	FRN200P11S-4JE	BU220-4C	1	DB160-4C	1		10	800	10	8.0		8	800	8	8.0
	200	FRN200G11S-4JE	220	FRN220P11S-4JE		1	DB200-4C	1		10	1000	10	10.0		9	1000	9	10.0
	220	FRN220G11S-4JE	280	FRN280P11S-4JE		1	DB220-4C	1		10	1100	10	11.0		8	1100	8	11.0
	280	FRN280G11S-4JE	315	FRN315P11S-4JE		2	DB160-4C	2		11	1600	11	16.0		10	1600	10	16.0
	315	FRN315G11S-4JE	355	FRN355P11S-4JE		2	DB160-4C	2		10	1600	10	16.0		9	1600	9	16.0
	355	FRN355G11S-4JE	400	FRN400P11S-4JE		2	DB200-4C	2		11	2000	11	20.0		10	2000	10	20.0
	400	FRN400G11S-4JE	450	FRN450P11S-4JE		2	DB200-4C	2		10	2000	10	20.0		9	2000	9	20.0
	—	—	500	FRN500P11S-4JE		2	DB200-4C	2		—	—	—	—		8	2000	8	20.0
Three-phase 200V	0.2	FRN0.2G11S-2JE	—	—	—	—	DB0.75-2	1	150%	90	9	37	0.037	—	—	—	—	—
	0.4	FRN0.4G11S-2JE						1		45	9	22	0.044					
	0.75	FRN0.75G11S-2JE						1		45	17	18	0.068					
	1.5	FRN1.5G11S-2JE					DB2.2-2	1		45	34	10	0.075					
	2.2	FRN2.2G11S-2JE						1		30	33	7	0.077					
	3.7	FRN3.7G11S-2JE	5.5	FRN5.5P11S-2JE	—	—	DB3.7-2	1		20	37	5	0.093	100%	15	37	3.5	0.093
	5.5	FRN5.5G11S-2JE	7.5	FRN7.5P11S-2JE	—	—	DB5.5-2	1		20	55	5	0.138		15	55	3.5	0.138
	7.5	FRN7.5G11S-2JE	11	FRN11P11S-2JE	—	—	DB7.5-2	1		10	37	5	0.188		7	37	3.5	0.188
	11	FRN11G11S-2JE	15	FRN15P11S-2JE	BU3-185-2	1	DB11-2	1		10	55	5	0.275		7	55	3.5	0.275
	15	FRN15G11S-2JE	18.5	FRN18.5P11S-2JE		1	DB15-2	1		10	75	5	0.375		8	75	4	0.375
	18.5	FRN18.5G11S-2JE	22	FRN22P11S-2JE		1	DB18.5-2	1		10	92	5	0.463		8	92	4	0.463
	22	FRN22G11S-2JE	30	FRN30P11S-2JE	BU3-220-2	1	DB22-2	1		8	88	5	0.55		6	88	3.5	0.55
	30	FRN30G11S-2JE	37	FRN37P11S-2JE	BU37-2C	1	DB30-2C	1	100%	10	150	10	1.5	75%	8	150	8	1.5
	37	FRN37G11S-2JE	45	FRN45P11S-2JE		1	DB37-2C	1		10	185	10	1.85		8	185	8	1.85
	45	FRN45G11S-2JE	55	FRN55P11S-2JE	BU55-2C	1	DB45-2C	1		10	225	10	2.25		8	225	8	2.25
	55	FRN55G11S-2JE	75	FRN75P11S-2JE		1	DB55-2C	1		10	275	10	2.75		7	275	7	2.75
	75	FRN75G11S-2JE	90	FRN90P11S-2JE	BU90-2C	1	DB75-2C	1		10	375	10	3.75		8	375	8	3.75
	90	FRN90G11S-2JE	110	FRN110P11S-2JE		1	DB90-2C	1		10	450	10	4.5		8	450	8	4.5

