

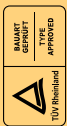
FUJI
ELECTRIC

Solutions for Drives



FRN G11S

The Universal Drive



Ideal combination of power and multiple-function. Dynamic torque-vector control promises optimum motor control under any operating condition.



Dynamic torque-vector control

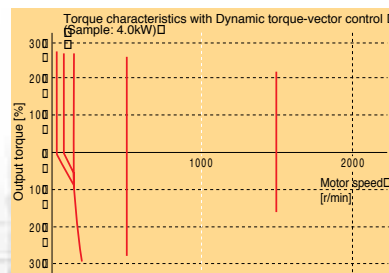
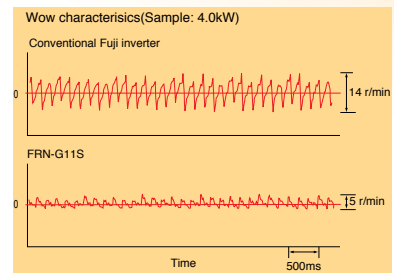
Dynamic torque-vector control system performs high-speed calculation to determine the required motor power for the load status. Our key technology is optimal control of voltage and current vectors for maximum output torque.

- A high starting torque of 200% at 0.5Hz.*
* (22kW or smaller), 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 deceleration function greatly reduces the inverter tripping.

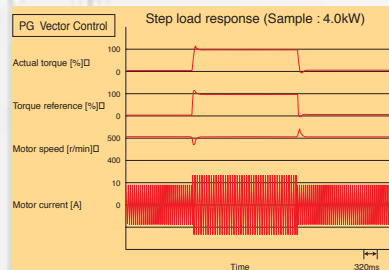
- Feedback control with PG
Enables the inverter to execute "vector control with PG" by adding on optional PG feedback card to obtain higher performance.
 - Speed control range : 1:1200
 - Speed control accuracy : $\pm 0.02\%$
 - Speed control response : 40Hz

achieved by conventional inverters, with the dynamic torque-vector control system, in combination with the Fuji's unique digital AVR.



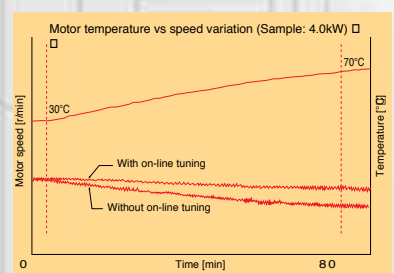
New on-line tuning system

- 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.



Reduced motor wow at low speed

- Motor wow at low speed (1Hz) reduced to less than 1/2 of that

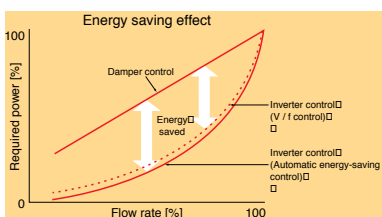
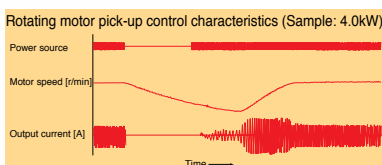


Environment-friendly features

- 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.

Advanced, convenient functions

- 16-step speed, 7 pattern operation 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.



Global products, communication

- 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, CAN open (Option)
- Universal DI/DO: Monitors digital I/O signal status and transmits to a host controller, helping to simplify factory automation.

Intelligent Keypad panel

- 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-□□□)

Protective functions, Maintenance 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.

- Accumulated operation time.
- Inverter operating condition (output current, heat sink temperature, input power, etc.)
- Detailed data on trip cause.

Extensive product line

- Since the product is equipped with a dual rating feature, it can be used for variable torque rating control [VT] (5.5kW or larger), as well as constant torque rating [CT].

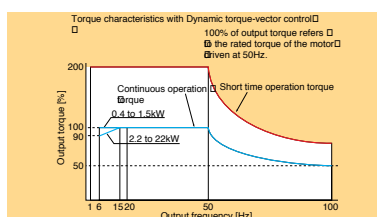
The variable torque rating can be used for one-class higher than the constant torque rating.

*For 30kW only, the model numbers for the VT rating and CT rating are different.

- 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).

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 (4 points), and relay contact output (1 point).
- 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.



The above torque characteristics may not be obtained depending on the motor characteristics.

Standard Specifications

FRENIC5000G11S 400V SERIES

FRN□□□G11S-4EN		0.4	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	—	30	37	45	55	75	90	110	132	160	200	220	280	315			
FRN□□□G11S-4EV		—	—	—	—	—	—	—	—	—	—	—	—	30	—	—	—	—	—	—	—	—	—	—	—	—			
Nominal applied motor (CT use) kW		0.4	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	—	30	37	45	55	75	90	110	132	160	200	220	280	315			
Maximum applied motor (VT use) kW		—	—	—	—	—	7.5	11	15	18.5	22	—	—	30	37	45	55	75	90	110	132	160	200	220	280	315	400		
Output ratings	Rated capacity *1) (kVA)	1.0	1.7	2.6	3.9	6.4	9.3	12	17	21	28	32	32	43	53	65	80	107	126	150	181	218	270	298	373				
	Rated voltage *2) (V)	3-phase 380, 400, 415V/50Hz			380, 400, 440, 460V/60Hz									OM:440V/50Hz															
	Rated current *3) (A)	(CT use)	1.5	2.5	3.7	5.5	9.0	13	18	24	30	39	45	—	60	75	91	112	150	176	210	253	304	377	415	520			
		(VT use)	—	—	—	—	—	16.5	23	30	37	44	—	—	60	75	91	112	150	176	210	253	304	377	415	520			
	Overload capability (A)	Short time (CT use)	150% of rated current for 1min.											150% of rated current for 1min.															
		Cont. (VT use)	200% of rated current for 0.5s						110% 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 *5) : 2% or less)																		Frequency :+5 to -5%									
	Momentary voltage dip capability *6)	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 *7) (A)	with DCR	0.82	1.5	2.9	4.2	7.1	10.0	13.5	19.8	26.8	33.2	39.3	54	54	67	81	100	134	160	196	232	282	352	385	491			
		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	86	104	124	150	—	—	—	—	—	—	—	—	—		
	Required power supply capacity (with DCR) (kVA)	0.6	1.1	2.1	3.0	5.0	7.0	9.4	14	19	24	28	38	38	47	57	70	93	111	136	161	196	244	267	341				
Control	Starting torque (CT use)	200% (with Dynamic torque-vector control selected)											— 180% (with Dynamic torque-vector control selected)																
	(VT use)	—						50%						50%															
Braking	Standard	Braking torque	150%			100%			20% *8)			15 to 10% *8)																	
		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 (ICE 60529)	IP40											IP00 (IP20:Option)																	
Cooling method	Natural cooling	Fan cooling																											
Standards	-UL/cUL -CE Marking (Low Voltage) -EMC Directive -TUV (up to 22kW) -EN 61800-2 (Ratings, specifications for low voltage adjustable frequency a.c. power drive systems) -EN 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	31	31	36	41	42	50	73	73	104	104	145	145	—	—				

CT : Constant Torque VT : Variable Torque

NOTES: *1) Inverter output capacity (kVA) at 415V.

*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) Refer to the EN 61800-3(5.2.3).

*6) Tested at standard load condition (85% load).

*7) This value is under FUJI original calculation method. (Refer to the Technical Information.)

*8) 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.)

Conformity to Low Voltage Directive

The FRENIC5000G11S Series conforms to the Low Voltage Directive with EN 50178.

Conformity to EMC Directive

■ Emission requirement

EMC filters in compliance with EN61800-3 are provided for all models (Option).

