e-Front runners

High Performance Vector Control Inverters

FRENIC 5000VG7S Series

FUJI INVERTERS

A HIGHLY EFFICIENT AND EFFECTIVE GLOBAL INVERTER WITH THE FUNCTIONS AND CAPABILITIES FOR ALL YOUR NEEDS.

MEH405e

THE INVERTER

FRENIC 5000VG7S

The world's finest inverter. The best control capability. The most requested functions.

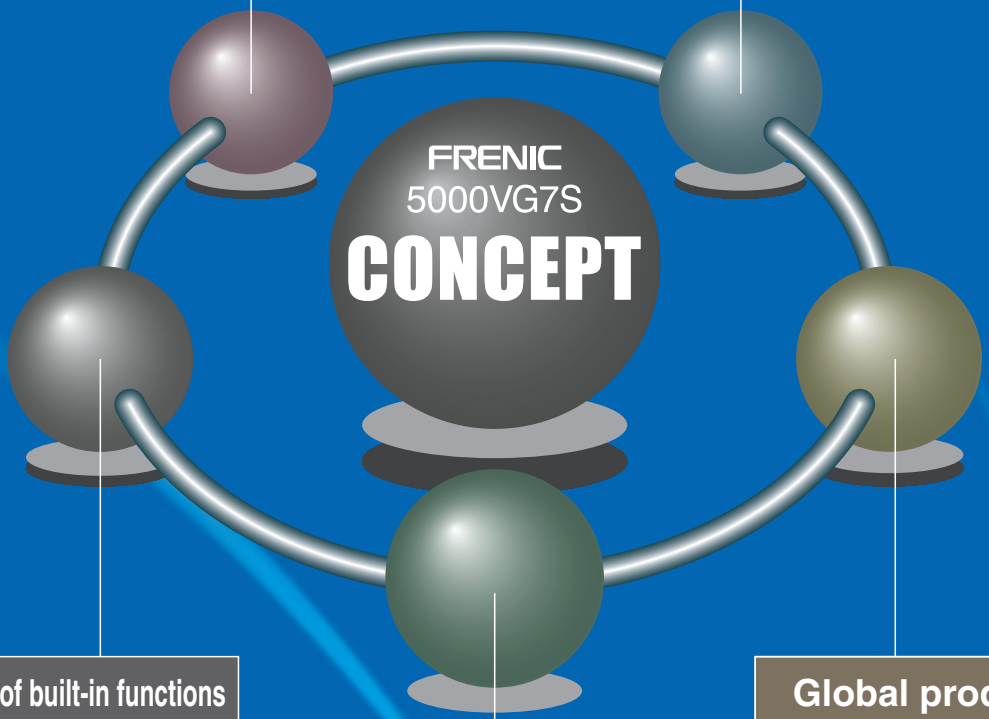
FRENIC5000VG7S is our highest performance vector control inverter developed using Fuji's leading technologies for the 21st century.
The inverter has a multi-drive function for high performance control of motors, worldwide.
System integration with UPAC
(optional card incorporating user-programmable functions)
enhances the capabilities of machines and devices such as vertical transfer equipment (cranes, multi-storied parking facilities), winding machines, injection molding machines, textile machines and steel production lines.
These enhancements allow comprehensive cost reductions. The wide range of capacity, conformity to international standards, and multi-language KEYPAD make the inverter ready for applications all over the world.

The industry's best control performance

- The multi-drive functions feature vector control, sensorless vector control, V/f control and vector control for synchronous motors.
- Vector control with dedicated motors has attained the industry's best control performance such as speed control accuracy of ±0.005%, speed response of 100Hz, current response of 800Hz and torque control accuracy (linearity) of ±3%.

System integration

- UPAC, the optional card incorporating user-programmable functions, enables user-original system configuration and construction. Dedicated package software products are also available.
- The RS-485 communications function is provided as standard and T-Link and SX bus communications functions are available as options.
- Inverter support loader for Windows is supplied to facilitate function code setting.



A wealth of built-in functions

- Tuning function to control various motors optimally.
- Load vibration suppressing observer function and load adaptive control function.
- Position control function such as zero speed lock.
- Position synchronization control using pulse train input (Option).
- Advanced orientation control (Option).

Capacity range expanded

A wide range of capacities and applications

- A single specification with a capacity range from 0.75 to 630kW makes system configuration simple.
- Optimal control is achieved with the CT use (constant torque) for 150% overload capability, the VT use (variable torque) for 110% overload capability and the HT use for 200% overload torque.

Global products

- A standard product, conforming to UL/cUL and CE marking, allows unification of devices and machines made at home and abroad.
- The KEYPAD has 8 user interface languages as standard to make export simple.
- Interfaces with various fieldbuses (Option).

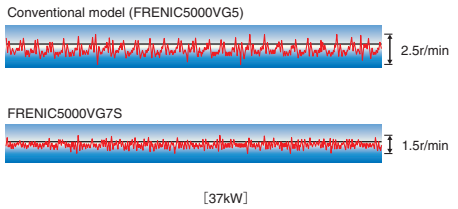
This high performance vector control inverter has complete control over speed and torque

The industry's best control performance

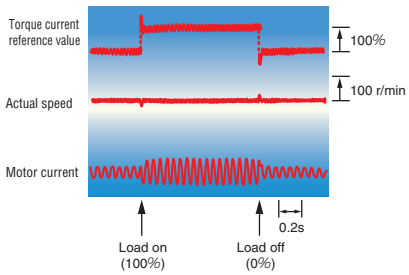
- Speed control accuracy of ±0.005% (tested with a dedicated motor with PG under vector control: one half compared to our conventional model).
- Speed response of 100Hz (tested with a dedicated motor with PG under vector control: twice compared to our conventional model).
- Current response of 800Hz (tested with a dedicated motor with PG under vector control: four times compared to our conventional model).
- Torque control accuracy (linearity) of ±3%.

Wow characteristics

Wow at low speed has been improved down to 60% or less (1Hz) by enhancing the speed response frequency by 2 times (compared with VG5), digital speed control accuracy by one tenth, and current control response by four times (compared with VG5).

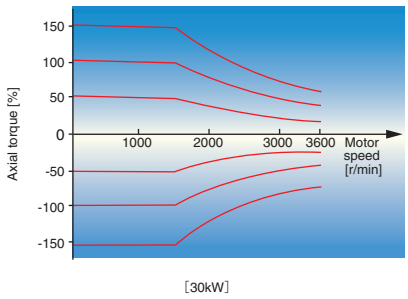


Follow-up characteristics under impact load



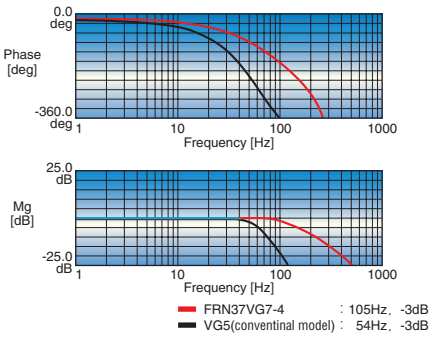
FRN7.5VG7S-2, at 500r/min

Speed-torque characteristics



[30kW]

Speed response characteristics



* Torque control accuracy is ± 5% for the motors with a capacity larger than 55kW. Contact Fuji Electric FA representative if further accuracy is required.

Use with different control types (multi-drive function)

- You can select four types of control for different motors.
  - ・Induction motors: vector control, sensorless vector control, V/f control
  - ・Synchronous motors: vector control (optional card required)

A wide range of capacity/flexible applications

- Simple system configuration based on a single specification with a capacity range from 0.75 to 630kW.
- A standard product that meets three specifications types.

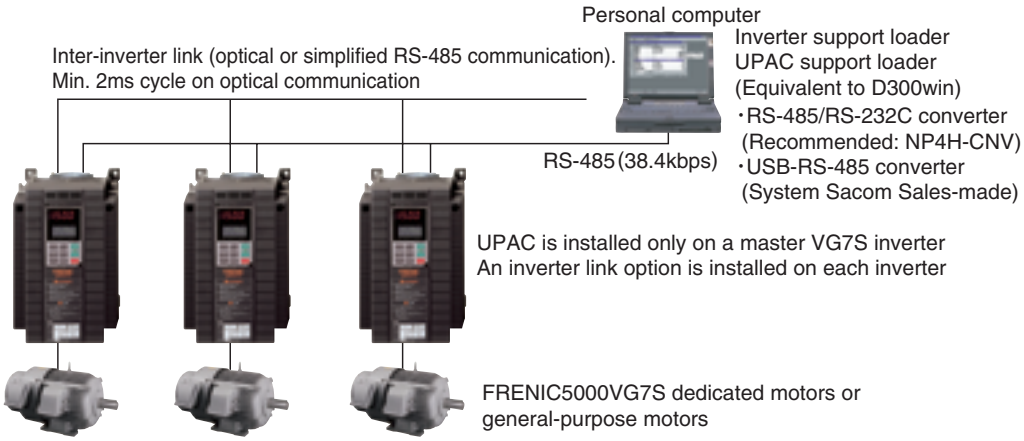
Specification type	Overload capability	Main application	Carrier frequency
CT	150%	Constant torque applications	High frequency
VT*	110%	Variable torque applications	Low frequency
HT	200%/170%	Vertical transfer applications	High frequency

(*) : One class smaller model applicable.

Built-in user-programmable functions (option as UPAC)

- Users can personalize inverter control and terminal functions in order to build an original system using the programmable functions of UPAC (User Programmable Application Card) .
- Dedicated package software products for tension control, dancer control and position control are provided.

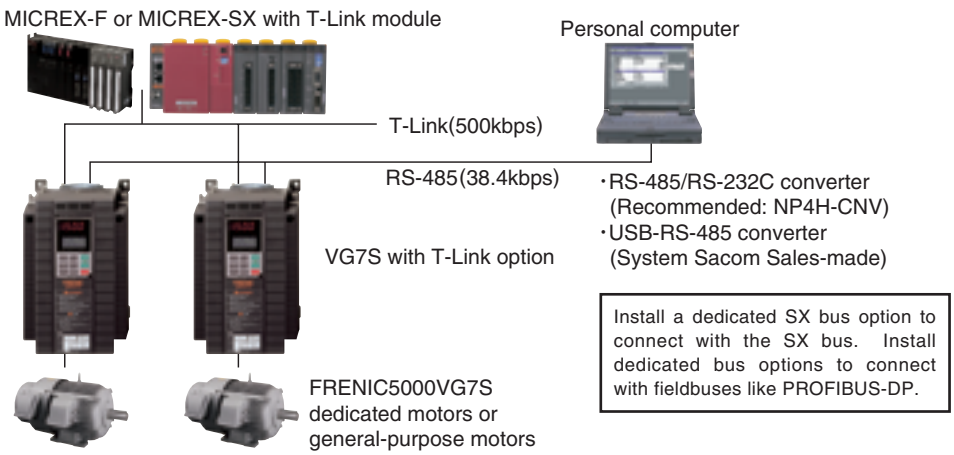
UPAC System



Enhanced network readiness

- The RS-485 communications function is provided as standard, and the T-Link and SX bus functions are provided as options.
- Interfaces with various fieldbuses such as PROFIBUS-DP or DeviceNet are available.

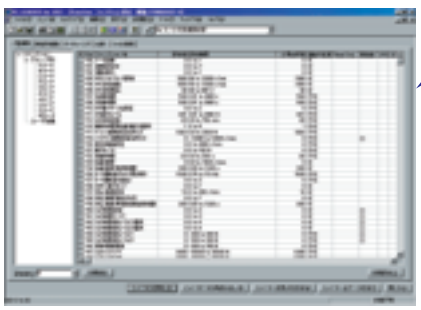
T-Link System



Install a dedicated SX bus option to connect with the SX bus. Install dedicated bus options to connect with fieldbuses like PROFIBUS-DP.

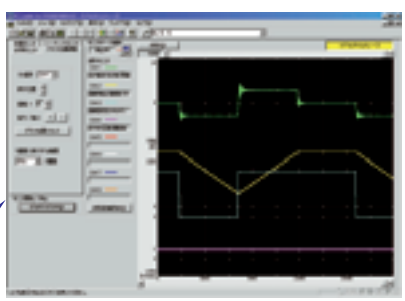
Inverter support loader provided

- An inverter support loader for Windows is available as an option to facilitate function code setting.



You can set an operational environment easily with the inverter support loader software by connecting to your personal computer over built-in RS-485 interface (max. 38,400bps).

The loader runs on Windows95/98 and NT. Real-time trace and historical trace are incorporated along with operation monitor and function settings.



Enhanced built-in functions

- Improved tuning function
  Motor parameters can be tuned while the motor is stopped.
- Built-in observer function for load vibration suppressing
- Equipped with load adaptive control function
  Stepless variable double-speed control is possible at light load.
- Increased position control function
  - ・Zero-speed locking control.
  - ・Position synchronizing control using pulse train input (Option).
  - ・Orientation control (Option).
- Vector control is applicable to two types of motors. Also, V/f control is applicable to the third motor.
- Built-in braking unit
  Built-in braking unit for 55kW or smaller models (200V series) and for 110kW or smaller models (400V series) allows downsizing machines and devices.
- 23 I/O terminal points

	Input	Output
Analog	3 points	3 points
Digital	11 points	6 points

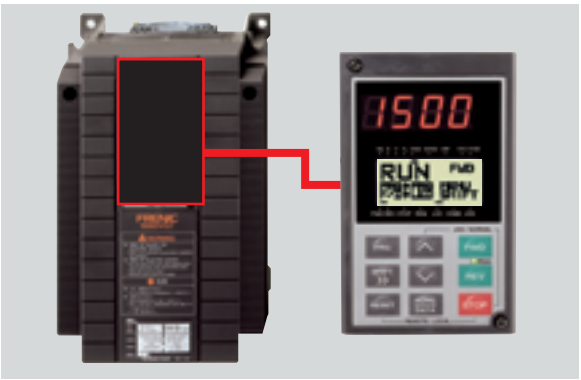
- Built-in PG interface card
  Both 12V and 15V voltage inputs are accepted. The card can handle line drivers as an option.

Upgraded maintenance/protective functions

- I/O terminal checking function
- Main circuit capacitor life judgment
- Inverter load factor measure
- Records and displays accumulated operation time
- Displays operating conditions such as output voltage, heat sink temperature and calculated torque value
- Detailed data is recorded on inverter trip
- Setting the thermal time constant of the electronic thermal overload protection makes different motors applicable.
- Standard protective function against input phase loss. Protects the inverter from damage caused by power line disconnection
- Motor protection with PTC thermistor
- Equipped with terminals for connecting DC REACTOR that can suppress harmonics

Interactive KEYPAD for simple operation

- Standard copy function
  Easily copies function code data to other inverters.
- Remote operation capability
  The KEYPAD is detachable for remote operation using an optional cable.
- 8 standard language interfaces (English, German, French, Italian, Spanish, Chinese, Korean and Japanese)
- Jogging operation from the KEYPAD or with input from an external signal
- Switching between KEYPAD operations (LOCAL) and external signal input operations (REMOTE) using the KEYPAD



Conformity to world standards

- Standard conformity to EC Directive (CE Marking), UL and cUL standards enables unification of specifications at home and abroad
- Conforms to the European EMC Directive with optional EMC filters

Note: Among FRENIC5000VG7S series, only 400V series conform to the EN standards.

Europe	North America/Canada
EC Directive (CE Marking)	UL and cUL standards

CE c UL us LISTED

Variation

Triple ratings (CT use, VT use, and HT use) and a wide variety of models from 0.75 to 800kW make system configuration easy!

200V Series

Nominal applied motor (kW)	Applicable inverter CT use (150%)	Applicable inverter VT use (110%)	Applicable inverter HT use (200%/170%)	Dedicated motor Common to all uses
0.75	FRN0.75VG7S-2			MVK8095A
1.5	FRN1.5VG7S-2	FRN0.75VG7S-2		MVK8097A
2.2	FRN2.2VG7S-2	FRN1.5VG7S-2		MVK8107A
3.7	FRN3.7VG7S-2	FRN2.2VG7S-2	FRN3.7VG7S-2	MVK8115A
5.5	FRN5.5VG7S-2	FRN3.7VG7S-2	FRN5.5VG7S-2	MVK8133A
7.5	FRN7.5VG7S-2	FRN5.5VG7S-2	FRN7.5VG7S-2	MVK8135A
11	FRN11VG7S-2	FRN7.5VG7S-2	FRN11VG7S-2	MVK8165A
15	FRN15VG7S-2	FRN11VG7S-2	FRN15VG7S-2	MVK8167A
18.5	FRN18.5VG7S-2	FRN15VG7S-2	FRN18.5VG7S-2	MVK8184A
22	FRN22VG7S-2	FRN18.5VG7S-2	FRN22VG7S-2	MVK8185A
30	FRN30VG7S-2	FRN22VG7S-2	FRN30VG7S-2	MVK8187A
37	FRN37VG7S-2	FRN30VG7S-2	FRN37VG7S-2	MVK8207A
45	FRN45VG7S-2	FRN37VG7S-2	FRN45VG7S-2	MVK8208A
55	FRN55VG7S-2	FRN45VG7S-2	FRN55VG7S-2	MVK9224A
75	FRN75VG7S-2	FRN55VG7S-2		MVK9254A
90	FRN90VG7S-2	FRN75VG7S-2		MVK9256A
110		FRN90VG7S-2		

400V Series

Nominal applied motor (kW)	Applicable inverter CT use (150%)	Applicable inverter VT use (110%)	Applicable inverter HT use (200%/170%)	Dedicated motor Common to all uses
3.7	FRN3.7VG7S-4		FRN3.7VG7S-4	MVK8115A
5.5	FRN5.5VG7S-4	FRN3.7VG7S-4	FRN5.5VG7S-4	MVK8133A
7.5	FRN7.5VG7S-4	FRN5.5VG7S-4	FRN7.5VG7S-4	MVK8135A
11	FRN11VG7S-4	FRN7.5VG7S-4	FRN11VG7S-4	MVK8165A
15	FRN15VG7S-4	FRN11VG7S-4	FRN15VG7S-4	MVK8167A
18.5	FRN18.5VG7S-4	FRN15VG7S-4	FRN18.5VG7S-4	MVK8184A
22	FRN22VG7S-4	FRN18.5VG7S-4	FRN22VG7S-4	MVK8185A
30	FRN30VG7S-4	FRN22VG7S-4	FRN30VG7S-4	MVK8187A
37	FRN37VG7S-4	FRN30VG7S-4	FRN37VG7S-4	MVK8207A
45	FRN45VG7S-4	FRN37VG7S-4	FRN45VG7S-4	MVK8208A
55	FRN55VG7S-4	FRN45VG7S-4	FRN55VG7S-4	MVK9224A
75	FRN75VG7S-4	FRN55VG7S-4		MVK9254A
90	FRN90VG7S-4	FRN75VG7S-4		MVK9256A
110	FRN110VG7S-4	FRN90VG7S-4		MVK9284A
132	FRN132VG7S-4	FRN110VG7S-4		MVK9286A
160	FRN160VG7S-4	FRN132VG7S-4		MVK931LA
200	FRN200VG7S-4	FRN160VG7S-4		MVK931MA
220	FRN220VG7S-4	FRN200VG7S-4		MVK931NA
250	FRN250VG7S-4			
280	FRN280VG7S-4	FRN220VG7S-4		
300		FRN250VG7S-4		
315	FRN315VG7S-4	FRN280VG7S-4		
355	FRN355VG7S-4	FRN315VG7S-4		
400	FRN400VG7S-4	FRN355VG7S-4		
500	FRN500VG7S-4	FRN400VG7S-4		
630	FRN630VG7S-4	FRN500VG7S-4		
710	FRN710BVG7S-4	FRN630VG7S-4		
800	FRN800BVG7S-4			

Capacity range added

Capacity range expanded

How to read the model number

FRN 5.5 □ VG 7 S - 2 SX

Code	Series name
FRN	FRENIC5000 Series

Code	Nominal applied motors
0.75	0.75kW
1.5	1.5kW
2.2	2.2kW
3.7	3.7kW
5.5	5.5kW
7.5	7.5kW
⟆	⟆
800	800kW

Code	Structure
None	Unit type
B	Stack type

Code	Unit series
None	Standard type
SX	SX-bus-compliant type
CC	CC-Link-compliant type
FB	Profibus-DP-compliant type, Device Net compliant

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

Code	Enclosure
S	Standard

Code	Developed inverter series
7	7 series

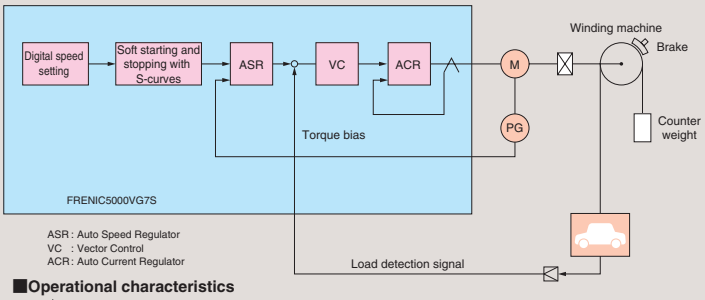
Code	Application range
VG	High performance vector control

Application examples

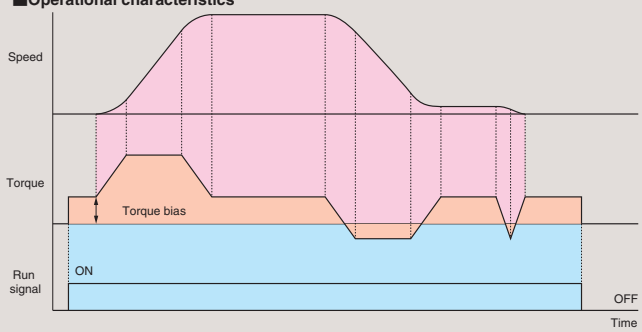
Multi-storied parking facility

FRENICS5000VG7S can build an optimal system for a multi-storied parking facility.

■Control block diagram



■Operational characteristics



① 15-step digital speed setting

Digital settings reduce speed fluctuations on starting and stopping at zero-speed operations.

② Multiple S-curves

Smooth acceleration and deceleration is achieved.

③ 200% or more of maximum torque

Attains 200% of maximum torque using HT specification.

④ Torque bias function

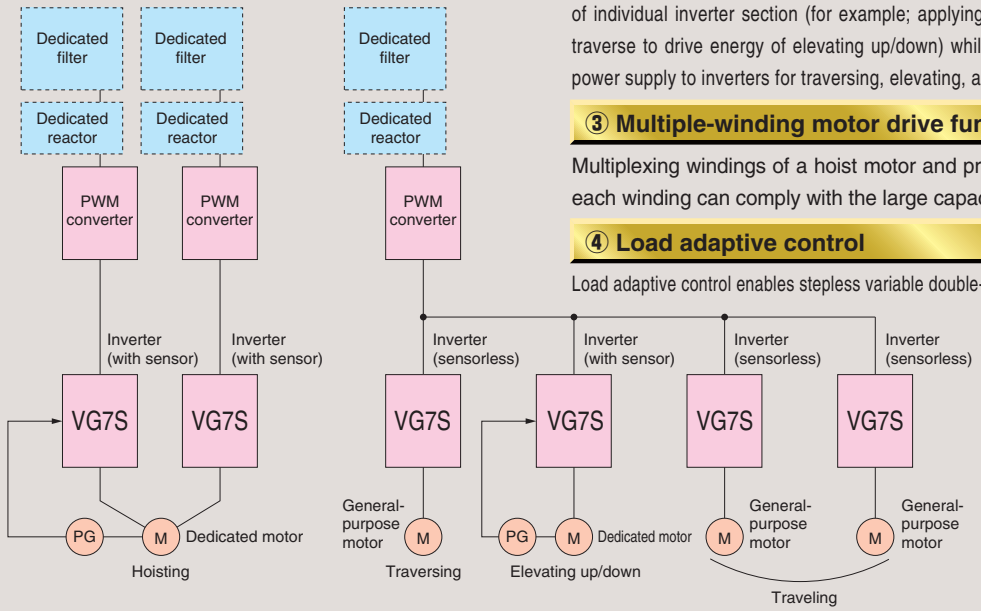
The torque detection signal drastically reduces rollbacks at starting.

⑤ Load adaptive control

Load adaptive control enables stepless variable double-speed control at light load.