NOTES:
1) Each model of the P11S series uses options that are one-class smaller than the options for the G11S series of the same capacity.
2) The braking time and duty cycle (%) are calculated as the constant-torque braking used for deceleration.
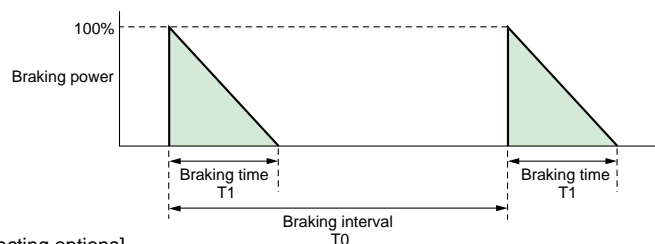
$$\text{Duty cycle (\%)} = \frac{T1}{T0} \times 100 \ [\%]$$

[Procedure for selecting options]
All three conditions listed below must be satisfied.
1 The maximum braking torque does not exceed the value shown in the table.
2 The energy discjarged in the resistor for each braking (the area of the triangle shown in the above figure) does not exceed the discharging capability (kWs) in the table.
3 The average loss (energy discharged in the resistor divided by a braking interval) does not exceed the average loss (kW) shown in the table.

Name (type)	Dimensions

Braking unit

Fig.A Fig.B Fig.C

Voltage	Type	Fig.	Dimensions [mm]						Mass [kg]
			W	W1	H	H1	H2	D	
400V series	BU3-220-4	A	See Fig. A						1.1
	BU37-4C	C	150	100	280	265	250	160	4
	BU55-4C		230	130					5.5
	BU90-4C								
	BU132-4C		250	150	370	355	340		9
	BU220-4C				450	435	420		13
200V series	BU3-185-2	A	See Fig. A						1.1
	BU3-220-2								1.2
	BU37-2C	B	150	100	240	225	210	160	4
	BU55-2C	C	230	130	240	225			6
	BU90-2C		250	150	370	355	340		9

Braking resistor

Fig.A Fig.B Fig.C Fig.D Fig.E

Voltage	Type	Fig.	Dimensions [mm]					Mass [kg]
			W	W1	H	H1	D	
400V series	DB0.75-4	A	64	-	310	295	67	1.3
	DB2.2-4				470	455		2.0
	DB3.7-4							1.7
	DB5.5-4	B	142	74	470	455	67	4.5
	DB7.5-4				520	495		5.0
	DB11-4	C	142	74	430	415	160	6.9
	DB15-4							6.9
	DB18.5-4				510	495		8.7
	DB22-4							8.7
	DB30-4C	D	420	388	660	628	140	11
	DB37-4C						240	14
	DB45-4C							19
	DB55-4C				750	718		21
	DB75-4C	E	550	520	283	240	440	26
	DB110-4C							30
	DB132-4C		650	620				41
	DB160-4C		750	720				57
	DB200-4C							43
	DB220-4C *		600	570				74
200V series	DB0.75-2	A	64	-	310	295	67	1.3
	DB2.2-2		76		345	332	94	2.0
	DB3.7-2							2.0
	DB5.5-2	B	142	90	450	430	67.5	4.5
	DB7.5-2		156		390	370	90	5.0
	DB11-2	C	142	74	430	415	160	6.9
	DB15-2							6.9
	DB18.5-2				510	495		8.7
	DB22-2							8.7
	DB30-2C	D	400	368	660	628	140	10
	DB37-2C							13
	DB45-2C						240	18
	DB55-2C				750	718		22
	DB75-2C	E	450	420	283	240	440	35
	DB110-2C		550	520				32

* Note: The braking resistor type DB220-4C use two braking resistors.

Ferrite ring for reducing radio noise (ACL-40B)(ACL-74B)

ACL-40B ACL-74B

Recommended wire size

Ferrite ring type	Q'ty	No. of turns	Recommended wire size [mm²]
ACL-40B	1	4	2.0, 3.5, 5.5
	2	2	8, 14
ACL-74B	1	4	8, 14
	2	2	22, 38, 60, 5.5 × 2, 8 × 2, 14 × 2, 22 × 2
	4	1	100, 150, 200, 250, 325, 38 × 2, 60 × 2, 100 × 2, 150 × 2