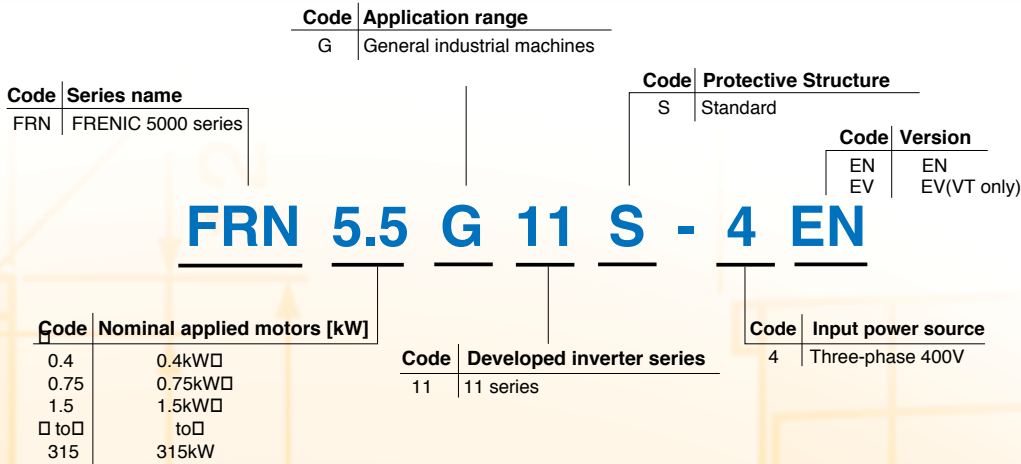
■ Immunity requirement

The FRENIC5000G11S Series inverters meet EN61800-3 as standard.

Item	Explanation																									
Control	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 motor speed is controlled with the speed reference of zero.																								
	Positioning control (*)	The SY option card can be used for positioning control by differential counter method.																								
	Synchronized operation (*)	This function controls the synchronized operation between 2 axes with PGs.																								
Indication	Operation mode (Running)	<table border="1"> <tr> <td style="text-align: center;">LED monitor</td> <td style="text-align: center;">LCD monitor (English, German, French, Spanish, Italian, Japanese)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Operation monitor & Alarm monitor</td> </tr> <tr> <td> <ul style="list-style-type: none"> · 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 ("F01") · PID reference value (Remote) ("C30") · PID feedback value </td> <td> Operation monitor · Displays operation guidance · Bargraph: Output frequency (%), Output current (A), Output torque (%) Alarm monitor · The alarm data is displayed when the inverter trips. </td> </tr> <tr> <td colspan="2" style="text-align: center;">Function setting & monitor</td> </tr> <tr> <td colspan="2"> Function setting Displays function codes and its data or data code, and changes the data value. </td> </tr> <tr> <td colspan="2"> Operation condition <ul style="list-style-type: none"> · Output frequency (Hz) · Output current (A) · Output voltage (V) · Torque calculation value (%) · Setting frequency (Hz) · Operation condition (FWD / REV, IL, VL / LU, TL) </td> <td> <ul style="list-style-type: none"> · Motor synchronous speed (r/min) · Load shaft speed (r/min) · Line speed (m/min) · PID reference value · PID feedback value · Driving torque limiter setting value (%) · Braking torque limiter setting value (%) </td> </tr> <tr> <td colspan="2"> Tester function (I/O check) · Digital I/O: ■ (ON), □ (OFF) · Analog I/O: (V), (mA), (H), (p/s) </td> </tr> <tr> <td colspan="2"> Maintenance data <ul style="list-style-type: none"> · Operation time (h) · DC link circuit voltage (V) · Temperature at inside air (°C) · Temperature at heat sink (°C) · Maximum current (A) · Main circuit capacitor life(%) · Control PC board life (h) </td> <td> <ul style="list-style-type: none"> · Cooling fan operation time (h) · Communication error times (KEYPAD, RS485, Option) · ROM version (Inverter, KEYPAD, Option) </td> </tr> <tr> <td colspan="2"> Load factor calculation <ul style="list-style-type: none"> · Measurement time (s) · Maximum current (A) </td> <td> <ul style="list-style-type: none"> · Average current (A) · Average braking power (%) </td> </tr> <tr> <td colspan="2"> Alarm data <ul style="list-style-type: none"> · Output frequency (Hz) · Output current (A) · Output voltage (V) · Torque calculation value (%) · Setting frequency (Hz) · Operation condition (FWD / REV, IL, VL / LU, TL) · Operation time (h) · DC link circuit voltage (V) </td> <td> <ul style="list-style-type: none"> · Temperature at inside air (°C) · Heat sink temperature (°C) · Communication error times (KEYPAD, RS485, Option) · Digital input terminal condition (Remote, Communication) · Transistor output terminal condition · Trip history code · Multiple alarm exist </td> </tr> </table>	LED monitor	LCD monitor (English, German, French, Spanish, Italian, Japanese)	Operation monitor & Alarm monitor		<ul style="list-style-type: none"> · 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 ("F01") · PID reference value (Remote) ("C30") · PID feedback value 	Operation monitor · Displays operation guidance · Bargraph: Output frequency (%), Output current (A), Output torque (%) Alarm monitor · The alarm data is displayed when the inverter trips.	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	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 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) · Er7 (Output phase loss error, impedance imbalance) · Er8 (RS485 error)																								
	Charge lamp	When the DC link circuit voltage is higher than 50V, the charge lamp is ON.																								

Item		Explanation
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
	Undervoltage	Detects DC link circuit undervoltage, and stops the inverter. 400V series: 400V 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	<ul style="list-style-type: none"> Ground fault protection for inverter output circuit (3-phase current detection method) Zero-phase current detection method (30kW or larger)
	Motor overload	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 (and stops the inverter).
	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, 1m/s ² at from 55 to less than 200Hz
Storage condition	-Temperature : -25 to +65 °C, -Humidity : 5 to 95%RH (non-condensing)	