Crane

■Crane system configuration



① Combination of vector control and sensorless vector control

Vector control inverters with sensors are applied to hoisting and elevating devices which require large starting torque and quick response while general-purpose motors and sensorless inverters are applied to traversing and traveling devices.

② PWM converter application

PWM converters drastically reduce harmonic current in power lines. Energy saving is achieved by supplying regenerative energy to power lines on winding-down or decelerating operations and utilizing the regenerative energy of individual inverter section (for example; applying regenerative energy from traverse to drive energy of elevating up/down) while providing a common DC power supply to inverters for traversing, elevating, and traveling devices.

③ Multiple-winding motor drive function

Multiplexing windings of a hoist motor and providing an inverter with each winding can comply with the large capacity system.

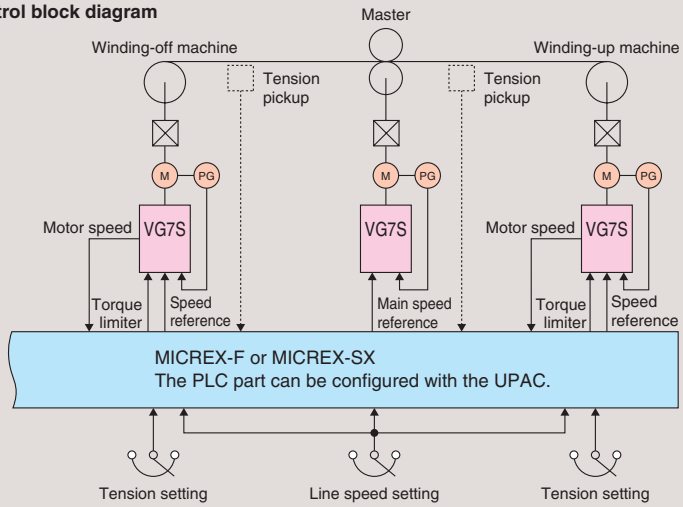
④ Load adaptive control

Load adaptive control enables stepless variable double-speed control at light load.

Winding-up and winding-off machines

The following diagram shows simplified tension control for winding-up and winding-off machines (torque reference open loop).

■**Control block diagram**



Torque reference is obtained from

Torque = Tension × Winding diameter

Using winding diameter calculation by PLC since tension reference cannot be input directly into the inverter.

① Winding diameter calculation

Fuji's PLC calculates winding diameter by reading the line speed and motor speed of the winding-up machine. The winding diameter of winding-off machines is calculated from the line speed and motor speed of the winding-off machine.

② Torque control

Torque is set, based on the following limitations because applying reference torque values corresponding to tension references directly into inverters may increase motor speed to the overspeed (OS) alarm level if there is breakage.

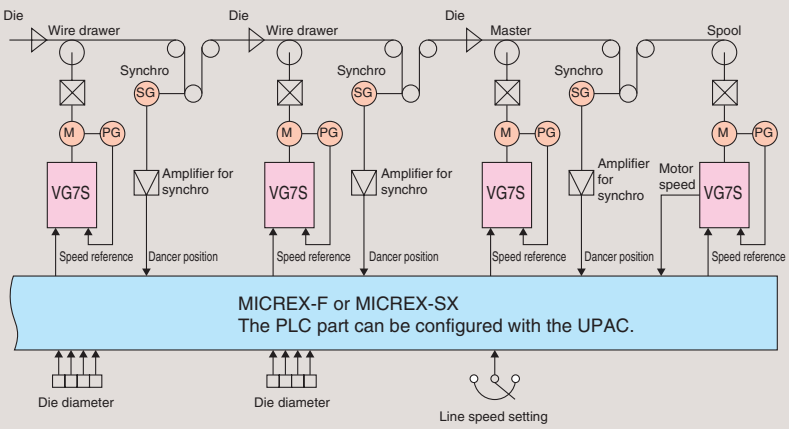
●**Speed reference**••••Speed reference higher than the speed of the motor is given to the winding-up device. Speed reference lower than the speed of the motor (or 0 [r/min]) is given to the winding-off device.

●**Torque limiter**••••Since inverters try to provide maximum torque with the speed references above, the PLC commands torque values corresponding to tension reference as torque limiter values.

Closed-loop control is also possible by employing tension pickups and inputting actual tensions into the PLC.

Wire drawing line

■**Control block diagram**



① Die diameter calculation

Different types of drawings are conducted on the same wire drawing line and die diameters vary according to wire. Employing Fuji's PLC and entering diameters as digital values after setting reduction ratios in the mechanical system and motor speed enables high-precision speed setting to skip readjusting when dies are changed.

② Winding diameter calculation

The reference speed is provided such that the peripheral speed of a spool remains constant by reading in the line speed and the motor speed while the diameter of the spool continuously changes.

③ Dancer control

Dancer control prevents lines from breaking due to differences in tensions among drawing machines and keeps the tensions constant. Dancer roll positions are set such that tensions among drawing machines are balanced when dancer rolls are at sensor positions. The PLC detects the movement of dancer rolls from tension imbalances and corrects the speeds to return the dancer rolls to sensor positions. A PID controller for adjusting dancer roll positions is integrated into the PLC.

Standard Specifications

CT use (for constant torque, overload capability: 150% - 1min.)

Three-phase 200V series

Type FRN□VG7S-2△△		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]		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Rated capacity [kVA] (*1)		1.9	3.0	4.1	6.8	10	14	18	24	28	34	44	55	68	81	107	131
Rated current (Continuous)		5	8	11	18	27	37	49	63	74	90	116	145	180	215	283	346
(1min.)		7.5	12	16.5	27	40.5	55.5	73.5	94.5	111	135	174	217.5	270	333	441	519
Input ratings	Phase, Voltage, Frequency	3-phase 200 to 230V, 50Hz/60Hz								3-phase 200 to 220V/50Hz, 200 to 230V/60Hz (*2)							
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*3)															
	Momentary voltage dip capability (*4)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 165V. If the voltage is less than 165V, the inverter can be operated for 15ms.															
	Rated current [A] (with DCR)	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
	(*7) (without DCR)	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 [kVA] (*5)	1.1	2.0	2.9	4.9	6.9	9.4	14	19	23	28	38	47	57	69	95	114
Braking method /braking torque		Braking resistor discharge control: 150% braking torque, Separately installed braking resistor (option), Separately installed braking unit (option for 75kW or more)															
Carrier frequency [kHz] (*6)		0.75 to 15														0.75 to 10	
Mass [kg]		8	8	8	8	8	8	12.5	12.5	25	25	30	37	46	48	70	115
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)															

*1) Inverter output capacity [kVA] at 220V.
*2) Order individually for 220 to 230V/50Hz.
*3) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*4) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*5) When power-factor correcting DC REACTOR is used. (Optional for 55kW or less model)
*6) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*7) This value is obtained by using a FUJI original calculation method.
*8) Use the function code F80 to switch between CT, VT and HT uses.
*9) Not EN standard conformed.

Three-phase 400V series

Type FRN□VG7S-4△△		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	250	280	315	355	400	500	630	710B	800B
Nominal applied motor [kW]		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	250	280	315	355	400	500	630	710	800
Rated capacity [kVA] (*1)		6.8	10	14	18	24	29	34	45	57	69	85	114	134	160	192	231	287	316	356	396	445	495	563	731	891	1044	1127
Rated current (Continuous)		9.0	13.5	18.5	24.5	32.0	39.0	45.0	60.0	75.0	91.0	112	150	176	210	253	304	377	415	468	520	585	650	740	960	1170	1370	1480
(1min.)		13.5	20.0	27.5	36.5	48.0	58.5	67.5	90.0	113	137	168	225	264	315	380	456	566	623	702	780	878	975	1110	1440	1755	2055	2220
Input ratings	Phase, Voltage, Frequency (*1)	3-phase 380 to 480V, 50Hz/60Hz					3-phase 380 to 440V/50Hz, 380 to 480V/60Hz (*8)																				DC513 to 758V	
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*2)																									—	
	Momentary voltage dip capability (*3)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 310V. If the voltage is less than 310V, the inverter can be operated for 15ms.																									—	
	Rated current [A] (with DCR)	7.1	10	13.5	19.8	26.8	33.2	39.3	54	67	81	100	134	160	196	232	282	352	385	438	491	552	624	704	880	1104	—	—
	(*6) (without DCR)	14.9	21.5	27.9	39.1	50.3	59.9	69.3	86	104	124	150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Required power supply capacity [kVA] (*4)	5.0	7.0	9.4	14	19	24	28	38	47	57	70	93	111	136	161	196	244	267	304	341	383	432	488	610	765	—	—
Braking method/braking torque		Braking resistor discharge control: 150% braking torque, Separately installed braking resistor (option), Separately installed braking unit (option for 132kW or more)																										
Carrier frequency [kHz] (*5)		0.75 to 15											0.75 to 10												0.75 to 5		2.5 to 5	
Mass [kg]		8	8	8	12.5	12.5	25	25	30	35	40	41	50	72	72	100	100	140	140	150	250	250	360	360	525	525	225×3	
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)																										

*1) Inverter output capacity [kVA] at 440V.
*2) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*3) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*4) When power-factor correcting DC REACTOR is used. (Optional for 55kW or less model)
*5) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*6) This value is obtained by using a FUJI original calculation method.
*7) Use the function code F80 to switch between CT, VT and HT uses.
*8) When the input voltage is 380 to 398V/50Hz or 380 to 430V/60Hz, a connector inside the inverter must be switched.
When the input voltage is 380Hz, the power output may be occasionally reduced.For the detail, refer to the user's manual of "FRENIC 5000 VG7S".
(described in 11.5 Characteristic combination list)
*9) The inverter for 18.5kW and 250kW motor does not conform to EN standards.If a standard-compliant model is required, select the inverter for 22kW and 280kW.

VT use (for variable torque, overload capability: 110% - 1min.)

Three-phase 200V series

Type FRN□VG7S-2△△		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]		1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Rated capacity [kVA] (*1)		3.0	4.1	6.8	10	14	18	24	28	34	44	55	68	81	107	131	158
Rated current (Continuous)		8	11	18	27	37	49	63	74	90	116	145	180	215	283	346	415
(1min.)		8.8	12.1	19.8	29.7	40.7	53.9	69.3	81.4	99	128	160	198	237	311	381	457
Input ratings	Phase, Voltage, Frequency	3-phase 200 to 230V, 50Hz/60Hz								3-phase 200 to 220V/50Hz, 200 to 230V/60Hz(*2)							
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*3)															
	Momentary voltage dip capability (*4)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 165V. If the voltage is less than 165V, the inverter can be operated for 15ms.															
	Rated current [A] (with DCR)	5.7	8.3	14.0	19.7	26.9	39.0	54.0	66.2	78.8	109	135	163	199	272	327	400
	(*7) (without DCR)	11.1	16.1	25.5	40.8	52.6	76.9	98.5	117	136	168	204	243	291	—	—	—
	Required power supply capacity [kVA] (*5)	2.0	2.9	4.9	6.9	9.4	14	19	23	28	38	47	57	69	95	114	139
Braking method/braking torque		Braking resistor discharge control: 110% braking torque, Separately installed braking resistor (option), Separately installed braking unit (option for 75kW or more)															
Carrier frequency [kHz] (*6)		0.75 to 10														0.75 to 6	
Mass [kg]		8	8	8	8	8	8	12.5	12.5	25	25	30	37	46	48	70	115
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)															

*1) Inverter output capacity [kVA] at 220V.
*2) Order individually for 220 to 230V/50Hz.
*3) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*4) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*5) When power-factor correcting DC REACTOR is used. (Optional for 55kW or less model)
*6) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*7) This value is obtained by using a FUJI original calculation method.
*8) Use the function code F80 to switch between CT, VT and HT uses.
*9) Not EN standard conformed.

Three-phase 400V series

Type FRN□VG7S-4△△		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	250	280	315	355	400	500	630
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	300	315	355	400	500	630	710
Rated capacity [kVA] (*1)		10	14	18	24	29	34	45	57	69	85	114	134	160	192	231	287	316	396	425	445	495	563	731	891	1044
Rated current (Continuous)		13.5	18.5	24.5	32.0	39.0	45.0	60.0	75.0	91.0	112	150	176	210	253	304	377	415	520	558	585	650	740	960	1170	1370
(1min.)		14.9	20.4	27	35.2	42.9	49.5	66	82.5	100	123	165	194	231	278	334	415	457	583	614	655	737	847	1056	1287	1507
Input ratings	Phase, Voltage, Frequency (*1)	3-phase 380 to 480V, 50Hz/60Hz					3-phase 380 to 440V/50Hz, 380 to 480V/60Hz (*8)																			
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*2)																								
	Momentary voltage dip capability (*3)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 310V. If the voltage is less than 310V, the inverter can be operated for 15ms.																								
	Rated current [A] (with DCR)	10	13.5	19.8	26.8	33.2	39.3	54	67	81	100	134	160	196	232	282	352	385	491	526	552	624	704	880	1104	1248
	(*6) (without DCR)	21.5	27.9	39.1	50.3	59.9	69.3	86	104	124	150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Required power supply capacity [kVA] (*4)	7.0	9.4	14	19	24	28	38	47	57	70	93	111	136	161	196	244	267	341	365	383	432	488	610	765	865
Braking method/braking torque		Braking resistor discharge control: 150% braking torque, Separately installed braking resistor (option), Separately installed braking unit (option for 132kW or more)																								
Carrier frequency [kHz] (*5)		0.75 to 10											0.75 to 6												0.75 to 5	0.75 to 2
Mass [kg]		8	8	8	12.5	12.5	25	25	30	35	40	41	50	72	72	100	100	140	140	150	250	250	360	360	525	525
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)																								

*1) Inverter output capacity [kVA] at 440V.
*2) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*3) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*4) When power-factor correcting DC REACTOR is used. (Optional for 55kW or less model)
*5) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*6) This value is obtained by using a FUJI original calculation method.
*7) Use the function code F80 to switch between CT, VT and HT uses.
*8) When the input voltage is 380 to 398V/50Hz or 380 to 430V/60Hz, a connector inside the inverter must be switched.
*9) The inverter for 22kW and 300kW motor does not conform to EN standards.If a standard-compliant model is required, select the inverter for 30kW and 315kW.

Standard Specifications

HT use (for vertical transfer application, overload torque: 200%/170% - 10s)

Three-phase 200V series

Type FRN□VG7S-2△△		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Nominal applied motor [kW]		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated capacity [kVA] (*1)		6.8	10	14	18	24	28	34	44	55	68	81
Rated current (*2)		18	27	37	49	63	74	90	116	145	180	215
	(1min.)	27	40.5	55.5	73.5	94.5	111	135	174	217.5	270	333
	(10s)	32.4	45.7	63.3	85.8	111	142	170	194	246	290	360
Input ratings	Phase, Voltage, Frequency	3-phase 200 to 230V, 50Hz/60Hz					3-phase 200 to 220V/50Hz, 200 to 230V/60Hz (*3)					
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*4)										
	Momentary voltage dip capability (*5)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 165V. If the voltage is less than 165V, the inverter can be operated for 15ms.										
	Rated current [A] (with DCR)	14.0	19.7	26.9	39.0	54.0	66.2	78.8	109	135	163	199
	(*8) (without DCR)	25.5	40.8	52.6	76.9	98.5	117	136	168	204	243	291
	Required power supply capacity [kVA] (*6)	4.9	6.9	9.4	14	19	23	28	38	47	57	69
Carrier frequency [kHz] (*7)		0.75 to 15										
Mass [kg]		8	8	8	12.5	12.5	25	25	30	37	46	48
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)										
Torque	Continuous [%] (*9)	100%										
	1min. rating [%] (*9)	150%										
	10s rating [%] (*9)	200% (at 80% or less of rated speed)/170% (at rated speed)							170%			
Braking method/braking torque		Braking resistor discharge control: 150% braking torque, Separately installed braking resistor (option)										

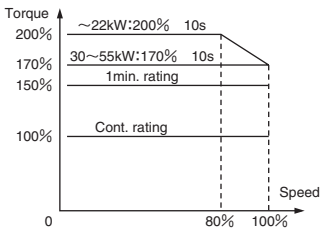
*1) Inverter output capacity [kVA] at 220V.
*2) Select the inverter capacity such that the square average current in cycle operation is 80% or less of the rated current of an inverter.
*3) Order individually for 220 to 230V/50Hz.
*4) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*5) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*6) When power-factor correcting DC REACTOR (option) is used.
*7) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*8) This value is obtained by using a FUJI original calculation method.
*9) These torque characteristics are obtained when combined with a dedicated motor.
*10) Use the function code F80 to switch between CT, VT and HT uses.
*11) Not EN standard conformed.

Three-phase 400V series

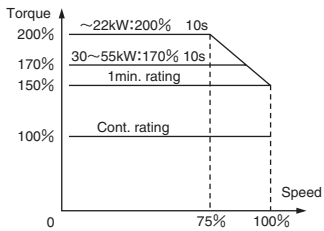
Type FRN□VG7S-4△△		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Nominal applied motor [kW]		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated capacity [kVA] (*1)		6.8	10	14	18	24	29	34	44	57	69	85
Rated current (*2)		9.0	13.5	18.5	24.5	32.0	39.0	45.0	58.0	75.0	91.0	112
	(1min.)	13.5	20.0	27.5	36.5	48.0	58.5	67.5	90.0	113	137	168
	(10s)	16	22.7	31.6	42.9	59.1	73.5	85.1	96.0	120	150	182
Input ratings	Phase, Voltage, Frequency	3-phase 380 to 480V, 50Hz/60Hz					3-phase 380 to 440V/50Hz, 380 to 480V/60Hz (*9)					
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*3)										
	Momentary voltage dip capability (*4)	When voltage drops from the rated voltage, the inverter will continue operation if the voltage is more than 310V. If the voltage is less than 310V, the inverter can be operated for 15ms.										
	Rated current [A](with DCR)	7.1	10	13.5	19.8	26.8	33.2	39.3	54	67	81	100
	(*7) (without DCR)	14.9	21.5	27.9	39.1	50.3	59.9	69.3	86	104	124	150
	Required power supply capacity [kVA] (*5)	5.0	7.0	9.4	14	19	24	28	38	47	57	70
Carrier frequency [kHz] (*6)		0.75 to 15										
Mass [kg]		8	8	8	12.5	12.5	25	25	30	35	40	41
Enclosure		Up to 15kW: IP20, 18.5kW or over: IP00 (IP20: option)										
Torque	Continuous [%] (*8)	100%										
	1min. rating [%] (*8)	150%										
	10s rating [%] (*8)	200% (at 80% or less of rated speed)/170% (at rated speed)							170%			
Braking method/braking torque		Braking resistor discharge control: 150% braking torque, Separately installed braking resistor (option)										

*1) Inverter output capacity [kVA] at 440V.
*2) Select the inverter capacity such that the square average current in cycle operation is 80% or less of the rated current of an inverter.
*3) Use a DC REACTOR if the voltage unbalance exceeds 2% (this is the same as for FUJI's conventional models).
Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67
*4) Tested at the standard load condition (85% load of nominal applied motor) prescribed by JEMA.
*5) When power-factor correcting DC REACTOR (option) is used.
*6) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
*7) This value is obtained by using a FUJI original calculation method.
*8) These torque characteristics are obtained when combined with a dedicated motor.
*9) When the input voltage is 380 to 398V/50Hz or 380 to 430V/60Hz, a connector inside the inverter must be switched.
*10) Use the function code F80 to switch between CT, VT and HT uses.
*11) The inverter for 18.5kW motor does not conform to EN standards.
If a standard-compliant model is required, select the inverter for 22kW.

Torque characteristics of HT use (for vertical transfer application, overload torque: 200%/170%) (Common to 3-phase 200V/400V)



< Driving torque characteristics >



< Braking torque characteristics >

CT use, VT use and HT use

Item			Explanation
Main circuit type			Voltage type IGBT sinusoidal PWM inverter
Motor control method			Vector control Sensorless vector control V/f control Vector control (synchronous motors) Simulated operation mode
Speed control	Maximum speed		200Hz in terms of inverter output frequency 2P: 12,000 r/min 4P: 6,000 r/min 6P: 4,000 r/min where PG frequency is 100kHz or less 400Hz for V/f control
	Control range	Vector control	1:1000 (Min. speed, base speed: 1.5 to 1500 r/min in terms of 4P with PG of 1024P/R) 1:4 (Constant torque range, constant output range)
		Sensorless control V/f control	1:100 (Min. speed, base speed: 15 to 1500 r/min in terms of 4P) 1:4 (Constant torque range, constant output range)
	Control response	Vector control	100Hz (max.)
		Sensorless control	20Hz (max.)
	Control accuracy	Vector control	Analog setting: ±0.1% of max. speed (25±10˚C) Digital setting: ±0.005% of max. speed (-10 to +50˚C)
		Sensorless control	Analog setting:±0.5% of max. speed (25±10˚C) Digital setting: ±0. 5% of max. speed (-10 to +50˚C)
	Setting resolution		0.005% of max. speed
Control	Operation method		KEYPAD operation: FWD or REV key, STOP key Digital input signal operation: FWD or REV command, Coast-to-stop command, reset input, multistep speed selection command, etc.
	Speed setting		KEYPAD operation: or key External potentiometer: three terminals, 1 to 5kΩ Analog input: 0 to ±10V UP/DOWN control: Speed increases when UP signal (DI) is ON, and decreases when DOWN signal (DI) is ON. Multistep speed: Up to 15 different speeds can be selected by combining four external input signals (DI). Digital signal: Setting with an option card's 16-bit parallel signal Serial link operation: RS-485 (standard). Setting through different communication options is possible. Jogging operation: or key, FWD or REV terminals in jogging mode
	Running status signal		Transistor output: Inverter running, Speed equivalence, Speed detection, inverter overload early warning, torque limiting, etc. Analog output: Motor speed, Output voltage, Torque, Load factor, etc.
	Acceleration/Deceleration time		0.01 to 3600s (4 independent settings for acceleration and deceleration selectable with external signals) (S-curve acceleration/deceleration in addition to linear acceleration/deceleration)
	Gain for speed setting		Sets the proportional relationship between analog speed setting and motor speed in the range of 0 to 200%.
	Jump speed		Jump speed (3 points) and jump hysteresis width (1 point) can be set.
	Rotating motor pick up (Flying start)		A rotating motor can be smoothly picked up by the inverter without stopping. (Vector control and sensorless vector control)
	Auto-restart after momentary power failure		Automatic restart is available without stopping the motor after a momentary power failure.
	Slip compensation		Compensates for the decrease of speed due to load and realizes stable operation (V/f control).
	Droop control		The motor speed droops in proportion to output torque.
	Torque limiting		Limits the torque to predetermined values (selectable from "common to 4 quadrants", "independent driving and braking", etc.) Analog and external signal (2 steps) settings are available (vector control and sensorless vector control).
	PID control		PID control with analog input
	Fan stop operation		Stops the cooling fan at low temperatures to reduce noise.
	Torque bias		Can be set using a fixed value (1 step, with polarity change in accord with motor rotating direction), internal setting (3 steps) by combination of external signals (DI signals), and analog setting (with holding function).
	Speed limiting		Same limit to FWD/REV rotation, upper and lower limits, and individual limits to FWD/REV rotation. Speed limit usable even in torque control mode.
	Motor selection		Select from three types.
	Multiple winding motor drive		Optional
	UP/DOWN control		Speed can be set with external signals (DI signals); combination of UP command, DOWN command, and zero clear command.
	Stopping function		Three types of stopping functions, STOP 1, 2 and 3
	PG pulse output		Divides PG signal for output.
	Observer		Suppresses load disturbances and vibrations.
	Position control		Optional
	Synchronized operation		Optional