Option cards and other options

Name (type)	Function	Specifications
Relay output card (OPC-G11S-RY)	• Includes four relay output circuits. • Converts transistor output signals from inverter control output terminals Y1 to Y4 to relay (1SPDT) output signals.	
Digital I/O interface card (OPC-G11S-DIO)	• For setting frequency using a binary code. • For monitoring frequency, output current, and output voltage using a binary code. • For input and output of other individual signals.	
Analog I/O interface card (OPC-G11S-AIO)	• For setting a torque limit value using an input analog signal. • For input of auxiliary signal to set frequency. • For analog monitoring of inverter output frequency, output current, and torque.	
T-link interface card (OPC-G11S-TL)	• For setting a frequency. • For setting, reading, and storing function data for function codes. • For setting operation commands (FWD, REV, RST, etc.). • For monitoring the operation status. • For reading trip information.	• Used together with MICREX-F series PLC.
Open bus card	It is an optional card conforming to various open buses. The following operation can be made from the personal computer and PLC. • Setting of running frequency • Setting of operation command (FWD,REV,RST,etc.) • Setting/reading of data code of each function code • Monitoring running frequency and operation status	Correspondent bus / Option type: Profibus DP — OPC-G11S-PDP DeviceNet — OPC-G11S-DEV Modbus Plus — OPC-G11S-MBP Interbus-S — OPC-G11S-IBS CAN open — OPC-G11S-COP
RS232C communication adaptor (OPC-G11S-PC)	The RS232C communication can be done by connecting it to the keypad panel on the main body of the inverter.	
Personal computer loader	• The operation status monitoring and the parameter setting can be made through the inverter's RS-485 interface from the host personal computer. • The parameter can be read and written collectively or individually. • Comparison of two arbitrary parameters. • Monitor of output frequency, output current, and operation status of inverter. • Monitor of alarm history and operation information on alarm.	Communication • Physical level : EIA-RS-485 • The number of units connected : Maximum 31 inverters • Synchronous method : start-stop synchronization • Transmission method : half duplex
PG feedback card (OPC-G11S-PG)	• For performing PG vector control using feedback signals obtained from a PG.	Applicable Pulse Encoder specification: • 100 to 3000P/R • A, B, Z phase • 12V or 15V
PG feedback card (OPC-G11S-PG2)	• For performing PG vector control using feedback signals obtained from a PG.	Applicable Pulse Encoder specification: • 100 to 3000P/R • A, B, Z phase • 5V
Synchronized operation card (OPC-G11S-SY)	• Speed control by pulse train input can be made.	Applicable Pulse Encoder specification: • 20 to 3000P/R • A, B, Z phase • 12V or 15V
Extension cable for keypad panel (CBIII-10R-□□)	Connects the keypad panel to an inverter unit. Three cable types are available: straight 2m, curled 1m, and curled 2m. The curled 1m cable can be extended up to 5m, and the curled 2m cable up to 10m. Note: Cables once extended to the maximum length do not return to their original length.	Type / Nominal length / Maximum length: CBIII-10R-2S — 2m — 2m CBIII-10R-1C — 1m — 5m CBIII-10R-2C — 2m — 10m
IP20 enclosure adapter (P20G11-□□)	• Used to put 30kW or larger models to change its enclosure of IP00 into that of IP20.	Type / Applicable inverter type: P20G11-30 — FRN30G11S-4JE,2JE / FRN30P11S-4JE,2JE to FRN37P11S-4JE,2JE P20G11-55 — FRN37G11S-4JE to FRN55G11S-4JE / FRN45P11S-4JE to FRN75P11S-4JE P20G11-75-4 — FRN75G11S-4JE / FRN37G11S-2JE to FRN55G11S-2JE / FRN90P11S-4JE / FRN45P11S-2JE to FRN75P11S-2JE P20G11-75-2 — FRN75G11S-2JE, FRN90P11S-2JE P20G11-110 — FRN90G11S-4JE to FRN110G11S-4JE / FRN110P11S-4JE to FRN132P11S-4JE P20G11-160 — FRN132G11S-4JE to FRN160G11S-4JE / FRN160P11S-4JE to FRN200P11S-4JE P20G11-220 — FRN200G11S-4JE to FRN220G11S-4JE / FRN90G11S-2JE / FRN220P11S-4JE to FRN280P11S-4JE / FRN110P11S-2JE P20G11-315 — FRN280G11S-4JE to FRN315G11S-4JE / FRN315P11S-4JE to FRN400P11S-4JE P20G11-400 — FRN315G11S-4JE to FRN400G11S-4JE / FRN450P11S-4JE to FRN500P11S-4JE
Mounting adapter for external cooling (PBG11-□□)	• Used to put the cooling fan section of the inverter outside the panel. • Only applicable to 22kW and below inverters. (30kW and above inverters can be modified to external cooling type by replacing the mounting bracket, as standard.)	Type / Applicable inverter type: PBG11-0.75 — FRN0.4G11S-4JE to FRN0.75G11S-4JE / FRN0.2G11S-2JE to FRN0.75G11S-2JE PBG11-3.7 — FRN1.5G11S-4JE to FRN3.7G11S-4JE / FRN1.5G11S-2JE to FRN3.7G11S-2JE PBG11-7.5 — FRN5.5G11S-4JE, 2JE to FRN7.5G11S-4JE, 2JE / FRN5.5P11S-4JE, 2JE to FRN11P11S-4JE, 2JE PBG11-22 — FRN11G11S-4JE, 2JE to FRN22G11S-4JE, 2JE / FRN15P11-4JE, 2JE to FRN22P11S-4JE, 2JE
Panel-mount adapter (MAG9-□□)	Used to put an FRN-G11S inverter to be mounted in panel holes that were used to mount an FVR-G7S inverter.	Type / Applicable inverter type: MAG9-3.7 — FRN0.4G11S-4JE to FRN3.7G11S-4JE / FRN0.4G11S-2JE to FRN3.7G11S-2JE MAG9-7.5 — FRN5.5G11S-4JE to FRN7.5G11S-4JE / FRN5.5G11S-2JE to FRN7.5G11S-2JE MAG9-22 — FRN11G11S-4JE to FRN22G11S-4JE / FRN11G11S-2JE to FRN22G11S-2JE