HOW TO READ THE MODEL NUMBER



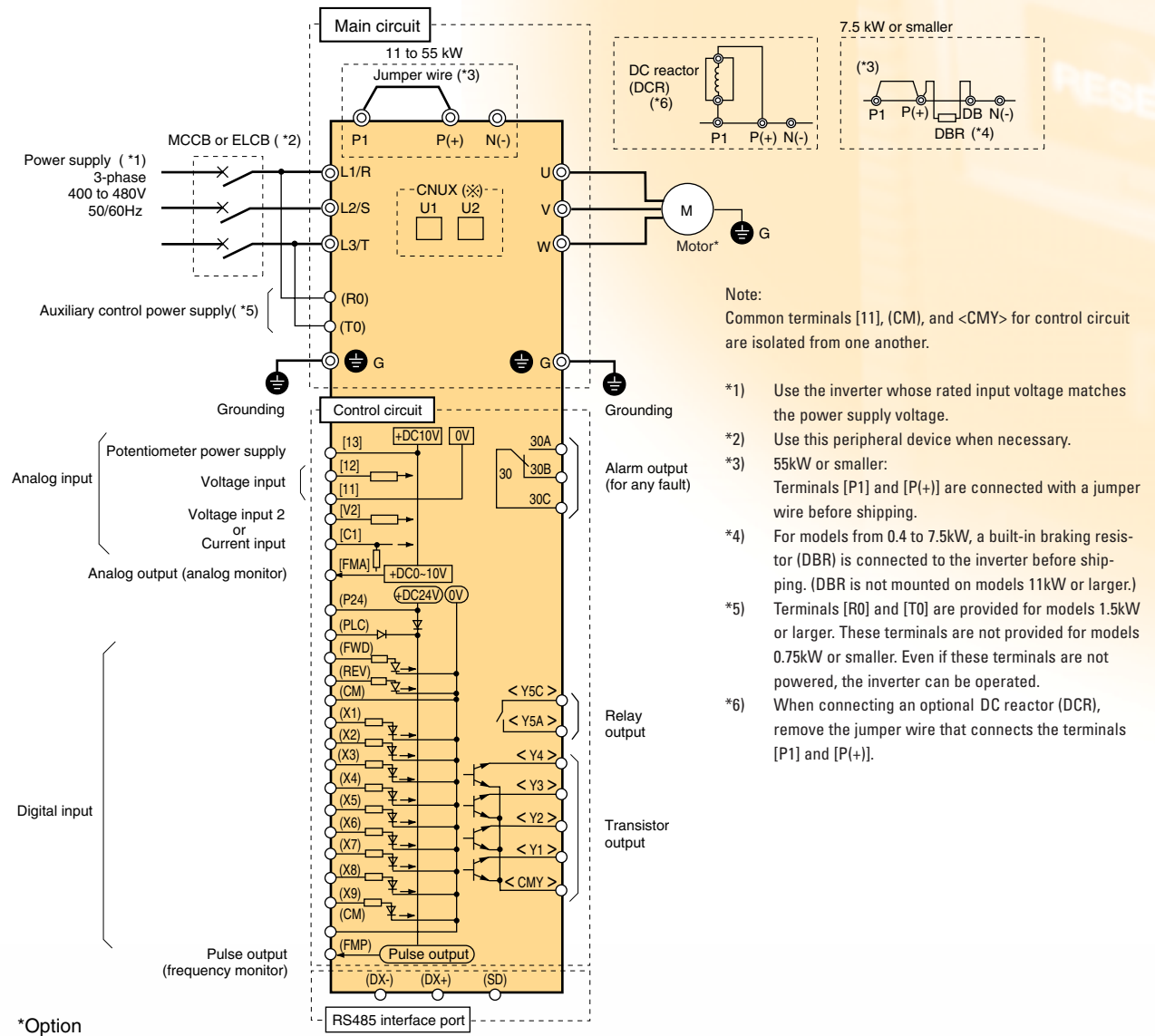
238 260

M3

M3

Basic Wiring Diagram

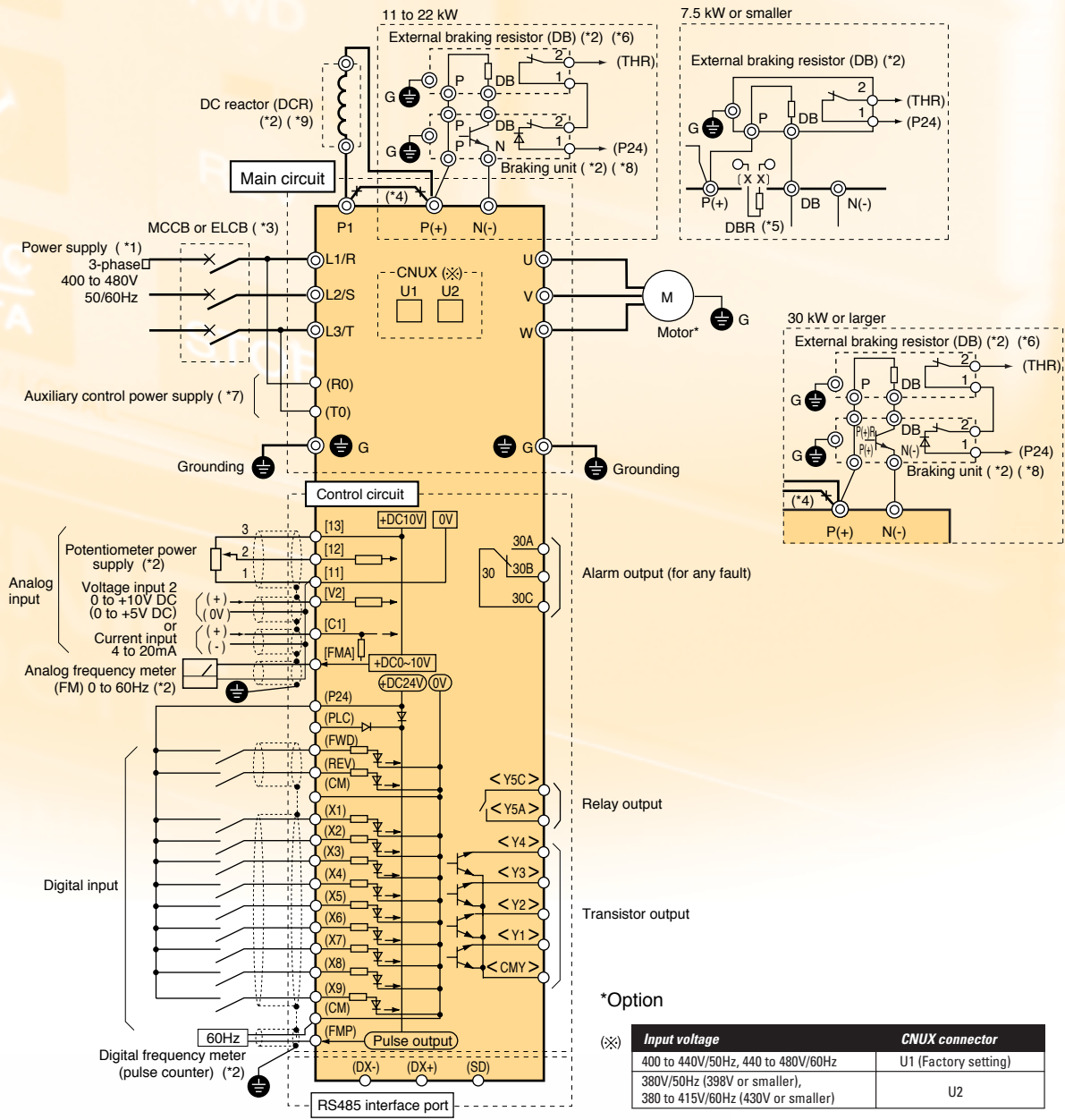
KEYPAD PANEL OPERATION



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

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

EXTERNAL SIGNAL INPUT OPERATION



FRN G11S

Note:

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

- *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) Terminals [P1] and [P(+)] are connected with a jumper wire before shipping.
- *5) For models from 0.4 to 7.5kW, a built-in braking resistor (DBR) is connected to the inverter before shipping. (DBR is not mounted on models 11kW or larger.) 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. Be sure to connect cables to these terminals correctly. (See the diagram)
- *7) Terminals [R0] and [T0] are provided for models 1.5kW or larger. These terminals are not provided for models 0.75kW or smaller. Even if these terminals are not powered, the inverter can be operated.
- *8) Connect the optional braking unit to the [P(+)] and [N(-)] terminals. Auxiliary terminals [1] and [2] have polarity.
- *9) When connecting an optional DC reactor (DCR), remove the jumper wire that connects the terminals [P1] and [P(+)].