Commonm Specifications

Item		Explanation
Indication	Running/Stopping	• Detected speed value • Speed reference value • Output frequency • Torque current reference value • Torque reference value • Torque calculation value • Motor output • Output current • Output voltage • DC link circuit voltage • Magnetic-flux reference value • Magnetic-flux calculation value • Load shaft speed • PID reference value • PID feedback value • PID output value • Ai adjusted value (12) • Ai adjusted value (Ai1) • Ai adjusted value (Ai2) • Ai adjusted value (Ai3) • Ai adjusted value (Ai4) • Optional monitor 1 • Optional monitor 2 • Optional monitor 3 • Optional monitor 4 • Optional monitor 5 • Optional monitor 6 • Presence of digital input/output signal • Motor temperature • Heat sink temperature • Load factor • Operation time, etc.
	Programming	Displays function codes, names, and data. Multi-language display: English, French, Spanish, German, Italian, Chinese, Korean and Japanese.
	Trip mode	Displays the following trip codes; • dbH Overheat at the DB circuit • dCF DC fuse blown • EF Ground fault • P9 PG error • Er1 Memory error • Er2 KEYPAD panel communication error • dO Excessive position deviation • Er4 Network error • Er5 RS-485 error • Er6 Operation procedure error • Er3 CPU error • Er8 A/D converter error • Er9 Speed disagreement • ErA UPAC error • Er7 Output wiring error • IPE IPM error • Lin Input phase loss • LU Undervoltage • Er6 Inter-inverter communication error • OC Overcurrent • OH1 Overheating at heat sink • OH2 External alarm input • nrb NTC thermistor disconnection • OH4 Motor overheat • OL1 Motor 1 overload • OL2 Motor 2 overload • OH3 Inverter internal overheat • OLU Inverter unit overload • OS Overspeed • OU Overvoltage • OL3 Motor 3 overload • PbF Charging circuit error
	Running/Trip mode	Stores and displays data for the last ten trips. Stores and displays the detailed cause of the last trip.
	Charge lamp	ON when there is residual voltage in the main circuit capacitors.
Protection	Overload	Protects the inverter by electronic thermal overload relay and the detection of inverter temperature.
	Overvoltage	Detects DC link circuit overvoltage and stops the inverter.
	Incoming surge	Protects the inverter from surge voltage between the main circuit power lines and the ground.
	Undervoltage	Detects DC link circuit undervoltage and stops the inverter.
	Overheat	Stops the inverter by detecting the inverter internal temperature.
	Short-circuit	Protects the inverter from overcurrent due to a short-circuit in the output circuit.
	Ground fault	Protects the inverter from overcurrent due to a ground fault in the output circuit.
	Motor protection	Protects the motor with NTC thermistor and PTC thermistor. Protects the motor with electronic thermal overload relay. Overload early warning: Overload early warning can be issued at a predetermined level before stopping the inverter. (The electronic thermal overload relay and the overload early warning can be set for motor 1 to 3 individually)
	DB resistor overheating	• Protects through internal functions of the inverter. • For the optional DB resistor, an external alarm signal issued from the built-in temperature sensor stops the inverter.
	Input phase loss	Protects the inverter from damage due to input phase loss.
	Output phase loss	Detects impedance imbalance in the output circuit and issues an alarm (under tuning operation).
	Retry	Sets the retry numbers and retry waiting time for stoppage due to an alarm (only for OU, OC, Lu, OH1, OH3, OLu, OL, dbH).
Conditions	Installation location	Indoor use only. Free from corrosive and flammable gases, dusts, and direct sunlight.
	Ambient temperature	–10 to +50˚C
	Ambient humidity	5 to 95%RH (no condensing)
	Altitude	3000m or less (output reduction may occur if the altitude is in the range between 1001 and 3000m).
	Vibration	Amplitude: 3mm at 2 to 9Hz, 9.8m/s^2 at 9 to 20Hz. 2m/s^2 at 20 to 55Hz, 1m/s^2 at 55 to 200Hz (200V 55kW, 400V 75kW or less) 2m/s^2 at 9 to 55Hz, 1m/s^2 at 55 to 200Hz (200V 75kW, 400V 90kW or above)
	Storage temperature	–25 to +65˚C
	Storage humidity	5 to 95%RH
Maintenance	Main circuit capacitor life	Life judgment function installed
	Common functions	• Displays and records accumulated time for capacitor life and cooling fan operation time in the control power. • Displays and records inverter operation time. • Displays and records the maximum output current and the maximum internal temperature for the past one year.
Communication	RS-485 communications	Provided as standard

Protective functions

Function	Description	LED monitor	Related function code
DB resistor overheating	When the built-in braking resistor overheats, the inverter stops discharging and running. Function codes E35 to 37 corresponding to the resistor (built-in/external) must be set.	dbH	E35-37
DC fuse blown	When a fuse at the main DC circuit blows due to a short-circuit in the IGBT circuit, the inverter stops operation.	dCF	
Ground fault	Activated by a ground fault in the inverter output circuit. Connect a separate earth-leakage protective relay or an earth-leakage circuit breaker for accident prevention such as human damage and fire.	EF	
Excessive position deviation	Activated when the position deviation between the reference and the detected values exceeds the function code o18 "Excessive deviation value" in synchronized operation. The option code "o" becomes valid and is displayed on the KEYPAD after installing options.	dO	o18
Memory error	Activated when a fault such as "write error" occurs in the memory.	Er 1	
KEYPAD communications error	Activated if a communications error is detected between the inverter control circuit and the KEYPAD when the start/stop command from the KEYPAD is valid (function code F02=0). NOTE: KEYPAD communications error does not indicate the alarm display and issue the alarm relay output when the inverter is operated by external signal input or the link function. The inverter continues operating.	Er2	F02
CPU error	Activated when a CPU error occurs due to noise.	Er3	
Network error	Activated if a communications error occurs due to noise when the inverter is operated through T- Link, SX bus or field bus.	Er4	o30,31
RS-485 communications error	Activated if: The function code H32 is set to 0 to 2, or a disconnection continues for more than the specified period of 0.1 to 60.0 with the function code H38.	Er5	H32,H33,H38
Operation procedure error	Activated if multiple network options (T-Link, SX bus, and field bus) are installed. Though you can install multiple SI, DI and PG options, this error is issued if the two SW settings are identical.	Er6	
Output wiring error	Activated when the measured data are out of the motor characteristic data range during executing tuning or the wires are not connected in the inverter output circuit.	Er7	H01,H71
A/D converter error	Activated when an error occurs in the A/D converter circuit.	Er8	
Speed disagreement	Activated when the deviation between the speed reference (speed setting) and the motor speed (detected speed, predicted speed) becomes excessive.	Er9	
UPAC error	Activated on a hardware fault in the UPAC option or a communications error between the inverter control circuit and the UPAC option.	ErA	
Inter-inverter communications error	Activated if a communications error occurs in inter-inverter communications over the optical option or simplified RS-485.	Erb	
IPM error	Actuated if IPM self-shutoff function is triggered by excessive current or overheat.	IPE	
Input phase loss	The inverter is protected from being damaged due to input phase loss.	Lin	
Undervoltage	Activated if the DC link circuit voltage decreases to the undervoltage level due to a reduction in the supply voltage. The alarm output is not issued when the DC link circuit voltage decreases and the "function code F14" is set to "3 to 5". • Undervoltage detection level: 200V series: 186V DC, 400V series: 371V DC.	LU	F14
NTC thermistor disconnection	Activated if the thermistor circuit is disconnected when the application of NTC thermistors to corresponding motors (M1, 2, 3) is specified with the function codes P30, A31 and A47.	nrb	P30,A31,A47
Overcurrent	Activated if the momentary value of the inverter output current exceeds the overcurrent detection level due to a short-circuit or ground fault.	OC	
Overheating at heat sink	Activated if the temperature of the heat sink to cool the rectifier diodes and the IGBTs increases due to cooling fan stoppage.	OH1	
External alarm	The inverter stops on receiving the external alarm signal (THR). It is activated by a terminal signal when the control circuit terminals (THR assignment) are connected to alarm terminals of external devices such as a braking unit or a braking resistor.	OH2	E01-E14
Inverter internal overheat	Activated if the ambient temperature of the control PC board increases due to poor ventilation of the inverter.	OH3	
Motor overheat	Activated if the detected temperature of the built-in NTC thermistor for motor temperature detection exceeds the data of the "function code E30 Motor overheat protection".	OH4	E30,E31
Motor 1 overload	Activated when the motor 1 current (inverter output current) exceeds the operation level set by "function code F11".	OL 1	F11
Motor 2 overload	Activated when the motor 2 current (inverter output current) exceeds the operation level set by "function code A33".	OL2	A33
Motor 3 overload	Activated when the motor 3 current (inverter output current) exceeds the operation level set by "function code A49".	OL3	A49
Inverter unit overload	Activated if the output current exceeds the overload characteristic of the inverse time characteristic.	OLU	
Overspeed	Activated if the motor speed (detected speed value/predicted speed value) exceeds 120% of the specified value by the function code "maximum speed".	OS	F03,A06,A40
Overvoltage	Activated if the DC link circuit voltage exceeds the overvoltage level due to an increase of supply voltage or regenerative braking current from the motor. However, the inverter cannot be protected from excessive voltage (high voltage, for example) supplied by mistake. • Overvoltage detection level 200V series: 400V DC, 400V series: 800V DC	OU	
PG error	Activated when the pulse generator terminal PA/PB circuits are disconnected. It is not activated when the sensorless control or the V/f control is selected.	PG	
Charging circuit error	Activated if the bypass circuit of the DC link circuit is not formed (the magnetic contactor for the charging circuit bypass is not closed) two minutes after power is supplied.	PbF	

NOTES:

- All protective functions are reset automatically if the control power voltage decreases to where maintaining the operation of the inverter control circuit is impossible.
- Fault history data is stored for the last ten trips.
- Stoppage due to a protective function can be reset by the RST key of the KEYPAD or turning OFF and then ON between the X terminal (RST assigning) and the CM. This action is invalid if the cause of an alarm is not found and resolved.
- In addition to these protective functions, there can be further protective from surge voltage by connecting surge suppressors to the main circuit power terminals (L1/R, L2/S, L3/T) and the auxiliary control power terminals (R0, T0).

External Dimensions

Fig. A (Internal mounting type)

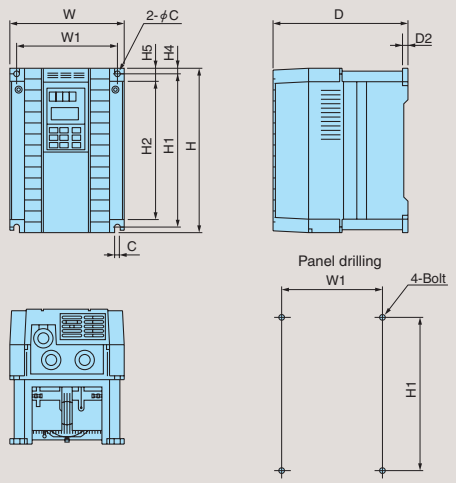
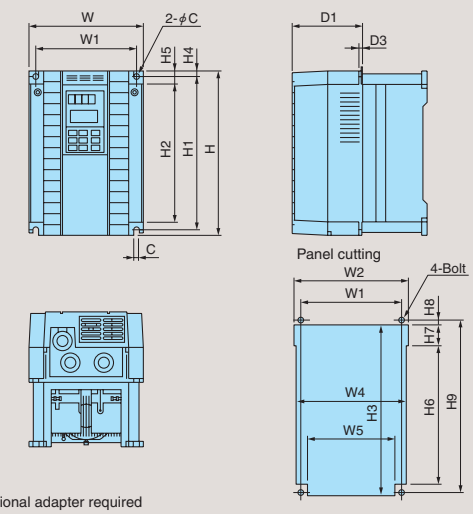


Fig. B (External cooling type)



Note: Optional adapter required

Fig. C (Internal mounting type)

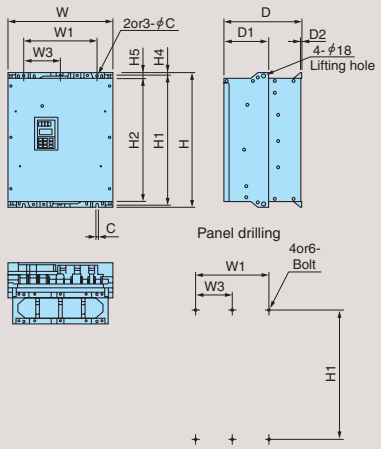
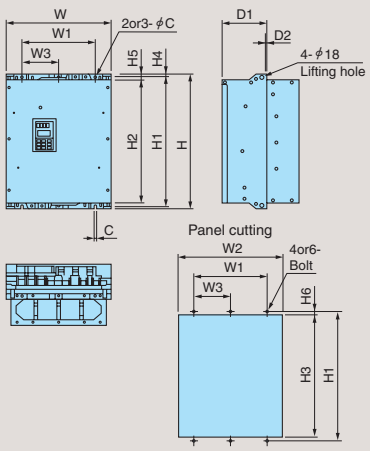


Fig. D (External cooling type)



KEYPAD (Common to all models)

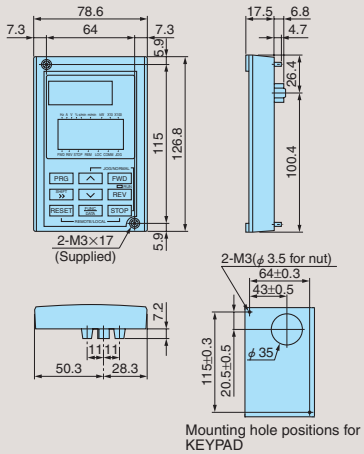


Fig. E (Type common to internal mounting, external cooling, and stand alone)

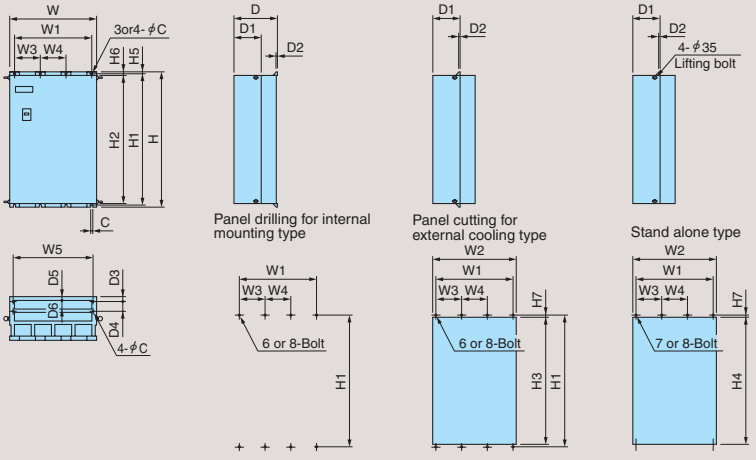
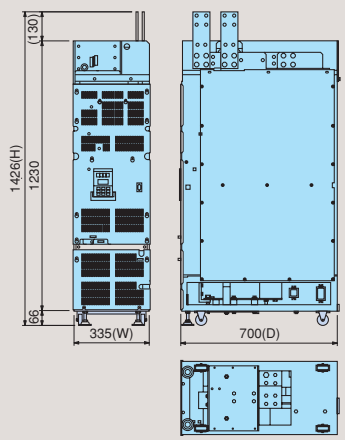


Fig. F (Stack type)



●200V series

Nominal applied motor [kW]	Inverter type	Fig.	Dimensions [mm]																							Approx. mass [kg]
			W	W1	W2	W3	W4	W5	H	H1	H2	H3	H4	H5	H6	H7	H8	H9	D	D1	D2	D3	C	Mtg. bolt	
0.75	FRN0.75VG7S-2	A	205	181	207	—	197	159	300	278	255	314	11	21	253.5	39	8	315	245	125	10	7	10	M8	8
1.5	FRN1.5VG7S-2	・																							
2.2	FRN2.2VG7S-2	B																							
3.7	FRN3.7VG7S-2																								8
5.5	FRN5.5VG7S-2																								
7.5	FRN7.5VG7S-2																								
11	FRN11VG7S-2		250	226	252		242	202	380	358	335	394			333.5			395							12.5
15	FRN15VG7S-2																								
18.5	FRN18.5VG7S-2	C	340	240	326	—	—	—	480	460	430	442	12	25	9	—	—	—	255	145	4	—	10	M8	25
22	FRN22VG7S-2	・																							
30	FRN30VG7S-2	D							550	530	500	512													30
37	FRN37VG7S-2		375	275	361				615	595	565	577							270						37
45	FRN45VG7S-2								740	720	690	702													46
55	FRN55VG7S-2																								48
75	FRN75VG7S-2		530	430	510				750	720	685	695	15.5	32.5	12.5				285	145			15	M12	70
90	FRN90VG7S-2		680	580	660	290			880	850	815	825							360	220					115

●400V series

Nominal applied motor [kW]	Inverter type	Fig.	Dimensions [mm]																								Approx. mass [kg]
			W	W1	W2	W3	W4	W5	H	H1	H2	H3	H4	H5	H6	H7	H8	H9	D	D1	D2	D3	D4	D5	D6	C	Mtg. bolt	
3.7	FRN3.7VG7S-4	A	205	181	207	—	197	159	300	278	255	314	11	21	253.5	39	8	315	245	125	10	7	—	—	—	10	M8	8
5.5	FRN5.5VG7S-4	・																										
7.5	FRN7.5VG7S-4	B																										
11	FRN11VG7S-4		250	226	252		242	202	380	358	335	394			333.5			395										12.5
15	FRN15VG7S-4																											
18.5	FRN18.5VG7S-4	C	340	240	326	—	—	—	480	460	430	442	12	25	9	—	—	—	255	145	4	—	—	—	—	10	M8	25
22	FRN22VG7S-4	・																										
30	FRN30VG7S-4	D							550	530	500	512																30
37	FRN37VG7S-4		375	275	361														270									35
45	FRN45VG7S-4								675	655	625	637																40
55	FRN55VG7S-4																											41
75	FRN75VG7S-4								740	720	690	702																50
90	FRN90VG7S-4		530	430	510				740	710	675	685	15.5	32.5	12.5				315	175						15	M12	72
110	FRN110VG7S-4																											
132	FRN132VG7S-4								1000	970	935	945							360	220								100
160	FRN160VG7S-4																											
200	FRN200VG7S-4		680	580	660	290																						140
220	FRN220VG7S-4																											
250	FRN250VG7S-4																											
280	FRN280VG7S-4	E	680	580	660	290	—	610	1400	1370	1330	1340	1335	15.5	35	14.5	—	—	450	285	6.4	50	100	35	115	15	M12	320
315	FRN315VG7S-4																											
355	FRN355VG7S-4		880	780	860	260	260	810																				410
400	FRN400VG7S-4																											
500	FRN500VG7S-4		999	900	980	300	300	900	1550	1520	1480	1490	1485	15.5	35	14.5	—	—	500	313.2	6.4	42	100	—	—	15	M12	525
630	FRN630VG7S-4																											
710	FRN710BVG7S-4	F																										225
800	FRN800BVG7S-4																											

NOTE1: For 75kW or larger inverters, the DC REACTOR for power-factor correction is provided as standard (separately installed).
Reserve the installation space outside of the inverter.
NOTE2: 3stacks required per inverter.

●Mounting adapter for external cooling (optional for models of 15kW or less)

Option type	Applicable inverter type
PBVG7-7.5	FRN0.75VG7S-2～FRN7.5VG7S-2 FRN3.7VG7S-4～FRN7.5VG7S-4
PBVG7-15	FRN11VG7S-2, FRN15VG7S-2 FRN11VG7S-4, FRN15VG7S-4

Since the 18.5kW or larger model can be modified to external cooling type by replacing the mounting bracket, the adapter is not required.

Dedicated motor Specifications

Three-phase 200V series standard specifications

Item		Specifications															
Dedicated motor rated output [kW]		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Applicable motor type (MVK_)		8095A	8097A	8107A	8115A	8133A	8135A	8165A	8167A	8184A	8185A	8187A	8207A	8208A	9224A	9254A	9256A
Moment of inertia of rotor [kg•m^2]		0.009	0.009	0.009	0.016	0.030	0.037	0.085	0.11	0.21	0.23	0.34	0.41	0.47	0.53	0.88	1.03
Base speed/Max. speed [r/min]		1500/3600										1500/3000			1500/2400		
Vibration		V10 or less													V15 or less		
Cooling fan	Voltage [V]	200 to 210V/50Hz, 200 to 230V/60Hz													200V/50Hz, 200, 220V/60Hz		
	Number of phases/poles	1-phase/4P						3-phase/4P									
	Input power [W]	40/50						90/120		150/210					80/120	270/390	
	Current [A]	0.29/0.27 to 0.31						0.49/0.44 to 0.48		0.75/0.77 to 0.8					0.76/0.8, 0.8	1.9/2.0, 2.0	
Approx. mass [kg]		28	29	32	46	63	73	111	133	190	197	235	280	296	380	510	570

Three-phase 400V series standard specifications

Item		Specifications																
Dedicated motor rated output [kW]		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220
Applicable motor type (MVK_)		8115A	8133A	8135A	8165A	8167A	8184A	8185A	8187A	8207A	8208A	9224A	9254A	9256A	9284A	9286A	931LA	931MA	931NA
Moment of inertia of rotor [kg•m^2]		0.016	0.030	0.037	0.085	0.11	0.21	0.23	0.34	0.41	0.47	0.53	0.88	1.03	1.54	1.77	2.97	3.29	3.66
Base speed/Max. speed [r/min]		1500/3600							1500/3000			1500/2400		1500/2000					
Vibration		V10 or less										V15 or less							
Cooling fan	Voltage [V]	200 to 210V/50Hz, 200 to 230V/60Hz			400 to 420V/50Hz, 400 to 440V/60Hz							400V/50Hz, 400, 440V/60Hz				380, 400, 415V/50Hz 400, 440V/60Hz			
	Number of phases/ poles	1-phase/4P			3-phase/4P														
	Input capacity [W]	40/50			90/120		150/210					80/120	270/390			450/650			
	Current [A]	0.29/0.27 to 0.31			0.27/0.24 to 0.25		0.38/0.39 to 0.4					0.39/ 0.4, 0.4	1.0/1.0, 1.0			1.8, 1.8, 1.8/2.4, 2.2			
Approx. mass [kg]		46	63	73	111	133	190	197	235	280	296	380	510	570	710	760	1230	1310	1420

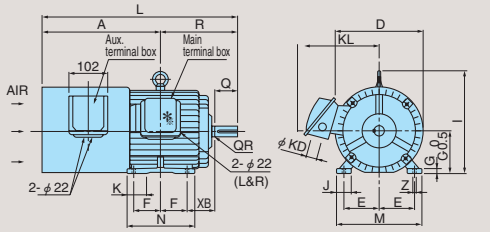
Common specifications

Item	Specifications
Insulation class/Number of poles	Class F/4P
Terminal design	Main terminal box (lug type): 3 or 6 main circuit terminals, NTC thermistor terminals = 2 (MVK8 series), 3 (MVK9 series, 1 is reserved) Auxiliary terminal box (terminal block): Pulse generator (PGP, PGM, PA, PB, SS), cooling fan (FU, FV or FU, FV, FW)
Mounting method	Foot mounted with bracket (IMB3), NOTE: Contact FUJI for other methods.
Degree of protection, Cooling method	JP44, Totally enclosed forced-ventilation system with cooling fan motor.A cooling fan blows air over the motor toward the drive-end. (* Only MVK8095A (0.75kW) is of natural air cooling type.)
Installation location	Indoor, 1000m or less in altitude.
Ambient temperature, humidity	-10 to +40˚C, 90%RH or less (no condensation)
Finishing color	Munsell N5
Standard conformity	MVK8 series: JEC-2137-2000, MVK9 series: JEM1466 or JEC-37
Standard accessories	Pulse generator (1024P/R, +15V, complementary output), NTC thermistors (1 or 2), cooling fan (except for MVK8095A).

NOTE: Contact a FUJI representative for dedicated motors other than those with 4-pole and a base speed of 1500 [r/min].

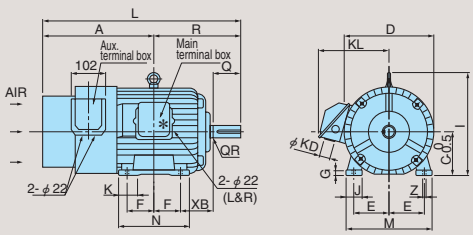
External dimensions of dedicated motors

Fig. A



A bushing to fill the cable hole is attached on the right side of the main terminal box (indicated by*).