Wiring equipment

Power supply voltage	Nominal applied motor (kW)	Inverter type G11S series	Inverter type P11S series	MCCB/ELCB With DCR	MCCB/ELCB Without reactor	MC1 With DCR	MC1 Without reactor	MC2 output circuit	Wire: Input With DCR	Wire: Input Without reactor	Wire: Output G11S	Wire: Output P11S	DCR circuit [P1,P(+)]	DB circuit [P(+),DB,N(-)]
Three-phase 400V	0.4	FRN0.4G11S-4JE	—	5	5	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	0.75	FRN0.75G11S-4JE	—	5	10	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	1.5	FRN1.5G11S-4JE	—	5	10	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	2.2	FRN2.2G11S-4JE	—	5	15	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	3.7	FRN3.7G11S-4JE	—	10	20	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	5.5	FRN5.5G11S-4JE	FRN5.5P11S-4JE	15	30	SC-05	SC-4-0	SC-05	2.0	2.0	2.0	2.0	2.0	2.0
	7.5	FRN7.5G11S-4JE	FRN7.5P11S-4JE	20	40	SC-05	SC-5-1	SC-05	2.0	3.5	2.0	2.0	2.0	2.0
	11	FRN11G11S-4JE	FRN11P11S-4JE	30	50	SC-05	SC-N1	SC-4-0	2.0	5.5	2.0	2.0	2.0	2.0
	15	FRN15G11S-4JE	FRN15P11S-4JE	40	60	SC-5-1	SC-N2	SC-5-1	3.5	8.0	3.5	3.5	3.5	2.0
	18.5	FRN18.5G11S-4JE	FRN18.5P11S-4JE	40	75	SC-N1	SC-N2S	SC-N1	5.5	14	5.5	5.5	5.5	2.0
	22	FRN22G11S-4JE	FRN22P11S-4JE	50	100	SC-N1	SC-N2S	SC-N1	5.5	14	8.0	5.5	8.0	2.0
	30	FRN30G11S-4JE	FRN30P11S-4JE	75	125	SC-N2	SC-N3	SC-N2	8.0	22	14	14	14	2.0
	37	FRN37G11S-4JE	FRN37P11S-4JE	100	125	SC-N2S	SC-N4	SC-N2S	14	22	14	14	22	2.0
	45	FRN45G11S-4JE	FRN45P11S-4JE	100	150	SC-N2S	SC-N4	SC-N3	22	38	22	22	22	2.0
	55	FRN55G11S-4JE	FRN55P11S-4JE	125	200	SC-N3	SC-N5	SC-N4	22	60	38	38	38	2.0
	75	FRN75G11S-4JE	FRN75P11S-4JE	175	—	SC-N4	—	SC-N5	38	—	60	60	60	2.0
	90	FRN90G11S-4JE	FRN90P11S-4JE	200	—	SC-N7	—	SC-N7	60	—	60	60	100	3.5
	110	FRN110G11S-4JE	FRN110P11S-4JE	250	—	SC-N7	—	SC-N8	60	—	100	100	100	5.5
	132	FRN132G11S-4JE	FRN132P11S-4JE	300	—	SC-N8	—	SC-N8	100	—	100	100	150	5.5
	160	FRN160G11S-4JE	FRN160P11S-4JE	350	—	SC-N11	—	SC-N11	150	—	150	150	150	8.0
	200	FRN200G11S-4JE	FRN200P11S-4JE	500	—	SC-N12	—	SC-N12	150	—	200	200	250	14
	220	FRN220G11S-4JE	FRN220P11S-4JE	500	—	SC-N12	—	SC-N12	200	—	200	200	250	14