***Option**

(X)	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

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

Terminal Functions

TERMINAL FUNCTIONS

	Symbol	Terminal name	Function	Remarks	Func. code	
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: Option		
	P(+), N(-)	For BRAKING UNIT	· Connect the BRAKING UNIT (Option). · Used for DC bus connection system.	BRAKING UNIT (Option): 11kW or larger		
	P(+), DB	For EXTERNAL BRAKING RESISTOR	Connect the EXTERNAL BRAKING RESISTOR (Option)	Only for 7.5kW or smaller		
	⊕ G	Grounding	Ground terminal for inverter chassis (housing).			
Analog input	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		
	13	Potentiometer power supply	+ 10V DC power supply for frequency setting POT (POT: 1 to 5k Ω)	· 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 \pm 10V DC / 0 to \pm 100% (0 to \pm 5V DC/0 to \pm 100%) · Inverse mode operation can be selected by function setting or digital input signal. +10 to 0V DC/0 to 100%	· Input impedance: 22k Ω · Allowable maximum input voltage: \pm 15V DC · If input voltage is 10 to 15V DC, the inverter estimates it to 10V DC.	F01, C30	
		(Torque control) (PID control) (PG feedback)	Used for torque control reference signal. Used for PID control reference signal or feedback signal. Used for reference signal of PG feedback control (option)		H18 F01, H21	
	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: 250 Ω · Allowable maximum input current: 30mA DC · If input current is 20 to 30mA DC, the inverter estimates it to 20mA DC.	F01, H21	
		(PID control) (PTC-Thermistor Input)	Used for PID control reference signal or feedback signal. The PTC-thermistor (for motor protection) can be connected to terminal C1 - 11.	Change over the Pin switch on control board. (SW2 : PTC)	H26, H27	
	V2	Voltage input 2	0 to +10V DC	Can't change over the terminal C1.	F01	
	11	Common	Common for analog signal	Isolated from terminal CMY and CM.		
	Digital input	FWD	Forward operation command	FWD: ON The motor runs in the forward direction. FWD: OFF The motor decelerates and stops.	When FWD and REV are simultaneously ON, the motor decelerates and stops.	F02
		REV	Reverse operation command	REV: ON The motor runs in the reverse direction. REV: 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: 22 to 27V (maximum source current : 5mA) · OFF state maximum terminal voltage: 2V (allowable maximum leakage current: 0.5mA) (Source logic)	E01 to E09	
(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)	C05 to C19	
(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)	F07, F08 E10 to E15	
(HLD)		3-wire operation stop command	Used for 3-wire operation. (HLD): ONThe inverter self-holds FWD or REV signal. (HLD): OFFThe inverter releases self-holding.	Assigned to terminal X7 at factory setting.		
(BX)		Coast-to-stop command	(BX): 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.	H11	
(RST)		Alarm reset	(RST): 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): OFF "OH2 trip" occurs and motor will coast-to-stop.	This alarm signal is held internally.		
(JOG)		Jogging operation	(JOG): ON JOG frequency is effective.	This signal is effective only while the inverter is stopping.	C20	
(Hz2/Hz1)		Freq. set 2 / Freq. set 1	(Hz2/Hz1): 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.	C30 / F01	
(M2/M1)		Motor 2 / Motor 1	(M2/M1): 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.	A10 to A18 / P01 to P09	
(DCBRK)		DC brake command	(DCBRK): 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.	F20 to F22	
(TL2/TL1)		Torque limiter 2 / Torque limiter 1	(TL2/TL1): ON ... Torque limiter 2 is effective.		E16, E17 / F40, F41	
(SW50) (SW60)		Switching operation between line and inverter	(SW50/SW60): ONThe motor is changed from inverter operation to line operation. (SW50/SW60): OFF ...The motor is changed from line operation to inverter operation.	Main circuit changeover signals are output through Y1 to Y5 terminal.		
(UP)		UP command	(UP): ON The output frequency increases.	When UP and DOWN commands are simultaneously ON, DOWN signal is effective.		
(DOWN)		DOWN command	(DOWN): 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.		F01, C30	
(WE-KP)		Write enable for KEYPAD	(WE-KP): ON The data is changed by KEYPAD.		F00	
(Hz/PID)		PID control cancel	(Hz/PID): ONThe PID control is canceled, and frequency setting by KEYPAD ([A] or [V]) is effective.		H20 to H25	
(IVS)		Inverse mode changeover	(IVS): 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.	F01, C30	
(IL) (Hz/TRQ) (LE)		Interlock signal for 52-2 TRQ control cancel Link enable (RS485, Bus)	Connect to auxiliary contact (1NC) of 52-2. (Hz/TRQ): ON The torque control is canceled, and ordinary operation is effective. (LE): ON The link operation is effective. Used to switch operation between ordinary operation and link operation to communication.	RS485: Standard, Bus: Option	H18 H30	
(U-DI) (STM)		Universal DI Pick up start mode	This signal is transmitted to main controller of LINK operation. (STM): ON The "Pick up" start mode is effective.		H09	
(PG/Hz) (SYC)		SY-PG enabled Synchronization command	(PG/Hz): ON Synchronized operation or PG-feedback operation is effective. (SYC): ON The motor is controlled for synchronized operation between 2 axes with PGs.	Option Option		
(ZERO)	Zero speed command	(ZERO): ON The motor speed is controlled with the speed reference of zero.	This function can be selected at PG feedback control. Option			
(STOP1) (STOP2)	Forced stop command Forced stop command with Deceleration time4	(STOP1): OFF The motor decelerates and stops. (STOP2): OFF The motor decelerates and stops with Deceleration time4.		E15		
(EXITE)	Pre-exciting command	(EXITE): 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 inverter that has SINK type digital input, when PLC power supply is off.				
P24	DC voltage supply	DC voltage supply (+24V, max. 100mA)				

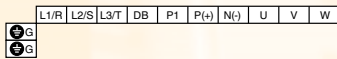
TERMINAL FUNCTIONS

	Symbol	Terminal name	Function	Remarks	Func. code
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 (0 to 1000V) · Universal AO (0 to 100%)	Allowable maximum output current: 2mA	F30 to F31
	(11)	(Common)			
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	F33 to F35
	(CM)	(Common)	* Kinds of function to be output is same as those of analog output (FMA).		
	CM	Common	Common for pulse output and digital input.	Isolated from terminal CMY and 11.	
Transistor output	Y1	Transistor output 1	Output the selected signals from the following items.	· ON state maximum output voltage : 3V (Allowable maximum sink current : 50mA) · OFF state maximum leakage current : 0.1mA (Allowable maximum voltage : 27V)	E20 to E23
	Y2	Transistor output 2			
	Y3	Transistor output 3			
	Y4	Transistor output 4			
	(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.		E30
	(FDT1)	Frequency level detection	Outputs ON signal by comparison of output frequency and preset value (level and hysteresis).		E31, E32
	(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 (Instantaneous power failure) 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.		E33 to E35
	(KP)	KEYPAD operation mode	Outputs ON signal when the inverter is in KEYPAD operation mode.		F02
	(STP)	Inverter stopping	Outputs ON signal when the inverter is in 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.		A01 to A18
	(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))	Refer to wiring diagram example.	
	(TU)	Time-up signal	Outputs time up signal (100ms ON pulse) at every stage end of PATTERN operation.		C21 to C28
	(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.		H06
	(TRY)	Auto-resetting	Outputs ON signal at auto resetting mode. (Including "Reset interval")		H04, H05
	(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°C), and outputs OFF signal when the temperature is lower than (trip level -15°C).		
	(SY)	Synchronization completion signal	Synchronization completion signal for synchronized operation.	Option	
	(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.		
	(N-EX)	Speed existence signal	Outputs ON signal when motor speed is larger than stop speed* on vector control with PG.	* stop speed = stop frequency (F25) x 120/pole [r/m]	F25
	CMY	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. Changeable exciting mode active or non-exciting mode active by function "F36".	· Contact rating : 250V AC, 0.3A, $\cos\phi=0.3$ (48V DC, 0.5A, non-inductive for Low Voltage Directive)	F36
	Y5A, Y5C	Relay output	Functions can be selected the same as Y1 to Y4.		E24
			Changeable exciting mode active or non-exciting mode active by function "E25".		E25
LINK	DX+, DX-, SD	RS485 I/O terminal	Connect the RS485 link signal.		

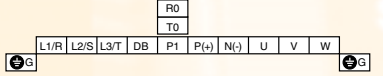
TERMINAL ARRANGEMENT

Main circuit terminals

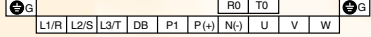
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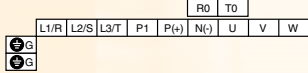
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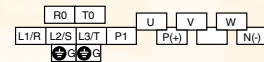
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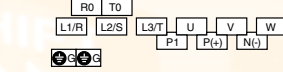
FRN11G11S-4-FRN22G11S-4EN



FRN30G11S-4-FRN110G11S-4EN / FRN30G11S-4EV



FRN132G11S-4-FRN220G11S-4EN



Control circuit terminals



30C	30A
30B	Y5A
Y5C	CMY
Y4	Y3
Y2	Y1
11	C1
12	FMA
13	FMP
V2	PLC
CM	X1
FWD	X2
REV	X3
P24	X4
P24	X5
P24	X6
DXB	X7
DXA	X8
SD	X9

Keypad panel Functions and Operation

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.

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.

Program key

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

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.

Reset key

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



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.

Unit indication

- Displays the unit for the information shown on the LED monitor.

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).

Stop key

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

Function/Data Select key

- In operation mode :
Changes the displayed values of LED monitor.
- In program mode :
Selects the function code or store the data.

Keypad panel operation

Perform the wiring shown in the Basic wiring diagram on page 11. Turn on inverter power, and use the Λ or ∇ key to set an output frequency. Press the $\boxed{\text{FUNC DATA}}$ key, then press the $\boxed{\text{FWD}}$ or $\boxed{\text{REV}}$ key.

The inverter starts running using the factory setting function data.

Press the $\boxed{\text{STOP}}$ 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 $\boxed{\text{PRG}}$ key to switch the operation monitor screen to the program menu screen.
- 2) Select "1. DATA SET", and press the $\boxed{\text{FUNC DATA}}$ key.
- 3) Press the Λ or ∇ key to select a target function code. To quickly scroll the function select screen, press $\boxed{\text{SHIFT >>}}$ key and the Λ or ∇ key at the same time. Press the $\boxed{\text{FUNC DATA}}$ key to access the function data.
- 4) Use the Λ , ∇ , and $\boxed{\text{SHIFT >>}}$ keys to change the function data to the target value. (Use the $\boxed{\text{SHIFT >>}}$ key to move the cursor when you want to enter a numerical value.)
- 5) Press the $\boxed{\text{FUNC DATA}}$ key to store the updated function data in memory. The screen shifts for the selection of the next function.
- 6) Pressing the $\boxed{\text{PRG}}$ key switches the screen to the operation monitor screen.