Fig.B



Shaft extension

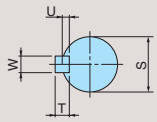


Fig.C

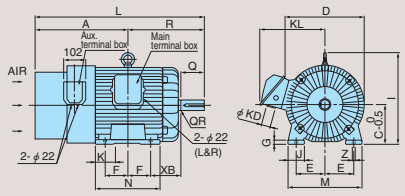


Fig.D

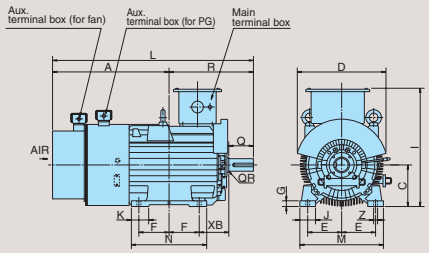
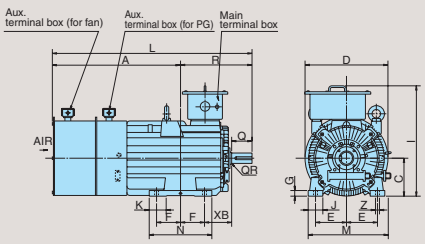


Fig.E



●Common dimensions to 200V and 400V series

Motor rated output [kW]	Motor type	Fig.	Dimensions [mm]																	Shaft extension [mm]						Approx. mass [kg]
			A	C	D	E	F	G	I	J	K	KD	KL	L	M	N	R	XB	Z	Q	QR	S	T	U	W	
0.75	**MVK8095A**	A	201.5	90	204	70	62.5	10	195	35.5	35.5	27	180	370	170	150	168.5	56	10	50	0.5	24j6	7	4	8	28
1.5	**MVK8097A**		277.5		203									446												29
2.2	**MVK8107A**		292	100		80	70	12.5	238	40	40		190	485	195	170	193	63	12	60		28j6					32
3.7	**MVK8115A**		299	112	236	95		14	270		50		205	499	224	175	200	70									46
5.5	**MVK8133A**	B	309	132	273	108		17	311	45		34	223	548	250	180	239	89		80		38k6	8	5	10	63
7.5	**MVK8135A**		328				89							586		212	258									73
11	**MVK8165A**	A	400	160	321	127	105	18	376	50	63	48	272	723	300	250	323	108	14.5	110	1	42k6			12	111
15	**MVK8167A**		422				127							767		300	345									133
18.5	**MVK8184A**		435	180	376	139.5	120.5	20	428	75	75		305	786.5	350	292	351.5	121			1.5	48k6	9	5.5	14	190
22	**MVK8185A**																									197
30	**MVK8187A**		454				139.5					60		824.5		330	370.5					55m6	10	6	16	235
37	**MVK8207A**	C	490	200	411	159	152.5	25	466	80	85	80	364	915.5	390	360	425.5	133	18.5	140	2	60m6	11	7	18	280
45	**MVK8208A**																									296
55	**MVK9224A**	C	723	225	445	178	143	25	515	80	95	—	391	1155	436	366	432	149	18.5	140	2	65m6	11	7	18	380
75	**MVK9254A**	D	693.5	250	535	203	155.5	30	743	100	120		—	1157	506	411	463.5	168	24			75m6	12	7.5	20	510
90	**MVK9256A**		711.5				174.5							1194		449	482.5									570
110	**MVK9284A**		764	280	600	228.5	184	35	798					1308	557	468	544	190		170		85m6	14	9	22	710
132	**MVK9286A**		789.5				209.5							1359		519	569.5									760
160	**MVK931LA**	E	1060	315	688	254	203	42	918	120	145			1649	628	526	589	216	28			95m6			25	1230
200	**MVK931MA**		1084.5				228.5							1699		577	614.5									1310
220	**MVK931NA**		1184.5											1799												1420

(Note 1) MVK8095A (0.75kW) is of natural cooling type (cooling system: IC410).
(Note 2) MVK8095A has the cable lead-in hole of φ22 (in 1 place).
(Note 3) MVK9224A (55kW) has an auxiliary terminal box for fan as shown in Fig. C.

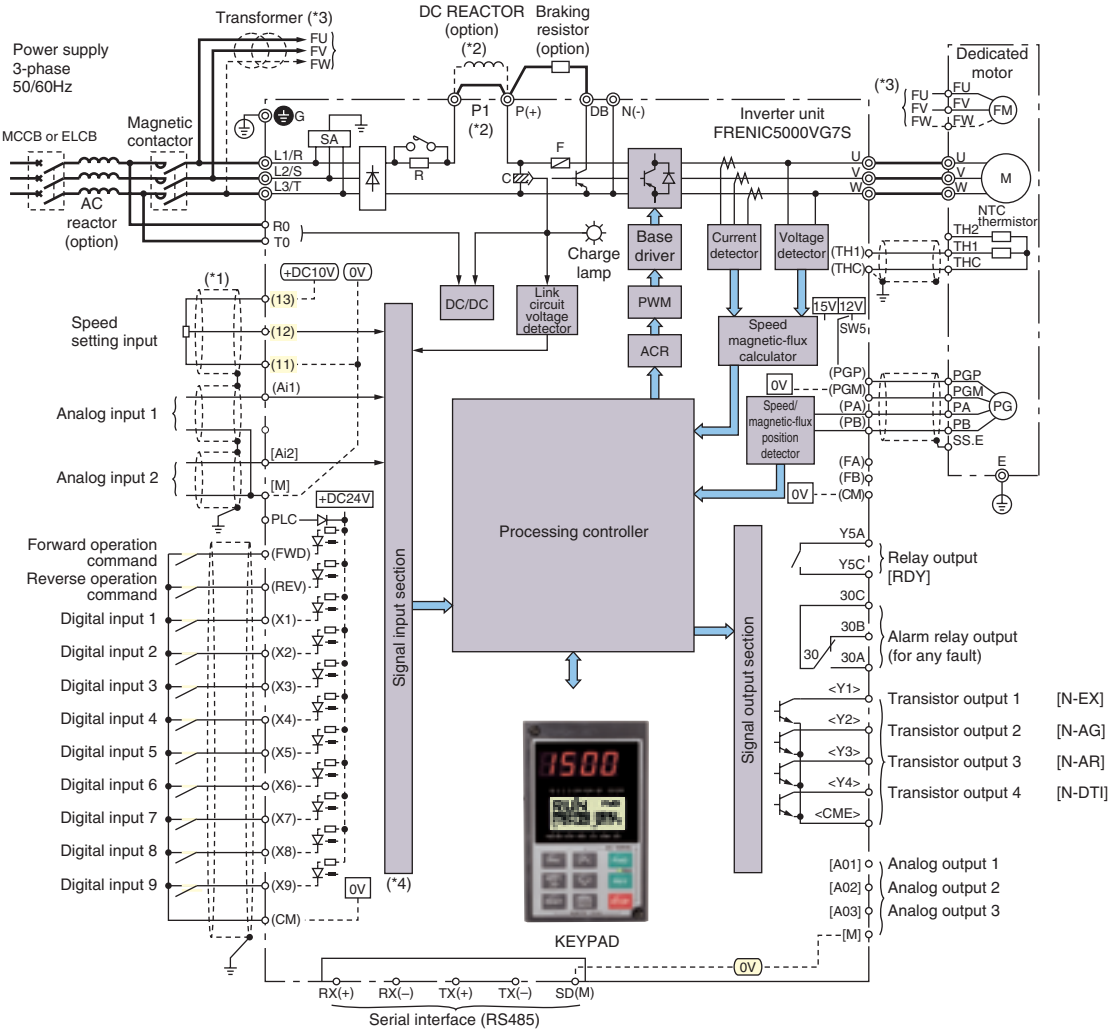
Terminal Functions

	Symbol	Terminal name	Function
Main circuit	L1/R, L2/S, L3/T	Power input	Connects a 3-phase power supply.
	U, V, W	Inverter output	Connects a 3-phase motor.
	P (+), P1	For DC REACTOR	Connects a DC REACTOR. A DC REACTOR is optional for 55kW or less and standard for 75kW or more.
	P(+), N(-)	For BRAKING UNIT	Connects a braking resistor via the braking unit. Used for a DC bus connection system.
	P(+), DB	For EXTERNAL BRAKING RESISTOR	Connects an external braking resistor (optional).
	G	Grounding	Ground terminal for inverter chassis (housing).
	R0, T0	Auxiliary control power supply	Connects the same AC power supply as that of the main circuit to back up the control circuit power supply.
Speed setting	13	Potentiometer power supply	Used for power supply for a speed setting POT (variable resistor: 1 to 5kΩ). 10V DC 10mA Max.
	12	Voltage input for speed setting	Used for analog reference voltage input. • 0 to +10V DC /0 to max. speed • Reversible operation can be selected by ±signals: 0 to +10V DC /0 to max. speed. (Input resistance: 10kΩ)
	11	Analog input common	Common terminal to input signals.
Analog input	Ai1	Analog input 1	The following functions can be selected and set according to the external analog input voltage (0 to ±10V DC). (Input resistance: 10kΩ) 0: Input signal off [OFF] 1: Auxiliary speed setting 1 [AUX-N1] 2: Auxiliary speed setting 2 [AUX-N2] 3: Torque limiter (level 1) [TL-REF1] 4: Torque limiter (level 2) [TL-REF2] 5: Torque bias reference [TB-REF] 6: Torque reference [T-REF] 7: Torque current reference [IT-REF] 8: Creep speed 1 in UP/DOWN setting [CRP-N1] 9: Creep speed 2 in UP/DOWN setting [CRP-N2] 10: Magnetic-flux reference [MF-REF] 11: Detected speed [LINE-N] 12: Motor temperature [M-TMP] 13: Speed override [N-OR] 14: Universal Ai [U-AI] 15: PID feedback value [PID-FB] 16: PID reference value [PID-REF] 17: PID correction value [PID-G] 18: Option Ai [O-AI]
	Ai2	Analog input 2	
	M	Analog input common	Common terminal to input signals.
Digital input	FWD	Forward operation command	FWD - CM: ON... The motor runs in the forward direction. FWD - CM: OFF...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	Digital input 1	The following functions can be assigned to the terminals X1 to X9. 0, 1, 2, 3: Multistep speed selection (step 1 to 15) [0: SS1, 1: SS2, 2: SS4, 3: SS8] 4, 5: ASR, ACC/DEC time selection (4 steps) [4: 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: Speed setting N2/Speed setting N1 [N2/N1] 12: Motor M2 selection [M-CH2] 13: Motor M3 selection [M-CH3] 14: DC brake command [DCBRK] 15: ACC/DEC cleared to zero [CLR] 16: Creep speed switching in UP/DOWN setting [CRP-N2/N1] 17: UP command in UP/DOWN setting [UP] 18: DOWN command in UP/DOWN setting [DOWN] 19: Write enable for KYEPAD (data can be changed) [WE-KP] 20: PID control cancel [KP/PID] 21: Inverse mode change over [IVS] 22: Interlock signal for 52-2 [IL] 23: Write enable through link [WE-LK] 24: Operation selection through link [LE] 25: Universal DI [U-DI] 26: Pick up start mode [STM] 27: Synchronization command [SYC] 28: Zero speed locking command [LOCK] 29: Pre-exciting command [EXITE] 30: Speed reference cancel [N-LIM] 31: H41 (torque reference) cancel [H41-CCL] 32: H42 (torque current reference) cancel [H42-CCL] 33: H43 (magnetic-flux reference) cancel [H43-CCL] 34: F40 (torque limiter mode 1) cancel [F40-CCL] 35: Torque limiter (level1, lecel2 selection) [TL2/TL1] 36: Bypass [BPS] 37, 38: Torque bias reference 1/2 [37:TB1, 38:TB2] 39: Droop selection [DROOP] 40: Ai1 zero hold [ZH-AI1] 41: Ai2 zero hold [ZH-AI2] 42: Ai3 zero hold [ZH-AI3] 43: Ai4 zero hold [ZH-AI4] 44: Ai1 polarity change [REV-AI1] 45: Ai2 polarity change [REV-AI2] 46: Ai3 polarity change [REV-AI3] 47: Ai4 polarity change [REV-AI4] 48: PID output inverse changeover [PID-INV] 49: PG alarm cancel [PG-CCL] 50: Undervoltage cancel [LU-CCL] 51: Ai torque bias hold [H-TB] 52: STOP1 (The motor stops with standard deceleration time) [SOPT1] 53: STOP2 (The motor decelerates and stops with deceleration time 4) [STOP2] 54: STOP3 (The motor stops with torque limiter) [STOP3] 55: DIA card enable [DIA] 56: DIB card enable [DIB] 57: Multi-winding motor control cancel [MT-ccl] 58, 59, 60, 61, 62, 63: Option Di 1/2/3/4/5/6 [O-DI1 to 6]
	X2	Digital input 2	
	X3	Digital input 3	
	X4	Digital input 4	
	X5	Digital input 5	
	X6	Digital input 6	
	X7	Digital input 7	
	X8	Digital input 8	
	X9	Digital input 9	
	PLC	PLC signal power supply	Connects to the PLC output signal power supply. (Rated voltage 24V (22 to 27V) DC)
	CM	Digital input common	Common terminal to digital input signals.

	Symbol	Terminal name	Function
Analog output	AO1	Analog output 1	• Provides the monitor signal of 0 to ±10V DC for signals from the following: 0: Detected speed (Speedometer, one-way deflection) [N-FB1+] 1: Detected Speed (Speedometer, two-way deflection)[F-FB1±] 2: Speed setting 1 (Before acceleration/deceleration calculation) [N-REF1] 3: Speed setting 2 (ASR input) [N-REF2] 4: Detected speed [N-FB2±] 5: Detected line speed [LINE-N±] 6: Torque current reference (Torque ammeter, two-way deflection) [IT-REF±] 7: Torque current reference (Torque ammeter, one-way deflection) [IT-REF+] 8: Torque reference (Torque meter, two-way deflection) [T-REF±] 9: Torque reference (Torque meter, one-way deflection) [T-REF+] 10: Motor current rms value [V-AC] 11: Motor voltage rms value [V-AC] 12: Input power [PWR] 13: DC link circuit voltage [V-DC] 14: +10V output test [P10] 15: -10V output test [N10]
	AO2	Analog output 2	
	AO3	Analog output 3	
	M	Analog output common	Common terminal to analog output signals.
Transistor output	Y1	Transistor output 1	• Outputs the selected signals from the following items: 0: Inverter running [RUN] 1: Speed existence [N-EX] 2: Speed agreement [N-AG] 3: Speed equivalence [N-AR] 4, 5, 6: Detected speed 1, 2, 3 [4: N-DT1, 5: N-DT2, 6: N-DT3] 7: Stopping on undervoltage [LU] 8: Detected torque polarity (braking/driving) [B/D] 9: Torque limiting [TL] 10, 11: Detected torque [10: T-DT1, 11: T-DT2] 12: KEYPAD operation mode [KP] 13: Inverter stopping [STOP] 14: Operation ready output [RDY] 15: Magnetic-flux detection signal [MF-DT] 16: Motor M2 selection status [16: SW-M2] 17: Motor M3 selection status [16: SW-M3] 18: Brake release signal [BRK] 19: Alarm indication1 [AL1] 20: Alarm indication 2 [AL2] 21: Alarm indication 3 [AL4] 22: Alarm indication 4 [AL8] 23: Fan operation signal [FAN] 24: Auto-resetting [TRY] 25: Universal DO [U-DO] 26: Heat sink overheat early warning [INV-OH] 27: Synchronization completion signal [SY-C] 28: Lifetime alarm [LIFE] 29: Under accelerating [U-ACC] 30: Under decelerating [U-DEC] 31: Inverter overload early warning [INV-OL] 32: Motor temperature early warning [M-OH] 33: Motor overload early warning [M-OL] 34: DB overload early warning [DB-OL] 35: Link transmission error [LK-ERR] 36: Load adaptive control under limiting [ANL] 37: Load adaptive control under calculation [ANC] 38: Analog torque bias hold [TBH] 39, 40, 41, 42, 43, 44, 45, 46, 47: Optional Do 1/2/3/4/5/6/7/8/9 [O-DO1 to 9]
	Y2	Transistor output 2	
	Y3	Transistor output 3	
	Y4	Transistor output 4	
	CME	Transistor output common	Common terminal to transistor output. Insulated from terminals CM and 11.
Relay output	Y5A,Y5C	Relay output	Functions can be selected for signals like Y1 to Y4. Contact capacity: 250V AC, 0.3A, cosø=0.3 (48V DC, 0.5A in compliance with Low Voltage directive)
	30A,30B, 30C	Alarm relay output (for any fault)	Outputs a non-voltage contact signal (1C) when a protective function is activated to stop inverter. Contact capacity: 250V AC, 0.3A cosø=0.3 (48V DC, 0.5A in compliance with Low Voltage directive) Can select alarm for exciting or non exciting conditions.
Communications	RX(+), RX(-) TX(+), TX(-)	RS-485 communications input/output	Input/output terminals for RS-485 communications. Can connect up to 31 inverters through a multidrop (daisy chain) connection.
	SD(M)	Communications shield cable connection	Connects to the shield cable.
Speed detection	PA,PB	Pulse generator 2-phase signal input	Terminals for connecting 2-phase signal of pulse generator.
	PGP,PGM	Pulse generator power supply	+15V DC pulse generator power supply (or can be switched to +12V).
	FA,FB	Pulse generator output	Outputs pulse generator signal by dividing by n. The "n" can be changed by function code E29.
	CM	Pulse generator output common	Common terminals to FA and FB.
Temperature detection	TH1,THC	NTC Thermistor PTC Thermistor	Motor temperature can be detected with the NTC and the PTC thermistors. The motor overheat protective level can be specified by the PTC thermistor function.

Wiring Diagram

Basic Wiring Diagram



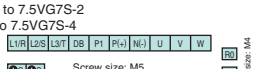
(*1) Use twisted cables or shielded cables for the wire indicated with .
(*2) When connecting a DC REACTOR, remove the jumper wire between the P1 and P (+) terminals.
(*3) The power supply for cooling fan for motors of 7.5kW or less is single-phase. Connect to the FU and the FV terminals. The cooling fan for models of 7.5kW or less for the 400V series is 200V/50Hz or 200 to 230V/60Hz. The cooling fan for models of 11kW or more for the 400V series is 400 to 420V/50Hz or 400 to 440V/60Hz. Obtain a transformer when using the fan for the power supply voltage that is not mentioned above.

(*4) The 24V power system and the 15V power system are insulated inside the inverter unit.

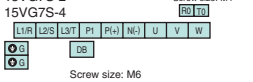
Terminal Arrangement

Main circuit terminals

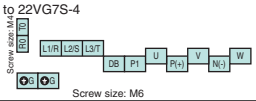
FRN0.75 to 7.5VG7S-2
FRN3.7 to 7.5VG7S-4



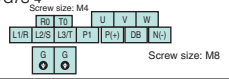
FRN11 to 15VG7S-2
FRN11 to 15VG7S-4



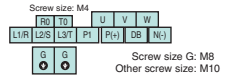
FRN18.5 to 22VG7S-2
FRN18.5 to 22VG7S-4



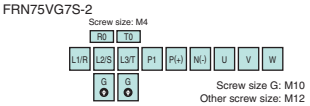
FRN30VG7S-2
FRN30 to 55VG7S-4



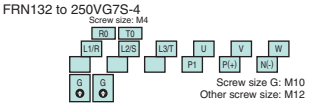
FRN37 to 55VG7S-2
FRN75 to 110VG7S-4



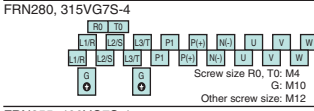
FRN75VG7S-2



FRN90VG7S-2
FRN132 to 250VG7S-4

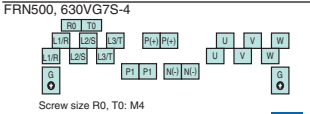


FRN280, 315VG7S-4



FRN355, 400VG7S-4

FRN500, 630VG7S-4



Control circuit terminals

Names and functions of the KEYPAD

LED monitor
Operation mode:
Displays the setting frequency, output current, output voltage, motor speed, and line speed.
Trip mode:
Displays the cause of a trip.

Unit indication
Displays the unit for the information that appears on the LED monitor.

Up/Down keys
Operation mode:
Increases or decreases the speed.
Program mode:
Changes the function codes and specified data values.

Program key
Switches the display to the menu screen or the initial screens for the operation and alarm modes.

Shift key (column shift)
Used to move the cursor horizontally for data change and to jump to another function block (when pressed with the UP/DOWN keys)

Reset key
Program mode:
Cancels the current input data and changes the screen.
Trip mode:
Releases from a trip stoppage.

LCD monitor
Displays different information ranging from operation status to function data. Operation guidance is displayed scrolling at the bottom.

FWD/REV keys
Operation mode:
Pressing the FWD or REV key lights the RUN lamp. Invalid when the function code F02 (Operation method) is set to 1 (external signal operation).

Stop key
Invalid when the function code F02 (Operation method) is set to 1 (external signal operation).

Function/Data select key
Used to switch the displayed value of LED monitor, input the speed setting and store the function code data.

KEYPAD operation

Turn on the inverter, set the speed with the and the keys, press the key, and then press the or the key to operate the inverter with the function codes set at factory shipment.

Press the key to stop the inverter.

See the Basic wiring diagram on page 22 for the connection.

Function setting

F: Fundamental Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
F00	0h	80(50h)	Data protection	0 – 1	1
F01	1h		Speed setting N1	0 – 7	1
F02	2h		Operation method	0 – 1	1
F03	3h	81(51h)	M1 max. speed	50 – 1500 – 24000 r/min	1
F04	4h	82(52h)	M1 rated speed	50 – 24000 r/min	1
F05	5h	83(53h)	M1 rated voltage	80 – 999 V	1
F07	7h	84(54h)	Acceleration time 1	0.01 – 5.00 – 99.99s 100.0 – 999.9s 1000 – 3600s	0.01 0.1 1
F08	8h	85(55h)	Deceleration time 1	0.01 – 5.00 – 99.99s 100.0 – 999.9s 1000 – 3600s	0.01 0.1 1
F10	Ah	86(56h)	M 1 electronic thermal overload relay (Select)	0 – 2	1
F11	Bh	87(57h)	M1 electronic thermal overload relay (Level)	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
F12	Ch	88(58h)	M1 electronic thermal overload relay (Thermal time constant)	0.5 – 75.0 min	0.1
F14	Eh		Restart mode after momentary power failure (Select)	0 – 5	1
F17	11h		Gain (for speed setting signal 12)	0.0 – 100.0 – 200.0 %	0.1
F18	12h		Bias (for speed setting signal 12)	-24000 – 0 – 24000 r/min	1
F20	14h	89(59h)	DC brake (Starting speed)	0 – 3600 r/min	1
F21	15h	90(5Ah)	DC brake (Braking level)	0 – 100 %	1
F22	16h	91(5Bh)	DC brake (Braking time)	0.0 – 30.0 s	0.1
F23	17h	92(5Ch)	Starting speed	0.0 – 150.0 r/min	1
F24	18h	93(5Dh)	Starting speed (Holding time)	0.00 – 10.00 s	0.01
F26	1Ah	94(5Eh)	Motor sound (Carrier freq.)	0.75 – 7 – 15 kHz	1
F27	1Bh	95(5Fh)	Motor sound (Sound tone)	0 – 3	1
F36	24h		30RY operation mode	0 – 1	1
F37	25h	96(60h)	Stop speed	0.0 – 10.0 – 150.0 r/min	0.1
F38	26h	97(61h)	Stop speed (Detection method)	0 – 1	1
F39	27h	98(62h)	Stop speed (Zero speed holding time)	0.00 – 0.50 – 10.00 s	0.01
F40	28h	99(63h)	Torque limiter mode 1	0 – 3	1
F41	29h	100(64h)	Torque limiter mode 2	0 – 3	1
F42	2Ah	101(65h)	Torque limiter value (level 1) selection	0 – 5	1
F43	2Bh	102(66h)	Torque limiter value (level 2) selection	0 – 5	1
F44	2Ch	103(67h)	Torque limiter value (level 1)	-300 – 150 – 300 %	1
F45	2Dh	104(68h)	Torque limiter value (level 2)	-300 – 10 – 300 %	1
F46	2Eh	105(69h)	Mechanical loss compensation value	-300.00 – 0.00 – 300.00 %	0.01
F47	2Fh	106(6Ah)	Torque bias T1	-300.00 – 0.00 – 300.00 %	0.01
F48	30h		Torque bias T2	-300.00 – 0.00 – 300.00 %	0.01
F49	31h		Torque bias T3	-300.00 – 0.00 – 300.00 %	0.01
F50	32h		Torque bias activation timer	0.00 – 1.00 s	0.01
F51	33h	251(FBh)	Torque reference monitor (Polarity selection)	0 – 1	1
F52	34h		LED monitor (Display coefficient A)	-999.00 – 1.00 – 999.00	0.01
F53	35h		LED monitor (Display coefficient B)	-999.00 – 1.00 – 999.00	0.01
F54	36h		LED monitor (Display filter)	0.0 – 0.2 – 5.0 s	0.1
F55	37h		LED monitor (Display selection)	0 – 28	1
F56	38h		LED monitor (Display at stopping state)	0 – 1	1
F57	39h		LCD monitor (Display selection)	0 – 1	1
F58	3Ah		LCD monitor (Language selection)	0 – 7	1
F59	3Bh		LCD monitor (Contrast adjusting)	0 – 5 – 10	1
F60	3Ch		Output unit (HP/kW) selection	0 – 1	1
F61	3Dh	107(6Bh)	ASR1-P (Gain)	0.1 – 10.0 – 200.0 (times)	0.1
F62	3Eh	108(6Ch)	ASR1-I (Constant of integration)	0.010 – 0.200 – 1.000 s	0.001
F63	3Fh	109(6Dh)	ASR1-FF (Gain)	0.000 – 9.999 s	0.001
F64	40h	110(6Eh)	ASR1 input filter	0.000 – 0.040 – 5.000 s	0.001
F65	41h	111(6Fh)	ASR1 detection filter	0.000 – 0.005 – 0.100 s	0.001
F66	42h	112(70h)	ASR1 output filter	0.000 – 0.002 – 0.100 s	0.001
F67	43h	113(71h)	S-curve acceleration start side 1	0 – 50 %	1
F68	44h	114(72h)	S-curve acceleration end side 1	0 – 50 %	1
F69	45h	115(73h)	S-curve deceleration start side 1	0 – 50 %	1
F70	46h	116(74h)	S-curve deceleration end side 1	0 – 50 %	1
F73	49h		Magnetic-flux level at light load	10 – 100 %	1
F74	4Ah	117(75h)	Pre-excitation time	0.0 – 10.0 s	0.1
F75	4Bh	118(76h)	Pre-excitation initial level	100 – 400 %	1
F76	4Ch		Speed limiter (method selection)	0 – 3	1
F77	4Dh		Speed limiter level 1	-110.0 – 100.0 – 110.0 %	0.1
F78	4Eh		Speed limiter level 2	-110.0 – 100.0 – 110.0 %	0.1
F79	4Fh	119(77h)	Motor selection (M1, M2, M3)	0 – 2	1
F80	50h		Current rating switching	0 – 2	1

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

indicates the factory setting.