	280	FRN280G11S-4JE	FRN280P11S-4JE	600	—	SC-N14	—	SC-N14	250	—	*	325	400	14
	315	FRN315G11S-4JE	FRN315P11S-4JE	*	—	*	—	*	*	—	*	*	*	*
	355	FRN355G11S-4JE	FRN355P11S-4JE	*	—	*	—	*	*	—	*	*	*	*
	400	FRN400G11S-4JE	FRN400P11S-4JE	*	—	*	—	*	*	—	*	*	*	*
	450	—	FRN450P11S-4JE	*	—	*	—	*	*	—	*	*	*	*
	500	—	FRN500P11S-4JE	*	—	*	—	*	*	—	*	*	*	*
Three-phase 200V	0.2	FRN0.2G11S-2JE	—	5	5	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	0.4	FRN0.4G11S-2JE	—	5	5	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	0.75	FRN0.75G11S-2JE	—	10	10	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	1.5	FRN1.5G11S-2JE	—	10	15	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	2.2	FRN2.2G11S-2JE	—	10	20	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	2.0
	3.7	FRN3.7G11S-2JE	—	20	30	SC-05	SC-5-1	SC-5-1	2.0	3.5	2.0	—	2.0	2.0
	5.5	FRN5.5G11S-2JE	FRN5.5P11S-2JE	30	50	SC-05	SC-N1	SC-4-0	3.5	5.5	3.5	2.0	2.0	2.0
	7.5	—	FRN7.5P11S-2JE	40	75	SC-5-1	SC-N2	SC-5-1	3.5	8.0	—	3.5	3.5	2.0
	7.5	FRN7.5G11S-2JE	—	40	75	SC-5-1	SC-N2	SC-5-1	3.5	8.0	3.5	—	3.5	2.0
	11	FRN11G11S-2JE	FRN11P11S-2JE	50	100	SC-N1	SC-N2S	SC-N1	5.5	14	5.5	5.5	8.0	2.0
	15	FRN15G11S-2JE	FRN15P11S-2JE	75	125	SC-N2	SC-N3	SC-N2	8.0	22	8.0	8.0	8.0	2.0
	18.5	FRN18.5G11S-2JE	FRN18.5P11S-2JE	100	150	SC-N2S	SC-N4	SC-N2S	14	38	14	14	14	2.0
	22	—	FRN22P11S-2JE	100	175	SC-N2S	SC-N5	SC-N3	14	38	—	14	14	2.0
	22	FRN22G11S-2JE	—	100	175	SC-N2S	SC-N5	SC-N3	14	38	14	—	14	2.0
	30	FRN30G11S-2JE	FRN30P11S-2JE	150	200	SC-N4	SC-N7	SC-N4	38	60	38	38	38	2.0
	37	—	FRN37P11S-2JE	175	250	SC-N5	SC-N8	SC-N5	38	60	—	38	60	2.0
	37	FRN37G11S-2JE	—	175	250	SC-N5	SC-N8	SC-N5	38	60	38	—	60	2.0
	45	FRN45G11S-2JE	FRN45P11S-2JE	200	300	SC-N7	SC-N10	SC-N7	60	100	60	60	100	3.5
	55	—	FRN55P11S-2JE	250	350	SC-N8	SC-N11	SC-N8	100	100	—	100	100	5.5
	55	FRN55G11S-2JE	—	250	350	SC-N8	SC-N11	SC-N8	100	100	100	—	100	5.5
	75	—	FRN75P11S-2JE	350	—	SC-N11	—	SC-N10	150	—	—	100	150	8.0
	75	FRN75G11S-2JE	—	350	—	SC-N11	—	SC-N10	150	—	150	—	150	8.0
	90	—	FRN90P11S-2JE	400	—	SC-N11	—	SC-N11	150	—	—	150	200	14
	90	FRN90G11S-2JE	—	400	—	SC-N11	—	SC-N11	150	—	150	—	200	14
	110	—	FRN110P11S-2JE	500	—	SC-N12	—	SC-N12	200	—	—	200	250	14