1. Setting a frequency

When the operation monitor screen is displayed, a frequency can be set by using the Λ or ∇ key in both the operation and stop modes. When the target frequency is displayed, press the $\boxed{\text{FUNC DATA}}$ key to enter the frequency in memory.

2. Switching a unit indication

During both operation and stop modes, each time the $\boxed{\text{FUNC DATA}}$ 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.

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

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

F00	DATA PRTC
F01	FREQ COM 1
F02	OPR METOD
F03	MAX Hz-1

F01	FREQ COM 1
	0
0~11	

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

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

Protective Functions

Function	Description		LED monitor
Overcurrent protection (Short-circuit) (Ground fault)	<ul style="list-style-type: none"> 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. 		During acceleration OC1
			During deceleration OC2
			While running at constant speed OC3
		• 30kW or larger model only	Ground fault EF
Overvoltage protection	<ul style="list-style-type: none"> The inverter stops when it detects an overvoltage in the DC link circuit. 	<ul style="list-style-type: none"> 400V series : 800V 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> The inverter may be tripped by some other protective function. 	
Undervoltage protection	<ul style="list-style-type: none"> Stops the inverter when the DC link circuit voltage drops below undervoltage level. 	<ul style="list-style-type: none"> 400V series : 400V DC or less 200V series : 200V DC or less 	LU
Input phase loss protection	<ul style="list-style-type: none"> The inverter is protected from being damaged when open-phase fault occurs. 		Li n
Overheat protection	<ul style="list-style-type: none"> Stops the inverter when it detects excess heat sink temperature in case of cooling fan failure or overload. 		OH1
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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. 	7.5kW or smaller model only	dbH
	<ul style="list-style-type: none"> This function stops the inverter by detecting an inverter overload. 		OLU
Electronic thermal overload relay (Motor protection)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> When a blown fuse is detected, the inverter stops running. 	• 30kW or larger model only	FUS
Stall prevention (Momentary overcurrent limitation)	<ul style="list-style-type: none"> When an output current exceeds the limit during acceleration, this function lowers output frequency to prevent the occurrence of an OC1 trip. 	<ul style="list-style-type: none"> The stall prevention function can be disabled. 	
Active drive	<ul style="list-style-type: none"> During running in which acceleration is 60s or longer, this function increases the acceleration time to prevent the occurrence of an OLU trip. 	<ul style="list-style-type: none"> The acceleration time can be prolonged up to three times the preset time. 	
External alarm input	<ul style="list-style-type: none"> The inverter stops on receiving external alarm signals. 	<ul style="list-style-type: none"> Use THR terminal function (digital input). 	OH2
Overspeed protection	<ul style="list-style-type: none"> Stops the inverter when the output frequency exceeds the rated maximum frequency by 20%. 		OS
PG error	<ul style="list-style-type: none"> If disconnection occurs in pulse generator circuits, the inverter issues an alarm. 		PG
Alarm output (for any fault)	<ul style="list-style-type: none"> The inverter outputs a relay contact signal when the inverter issued an alarm and stopped. 	<ul style="list-style-type: none"> Output terminals: 30A, 30B, and 30C Use the RST terminal function for signal input. 	
Alarm reset command	<ul style="list-style-type: none"> An alarm-stop state of the inverter can be cleared with the RESET key or by a digital input signal (RST). 	<ul style="list-style-type: none"> Even if main power input is turned off, alarm history and trip-cause data are retained. 	
Alarm history memory	<ul style="list-style-type: none"> Store up to four instances of previous alarm data. 		
Storage of data on cause of trip	<ul style="list-style-type: none"> The inverter can store and display details of the latest alarm history data. 		
Memory error	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> If an error is detected in communication between the inverter and KEYPAD when the Keypad panel is being used, the inverter stops. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> If the inverter detects a CPU error caused by noise or some other factor, the inverter stops. 		Er3
Option communication error	<ul style="list-style-type: none"> If a checksum error or disconnection is detected during communication, the inverter issues an alarm. 		Er4
Option error	<ul style="list-style-type: none"> If a linkage error or other option error is detected, the inverter issues an alarm. 		Er5
Output phase loss error	<ul style="list-style-type: none"> If an unbalance of output circuits is detected during auto-tuning, this function issues an alarm (and stops the inverter). 		Er7
RS485 communication error	<ul style="list-style-type: none"> 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.

Function Settings

FUNDAMENTAL FUNCTIONS

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Code	Function name	LCD monitor	Setting range	Min. unit	Factory setting	
					-22kW	30kW-
F00	Data protection	F00 I DATA PRTC	0 : Data change enable 1 : Data protection	-	0	
F01	Frequency command 1	F01 I FREQ CMD 1	0 : KEYPAD operation (□ or □ key) 1 : Voltage input (terminals 12 and V2) (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 and V2) (+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 I OPR METHOD	0 : KEYPAD operation (FWD) or (REV) or (STOP) key) 1 : FWD or REV command signal operation	-	0	
F03	Maximum frequency 1	F03 I MAX Hz-1	50 to 400Hz	1Hz	50	
F04	Base frequency 1	F04 I BASE Hz-1	25 to 400Hz	1Hz	50	
F05	Rated voltage 1 (at Base frequency 1)	F05 I RATED V-1	0 (Free), 320 to 480V	1V	400	
F06	Maximum voltage 1 (at Maximum frequency 1)	F06 I MAX V-1	320 to 480V	1V	400	
F07	Acceleration time 1	F07 I ACC TIME1	0.01 to 3600s	0.01s	6.00	20.00
F08	Deceleration time 1	F08 I DEC TIME1	0.01 to 3600s	0.01s	6.00	20.00
F09	Torque boost 1	F09 I 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	0.0 (EV : 0.1)	
F10	Electronic thermal overload relay for motor 1	F10 I ELCTRN OL1	0 : Inactive 1 : Active (for 4-pole standard motor) 2 : Active (for 4-pole inverter motor)	-	1	
F11	(Level)	F11 I OL LEVEL1	Approx. 20 to 135% of rated current	0.01A	*1)	
F12	(Thermal time constant)	F12 I TIME CNST 1	0.5 to 75.0 min	0.1min	5.0	10.0
F13	Electronic thermal overload relay (for braking resistor)	F13 I DBR OL	[7.5kW or smaller] 0 : Inactive 1 : Active (for built-in braking resistor) 2 : Active (for external braking resistor) [11kW or larger] 0 : Inactive	-	1	
F14	Restart mode after momentary power failure	F14 I 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 and restarts at output frequency of before power failure) 5 : Active (Momentarily stops and restarts at starting frequency)	-	0	
F15	Frequency limiter (High)	F15 I H LIMITER	0 to 400Hz	1Hz	70	
F16	limiter (Low)	F16 I L LIMITER	0 to 400Hz	1Hz	0	
F17	Gain (for frequency setting signal)	F17 I FREQ GAIN	0.0 to 200.0%	0.1%	100.0	
F18	Bias frequency	F18 I FREQ BIAS	-400.0 to 400.0Hz	0.1Hz	0.0	
F20	DC brake (Starting freq.)	F20 I DC BRK Hz	0.0 to 60.0Hz	0.1Hz	0.0	
F21	(Braking level)	F21 I DC BRK LVL	0 to 100%	1%	0	
F22	(Braking time)	F22 I DC BRK t	0.0 (DC brake inactive), 0.1 to 30.0s	0.1s	0.0	
F23	Starting frequency (Freq.)	F23 I START Hz	0.1 to 60.0Hz	0.1Hz	0.5	
F24	(Holding time)	F24 I HOLDING t	0.0 to 10.0s	0.1s	0.0	
F25	Stop frequency	F25 I STOP Hz	0.1 to 6.0Hz	0.1Hz	0.2	
F26	Motor sound (Carrier freq.)	F26 I MTR SOUND	CT use 0.75 to 15kHz (Up to 55kW) 0.75 to 10kHz (75kW and above) VT use* 0.75 to 15kHz (Up to 22kW) 0.75 to 10kHz (30 to 75kW) 0.75 to 6kHz (90kW and above)	1kHz	15 (Up to 55kW)* 10 (75kW and above)*	
F27	(Sound tone)	F27 I SOUND TONE	*In case of VT use, carrier frequency should be adjusted depending on capacity. 0 : level 0 1 : level 1 2 : level 2 3 : level 3	-	0	
F30	FMA (Voltage adjust)	F30 I FMA V-ADJ	0 to 200%	1%	100	
F31	(Function)	F31 I 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 I FMP PULSES	300 to 6000 p/s (at full scale)	1p/s	1440	
F34	(Voltage adjust)	F34 I FMP V-ADJ	0% : (Pulse rate output: 50% duty) 1 to 200% : (Voltage adjust: 2670p/s, duty adjust)	1%	0	
F35	(Function)	F35 I 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 I 30RY MODE	0 : The relay (30) excites on trip mode. 1 : The relay (30) excites on normal mode.	-	0	
F40	Torque limiter 1 (Driving)	F40 I DRV TRQ 1	20 to 200, 999% (999: No limit) *2)	1%	180	150
F41	(Braking)	F41 I BRK TRQ 1	0 (Automatic deceleration control), 20 to 200, 999% (999: No limit) *2)	1%	150	100
F42	Torque vector control 1	F42 I TRQVECTOR1	0 : Inactive 1 : Active	-	0	