E: Extension Terminal Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
E01	101h	120(78h)	X1 function selection	0 – 63	1
E02	102h	121(79h)	X2 function selection	0 – 1 – 63	1
E03	103h	122(7Ah)	X3 function selection	0 – 2 – 63	1
E04	104h	123(7Bh)	X4 function selection	0 – 3 – 63	1
E05	105h	124(7Ch)	X5 function selection	0 – 4 – 63	1
E06	106h	125(7Dh)	X6 function selection	0 – 5 – 63	1
E07	107h	126(7Eh)	X7 function selection	0 – 7 – 63	1
E08	108h	127(7Fh)	X8 function selection	0 – 8 – 63	1
E09	109h	128(80h)	X9 function selection	0 – 9 – 63	1
E10	10Ah	129(81h)	X11 function selection	0 – 25 – 63	1
E11	10Bh	130(82h)	X12 function selection	0 – 25 – 63	1
E12	10Ch	131(83h)	X13 function selection	0 – 25 – 63	1
E13	10Dh	132(84h)	X14 function selection	0 – 25 – 63	1
E14	10Eh		X function normally open/normally closed	0000 – 01FF	1
E15	10Fh	133(85h)	Y1 function selection	0 – 1 – 47	1
E16	110h	134(86h)	Y2 function selection	0 – 2 – 47	1
E17	111h	135(87h)	Y3 function selection	0 – 3 – 47	1
E18	112h	136(88h)	Y4 function selection	0 – 4 – 47	1
E19	113h	137(89h)	Y5 function selection	0 – 14 – 47	1
E20	114h	138(8Ah)	Y11 function selection	0 – 26 – 47	1
E21	115h	139(8Bh)	Y12 function selection	0 – 26 – 47	1
E22	116h	140(8Ch)	Y13 function selection	0 – 26 – 47	1
E23	117h	141(8Dh)	Y14 function selection	0 – 26 – 47	1
E24	118h	142(8Eh)	Y15 function selection	0 – 26 – 47	1
E25	119h	143(8Fh)	Y16 function selection	0 – 26 – 47	1
E26	11Ah	144(90h)	Y17 function selection	0 – 26 – 47	1
E27	11Bh	145(91h)	Y18 function selection	0 – 26 – 47	1
E28	11Ch		Y function normally open/normally closed	0000 – 001F	1
E29	11Dh	146(92h)	PG pulse output selection	0 – 9	1
E30	11Eh		Motor overheat protection (Temperature)	100 – 150 – 200 °C	1
E31	11Fh		Motor overheat early warning (Temperature)	50 – 75 – 200 °C	1
E32	120h	205(CDh)	M1-M3 PTC operation level	0.00 – 1.60 – 5.00 V	0.01
E33	121h		Inverter overload early warning	25 – 90 – 100 %	1
E34	122h		Motor overload early warning	25 – 90 – 100 %	1
E35	123h		DB overload protection	0 – 100 %	1
E36	124h		DB overload early warning	0 – 80 – 100 %	1
E37	125h		DB thermal time constant	0 – 300 – 1000 s	1
E38	126h	147(93h)	Speed detection method	000 – 111	1
E39	127h	148(94h)	Speed detection level 1	0 – 1500 – 24000 r/min	1
E40	128h	149(95h)	Speed detection level 2	-24000 – 1500 – 24000 r/min	1
E41	129h	150(96h)	Speed detection level 3	-24000 – 1500 – 24000 r/min	1
E42	12Ah	151(97h)	Speed equivalence (Detection range)	1.0 – 3.0 – 20.0 %	0.1
E43	12Bh	152(98h)	Speed agreement (Detection range)	1.0 – 3.0 – 20.0 %	0.1
E44	12Ch	153(99h)	Speed agreement (Off delay timer)	0.000 – 0.100 – 1.000 s	0.001
E45	12Dh	154(9Ah)	Enable/disable alarm for speed disagreement	00 – 21	1

Function code	485 No.	Link No.	Name	Setting range	Min. unit
E46	12Eh	155(9Bh)	Torque detection level 1	1 – 30 – 300 %	1
E47	12Fh	156(9Ch)	Torque detection level 2	1 – 30 – 300 %	1
E48	130h	157(9Dh)	Magnetic-flux detection level	10 – 100 %	1
E49	131h		Ai1 function selection	0 – 18	1
E50	132h		Ai2 function selection	0 – 18	1
E51	133h		Ai3 function selection	0 – 18 (Displayed when AIO option installed)	1
E52	134h		Ai4 function selection	0 – 18 (Displayed when AIO option installed)	1
E53	135h		Ai1 gain setting	-10.000 – 1.000 – 10.000 (times)	0.001
E54	136h		Ai2 gain setting	-10.000 – 1.000 – 10.000 (times)	0.001
E55	137h		Ai3 gain setting	-10.000 – 1.000 – 10.000 (times) (Displayed when AIO option installed)	0.001
E56	138h		Ai4 gain setting	-10.000 – 1.000 – 10.000 (times) (Displayed when AIO option installed)	0.001
E57	139h		Ai1 bias setting	-100.0 – 0.0 – 100.0 %	0.1
E58	13Ah		Ai2 bias setting	-100.0 – 0.0 – 100.0 %	0.1
E59	13Bh		Ai3 bias setting	-100.0 – 0.0 – 100.0 % (Displayed when AIO option installed)	0.1
E60	13Ch		Ai4 bias setting	-100.0 – 0.0 – 100.0 % (Displayed when AIO option installed)	0.1
E61	13Dh		Ai1 filter setting	0.000 – 0.010 – 0.500 s	0.001
E62	13Eh		Ai2 filter setting	0.000 – 0.010 – 0.500 s	0.001
E63	13Fh		Ai3 filter setting	0.000 – 0.010 – 0.500 s (Displayed when AIO option installed)	0.001
E64	140h		Ai4 filter setting	0.000 – 0.010 – 0.500 s (Displayed when AIO option installed)	0.001
E65	141h		Increment/decrement limiter (Ai1)	0.00 – 60.00 s	0.01
E66	142h		Increment/decrement limiter (Ai2)	0.00 – 60.00 s	0.01
E67	143h		Increment/decrement limiter (Ai3)	0.00 – 60.00 s (Displayed when AIO option installed)	0.01
E68	144h		Increment/decrement limiter (Ai4)	0.00 – 60.00 s (Displayed when AIO option installed)	0.01
E69	145h		AO1 function selection	0 – 1 – 31	1
E70	146h		AO2 function selection	0 – 6 – 31	1
E71	147h		AO3 function selection	0 – 3 – 31	1
E72	148h		AO4 function selection	0 – 31 (Displayed when AIO option installed)	1
E73	149h		AO5 function selection	0 – 31 (Displayed when AIO option installed)	1
E74	14Ah		AO1 gain setting	-100.00 – 1.00 – 100.00	0.01
E75	14Bh		AO2 gain setting	-100.00 – 1.00 – 100.00	0.01
E76	14Ch		AO3 gain setting	-100.00 – 1.00 – 100.00	0.01
E77	14Dh		AO4 gain setting	-100.00 – 1.00 – 100.00 (Displayed when AIO option installed)	0.01
E78	14Eh		AO5 gain setting	-100.00 – 1.00 – 100.00 (Displayed when AIO option installed)	0.01
E79	14Fh		AO1 bias setting	-100.0 – 0.0 – 100.0 %	0.1
E80	150h		AO2 bias setting	-100.0 – 0.0 – 100.0 %	0.1
E81	151h		AO3 bias setting	-100.0 – 0.0 – 100.0 %	0.1
E82	152h		AO4 bias setting	-100.0 – 0.0 – 100.0 % (Displayed when AIO option installed)	0.1
E83	153h		AO5 bias setting	-100.0 – 0.0 – 100.0 % (Displayed when AIO option installed)	0.1
E84	154h		AO1-5 filter setting	0.000 – 0.010 – 0.500 s	0.001

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

indicates the factory setting.

C:Control Functions of Frequency

Function code	485 No.	Link No.	Name	Setting range	Min. unit
C01	201h		Jump speed 1	0 – 24000 r/min	1
C02	202h		Jump speed 2	0 – 24000 r/min	1
C03	203h		Jump speed 3	0 – 24000 r/min	1
C04	204h		Jump hysteresis	0 – 1000 r/min	1
C05	205h	158(9Eh)	Multistep speed 1	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C06	206h	159(9Fh)	Multistep speed 2	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C07	207h	160(A0h)	Multistep speed 3	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C08	208h	161(A1h)	Multistep speed 4	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C09	209h	162(A2h)	Multistep speed 5	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C10	20Ah	163(A3h)	Multistep speed 6	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C11	20Bh	164(A4h)	Multistep speed 7	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C12	20Ch		Multistep speed 8	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C13	20Dh		Multistep speed 9	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C14	20Eh		Multistep speed 10	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C15	20Fh		Multistep speed 11	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C16	210h		Multistep speed 12	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C17	211h		Multistep speed 13	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C18	212h		Multistep speed 14/Creep speed 1	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C19	213h		Multistep speed 15/Creep speed 2	0 – 24000 r/min 0.00 – 100.00 % 0.0 – 999.9 m/m (Switch with C21)	1 0.01 0.1
C20	214h		Multistep speed reference agreement timer	0.000 – 0.100 s	0.001
C21	215h		Multistep setting definition	0 – 2	1
C25	219h		Speed setting N2	0 – 7	1
C29	21Dh		Jogging speed	0 – 50 – 24000 r/min	1
C30	21Eh		ASR-P (Gain) JOG	0.1 – 10.0 – 200.0 (times)	0.1
C31	21Fh		ASR-I (Constant of integration) JOG	0.010 – 0.200 – 1.000 s	0.001
C32	220h		ASR-JOG input filter	0.000 – 0.040 – 5.000 s	0.001
C33	221h		ASR-JOG detection filter	0.000 – 0.005 – 0.100 s	0.001
C34	222h		ASR-JOG output filter	0.000 – 0.002 – 0.100 s	0.001

Function setting

Function code	485 No.	Link No.	Name	Setting range	Min. unit
C35	223h		Acceleration time JOG	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C36	224h		Deceleration time JOG	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C37	225h		S-curve start side JOG	0 – 50 %	1
C38	226h		S-curve end side JOG	0 – 50 %	1
C40	228h		ASR2-P Gain	0.1 – 10.0 – 200.0 (times)	0.1
C41	229h		ASR2-I (Constant of integration)	0.010 – 0.200 – 1.000 s	0.001
C42	22Ah		ASR2-FF (Gain)	0.000 – 9.999 s	0.001
C43	22Bh		ASR2 input filter	0.000 – 0.040 – 5.000 s	0.001
C44	22Ch		ASR2 detection filter	0.000 – 0.005 – 0.100 s	0.001
C45	22Dh		ASR2 output filter	0.000 – 0.002 – 0.100 s	0.001
C46	22Eh		Acceleration time 2	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C47	22Fh		Deceleration time 2	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C48	230h		S-curve start side 2	0 – 50 %	1
C49	231h		S-curve end side 2	0 – 50 %	1
C50	232h		ASR3-P gain	0.1 – 10.0 – 200.0 (times)	0.1
C51	233h		ASR3-I (Constant of integration)	0.010 – 0.200 – 1.000 s	0.001
C52	234h		ASR3-FF (Gain)	0.000 – 9.999 s	0.001
C53	235h		ASR3 input filter	0.000 – 0.040 – 5.000 s	0.001
C54	236h		ASR3 detection filter	0.000 – 0.005 – 0.100 s	0.001
C55	237h		ASR3 output filter	0.000 – 0.002 – 0.100 s	0.001
C56	238h		Acceleration time 3	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C57	239h		Deceleration time 3	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C58	23Ah		S-curve start side 3	0 – 50 %	1
C59	23Bh		S-curve end side 3	0 – 50 %	1
C60	23Ch		ASR4-P gain	0.1 – 10.0 – 200.0 (times)	0.1
C61	23Dh		ASR4-I (Constant of integration)	0.010 – 0.200 – 1.000 s	0.001
C62	23Eh		ASR4-FF (Gain)	0.000 – 9.999 s	0.001
C63	23Fh		ASR4 input filter	0.000 – 0.040 – 5.000 s	0.001
C64	240h		ASR4 detection filter	0.000 – 0.005 – 0.100 s	0.001
C65	241h		ASR4 output filter	0.000 – 0.002 – 0.100 s	0.001
C66	242h		Acceleration time 4	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C67	243h		Deceleration time 4	0.01 – 5.00 – 99.99s	0.01
				100.0 – 999.9s	0.1
				1000 – 3600s	1
C68	244h		S-curve start side 4	0 – 50 %	1
C69	245h		S-curve end side 4	0 – 50 %	1
C70	246h		ASR switching time	0.00 – 1.00 – 2.55 s	0.01
C71	247h	165(A5h)	Acceleration/deceleration time switching speed	0.00 – 100.00%	0.01
C72	248h	166(A6h)	ASR switching time	0.00 – 100.00%	0.01
C73	249h		Creep speed switching (on UP/DOWN control)	00 – 11	1

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

indicates the factory setting.

P:Motor Parameters

Function code	485 No.	Link No.	Name	Setting range	Min. unit
P01	301h		M1 control method	0 – 3	1
P02	302h		M1 motor selection	0 – 37	1
P03	303h	167(A7h)	M1 rated capacity	0.00 – 900.0kW (F60 = 0)	0.01
				0.00 – 120.0HP (F60 = 1)	
P04	304h	168(A8h)	M1 rated current	0.01 – 99.99A	0.01
				100.0 – 999.9A	0.1
				1000 – 2000A	1
P05	305h	169(A9h)	M1 pole number	2 – 4 – 30 (poles)	2
P06	306h	170(AAh)	M1-%R1	0.00 – 30.00 %	0.01
P07	307h	171(ABh)	M1-%X	0.00 – 50.00 %	0.01
P08	308h	172(ACh)	M1 exciting current	0.01 – 99.99A	0.01
				100.0 – 999.9A	0.1
				1000 – 2000A	1
P09	309h	173(ADh)	M1 torque current	0.01 – 99.99A	0.01
				100.0 – 999.9A	0.1
				1000 – 2000A	1
P10	30Ah	174(AEh)	M1 slip on driving	0.001 – 10.000 Hz	0.001
P11	30Bh	175(AFh)	M1 slip on braking	0.001 – 10.000 Hz	0.001
P12	30Ch	176(B0h)	M1 iron loss coefficient 1	0.00 – 10.00 %	0.01
P13	30Dh	177(B1h)	M1 iron loss coefficient 2	0.00 – 10.00 %	0.01
P14	30Eh	178(B2h)	M1 iron loss coefficient 3	0.00 – 10.00 %	0.01
P15	30Fh	179(B3h)	M1 magnetic saturation coefficient 1	0.0 – 100.0 %	0.1
P16	310h	180(B4h)	M1 magnetic saturation coefficient 2	0.0 – 100.0 %	0.1
P17	311h	181(B5h)	M1 magnetic saturation coefficient 3	0.0 – 100.0 %	0.1
P18	312h	182(B6h)	M1 magnetic saturation coefficient 4	0.0 – 100.0 %	0.1
P19	313h	183(B7h)	M1 magnetic saturation coefficient 5	0.0 – 100.0 %	0.1
P20	314h	184(B8h)	M1 secondary time constant	0.001 – 9.999 s	0.001
P21	315h	185(B9h)	M1 induced voltage coefficient	0 – 999 V	1
P22	316h	186(BAh)	M1-R2 correction coefficient 1	0.500 – 5.000	0.001
P23	317h	187(BBh)	M1-R2 correction coefficient 2	0.500 – 5.000	0.001
P24	318h	188(BCh)	M1-R2 correction coefficient 3	0.010 – 5.000	0.001
P25	319h	189(BDh)	M1 exciting current correction coefficient	0.000 – 5.000	0.001
P26	31Ah	190(BEh)	M1-ACR-P (Gain)	0.1 – 20.0	0.1
P27	31Bh	191(BFh)	M1-ACR-I (Integration time)	0.5 – 100.0 ms	0.1
P28	31Ch	192(C0h)	M1-PG pulse number	100 – 1024 – 60000	1
P29	31Dh	214(D6h)	M1 external PG correction coefficient	0000 – 4000 – 4FFF	1
P30	31Eh	193(C1h)	M1 thermistor selection	0 – 1 – 3	1

H:High Performance Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
H01	401h		Tuning operation selection	0 – 4	1
H02	402h	14(0Eh)	All save function	0 – 1	1
H03	403h		Data initializing	0 – 1	1
H04	404h		Auto-reset (Times)	0 – 10	1
H05	405h		Auto-reset (Reset interval)	0.01 – 5.00 – 20.00 s	0.01
H06	406h		Fan stop operation	0 – 1	1
H08	408h		Rev. phase sequence lock	0 – 1	1
H09	409h	194(C2h)	Start mode (Rotating motor pick up)	0 – 2	1
H10	40Ah	195(C3h)	Energy-saving operation	0 – 1	1
H11	40Bh		Automatic operation OFF function	0 – 2	1
H13	40Dh	196(C4h)	Auto-restart (Restart time)	0.1 – 0.5 – 5.0 s	0.1
H14	40Eh		Auto-restart (Speed fall rate)	1 – 500 – 3600 (r/min/s)	1
H15	40Fh		Auto- restart (Holding DC voltage)	200 – 235 – 300V (3-Phase 200V series)	1
				400 – 470 – 600V (3-Phase 400V series)	
H16	410h		Auto-restart (Operation command selfhold setting)	0 – 1	1

Function code	485 No.	Link No.	Name	Setting range	Min. unit
H17	411h		Auto-restart (Operation command selfhold time)	0.0 – 30.0 s	0.1
H19	413h	197(C5h)	Active drive	0 – 1	1
H20	414h	198(C6h)	PID control	0 – 3	1
H21	415h	199(C7h)	Command selection	0 – 1	1
H22	416h	201(C9h)	P-gain	0.000 – 1.000 – 10.000 (times)	0.001
H23	417h	202(CAh)	I-gain	0.00 – 1.00 – 100.00 s	0.01
H24	418h	203(CBh)	D-gain	0.000 – 10.000 s	0.001
H25	419h	200(C8h)	Output upper limit value	-300 – 100 – 300 %	1
H26	41Ah	204(CCh)	Output lower limit value	-300 – -100 – 300 %	1
H27	41Bh	206(CEh)	Speed reference selection	0 – 2	1
H28	41Ch	207(CFh)	Droop operation	0.0 – 25.0 %	0.1
H29	41Dh		Link function protection	0 – 1	1
H30	41Eh	208(D0h)	Serial link	0 – 3	1
H31	41Fh		RS-485 (Address)	0 – 1 – 255	1
H32	420h		RS-485 (Mode select on no response error)	0 – 3	1
H33	421h		RS-485 (Timer)	0.01 – 2.00 – 20.00 s	0.01
H34	422h		RS-485 (Baud rate)	0 – 4	1
H35	423h		RS-485 (Data length)	0 – 1	1
H36	424h		RS-485 (Parity check)	0 – 1 – 2	1
H37	425h		RS-485 (Stop bits)	0 – 1	1
H38	426h		RS-485 (No response error detection time)	0.0 – 60.0 s	0.1
H39	427h		RS-485 (Response interval)	0.00 – 0.01 – 1.00 s	0.01
H40	428h		Protocol selection	0 – 1 – 2	1
H41	429h	209(D1h)	Torque reference selection	0 – 5	1
H42	42Ah	210(D2h)	Torque current reference selection	0 – 4	1
H43	42Bh	211(D3h)	Magnetic-flux reference selection	0 – 3	1
H44	42Ch	212(D4h)	Magnetic-flux reference value	10 – 100 %	1
H46	42Eh	215(D7h)	Observer type selection	0 – 2	1
H47	42Fh	216(D8h)	M1 compensation gain	0.00 – 1.00 (times)	0.01
H48	430h		M2 compensation gain	0.00 – 1.00 (times)	0.01
H49	431h	217(D9h)	M1 integration time	0.005 – 0.100 – 1.000 s	0.001
H50	432h		M2 integration time	0.005 – 0.100 – 1.000 s	0.001
H51	433h	218(DAh)	M1 load inertia	0.001 – 50.000 (kg·m^2)	0.001
H52	434h		M2 load inertia	0.001 – 50.000 (kg·m^2)	0.001
H53	435h	213(D5h)	Line speed feedback selection	0 – 3	1
H55	437h		Zero speed control (Gain)	0 – 5 – 100 (times)	1
H56	438h		Zero speed control (completion range)	0 – 100 (pulses)	1
H57	439h		Overvoltage suppressing function	0 – 1	1
H58	43Ah		Overcurrent suppressing function	0 – 1	1
H60	43Ch		Load adaptive control function definition 1	0 – 3	1
H61	43Dh		Load adaptive control function definition 2	0 – 1	1
H62	43Eh		Winding up speed	0.0 – 999.9 m/min	0.1
H63	43Fh		Counter weight mass	0.00 – 600.00 (t)	0.01
H64	440h		Safety coefficient	0.50 – 1.00 – 1.20	0.01
H65	441h		Mechanical efficiency	0.500 – 1.000	0.001
H66	442h		Rated loading	0.00 – 600.00 (t)	0.01
H68	444h		Trip data delete	0 – 1	1
H70	446h		Reserved 1	0 – 9999	1
H71	447h		Reserved 2	0 – 6	1
H72	448h		Reserved 3	0 – 9999	1
H73	449h		Reserved 4	0 – 9999	1

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

indicates the factory setting.