NOTES :
- For molded-case circuit breakers (MCCB) and earth-leakage circuit breakers (ELCB), the required frame type and series depend on the facility transformer capacity and other factors. When selecting optimal breakers, refer to the relevant technical data.
- Also select the rated sensitive current of ELCB utilizing the technical data.
- The recommended wire sizes are based on the condition that the temperature inside the panel does not exceeds 50°C.
- The above wires are 600V HIV insulated cables (75°C).
- Data in the above table may differ for different conditions (ambient temperature, power supply voltage, and other factors).

*Contact Fuji Electric.

NOTES

Application to standard motors

• Driving a 400V standard motor

When driving a 400V standard motor with an inverter, damage may occur in the insulation of motor. Use the output circuit filter (OFL) if necessary after confirmation with the motor manufacturer. The use of Fuji Electric Motor does not require the output circuit filter because of its reinforced insulation.

• Torque characteristics and temperature rise

When the inverter is used to operate a standard motor, the temperature rises a little higher than during operation by a commercial power supply. The cooling effect decreases in the low-speed range, reducing the allowable output torque. (If a constant torque is required in the low-speed range, use a Fuji inverter motor or a motor quipped with a separately ventilating fan.)

• Vibration

Use of an inverter does not increase vibration of a standard motor, but when the motor is mounted to a machine, resonance may be caused by the natural frequencies including the natural frequency of the machine system.

* We recommend that you use rubber coupling or anti-vibration rubber.

* We also recommend that you use the inverter jump frequency control function to avoid resonance point in the motor operation.

Note that operation of a 2-pole motor at 60Hz or over may cause abnormal vibration.

• Noise

When an inverter drives a standard motor, the motor noise level increases compared with driven by a commercial power supply. To reduce noise, set the inverter carrier frequency at a high level. High-speed operation at 60Hz or over can result in more noise.

Application to special motors

• Explosion-proof motors

When driving an explosion-proof motor with an inverter, use a combination of a motor and an inverter that has been approved in advance. Such approved products are available in our special product series. Contact Fuji for details.

• Submersible motors and pumps

These motors have a larger rated current than standard motors. Select the inverter capacity so that these motors can run within the inverter rated current. These motors differ from standard motors in thermal characteristics. Set a small value according to the thermal time constant of motor for setting electronic thermal relay function.

• Brake motors

For motors with parallel-connection brakes, obtain the brake power from the primary circuit (commercial power supply). If you connect the brake power to the inverter power output circuit by mistake, problems may occur. Do not use inverters for driving motors equipped with series-connection brakes.

• Geared motors

When the power transmission mechanism uses an oil-lubricated gearbox or speed changer/reducer, continuous motor operation at low speed may cause poor lubrication.

• Synchronous motors

It is necessary to use software suitable for the motor type.

Contact Fuji for details.