Basic Functions

FRN G11S

EXTENSION TERMINAL FUNCTIONS

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Code	Function name	LCD monitor	Setting range	Min. Factory setting			
				unit	-22kW	30kW-	
E01 - E09	X1 terminal function	E01 IX1 FUNC	Selects from the following items.	-	0		
	X2 terminal function	E02 IX2 FUNC		-	1		
	X3 terminal function	E03 IX3 FUNC		-	2		
	X4 terminal function	E04 IX4 FUNC		-	3		
	X5 terminal function	E05 IX5 FUNC		-	4		
	X6 terminal function	E06 IX6 FUNC		-	5		
	X7 terminal function	E07 IX7 FUNC		-	6		
	X8 terminal function	E08 IX8 FUNC		-	7		
	X9 terminal function	E09 IX9 FUNC		-	8		
	X1-X9 Terminal				0 : Multistep freq. selection (1 to 4 bit)	[SS1]	
			1 : Multistep freq. selection (1 to 4 bit)	[SS2]			
			2 : Multistep freq. selection (1 to 4 bit)	[SS4]			
			3 : Multistep freq. selection (1 to 4 bit)	[SS8]			
			4 : ACC / DEC time selection (1 to 2 bit)	[RT1]			
			5 : ACC / DEC time selection (1 to 2 bit)	[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]			
ACC 2.3.4 DEC 2.3.4	E10 Acceleration time 2	E10 IACC TIME2	0.01 to 3600s	0.01s	10.00	100.00	
	E11 Deceleration time 2	E11 IDEC TIME2		0.01s	10.00	100.00	
	E12 Acceleration time 3	E12 IACC TIME3		0.01s	15.00	100.00	
	E13 Deceleration time 3	E13 IDEC TIME3		0.01s	15.00	100.00	
	E14 Acceleration time 4	E14 IACC TIME4		0.01s	3.00	100.00	
	E15 Deceleration time 4	E15 IDEC TIME4		0.01s	3.00	100.00	
	E16 Torque limiter 2 (Driving)	E16 IDRV TRQ 2		20 to 200%, 999% (999: No limit) *2)	1%	180	150
E17 Torque limiter 2 (Braking)	E17 IBRK TRQ 2	0 (Automatic deceleration control), 20 to 200%, 999% (999: No limit) *2)	1%	150	100		
E20 - E24	Y1 terminal function	E20 IY1 FUNC	Selects from the following items.	-	0		
	Y2 terminal function	E21 IY2 FUNC		-	1		
	Y3 terminal function	E22 IY3 FUNC		-	2		
	Y4 terminal function	E23 IY4 FUNC		-	7		
	Y5A,Y5C terminal function	E24 IY5 FUNC		-	10		
				0 : Inverter running	[RUN]		
				1 : Frequency equivalence signal	[FAR]		
				2 : Frequency level detection	[FD1]		
				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]	For Line / Inverter changeover operation	
		12 : Line/Inv changeover (for 52-2)	[SW52-2]				
		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]		For Alarm signal output		
		22 : Alarm indication 2	[AL2]				
		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]				
		31 : 2nd Freq. level detection	[FD2]				
		32 : 2nd OL level early warning	[OL2]				
		33 : Terminal C1 off signal	[C1OFF]				
		34 : Speed existence signal	[N-EX]				
E25	Y5 RY operation mode	E25 IY5RY MODE	0 : Inactive (Y5 Ry excites at "ON signal" mode.) 1 : Active (Y5 Ry excites at "OFF signal" mode.)	-	0		
E30	FAR function signal (Hysteresis)	E30 IFAR HYSTR	0.0 to 10.0Hz	0.1Hz	2.5		
E31	FDT1 function signal (Level)	E31 IFDT1 LEVEL	0 to 400Hz	1Hz	50		
E32	FDT1 function signal (Hysteresis)	E32 IFDT1 HYSTR	0.0 to 30.0Hz	0.1Hz	1.0		
E33	OL1 function signal (Mode select)	E33 IOL1 WARNING	0 : Thermal calculation 1 : Output current	-	0		
E34	OL1 function signal (Level)	E34 IOL1 LEVEL	Approx. 5 to 200% of rated current	0.01A	*1		
E35	OL1 function signal (Timer)	E35 IOL1 TIMER	0.1 to 60.0s	0.1s	10.0		
E36	FDT2 function (Level)	E36 IFDT2 LEVEL	0 to 400Hz	1Hz	50		
E37	OL2 function (Level)	E37 IOL2 LEVEL	Approx. 5 to 200% of rated current	0.01A	*1		

EXTENSION TERMINAL FUNCTIONS (cont'd)

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

	Code	Function name	LCD monitor	Setting range	Min. unit	Factory setting
					-22kW	30kW-
LED & LCD Monitor	E40	Display coefficient A	E40 I COEF A	-999.00 to 999.00	0.01	0.01
	E41	Display coefficient B	E41 I COEF B	-999.00 to 999.00	0.01	0.00
	E42	LED Display filter	E42 I DISPLAY FL	0.0 to 5.0s	0.1s	0.5
	E43	LED Monitor (Function)	E43 I 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 I LED MNTR2	0 : Setting value 1 : Output value	-	0
	E45	LCD Monitor (Function)	E45 I LCD MNTR	0 : Displays operation guidance 1 : Bar graph (Output freq., Output current, and Output torque)	-	0
	E46	Language	E46 I LANGUAGE	0 : Japanese 1 : English 2 : German 3 : French 4 : Spanish 5 : Italian	-	1
	E47	LCD Monitor (Contrast)	E47 I CONTRAST	0 (Soft) to 10 (Hard)	-	5