A:Alternative Motor Parameters

Function code	485 No.	Link No.	Name	Setting range	Min. unit
A01	501h		M2 control method	0 – 1	1
A02	502h		M2 rated capacity	0.00 – 900.0kW (F60=0) 0.00 – 1200.0HP (F60=1)	0.01
A03	503h		M2 rated current	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A04	504h		M2 rated voltage	80 – 999 V	1
A05	505h		M2 rated speed	50 – 1500 – 24000 r/min	1
A06	506h		M2 maximum speed	50 – 1500 – 24000 r/min	1
A07	507h		M2 pole number	2 – 4 – 12 (poles)	2
A08	508h		M2-%R1	0.00 – 30.00 %	0.01
A09	509h		M2-%X	0.00 – 50.00 %	0.01
A10	50Ah		M2 exciting current	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A11	50Bh		M2 torque current	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A12	50Ch		M2 slip on driving	0.001 – 10.000 Hz	0.001
A13	50Dh		M2 slip on braking	0.001 – 10.000 Hz	0.001
A14	50Eh		M2 iron loss coefficient 1	0.00 – 10.00 %	0.01
A15	50Fh		M2 iron loss coefficient 2	0.00 – 10.00 %	0.01
A16	510h		M2 iron loss coefficient 3	0.00 – 10.00 %	0.01
A17	511h		M2 magnetic saturation coefficient 1	0.0 – 100.0 %	0.1
A18	512h		M2 magnetic saturation coefficient 2	0.0 – 100.0 %	0.1
A19	513h		M2 magnetic saturation coefficient 3	0.0 – 100.0 %	0.1
A20	514h		M2 magnetic saturation coefficient 4	0.0 – 100.0 %	0.1
A21	515h		M2 magnetic saturation coefficient 5	0.0 – 100.0 %	0.1
A22	516h		M2 secondary time constant	0.001 – 9.999 s	0.001
A23	517h		M2 induced voltage coefficient	0 – 999 V	1
A24	518h		M2-R2 correction coefficient 1	0.000 – 5.000	0.001
A25	519h		M2-R2 correction coefficient 2	0.000 – 5.000	0.001
A26	51Ah		M2-R2 correction coefficient 3	0.010 – 5.000	0.001
A27	51Bh		M2 exciting current correction coefficient	0.000 – 5.000	0.001
A28	51Ch		M2-ACR-P (Gain)	0.1 – 1.0 – 20.0	0.1
A29	51Dh		M2-ACR-I (Integration time)	0.5 – 1.0 – 100.0 ms	0.1
A30	51Eh		M2-PG pulse number	100 – 1024 – 60000	1
A31	51Fh		M2 thermistor selection	0 – 1 – 3	1
A32	520h		M2 electronic thermal overload relay (Select)	0 – 2	1
A33	521h		M2 electronic thermal overload relay (Level)	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A34	522h		M2 electronic thermal overload relay (Thermal time constant)	0.5 – 75.0 min	0.1
A35	523h	229(E5h)	M3 rated capacity	0.00 – 900.0kW (F60=0) 0.00 – 1200.0HP (F60=1)	0.01
A36	524h	230(E6h)	M3 rated current	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A37	525h	231(E7h)	M3 rated voltage	80 – 999 V	1
A38	526h	232(E8h)	M3 maximum output voltage (at V/f maximum speed)	80 – 999 V	1
A39	527h	233(E9h)	M3 rated speed	50 – 1500 – 24000 r/min	1
A40	528h	234(EAh)	M3 maximum speed	50 – 1500 – 24000 r/min	1
A41	529h	235(EBh)	M3 pole number	2 – 4 – 12 (poles)	2
A42	52Ah	236(ECh)	M3-%R1	0.00 – 30.00 %	0.01
A43	52Bh	237(EDh)	M3-%X	0.00 – 50.00 %	0.01
A44	52Ch	238(EEh)	M3 exciting current	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A45	52Dh	239(EFh)	M3 slip compensation control	-20.000 – 0.000 – 5.000	0.001

Function setting

indicates the factory setting.

Function code	485 No.	Link No.	Name	Setting range	Min. unit
A46	52Eh	240(F0h)	M3 torque boost	0.0 – 20.0	0.1
A47	52Fh	241(F1h)	M3 thermistor selection	0 – 1 – 3	1
A48	530h	242(F2h)	M3 electronic thermal overload relay (Select)	0 – 2	1
A49	531h	243(F3h)	M3 electronic thermal overload relay (Level)	0.01 – 99.99A 100.0 – 999.9A 1000 – 2000A	0.01 0.1 1
A50	532h	244(F4h)	M3 electronic thermal overload relay (Thermal time constant)	0.5 – 75.0 min	0.1

O:Optional Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
o01	601h	245(F5h)	DIA function selection	0 – 1	1
o02	602h	246(F6h)	DIB function selection	0 – 1	1
o03	603h		DIA BCD input setting	99 – 1000 – 7999	1
o04	604h		DIB BCD input setting	99 – 1000 – 7999	1
o05	605h		Feedback pulse selection	0 – 1	1
o06	606h		Digital line speed detection definition (PG pulse number)	100 – 1024 – 60000 (P/R)	1
o07	607h		Digital line speed detection definition (Detected pulse correction 1)	0 – 1000 – 9999	1
o08	608h		Digital line speed detection definition (Detected pulse correction 2)	0 – 1000 – 9999	1
o09	609h		ABS signal input definition (Synchronization)	0 – 16	1
o 10	60Ah		Magnetic pole position offset (Synchronization)	0000 – FFFF	1
o 11	60Bh		Salient pole ratio (%Xq/%Xd)	1.000 – 3.000	0.001
o 12	60Ch		Reference pulse selection	0 – 1	1
o 13	60Dh		Pulse train input form selection	0 – 2	1
o 14	60Eh	247(F7h)	Reference pulse correction 1	0 – 1000 – 9999	1
o 15	60Fh	248(F8h)	Reference pulse correction 2	0 – 1000 – 9999	1
o 16	610h	249(F9h)	APR gain	0.1 – 999.9 (times)	0.1
o 17	611h	250(FAh)	F/F gain	0.0 – 1.5 (times)	0.1
o 18	612h		Deviation excess range	0 – 65535 (pulses)	1
o 19	613h		Deviation zero range	0 – 20 – 1000 (pulses)	1
o30	61Eh		Action on communications error	0 – 3	1
o31	61Fh		Action time on communications error	0.01 – 0.10 – 20.00 s	0.01
o32	620h		Communications format	0 – 1	1
o33	621h	253(FDh)	Multiwinding system	0 – 1	1
o34	622h		Multiwinding system slave station number	1 – 5	1
o35	623h		Link station adress	0 – 255	1
o36	624h		Link system slave station number	1 – 155	1
o37	625h		Communications definition setting	0000 – 0010 – 0124	1
o38	626h		UPAC start/stop	0 – 2	1
o39	627h		UPAC memory mode	00 – 1F	1
o40	628h		UPAC Address	100 – 255	1

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

Function codes "S" and "M" are codes to access the inverter through links (RS485, T-Link, SX communications, field bus , etc). You cannot use them with the KEYPAD panel.
Though you can access the codes "F", "E", and "C" through these links, these links are specifically designed to access the code "S" for operation and control and the "M" for data monitoring.

S:Serial Communication Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
S01	701h	1(1h)	Frequency/speed reference (Setting 1)	-24000 – 24000 r/min	1
S02	702h	2(2h)	Torque reference	0.01% / 1d	0.01
S03	703h	3(3h)	Torque current reference	0.01% / 1d	0.01
S04	704h	4(4h)	Magnetic-flux reference	0.01% / 1d	0.01
S05	705h	5(5h)	Orientation position reference	0000 – FFFF	1
S06	706h	6(6h)	Operation method 1	0000 – FFFF	1
S07	707h	7(7h)	Universal Do	0000 – FFFF	1
S08	708h	8(8h)	Acceleration time	0.0 – 3600.0 s	0.1
S09	709h	9(9h)	Deceleration time	0.0 – 3600.0 s	0.1
S10	70Ah	10(Ah)	Torque limiter level 1	0.01% / 1d	0.01
S11	70Bh	11(Bh)	Torque limiter level 2	0.01% / 1d	0.01
S12	70Ch	12(Ch)	Operation method 2	0000 – FFFF	1

M:Monitoring Functions

Function code	485 No.	Link No.	Name	Setting range	Min. unit
M01	801h	15(Fh)	Speed setting 4 (ASR input)	-24000 – 24000 r/min	1
M02	802h	16(10h)	Torque reference	0.01% / 1d	0.01
M03	803h	17(11h)	Toque current reference	0.01% / 1d	0.01
M04	804h	18(12h)	Magnetic-flux reference	0.01% / 1d	0.01
M05	805h	19(13h)	Output frequency reference	0.1Hz / 1d	0.1
M06	806h	20(14h)	Detected speed value	-24000 – 24000 r/min	1
M07	807h	21(15h)	Calculated torque value	0.01% / 1d	0.01
M08	808h	22(16h)	Calculated torque current value	0.01% / 1d	0.01
M09	809h	23(17h)	Output frequency	0.1Hz / 1d	0.1
M10	80Ah	24(18h)	Motor output	0.1kW / 1d	0.1
M11	80Bh	25(19h)	Output current rms value	0.1A / 1d	0.1
M12	80Ch	26(1Ah)	Output voltage rms value	0.1V / 1d	0.1
M13	80Dh	27(1Bh)	Operation method (final command)	0000 – FFFF	1
M14	80Eh	28(1Ch)	Operation status	0000 – FFFF	1
M15	80Fh	29(1Dh)	Output terminals Y1 - Y18	0000 – FFFF	1
M16	810h	30(1Eh)	Latest alarm data	0 – 48	1
M17	811h	31(1Fh)	Last alarm data	0 – 48	1
M18	812h	32(20h)	Second last alarm data	0 – 48	1
M19	813h	33(21h)	Third last alarm data	0 – 48	1
M20	814h	34(22h)	Accumulated operation time	0 – 65535 h	1
M21	815h	35(23h)	DC link circuit voltage	1V / 1d	1
M22	816h	36(24h)	Motor temperature	1°C / 1d	1
M23	817h	37(25h)	Type code	0000 – FFFF	1
M24	818h	38(26h)	Capacity code	0 – 29	1
M25	819h	39(27h)	Inverter ROM (main control) version	0000 – FFFF	1
M26	81Ah	40(28h)	Communications error code	0 – 65535	1
M27	81Bh	41(29h)	Speed setting on alarm	-24000 – 24000 r/min	1
M28	81Ch	42(2Ah)	Torque reference on alarm	0.01% / 1d	0.01
M29	81Dh	43(2Bh)	Torque current reference on alarm	0.01% / 1d	0.01
M30	81Eh	44(2Ch)	Magnetic-flux reference on alarm	0.01% / 1d	0.01
M31	81Fh	45(2Dh)	Output frequency reference on alarm	0.1Hz / 1d	0.1
M32	820h	46(2Eh)	Detected speed on alarm	-24000 – 24000 r/min	1
M33	821h	47(2Fh)	Calculated torque on alarm	0.01% / 1d	0.01
M34	822h	48(30h)	Calculated torque current on alarm	0.01% / 1d	0.01

Function code	485 No.	Link No.	Name	Setting range	Min. unit
M35	823h	49(31h)	Output frequency on alarm	0.1Hz / 1d	0.1
M36	824h	50(32h)	Motor output on alarm	0.1kW / 1d	0.1
M37	825h	51(33h)	Output current rms value on alarm	0.1A / 1d	0.1
M38	826h	52(34h)	Output voltage rms value on alarm	0.1V / 1d	0.1
M39	827h	53(35h)	Operation method on alarm	0000 – FFFF	1
M40	828h	54(36h)	Operation status on alarm	0000 – FFFF	1
M41	829h	55(37h)	Output terminal on alarm	0000 – FFFF	1
M42	82Ah	56(38h)	Accumulated operation time on alarm	0 – 65535 h	1
M43	82Bh	57(39h)	DC link circuit voltage on alarm	1V / 1d	1
M44	82Ch	58(3Ah)	Inverter internal temperature on alarm	1°C / 1d	1
M45	82Dh	59(3Bh)	Heat sink temperature on alarm	1°C / 1d	1
M46	82Eh	60(3Ch)	Main circuit capacitor life on alarm	0 – 100%	1
M47	82Fh	61(3Dh)	PC board capacitor life on alarm	0 – 65535 h	1
M48	830h	62(3Eh)	Cooling fan life	0 – 65535 h	1
M49	831h	63(3Fh)	Speed setting 1 (before multistep speed command)	-24000 – 24000 r/min	1
M50	832h	64(40h)	Speed setting 2 (before calculation of accel./decel.)	-24000 – 24000 r/min	1
M51	833h	65(41h)	Speed setting 3 (after speed limit)	-24000 – 24000 r/min	1
M52	834h	66(42h)	Control output 1	0000 – FFFF	1
M53	835h	67(43h)	Control output 2	0000 – FFFF	1
M54	836h	68(44h)	Control output 3	0000 – FFFF	1
M55	837h	69(45h)	Option monitor 1	0000 – FFFF	1
M56	838h	70(46h)	Option monitor 2	0000 – FFFF	1
M57	839h	71(47h)	Option monitor 3	0 – 65535	1
M58	83Ah	72(48h)	Option monitor 4	0 – 65535	1
M59	83Bh	73(49h)	Option monitor 5	-32768 – 32767	1
M60	83Ch	74(4Ah)	Option monitor 6	-32768 – 32767	1

U:User Functions(UPAC)

Function code	485 No.	Link No.	Name	Setting range	Min. unit
U01	B01h	219(DBh)	USER P1	-32768 – 32767	1
U02	B02h	220(DCh)	USER P2	-32768 – 32767	1
U03	B03h	221(DDh)	USER P3	-32768 – 32767	1
U04	B04h	222(DEh)	USER P4	-32768 – 32767	1
U05	B05h	223(DFh)	USER P5	-32768 – 32767	1
U06	B06h	224(E0h)	USER P6	-32768 – 32767	1
U07	B07h	225(E1h)	USER P7	-32768 – 32767	1
U08	B08h	226(E2h)	USER P8	-32768 – 32767	1
U09	B09h	227(E3h)	USER P9	-32768 – 32767	1
U10	B0Ah	228(E4h)	USER P10	-32768 – 32767	1
U11	B0Bh		USER P11	-32768 – 32767	1
U12	B0Ch		USER P12	-32768 – 32767	1
U13	B0Dh		USER P13	-32768 – 32767	1
U14	B0Eh		USER P14	-32768 – 32767	1
U15	B0Fh		USER P15	-32768 – 32767	1
U16	B10h		USER P16	-32768 – 32767	1
U17	B11h		USER P17	-32768 – 32767	1
U18	B12h		USER P18	-32768 – 32767	1
U19	B13h		USER P19	-32768 – 32767	1
U20	B14h		USER P20	-32768 – 32767	1
U21	B15h		USER P21	-32768 – 32767	1
U22	B16h		USER P22	-32768 – 32767	1
U23	B17h		USER P23	-32768 – 32767	1
U24	B18h		USER P24	-32768 – 32767	1
U25	B19h		USER P25	-32768 – 32767	1
U26	B1Ah		USER P26	-32768 – 32767	1
U27	B1Bh		USER P27	-32768 – 32767	1

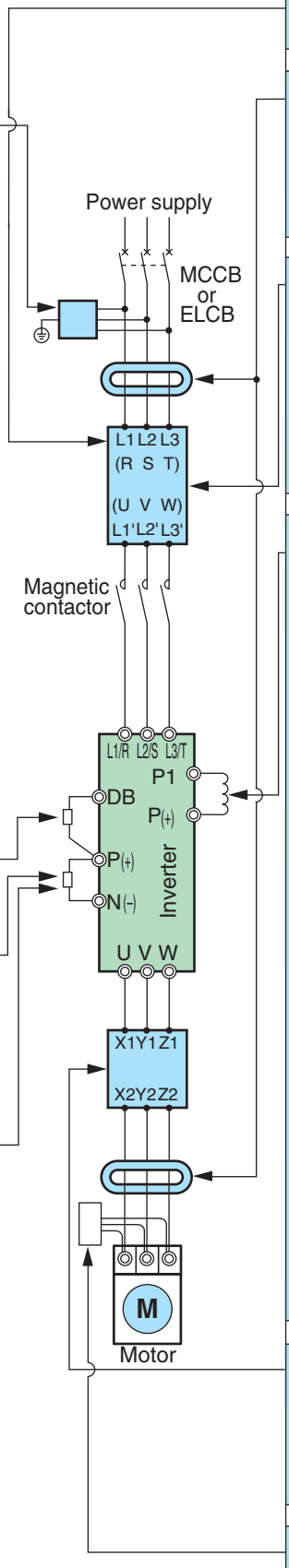
You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

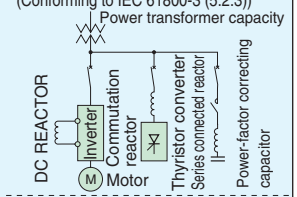
Function code	485 No.	Link No.	Name	Setting range	Min. unit
U28	B1Ch		USER P28	-32768 – 32767	1
U29	B1Dh		USER P29	-32768 – 32767	1
U30	B1Eh		USER P30	-32768 – 32767	1
U31	B1Fh		USER P31	-32768 – 32767	1
U32	B20h		USER P32	-32768 – 32767	1
U33	B21h		USER P33	-32768 – 32767	1
U34	B22h		USER P34	-32768 – 32767	1
U35	B23h		USER P35	-32768 – 32767	1
U36	B24h		USER P36	-32768 – 32767	1
U37	B25h		USER P37	-32768 – 32767	1
U38	B26h		USER P38	-32768 – 32767	1
U39	B27h		USER P39	-32768 – 32767	1
U40	B28h		USER P40	-32768 – 32767	1
U41	B29h		USER P41	-32768 – 32767	1
U42	B2Ah		USER P42	-32768 – 32767	1
U43	B2Bh		USER P43	-32768 – 32767	1
U44	B2Ch		USER P44	-32768 – 32767	1
U45	B2Dh		USER P45	-32768 – 32767	1
U46	B2Eh		USER P46	-32768 – 32767	1
U47	B2Fh		USER P47	-32768 – 32767	1
U48	B30h		USER P48	-32768 – 32767	1
U49	B31h		USER P49	-32768 – 32767	1
U50	B32h		USER P50	-32768 – 32767	1
U51	B33h		USER P51	-32768 – 32767	1
U52	B34h		USER P52	-32768 – 32767	1
U53	B35h		USER P53	-32768 – 32767	1
U54	B36h		USER P54	-32768 – 32767	1
U55	B37h		USER P55	-32768 – 32767	1
U56	B38h		USER P56	-32768 – 32767	1
U57	B39h		USER P57	-32768 – 32767	1
U58	B3Ah		USER P58	-32768 – 32767	1
U59	B3Bh		USER P59	-32768 – 32767	1
U60	B3Ch		USER P60	-32768 – 32767	1
U61	B3Dh	75(4Bh)	USER P61/U-Ai1	-32768 – 32767	1
U62	B3Eh	76(4Ch)	USER P62/U-Ai2	-32768 – 32767	1
U63	B3Fh	77(4Dh)	USER P63/U-Ai3	-32768 – 32767	1
U64	B40h	78(4Eh)	USER P64/U-Ai4	-32768 – 32767	1

You can change the setting of the functions indicated with during operation. Stop the operation before changing other functions.

Option guides

Name	Main operations/applications
Surge absorber (suppressor)	Absorbs surges and noises generated from the inverter to prevent malfunction of magnetic contactors, mini control relays, and timers.
Arrester	Suppresses induced lightning surges from the power source to protect entire equipment connected to the power source.
Surge killer	Absorbs surges and noises coming from outside to protect electronic devices inside the panel from malfunction.
Control option card	Enables more precise operation, control and installation of different I/Os.
Communications option card	Facilitates system construction including PLCs and PCs.
Extension cable for KEYPAD	Used for remote control between an inverter and the KEYPAD.
Braking resistor	Increases braking capability for highly frequent stopping and large moment of inertia.
Braking unit	Used in combination with a braking resistor for units of 75kW or more for 200V and 132kW or more for 400V.
Power regenerative PMW converter, RHC series	Used for suppressing power source harmonics of inverters. It is also equipped with a power supply regenerative function to drastically increase braking capability and reduce energy consumption. Use in combination with dedicated reactors for the RHC series.
Dedicated filter for the RHC series	Dedicated filter for the RHC series is used if the power supply impedance at the rated current of an inverter exceeds 1% and electronic equipment is connected to the same power supply. Use in combination with dedicated filter reactors, filter capacitors and filter resistors.



Name	Main operations/applications
EMC compliance filter	Dedicated filter to comply with the European EMC Directive (Emission).
Ferrite ring for reducing radio noise	Used to reduce radio noise. Inserting it on the power supply side if the cable length between a motor and an inverter is short (roughly 20m or less) or on the output side if the cable length exceeds 20m is recommended.
AC reactor (ACR)	Can be used to correct the power-factor and to normalize the power supply. We recommend more efficient, compact and light DC REACTOR. Use only when you require an especially stable power supply such as a DC bus connection (PN connection operation). Use DC REACTOR (DCR) for reducing harmonic.
DC REACTOR (DCR)	[For power supply normalization] ①Use if the power transformer capacity is 500kVA or more and exceeds the inverter rated capacity by 10 times. ②Use if the inverter and a thyristor converter are connected with the same transformer. *Check if the thyristor converter uses a commutation reactor. If not, an AC reactor must be connected to the power supply side. ③Connect to prevent trips when 0U trip occurs due to opening/closing of the phase-advancing capacitor for the power supply lines. ④Use if the voltage unbalance exceeds 2%. Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V]) / Three-phase average voltage [V] × 67[%] (Conforming to IEC 61800-3 (5.2.3))  [For improving the input power-factor and reducing harmonics] - Used to reduce the input harmonic current (correcting power-factor)
Output circuit filter	Connected to the output of a low-noise inverter to: • Suppress fluctuations of motor terminal voltage. • Prevent damages to the motor insulation due to surge voltage in 400V series inverter.
Surge supperession unit SSU-□□□-□TA-NS	Prevents the motor insulation from being damaged by the surge current of the inverter.

Control option cards and support software

Category	Name	Type	Switch with SW on the PCB.	Specifications
Analog card	Synchronized operation card	OPC-VG7-SN		Synchronizing interface circuits for dancer control.
	F/V converter	OPC-VG7-FV		F/V converter
	Aio extension card	OPC-VG7-AIO		Extension card of Ai: 2 points + Ao 2 points.
	Ai extension card	OPC-VG7-AI		Extension card of Ai: 2 points.
Digital card (for 8-bit bus)	Di interface card	OPC-VG7-DI	OPC-VG7-DI(A)	16-bit Di of binary or 4-digit BCD + sign.
			OPC-VG7-DI(B)	For setting the speed, torque and the torque current reference.
	Dio extension card	OPC-VG7-DIO	OPC-VG7-DIO(A)	Extension of Di(4 bits) and Do(8 bits) for function selecting. Dio option card for direct landing control. Di × 16 bit + Do × 10 bit
			OPC-VG7-DIO(B)	UPAC exclusive use
	PG interface extension card	OPC-VG7-PG	OPC-VG7-PG(SD)	+5V line drivers type, voltage output PGs (A,B and Z-phase signals). Used for detecting motor speed, line speed, position reference and position detection.
			OPC-VG7-PG(LD)	
			OPC-VG7-PG(PR)	
			OPC-VG7-PG(PD)	
		OPC-VG7-PGo	OPC-VG7-PGo(SD)	Open collector type voltage output PGs (A,B and Z-phase signals). Used for detecting motor speed, line speed, position reference and position detection.
			OPC-VG7-PGo(LD)	
			OPC-VG7-PGo(PR)	
			OPC-VG7-PGo(PD)	
	T-Link interface card	OPC-VG7-TL		T-link interface card for FUJI MICREX-F series PLC.
	High-speed serial card	OPC-VG7-SI		Used for multiwinding motor drive system.
		OPC-VG7-SIU		Used for UPAC communications system.
		OPC-VG7-SIR		Used for parallel motor drive systems with reactor.
	RS-485 extension card	OPC-VG7-RS		I/F option card for UPAC communications and RS-485.
	CC-Link interface card	OPC-VG7-CCL *		
	PG card for synchronous motor driving	OPC-VG7-PMPG		+5V line drivers type / Open collector type: A, B + magnetic pole position (max. 4 bits).
		OPC-VG7-PMPGo		
	Magnet orientation card	OPC-VG7-MG		Position control of controlled axis with the use of magnet sensor.
	Resolver interface card	OPC-VG7-RD		Resolver interface card
Digital card (for 16-bit bus)	User Programmable Application Card	OPC-VG7-UPAC		Technology card
	SX bus interface card	OPC-VG7-SX *		SX bus interface card for FUJI MICREX-SX series PLC.
Fieldbus interface unit	PROFIBUS-DP	OPC-VG7-PDP *		Used as interface between KEYPAD and inverter unit.
	DeviceNet	OPC-VG7-DEV *		
Separate installation type	Synchronized operation unit	MCA-VG7-SN		Synchronizing interface circuits
	F/V converter	MCA-VG7-FV		F/V converter
	Dancer controller	MCAII-PU		Dancer controller
	PG signal switch	MCA-VG7-CPG		Switch between PG and NTC signal (2-signal switch)
Loader	Inverter support loader	WPS-VG7-PCL		For Windows.
Package software	Tension control software	WPS-VG7-TEN		For Windows.
	Dancer control software	WPS-VG7-DAN		Supplied with inverter support loader CD-ROM.
	Position control software	WPS-VG7-POS		

NOTE: The items marked with * cannot be used for the VG7S of standard version. The VG7S equipped with these items will be of special version. For details, please contact your FUJI sales representative.