• Single-phase motors

Single-phase motors are not suitable for inverter-driven variable speed operation. Use three-phase motors.

* Even if a single-phase power supply is available, use a three-phase motor, because the inverter provides three-phase output.

Combination with peripheral device

• Installation location

Use the inverter in an ambient temperature range between -10 to 50˚C.

* When driving an inverter of 22kW or smaller at a place in a temperature of 40˚C or over, remove the ventilation covers. Install an inverter on non-flammable material. The inverter and braking resistor surfaces become hot under certain operating conditions.

• Installing Fuji Auto Breaker (MCCB)

Install a Fuji Auto Breaker (MCCB) or earth-leakage circuit breaker in the primary circuit of the inverter to protect wires.

• Magnetic contactor in the secondary circuit

If a magnetic contactor is mounted in the secondary circuit for switching to the motor operation by commercial power supply or for any other purposes, ensure that the inverter and the motor are stopped before you turn on or off the contactor. For switching operation from/to commercial power supply, use newly developed "Line/inverter changeover operation" function using terminals such as SW88, SW52-2, SW52-1, SW50, is recommended.

• Magnetic contactor in the primary circuit

Do not open or close the magnetic contactor in the primary circuit more than once an hour. If frequent starts or stops are required during motor operation, send FWD or REV signals to the control terminal.

• Protecting the motor

When you drive a motor with an inverter, the motor can be protected with an electronic thermal relay function of the inverter. In addition to the operation level, set the motor type (standard motor, inverter motor). For high-speed motors or water-cooled motors, set a small value as the thermal time constant and protect the motor in combination with the "cooling system OFF" signal. When driving several motors with an inverter, connect a thermal relay to each motor and turn on the inverter's electronic thermal relay function. If you connect the motor thermal relay to the motor with a long cable, high-frequency current may flow into the wiring floating capacity. This may cause the relay to trip at a current lower than the set value for the thermal relay. If this happens, lower the carrier frequency or use the output circuit filter (OFL).

• Power-factor correcting capacitor

Do not mount the power-factor correcting capacitor in the inverter primary circuit. (Use the DC reactor to improve the inverter power factor.) Do not use the power-factor correcting capacitor in the inverter secondary circuit. Overcurrent trip will occur, disabling motor operation.

• Reducing noise

Use of filter and shielded wires are typical measures against noise that meets EMC Directives. For details, refer to the operation procedure manual.

• Measures against surge current

If OV trip occurs while the inverter is stopped or operated under a light load, it is assumed that the surge current is generated by open/close of the phase-advancing capacitor in the power system.

* Connect a DC reactor to the inverter.

• Megger test

When checking insulation resistance of the inverter, use a 500V megger and follow the instructions described in the instruction manual.

Wiring

• Control circuit wiring length

When conducting a remote control, limit the wiring length between the inverter and operator box to 20m or less and use twisted shielded cable.

• Wiring length between inverter and motor

If long wiring is used between the inverter and the motor, the inverter will overheat or trip because of overcurrent (under the influence of high-frequency current flowing into the floating capacity) in the wires connected to the phases. Ensure that the wiring is shorter than 50m for models 3.7kW or smaller, shorter than 100m for 5.5kW or larger. If these lengths must be exceeded, lower the carrier frequency or mount an output circuit filter (OFL). When wiring is longer than 50m, and Dynamic torque-vector control or vector with PG is selected, execute off-line auto-tuning.

• Wiring size

Select a cable with a sufficient capacity by referring to the current value or recommended wire size.

• Grounding

Securely ground the inverter using the grounding terminal.

Selecting inverter capacity

• Driving standard motor

Select an inverter from the capacity range of nominal applied motors shown in the inverter standard specifications table. When large starting torque is required or acceleration or deceleration is required in a short time, select an inverter with a capacity one class greater than the standard.

• Driving special motor

Select an inverter that meets the following condition: Inverter rated current > Motor rated current

Transportation, storage

When transporting or storing inverters, select the procedures and places that meet the environmental conditions given in the inverter specifications. Ensure that the above environmental conditions are met also when transporting an inverter mounted to a machine.

Fuji Electric Co., Ltd.

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