CONTROL FUNCTIONS OF FREQUENCY

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

	Code	Function name	LCD monitor	Setting range	Min. unit	Factory setting
					-22kW	30kW-
Jump Hz Control	C01	Jump (Jump freq. 1)	C01 I JUMP Hz 1	0 to 400Hz	1Hz	0
	C02	frequency (Jump freq. 2)	C02 I JUMP Hz 2		1Hz	0
	C03	(Jump freq. 3)	C03 I JUMP Hz 3		1Hz	0
	C04	(Hysteresis)	C04 I JUMP HYSTR	0 to 30Hz	1Hz	3
Multi-Hz Control	C05	Multistep (Freq. 1)	C05 I MULTI Hz-1	0.00 to 400.00Hz	0.01Hz	0.00
	C06	frequency (Freq. 2)	C06 I MULTI Hz-2		0.01Hz	0.00
	C07	setting (Freq. 3)	C07 I MULTI Hz-3		0.01Hz	0.00
	C08	(Freq. 4)	C08 I MULTI Hz-4		0.01Hz	0.00
	C09	(Freq. 5)	C09 I MULTI Hz-5		0.01Hz	0.00
	C10	(Freq. 6)	C10 I MULTI Hz-6		0.01Hz	0.00
	C11	(Freq. 7)	C11 I MULTI Hz-7		0.01Hz	0.00
	C12	(Freq. 8)	C12 I MULTI Hz-8		0.01Hz	0.00
	C13	(Freq. 9)	C13 I MULTI Hz-9		0.01Hz	0.00
	C14	(Freq. 10)	C14 I MULTI Hz10		0.01Hz	0.00
	C15	(Freq. 11)	C15 I MULTI Hz11		0.01Hz	0.00
	C16	(Freq. 12)	C16 I MULTI Hz12		0.01Hz	0.00
	C17	(Freq. 13)	C17 I MULTI Hz13		0.01Hz	0.00
	C18	(Freq. 14)	C18 I MULTI Hz14		0.01Hz	0.00
	C19	(Freq. 15)	C19 I MULTI Hz15		0.01Hz	0.00
	C20	JOG frequency	C20 I JOG Hz	0.00 to 400.00Hz	0.01Hz	5.00
Pattern Operation	C21	PATTERN operation (Mode select)	C21 I 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 I STAGE 1	* Operation time: 0.00 to 6000s * F1 to F4 and R1 to R4 Code FWD / REV ACC / DEC F1: FWD ACC1 / DEC1 F2: FWD ACC2 / DEC2 F3: FWD ACC3 / DEC3 F4: FWD ACC4 / DEC4 R1: REV ACC1 / DEC1 R2: REV ACC2 / DEC2 R3: REV ACC3 / DEC3 R4: REV ACC4 / DEC4	0.01s	0.00 F1
	C23	(Stage 2)	C23 I STAGE 2		0.01s	0.00 F1
	C24	(Stage 3)	C24 I STAGE 3		0.01s	0.00 F1
	C25	(Stage 4)	C25 I STAGE 4		0.01s	0.00 F1
	C26	(Stage 5)	C26 I STAGE 5		0.01s	0.00 F1
	C27	(Stage 6)	C27 I STAGE 6		0.01s	0.00 F1
	C28	(Stage 7)	C28 I STAGE 7		0.01s	0.00 F1
			*Setting for operation time, FWD/REV rotation and ACC/DEC time select.			
	C30	Frequency command 2	C30 I FREQ CMD 2	0 : KEYPAD operation (▲ or ▼ key) 1 : Voltage input (terminal 12) (0 to +10V DC, 0 to +5V DC) 2 : Inactive 3 : Inactive 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 : Inactive 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	Bias (Terminal 12)	C31 I BIAS 12	-100 to +100.0%	0.1%	0.0
	C32	Gain (Terminal 12)	C32 I GAIN 12	0.0 to +200.0%	0.1%	100.0
C33	Analog setting signal filter	C33 I REF FILTER	0.00 to 5.00s	0.01s	0.05	

MOTOR PARAMETERS

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Code		Function name	LCD monitor	Setting range	Min. unit	Factory setting
					-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

Code		Function name	LCD monitor	Setting range	Min. unit	Factory setting	
					-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 pattern (Mode select)	H07 ACC PTN	0 : Linear 1 : S-curve (weak) 2 : S-curve (strong) 3 : Non-linear (For variable torque load)	-	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 when 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.)	-	0 (EV: 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	0.1 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	1V	470	
	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	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	
	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% / Frequency 0 to max.) 2 : Active (Inverse operation mode : PID output 0 to 100% / Frequency 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	
Y1-Y5C Terminal	H25	(Feedback filter)	H25 FB FILTER	0.0 to 60.0s	0.1s	0.5	
	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	-9.9 to 0.0Hz	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 X 3 : X 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	

ALTERNATIVE MOTOR PARAMETERS

The functions with codes emphasized in grey boxes can be set while the inverter is running. Other functions must be set while the inverter is stopped.

Code	Function name	LCD monitor	Setting range	Min.	Factory setting
				unit	-22kW 30kW-
R01	Maximum frequency 2	A01 IMAX Hz-2	50 to 400Hz	1Hz	50
R02	Base frequency 2	A02 IBASE Hz-2	25 to 400Hz	1Hz	50
R03	Rated voltage 2 (at Base frequency 2)	A03 I RATED V-2	0 (Free), 320 to 480V	1V	400
R04	Maximum voltage 2 (at Maximum frequency 2)	A04 I MAX V-2	320 to 480V	1V	400
R05	Torque boost 2	A05 I 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)	-	0.0 (EV : 0.1)
R06	Electronic thermal overload relay for motor 2 (Level)	A06 I ELCTRN OL2	0 : Inactive 1 : Active (for 4-pole standard motor) 2 : Active (for 4-pole inverter motor)	-	1
R07	(Thermal time constant)	A07 I TOL LEVEL2	Approx. 20 to 135% of rated current	0.01A	*1)
R08		A08 I TIME CNST2	0.5 to 75.0 min	0.1min	5.0 10.0
R09	Torque vector control 2	A09 I TRVECTOR2	0 : Inactive 1 : Active	-	0
R10	Number of motor 2 poles	A10 I M2 POLES	2 to 14	2	4
R11	Motor 2 (Capacity)	A11 I M2-CAP	22kW or smaller : 0.01 to 45.00 kW 30kW or larger : 0.01 to 500.00 kW	0.01kW	*1)
R12	(Rated current)	A12 I M2-Ir	0.00 to 2000 A	0.01A	*1)
R13	(Tuning)	A13 I 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 lo (on motor running mode))	-	0
R14	(On-line Tuning)	A14 I M2 TUN2	0 : Inactive 1 : Active (Real time tuning of %R1 and %X)	-	0
R15	(No-load current)	A15 I M2-lo	0.00 to 2000 A	0.01A	*1)
R16	(%R1 setting)	A16 I M2-%R1	0.00 to 50.00 %	0.01%	*1)
R17	(%X setting)	A17 I M2-%X	0.00 to 50.00 %	0.01%	*1)
R18	Slip compensation control 2	A18 I SLIP COMP2	0.00 to +15.00 Hz	0.01Hz	0.00

NOTES :

*1) Typical value of standard Fuji 4P motor.

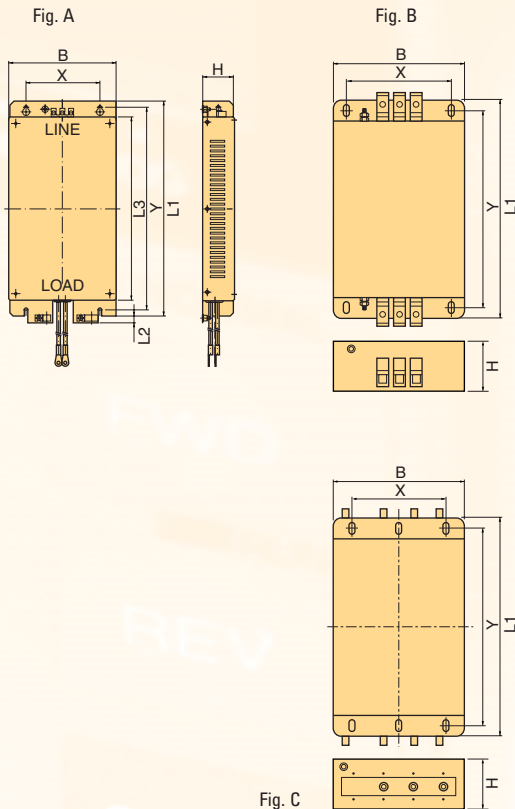
*2) Percent shall be set according to FUNCTION CODE : P02 or A11, Motor capacity.

Torque referenced here may not be obtainable when DATA CODE : 0 is selected for FUNCTION CODE : F42 or A09.

FRN G11S

Options

EMC FILTER



Inverter type	EMC filter type	Fig.	Dimensions, mm							Mtg. bolt
			L1	L2	L3	B	H	Y	X	
FRN0.4G11S-4EN to FRN0.75G11S-4EN	EFL-0.75G11-4	A	310	10	265	116	42	293	90	M5
FRN1.5G11S-4EN to FRN4.0G11S-4EN	EFL-4.0G11-4		310	10	265	155	45	293	105	M5
FRN5.5G11S-4EN to FRN7.5G11S-4EN	EFL-7.5G11-4		331	10	260	225	47.5	311	167	M8
FRN11G11S-4EN to FRN15G11S-4EN (CT)	EFL-15G11-4	B	480	20	400	250	70	449	185	M8
FRN15G11S-4EN (VT) to FRN22G11S-4EN	EFL-22G11-4		480	20	400	250	70	449	185	M8
FRN30G11S-4EV, FRN30G11S-4EN (CT)	RF3100-F11	B	435	-	-	200	130	408	166	M6
FRN30G11S-4EN (VT) to FRN90G11S-4EN (CT)	RF3180-F11		495	-	-	200	160	468	166	M6
FRN90G11S-4EN (VT) to FRN132G11S-4EN (CT)	RF3280-F11	C	587	-	-	250	205	560	170	M6
FRN132G11S-4EN (VT) to FRN220G11S-4EN (CT)	RF3400-F11		587	-	-	250	205	560	170	M6
FRN220G11S-EN (VT) to FRN315G11S-4EN	RF3880-F11		688	-	-	364	180	648	300	M6