Category	Name	Type	Standard length	Max. length	Specifications
Cable	Extension cable for KEYPAD	CBIII-10R-2S	2m	2m	Connection cable between an inverter and the KEYPAD panel
		CBIII-10R-1C	1m	5m	
		CBIII-10R-2C	2m	10m	
	RS-485 / RS232C converter with cable	NP4H-CNV	2m	2m	Converter with cable for a personal computer loader

●Maximum installable number of inverter built-in option cards (4)

Category	Maximum installable number	
	Example 1	Example 2
Analog card	1	0
Digital card (for 8-bit bus)	1	2
Digital card (for 16-bit bus)	1	1
Field bus interface unit	1	1

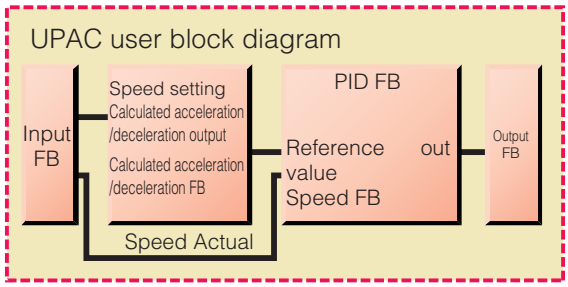
●Restrictions for installing built-in option cards

(1) When you use OPC-VG7-PG for detecting motor speed, the input from the terminals (PA, PB) on the control PC board of the main unit is disabled.
(2) When you install OPC-VG7-PMPG, you should select terminals according to the control method. The terminals (PA, PB) on the control PC board of the main unit are enabled if vector control is selected. The OPC-VG7-PMPG is enabled if vector control (for synchronous motors) is selected.
(3) You cannot use OPC-VG7-TL (T-Link interface), OPC-VG7-SX (SX bus interface) and the field bus interface unit simultaneously. If these are used at the same time, the operation procedure error (Er6) will be issued.
(4) You can select how to use OPC-VG7-DI, OPC-VG7-PG with the switch setting on the control PC board.
You can install a pair of either OPC-VG7-DI, OPC-VG7-PG. If the setting of the switches selecting how to use them are the same, the operation procedure error (Er6) will be issued.

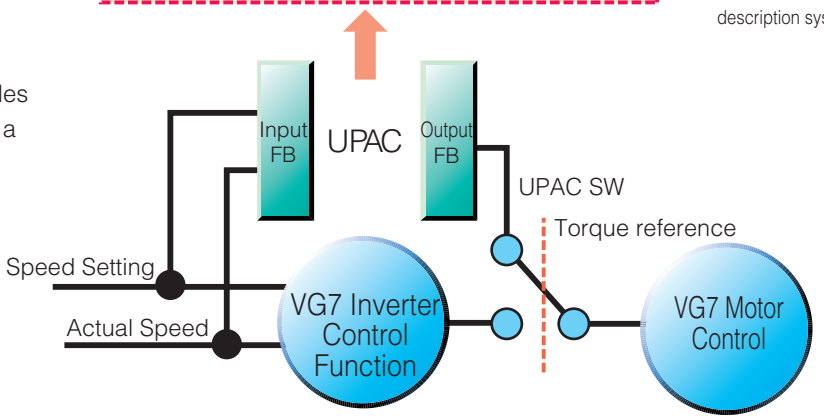
■UPAC

Optional user-programmable functions installed on the inverter

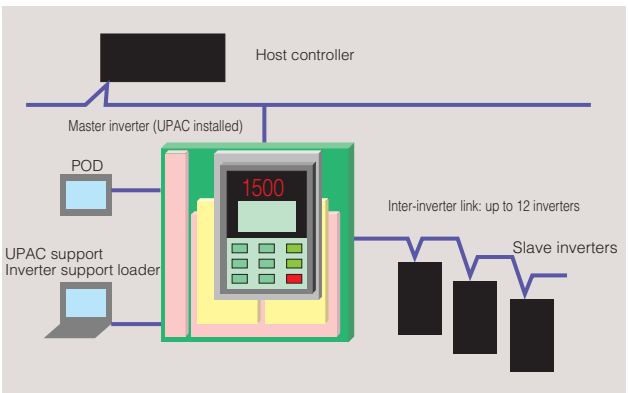
- The option of built-in user-programmable functions is referred to as UPAC (User Programmable Application Card).
- Users can alter part of the inverter control or control terminal functions to perform sequence control.
- Software supporting UPAC is the same as the integrated programming support tool SES300 of MICREX-SX (upgrade for UPAC is necessary on installation).
- High-speed serial card (option) enables master-slave configuration assigning a UPAC-installed inverter as a master.



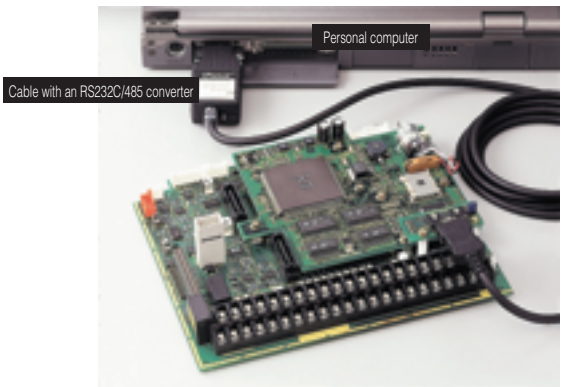
SE300: Integrated programming environment SE300
1. Programming support tool SED300 (D300 WIN)
2. Action specification description system SEA300



UPAC system application



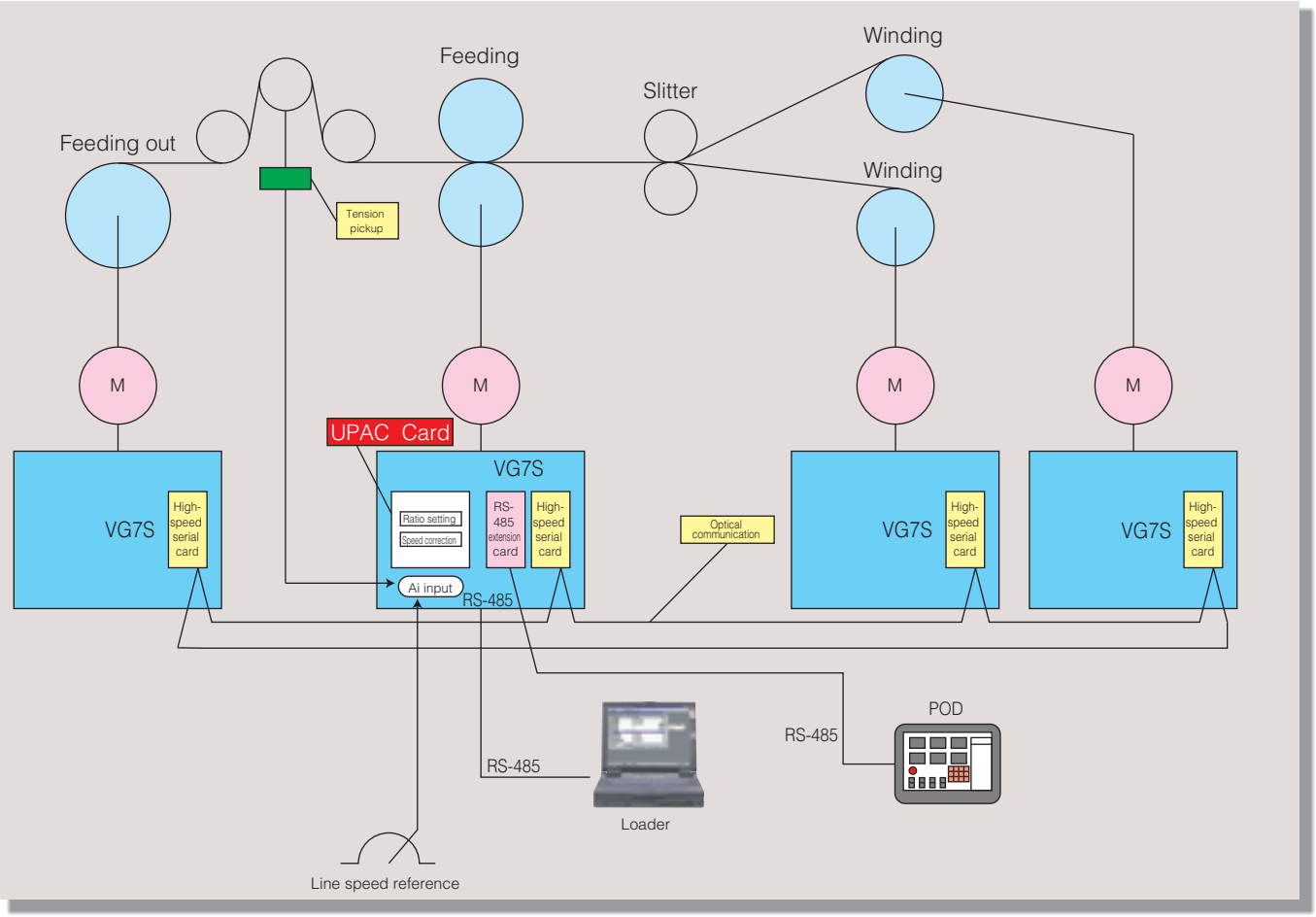
Cable connection



An example of a System Configuration with UPAC

Below is an example of a winding up system with UPAC.

The inverter for a feed shaft is assigned as a master and UPAC is installed on it.
The entire system is controlled by UPAC by linking it with three other inverters via optical communications.
Speed control is applied to the feed shaft, tension control with tension pickups is applied to the feed-out shaft, and direct tension control without tension sensors is applied to the take-up shafts.
Tension control is stabilized with simultaneous acceleration/deceleration compensation and mechanical loss compensation.
A POD (Programmable Operation Display) is used for the entry of control data and control status display.
A loader for the personal computer is provided as a programming support tool with UPAC. Easy programming is realized by loader functions such as defining original circuits of users as FBs (Function Blocks) and multiple windows.

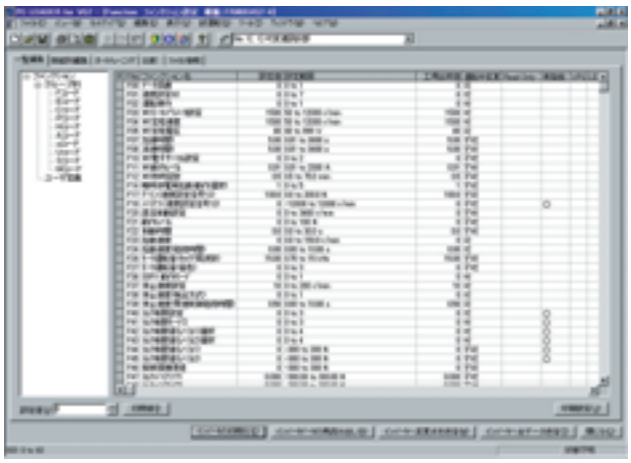


■ Inverter Support Loader

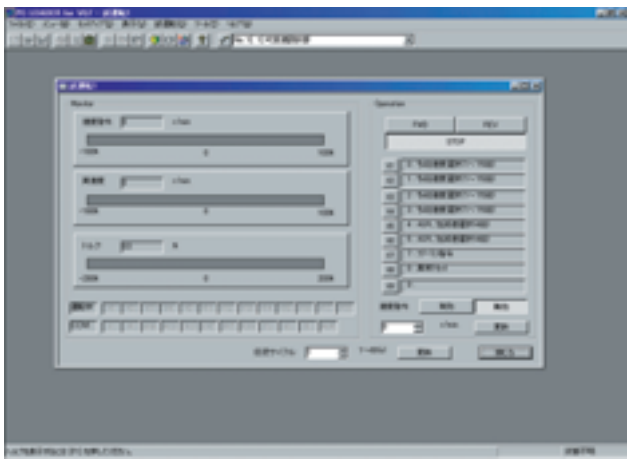
Complete Functions

- You can edit, compare and copy the function code data.
- Operation monitoring, real-time/historical traces, fault monitoring and multiple monitoring are also available.
- Trial operation and tuning are available.
- You can monitor the operational status of up to 31 inverters by executing multiple-scan from your personal computer.
- You can choose the English or Japanese version on installation.
- You can trace 100 points of data sampled at 1ms interval in the historical trace and use them for operation/fault analysis in combination with the trigger function.
- Operation is compatible with Windows95/98/NT/XP/2000.

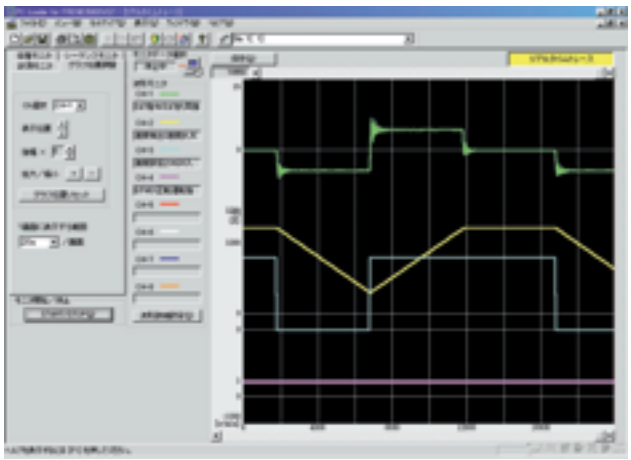
Function code list editing



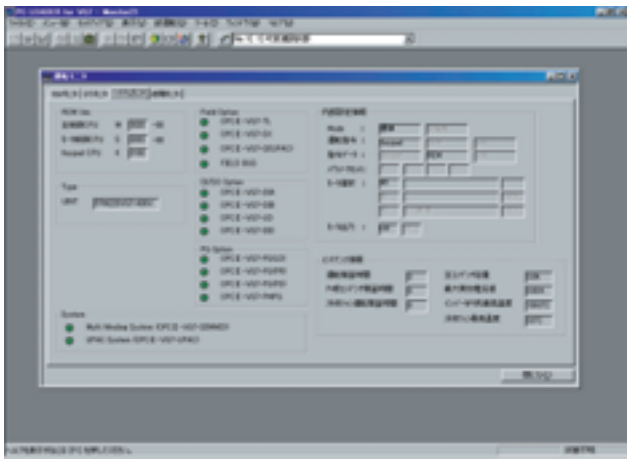
Trial operation screen



Real-time trace



System monitor



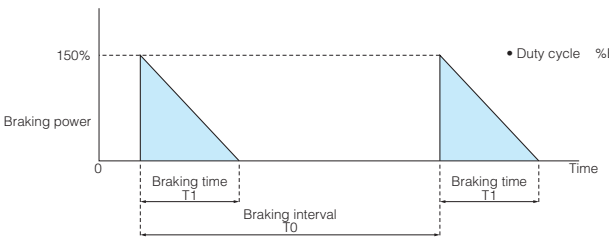
NOTES:

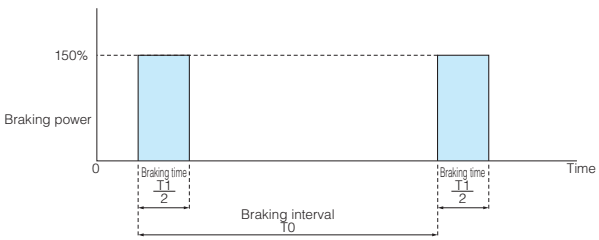
- Connectors are available for connecting to the inverter. Fuji's RS-485/232C converter cable (D-SUB 9 connector) is recommended.
- Though the minimum sampling interval for the real-time trace is 10ms, it may actually be longer due to the communication speed of your personal computer.
- Operation from the KEYPAD or the terminal block (external signal input) is disabled in loader trial operations. Operation from the loader is switched to the personal computer, KEYPAD or terminal block automatically for real operations.
- Product technology names related to Windows95, 98, NT, XP, and 2000 are trademarks or registered trademarks of Microsoft Corporation.

■ Braking resistor, braking unit (max. 150% torque, 10%ED)

Power supply voltage	Nominal applied motor [kW]	Inverter type	Braking unit		Braking resistor			Continuous braking (100% torque conversion value)			Repetitive braking (100s or less cycle)	
			Type	Q'ty	Type	Ohmic value	Q'ty	Max. braking torque [%]	Braking time [s]	Discharging capability [kWs]	Duty cycle [%ED]	Average loss [kW]
200V	0.75	FRN0.75VG7S-2	Built-in inverter		DB2.2V-21B	30Ω	1	150%	10s	16.5	10%ED	0.165
	1.5	FRN1.5VG7S-2										
	2.2	FRN2.2VG7S-2										
	3.7	FRN3.7VG7S-2			DB3.7V-21B	24Ω	1			27.75		0.2775
	5.5	FRN5.5VG7S-2			DB5.5V-21B	16Ω	1			41.25		0.4125
	7.5	FRN7.5VG7S-2			DB7.5V-21B	12Ω	1			56.25		0.5625
	11	FRN11VG7S-2			DB11V-21B	8Ω	1			82.5		0.825
	15	FRN15VG7S-2			DB15V-21B	6Ω	1			112.5		1.125
	18.5	FRN18.5VG7S-2			DB18.5V-21B	4.5Ω	1			138.75		1.3875
	22	FRN22VG7S-2			DB22V-21B	4Ω	1			165		1.65
	30	FRN30VG7S-2			DB30V-21B	2.5Ω	1			225		2.25
	37	FRN37VG7S-2			DB37V-21B	2.25Ω	1			277.5		2.775
	45	FRN45VG7S-2			DB45V-21B	2Ω	1			337.5		3.375
	55	FRN55VG7S-2			DB55V-21C	1.6Ω	1			412.5		4.125
	75	FRN75VG7S-2	BU55-2C	2	DB75V-21C	2.4/2Ω	1			562.5		5.625
	90	FRN90VG7S-2	BU90-2C	2	DB90V-21C	2/2Ω	1			675		6.75
400V	3.7	FRN3.7VG7S-4	Built-in inverter		DB3.7V-41B	96Ω	1	150%	10s	27.75	10%ED	0.2775
	5.5	FRN5.5VG7S-4			DB5.5V-41B	64Ω	1			41.25		0.4125
	7.5	FRN7.5VG7S-4			DB7.5V-41B	48Ω	1			56.25		0.5625
	11	FRN11VG7S-4			DB11V-41B	32Ω	1			82.5		0.825
	15	FRN15VG7S-4			DB15V-41B	24Ω	1			112.5		1.125
	18.5	FRN18.5VG7S-4			DB18.5V-41B	18Ω	1			138.75		1.3875
	22	FRN22VG7S-4			DB22V-41B	16Ω	1			165		1.65
	30	FRN30VG7S-4			DB30V-41B	10Ω	1			225		2.25
	37	FRN37VG7S-4			DB37V-41B	9Ω	1			277.5		2.775
	45	FRN45VG7S-4			DB45V-41B	8Ω	1			337.5		3.375
	55	FRN55VG7S-4			DB55V-41C	6.5Ω	1			412.5		4.125
	75	FRN75VG7S-4			DB75V-41C	4.7Ω	1			562.5		5.625
	90	FRN90VG7S-4			DB90V-41C	3.9Ω	1			675		6.75
	110	FRN110VG7S-4			DB110V-41C	3.2Ω	1			825		8.25
	132	FRN132VG7S-4	BU220-4C	1	DB132V-41C	2.6Ω	1			990		9.9
	160	FRN160VG7S-4			DB160V-41C	2.2Ω	1			1200		12.0
	200	FRN200VG7S-4	BU220-4C	2	DB200V-41C	3.5/2Ω	1			1500		15.0
	220	FRN220VG7S-4			DB220V-41C	3.2/2Ω	1			1650		16.5
	250	FRN250VG7S-4			DB132V-41C	2.6 Ω	2			1875		18.8
	280	FRN280VG7S-4			DB160V-41C	2.2/2Ω	2			2100		21.0
	315	FRN315VG7S-4			DB160V-41C	2.2/2Ω	2			2363		23.6
	355	FRN355VG7S-4	BU220-4C	3	DB132V-41C	2.6/3Ω	3			2663		26.6
	400	FRN400VG7S-4			DB132V-41C	2.6/3Ω	3			3000		30.0
	500	FRN500VG7S-4		4	DB132V-41C	2.6/4Ω	4			3750		37.5
	630	FRN630VG7S-4			DB160V-41C	2.2/4Ω	4			4725		47.3

NOTES:
- The braking time and duty cycle [%ED] are calculated as the constant-torque braking used for deceleration as described below.
- Refer to the User's Manual for braking resistors other than those for 10%ED.