OPTION CARDS AND OTHER OPTIONS

Name (type)	Function	Specifications		
Relay output card (OPC-G11S-RY)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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. 	1x Input ±0...10V DC 1x Input 0...10V DC 1x Input 4...20m A 1x Output 0...10V DC 1x Output 4...20m A		
Fieldbus interface card (OPC-G11S-PDP) (OPC-G11S-IBS) (OPC-G11S-COP) (OPC-G11S-DEV) (OPC-G11S-MBP)	<ul style="list-style-type: none"> For setting a frequency. For setting and reading function data for function codes. For setting operation commands (FWD, REV, RST, etc.). For monitoring the operation status. For reading trip information. 	PDP: Profibus DP IBS: Interbus S COP: Can Open DEV: Device Net MBP: Modbus +		
PG feedback card (OPC-G11S-PG) (OPC-G11S-PG2)	<ul style="list-style-type: none"> For performing PG vector control using feedback signals obtained from a PG. 	Applicable Pulse Encoder specification: PG: 12 to 15V DC, A-, B-, Z-phase, 20 to 3000 P/R PG2: 5V DC, A-, \bar{A} -, B-, \bar{B} -phase, 20 to 3000P/R		
Synchronized operation card (OPC-G11S-SY)	<ul style="list-style-type: none"> Wait-and synchronize mode, simultaneous-start-and-synchronizing mode. Proportional speed operation Speed control by pulse train input can be made. 			
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
Copy unit (CP-G11S) (Available soon)	<ul style="list-style-type: none"> For batch data transfer (read, store, write) between an inverter unit and the copy unit. For comparison of data stored in an inverter and data stored in the copy unit. For comparison of two sets of data stored in the copy unit. For editing a part of the data stored in an inverter. Write protection is available in copy mode and edit mode. The copy unit can write data to inverter memory even though the inverter is not connected to power source. 	Application <ul style="list-style-type: none"> Copying Verification Editing Write protect 		
IP20 enclosure adapter (P20G11-□□)	<ul style="list-style-type: none"> Used to put 30kW or larger models to change its enclosure of IP00 into that of IP20. 	Type	Applicable inverter type	
		P20G11-30	FRN30G11S-4EN FRN30G11S-4EV	
		P20G11-55	FRN37G11S-4EN to FRN55G11S-4EN	
		P20G11-75-4	FRN75G11S-4EN	
		P20G11-75-2	FRN75G11S-2EN	
		P20G11-110	FRN90G11S-4EN to FRN110G11S-4EN	
		P20G11-160	FRN132G11S-4EN to FRN160G11S-4EN	
P20G11-220	FRN200G11S-4EN to FRN220G11S-4EN			
Mounting adapter for external cooling (PBG11-□□)	<ul style="list-style-type: none"> 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-4EN to FRN0.75G11S-4EN	
		PBG11-3.7	FRN1.5G11S-4EN to FRN3.7G11S-4EN	
		PBG11-7.5	FRN5.5G11S-4EN to FRN7.5G11S-4EN	
		PBG11-22	FRN11G11S-4EN to FRN22G11S-4EN	
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-4EN to FRN3.7G11S-4EN	
		MAG9-7.5	FRN5.5G11S-4EN to FRN7.5G11S-4EN	
		MAG9-22	FRN11G11S-4EN to FRN22G11S-4EN	

FIG. 5

Internal mounting type (30kW or larger) **External cooling type (30kW or larger)**

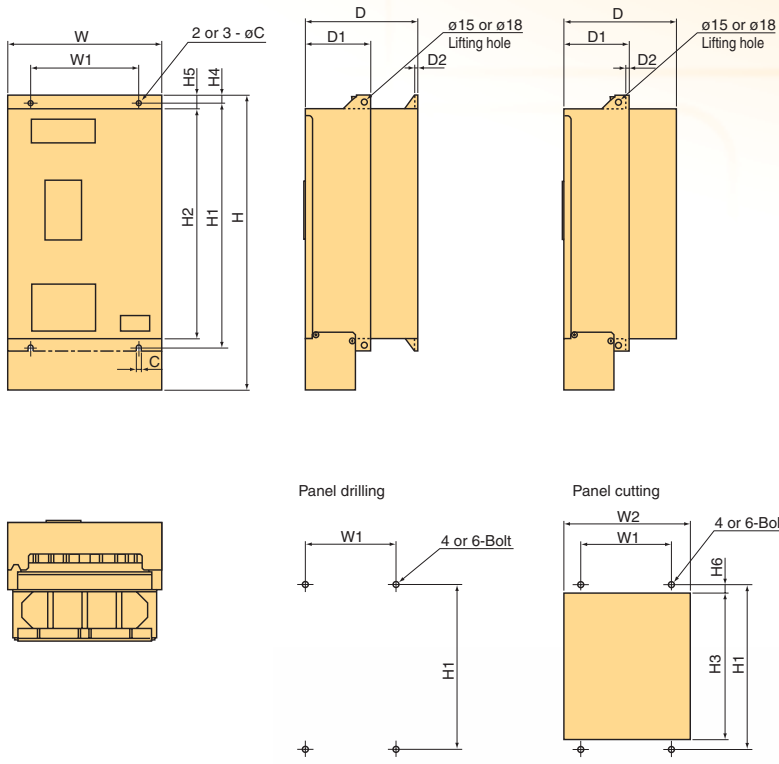
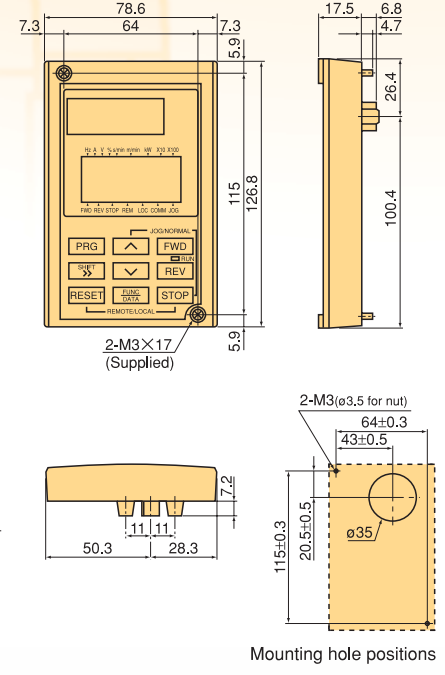


FIG. 6

KEYPAD panel (Common for all models)



Power supply voltage	Nominal applied motor (kW)	Type	Dimensions (mm)													Mtg. Bolt											
			W	W1	W2	H	H1	H2	H3	H4	H5	H6	D	D1	D2		C										
400V	30	FRN30G11S-4EN/FRN30G11S-4EV	340	240	326																						
	37	FRN37G11S-4EN				645	530	500	512																		
	45	FRN45G11S-4EN	375	275	361	770	655	625	637	12	25	9	270	145													
	55	FRN55G11S-4EN				835	720	690	702																		
	75	FRN75G11S-4EN																									
	90	FRN90G11S-4EN				827.5	710	675	685																		
	110	FRN110G11S-4EN	530	430	510					15.5	32.5	12.5	315	175	4												
	132	FRN132G11S-4EN																									
	160	FRN160G11S-4EN				1087.5	970	935	945				360	220													
	200	FRN200G11S-4EN	680	580	660																						
220	FRN220G11S-4EN																										
280	FRN280G11S-4EN	Available soon																									
315	FRN315G11S-4EN																										

FRENIC 5000G11S 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 filmmanufacturing machine
- Cooling-tower fans
- Ventilating fans
- Air-conditioning equipment

Food processing machines

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

Machine tools

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

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

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

Packaging machinery

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

Paper making/textile machinery

- Spinning machine
- Knitting machine
- Textile printing machine
- Industrial sawing machine
- Synthetic fiber manufacturing plant

Chemical machinery/ wood working machines

- Fluid mixing machine
- Extruder
- Vibrator
- Centrifugal separator
- Coating machine
- Take-up roller
- Routing machine
- Sanding machine
- Planing machine

Other machinery

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

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