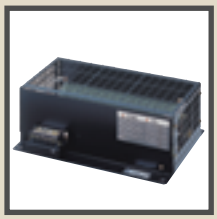


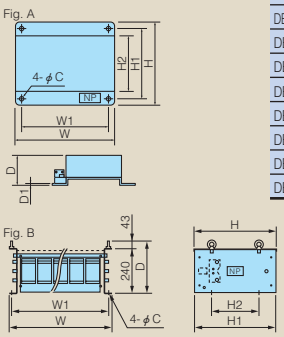


[Selection procedure]
All three conditions listed below must be satisfied simultaneously.
① The maximum braking torque does not exceed the value shown on the table.
② The energy discharged in the resistor for each braking (the area of the triangle shown in the above figure) does not exceed the discharging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

Options

■Braking resistor





200V Series

Type	Fig.	Dimensions [mm]								Mass [kg]
		W	W1	H	H1	H2	D	D1	C	
DB2.2V-21B	A	330	298	242	210	165	140	1.6	8	4
DB3.7V-21B		400	368	280	248	203	140	1.6	8	5
DB5.5V-21B		400	368	280	248	203	140	1.6	8	5
DB7.5V-21B		400	368	480	448	377	140	1.6	10	6
DB11V-21B		400	368	480	448	377	140	1.6	10	7
DB15V-21B		400	368	660	628	557	140	1.6	10	10
DB18.5V-21B		400	368	660	628	557	140	1.6	10	10
DB22V-21B		400	368	660	628	557	240	1.6	10	13
DB30V-21B		400	368	660	628	557	240	1.6	10	18
DB37V-21B		405	368	750	718	647	240	1.6	10	22
DB45V-21B		405	368	750	718	647	340	1.6	10	26
DB55V-21C	B	450	420	440	430	250	283	—	12	35
DB75V-21C		600	570	440	430	250	283	—	12	33
DB90V-21C		700	670	440	430	250	283	—	12	43

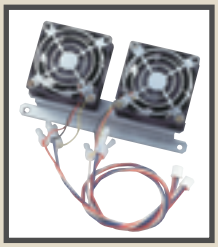
400V Series

Type	Fig.	Dimensions [mm]								Mass [kg]
		W	W1	H	H1	H2	D	D1	C	
DB3.7V-41B	A	420	388	280	248	203	140	1.6	8	5
DB5.5V-41B		420	388	480	448	377	140	1.6	10	7
DB7.5V-41B		420	388	480	448	377	140	1.6	10	7
DB11V-41B		420	388	480	448	377	140	1.6	10	8
DB15V-41B		420	388	660	628	557	140	1.6	10	11
DB18.5V-41B		420	388	660	628	557	140	1.6	10	11
DB22V-41B		420	388	660	628	557	240	1.6	10	14
DB30V-41B		420	388	660	628	557	240	1.6	10	19
DB37V-41B		425	388	750	718	647	240	1.6	10	21
DB45V-41B		425	388	750	718	647	340	1.6	10	26
DB55V-41C	B	550	520	440	430	250	283	—	12	26
DB75V-41C		550	520	440	430	250	283	—	12	30
DB90V-41C		650	620	440	430	250	283	—	12	41
DB110V-41C		750	720	440	430	250	283	—	12	57
DB132V-41C		750	720	440	430	250	283	—	12	43
DB160V-41C		600	570	440	430	250	283	—	12	74
DB200V-41C		725	695	440	430	250	283	—	12	50(x2)
DB220V-41C		725	695	440	430	250	283	—	12	51(x2)

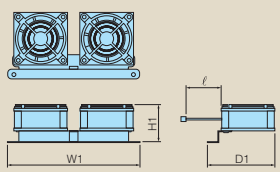
■Braking unit (BU □□-□) : G11 / P11

Voltage	Type	Fig.	Dimensions [mm]						Mass [kg]
			W	W1	H	H1	H2	D	
200V series	BU22-2C	A	Fig.A						2
		A							
	BU37-2C	B	150	100	240	225	210	160	4
	BU55-2C	C	230	130	240	225			6
	BU90-2C	C	250	150	370	355	340		9
400V series	BU22-4C	A	Fig.A						2
	BU22-4D	D	Fig.D						1.5
	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

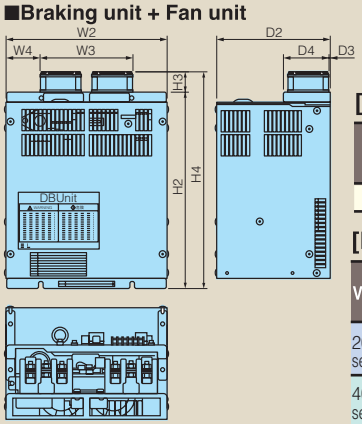
■Fan unit for braking unit (BU-F)



■Fan unit



■Braking unit + Fan unit



[Fan unit]

Type	Dimensions [mm]			
	W1	H1	D1	ℓ(Fan power supply cable)
BU-F	149	44	76	320

[Braking unit + Fan unit]

Voltage	Type	Dimensions [mm]								
		W2	W3	W4	H2	H3	H4	D2	D3	D4
200V series	BU55-2C+BU-F	230	135	47.5	240	30	270	160	1.2	64
	BU90-2C+BU-F	250		57.5	370		400			
400V series	BU220-4C+BU-F	250	135	57.5	450	30	480	160	1.2	64

■DC REACTOR (DCR□-□□□)

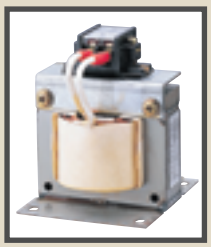


Fig. A

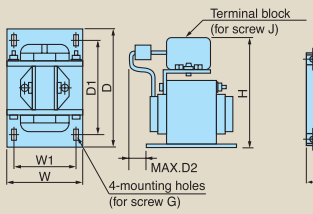


Fig. B

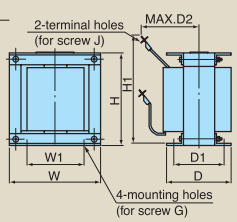


Fig. C

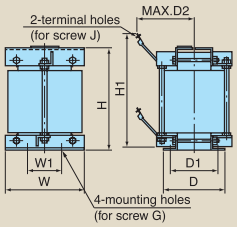
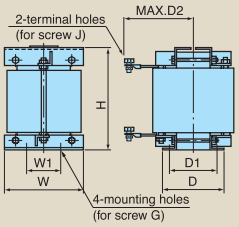


Fig. D

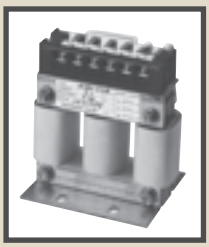


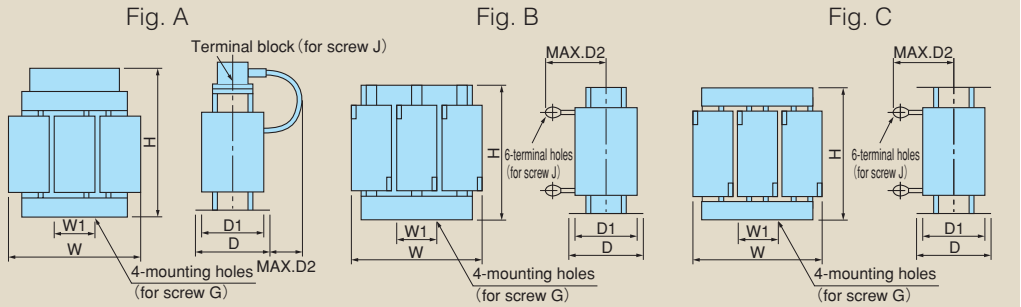
*The DC REACTOR is provided as standard (supplied for external installation) in inverters of 75kW or more.

Voltage	Nominal applied motor [kW]	Inverter type		REACTOR type	Fig.	Dimensions [mm]									Mass [kg]
		CT use [150%]	VT use [110%]			W	W1	D	D1	D2	G	H	H1	J	
200V series	0.75	FRN0.75VG7S-2	—	DCR2-0.75	A	66	56	90	72	20	M4 (5.2×8)	94	—	M4	1.4
	1.5	FRN1.5VG7S-2	FRN0.75VG7S-2	DCR2-1.5	A	66	56	90	72	20	M4 (5.2×8)	94	—	M4	1.6
	2.2	FRN2.2VG7S-2	FRN1.5VG7S-2	DCR2-2.2	A	86	71	100	80	10	M5 (6×9)	110	—	M4	1.8
	3.7	FRN3.7VG7S-2	FRN2.2VG7S-2	DCR2-3.7	A	86	71	100	80	20	M5 (6×9)	110	—	M4	2.6
	5.5	FRN5.5VG7S-2	FRN3.7VG7S-2	DCR2-5.5	A	111	95	100	80	20	M6 (7×11)	130	—	M5	3.6
	7.5	FRN7.5VG7S-2	FRN5.5VG7S-2	DCR2-7.5	A	111	95	100	80	23	M6 (7×11)	130	—	M5	3.8
	11	FRN11VG7S-2	FRN7.5VG7S-2	DCR2-11	A	111	95	100	80	24	M6 (7×11)	137	—	M6	4.3
	15	FRN15VG7S-2	FRN11VG7S-2	DCR2-15	A	146	124	120	96	15	M6 (7×11)	180	—	M8	5.9
	18.5	FRN18.5VG7S-2	FRN15VG7S-2	DCR2-18.5	A	146	124	120	96	25	M6 (7×11)	180	—	M8	7.4
	22	FRN22VG7S-2	FRN18.5VG7S-2	DCR2-22A	A	146	124	120	96	25	M6 (7×11)	180	—	M8	7.5
	30	FRN30VG7S-2	FRN22VG7S-2	DCR2-30B	B	152	90	156	116	115	M6 (φ8)	130	190	M10	12
	37	FRN37VG7S-2	FRN30VG7S-2	DCR2-37B	B	171	110	151	110	115	M6 (φ8)	150	200	M10	14
	45	FRN45VG7S-2	FRN37VG7S-2	DCR2-45B	B	171	110	166	125	120	M6 (φ8)	150	200	M10	16
	55	FRN55VG7S-2	FRN45VG7S-2	DCR2-55B	C	190	160	131	90	100	M6 (φ8)	210	250	M12	16
	75	FRN75VG7S-2	FRN55VG7S-2	DCR2-75B	C	200	170	141	100	130	M8 (φ10)	210	270	M12	18
	90	FRN90VG7S-2	FRN75VG7S-2	DCR2-90B	C	180	150	151	110	162	M8 (φ10)	240	280	M12	20
	110	—	FRN90VG7S-2	DCR2-110B	C	190	160	161	120	172	M8 (φ10)	270	330	M12	25
400V series	3.7	FRN3.7VG7S-4	—	DCR4-3.7	A	86	71	100	80	20	M5 (6×9)	110	—	M4	2.6
	5.5	FRN5.5VG7S-4	FRN3.7VG7S-4	DCR4-5.5	A	86	71	100	80	20	M5 (6×9)	110	—	M4	2.6
	7.5	FRN7.5VG7S-4	FRN5.5VG7S-4	DCR4-7.5	A	111	95	100	80	24	M6 (7×11)	130	—	M5	4.2
	11	FRN11VG7S-4	FRN7.5VG7S-4	DCR4-11	A	111	95	100	80	24	M6 (7×11)	130	—	M5	4.3
	15	FRN15VG7S-4	FRN11VG7S-4	DCR4-15	A	146	124	120	96	15	M6 (7×11)	168	—	M5	5.9
	18.5	FRN18.5VG7S-4	FRN15VG7S-4	DCR4-18.5	A	146	124	120	96	25	M6 (7×11)	171	—	M6	7.2
	22	FRN22VG7S-4	FRN18.5VG7S-4	DCR4-22A	A	146	124	120	96	25	M6 (7×11)	171	—	M6	7.2
	30	FRN30VG7S-4	FRN22VG7S-4	DCR4-30B	B	152	90	157	115	100	M6 (φ8)	130	190	M8	13
	37	FRN37VG7S-4	FRN30VG7S-4	DCR4-37B	B	171	110	150	110	100	M6 (φ8)	150	200	M8	15
	45	FRN45VG7S-4	FRN37VG7S-4	DCR4-45B	B	171	110	165	125	110	M6 (φ8)	150	210	M8	18
	55	FRN55VG7S-4	FRN45VG7S-4	DCR4-55B	B	171	110	170	130	110	M6 (φ8)	150	210	M8	20
	75	FRN75VG7S-4	FRN55VG7S-4	DCR4-75B	C	190	160	151	115	100	M8 (φ10)	240	270	M10	20
	90	FRN90VG7S-4	FRN75VG7S-4	DCR4-90B	C	190	160	161	125	142	M8 (φ10)	250	280	M10	23
	110	FRN110VG7S-4	FRN90VG7S-4	DCR4-110B	C	190	160	161	125	142	M8 (φ10)	250	280	M10	25
	132	FRN132VG7S-4	FRN110VG7S-4	DCR4-132B	C	200	170	171	135	142	M8 (φ10)	260	280	M10	28
	160	FRN160VG7S-4	FRN132VG7S-4	DCR4-160B	C	210	180	171	135	142	M10 (φ12)	290	320	M10	32
	200	FRN200VG7S-4	FRN160VG7S-4	DCR4-200B	C	210	180	171	135	162	M10 (φ12)	295	330	M10	35
	220	FRN220VG7S-4	FRN200VG7S-4	DCR4-220B	C	220	190	171	135	162	M10 (φ12)	300	350	M12	40
	250	FRN250VG7S-4	—	DCR4-280B	C	220	190	181	145	172	M10 (φ12)	320	370	M12	45
	280	FRN280VG7S-4	FRN220VG7S-4	DCR4-280B	C	220	190	181	145	172	M10 (φ12)	320	370	M12	45
	300	—	FRN250VG7S-4	DCR4-315B	D	220	190	181	145	150	M10 (12×20)	320	—	M12	52
	315	FRN315VG7S-4	FRN280VG7S-4	DCR4-315B	D	220	190	181	145	150	M10 (12×20)	320	—	M12	52
	355	FRN355VG7S-4	FRN315VG7S-4	DCR4-355B	D	220	190	181	145	160	M10 (12×20)	320	—	M12	55
	400	FRN400VG7S-4	FRN355VG7S-4	DCR4-400B	D	240	210	181	145	170	M10 (12×20)	340	—	M12	60
	500	FRN500VG7S-4	FRN400VG7S-4	DCR4-500B	D	260	225	181	145	185	M10 (12×20)	340	—	M12	70
	630	FRN630VG7S-4	FRN500VG7S-4	DCR4-630B	D	300	245	211	170	200	M10 (12×20)	390	—	M12	80
	710	—	FRN630VG7S-4	DCR4-710B	D	310	255	211	170	210	M10 (12×20)	405	—	M12	88

The DC REACTORS in [ ] are provided as standard (separately installed).
Note) When FRN55VG7S-2 and FRN55VG7S-4 are ordered as the CT specification, they do not come equipped with a DC reactor (DCR) as standard.
The DC reactor is included as standard when ordered as the VT specification.

■ AC REACTOR (ACRo-ooo)

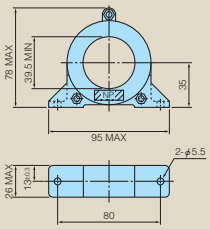




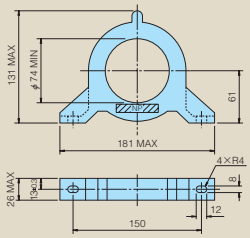
Voltage	Nominal applied motor [kW]	Inverter type		REACTOR type	Fig.	Dimensions [mm]								Mass [kg]
		CT use [150%]	VT use [110%]			W	W1	D	D1	D2	G	H	J	
200V series	0.75	FRN0.75VG7S-2	—	ACR2-0.75A	A	120	40	100	75	20	M5(6×10)	115	M4	1.9
	1.5	FRN1.5VG7S-2	FRN0.75VG7S-2	ACR2-1.5A		120	40	100	75	20	M5(6×10)	115	M4	2.0
	2.2	FRN2.2VG7S-2	FRN1.5VG7S-2	ACR2-2.2A		120	40	100	75	20	M5(6×10)	115	M4	2.0
	3.7	FRN3.7VG7S-2	FRN2.2VG7S-2	ACR2-3.7A		125	40	100	75	25	M5(6×10)	125	M4	2.4
	5.5	FRN5.5VG7S-2	FRN3.7VG7S-2	ACR2-5.5A		125	40	115	90	25	M5(6×10)	125	M4	3.1
	7.5	FRN7.5VG7S-2	FRN5.5VG7S-2	ACR2-7.5A	B	125	40	115	90	106	M5(6×10)	95	M5	3.1
	11	FRN11VG7S-2	FRN7.5VG7S-2	ACR2-11A		125	40	125	100	106	M5(6×10)	95	M6	3.7
	15	FRN15VG7S-2	FRN11VG7S-2	ACR2-15A		180	60	110	85	106	M6(7×11)	115	M6	4.8
	18.5	FRN18.5VG7S-2	FRN15VG7S-2	ACR2-18.5A		180	60	110	85	109	M6(7×11)	115	M6	5.1
	22	FRN22VG7S-2	FRN18.5VG7S-2	ACR2-22A		180	60	110	85	109	M6(7×11)	115	M6	5.1
	30	FRN30VG7S-2	FRN22VG7S-2	ACR2-37		190	60	120	90	172	M6(7×11)	190	M8	11
	37	FRN37VG7S-2	FRN30VG7S-2											
	45	FRN45VG7S-2	FRN37VG7S-2	ACR2-55	C	190	60	120	90	200	M6(7×11)	190	M12	13
	55	FRN55VG7S-2	FRN45VG7S-2											
	75	FRN75VG7S-2	FRN55VG7S-2	ACR2-75		250	100	120	90	200	M8(9×14)	250	M12	25
	90	FRN90VG7S-2	FRN75VG7S-2	ACR2-90		285	190	158	120	190	M10(12×20)	210	M12	26
	110	—	FRN90VG7S-2	ACR2-110		280	150	138	110	200	M8(10×20)	270	M12	30
400V series	3.7	FRN3.7VG7S-4	—	ACR4-3.7A	B	125	40	100	75	106	M5(6×10)	95	M4	2.4
	5.5	FRN5.5VG7S-4	FRN3.7VG7S-4	ACR4-5.5A		125	40	115	90	106	M5(6×10)	95	M5	3.1
	7.5	FRN7.5VG7S-4	FRN5.5VG7S-4	ACR4-7.5A		125	40	115	90	106	M5(6×10)	95	M5	3.7
	11	FRN11VG7S-4	FRN7.5VG7S-4	ACR4-11A		180	60	110	85	106	M6(7×11)	115	M6	4.3
	15	FRN15VG7S-4	FRN11VG7S-4	ACR4-15A		180	60	110	85	106	M6(7×11)	137	M6	5.4
	18.5	FRN18.5VG7S-4	FRN15VG7S-4	ACR4-18.5A										5.7
	22	FRN22VG7S-4	FRN18.5VG7S-4	ACR4-22A										5.9
	30	FRN30VG7S-4	FRN22VG7S-4	ACR4-37		190	60	120	90	172	M6(7×11)	190	M8	12
	37	FRN37VG7S-4	FRN30VG7S-4											
	45	FRN45VG7S-4	FRN37VG7S-4	ACR4-55	C	190	60	120	90	200	M6(7×11)	190	M10	14
	55	FRN55VG7S-4	FRN45VG7S-4											
	75	FRN75VG7S-4	FRN55VG7S-4	ACR4-75		190	60	126	90	157	M6(7×10)	190	M10	16
	90	FRN90VG7S-4	FRN75VG7S-4	ACR4-110		250	100	136	105	202	M8(9.5×18)	245	M12	24
	110	FRN110VG7S-4	FRN90VG7S-4											
	132	FRN132VG7S-4	FRN110VG7S-4	ACR4-132		250	100	146	115	207	M8(10×16)	250	M12	32
	160	FRN160VG7S-4	FRN132VG7S-4	ACR4-220		320	120	150	110	240	M10(12×20)	300	M12	40
	200	FRN200VG7S-4	FRN160VG7S-4											
	220	FRN220VG7S-4	FRN200VG7S-4											
	250	FRN250VG7S-4	—	ACR4-280		380	130	150	110	260	M10(12×20)	300	M12	52
	280	FRN280VG7S-4	FRN220VG7S-4											

Note) This is necessary only in operation which requires specially stable power supply such as operation using DC bus connection (PN connection).
Use a DC reactor (DCR) for countermeasure for harmonics.

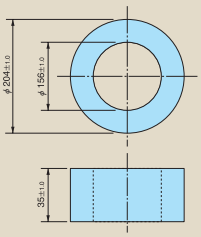
■ Ferrite ring for reducing radio noise (ACL-40B, ACL-74B)



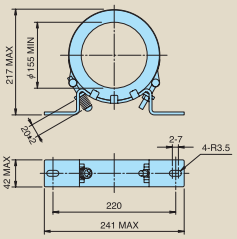
ACL-40B



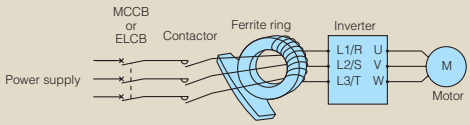
ACL-74B



F200160
(W/o mounting legs)



F200160PB
(Mounting legs provided)



Recommended wire size

Ferrite ring types for reducing radio noise	Q'ty	No. of turns	Recommended wire size [mm^2] *)
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
F200160	4	1	200×2, 250×2, 325×2
F200160PB	4	1	200×2, 250×2, 325×2

NOTE: *) Use a 600V HIV insulation cable (Allowable temp. 75°C).
Contact Fuji when using wires of size other than mentioned above.

■ EMC compliant filter (RF3ooo-F11) [400V series]

Fig. A

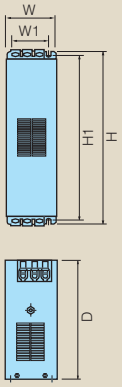


Fig. B

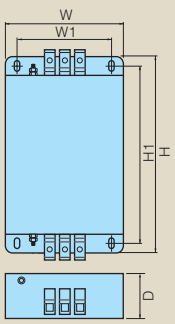
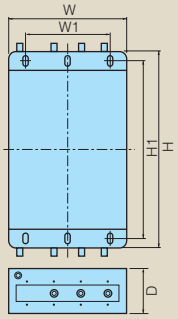


Fig. C



Inverter type	EMC filter type	Rated voltage [V]	Rated current [A]	Leakage current[mA] Normal	Leakage current[mA] Open phase	Fig.	Dimensions [mm] W	W1	H	H1	D	Mtg. screw
FRN3.7 to 7.5VG7S-4	FS5941-40-47	480	40	25	176	A	70	45	290	275	185	M5
FRN11 to 15VG7S-4	FS5941-60-52		60				80	55	329	314	185	M6
FRN22VG7S-4	FS5941-86-52		86				80	55	329	314	185	M6
FRN30VG7S-4	RF3100-F11		100	0.5	130	B	200	166	435	408	130	M6
FRN37 to 90VG7S-4	RF3180-F11		180				200	166	495	468	160	M6
FRN110 to 132VG7S-4	RF3280-F11		280		270	C	250	170	587	560	205	M6
FRN160 to 220VG7S-4	RF3400-F11		400	1.5			250	170	587	560	205	M6
FRN280 to 400VG7S-4	RF3880-F11		880				364	300	688	648	180	M8

■ Output circuit filter (OFL-□□-4A) [400V series]

● Filter

Fig. A

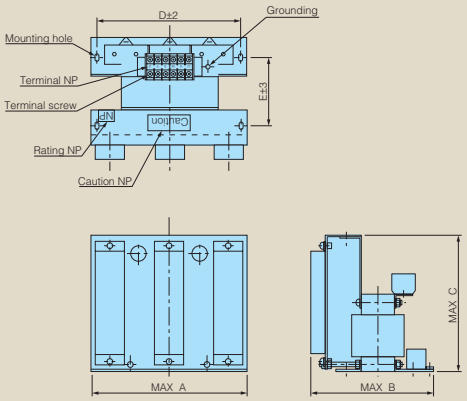


Fig. B

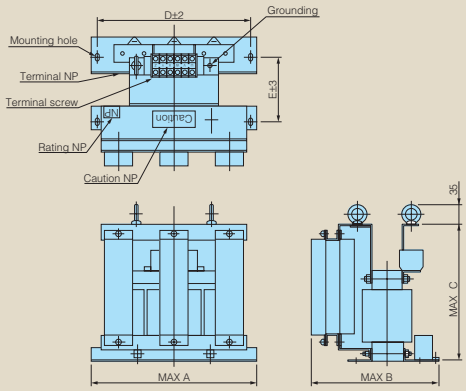


Fig. C

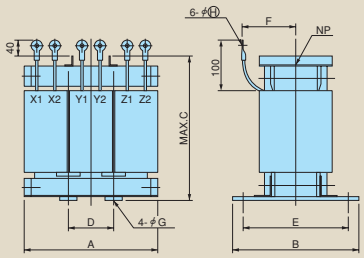
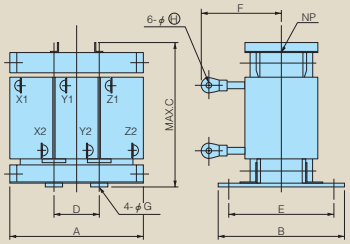
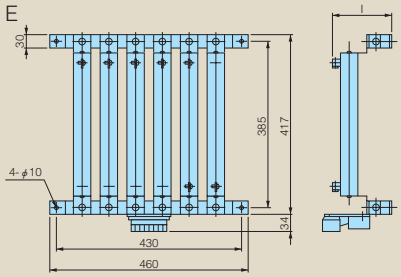


Fig. D



● Resistor/capacitor

Fig. E



The capacitor and resistor for filter OFL-30-4A or larger have to be installed separately (the capacitor and resistor masses are not included in the filter mass on the table below).

Applicable inverter	Filter type	Fig.	Dimensions [mm]										Approx. mass [kg]
			A	B	C	D	E	F	I	Grounding screw	Terminal screw H	Mounting screw G	
FRN3.7VG7S-4	OFL-3.7-4A	A	220	225	220	200	115	–	–	M4	M4	M5	14
FRN5.5VG7S-4	OFL-7.5-4A		290	290	230	260	160			M5	M5	M6	22
FRN7.5VG7S-4													
FRN11VG7S-4	OFL-15-4A	B	330	275	310	300	145			M6	M6	M8	35
FRN15VG7S-4													
FRN18.5VG7S-4	OFL-22-4A			300	330		170						45
FRN22VG7S-4													
FRN30VG7S-4	OFL-30-4A	C	210	175	210	70	140	90	160	–	6.4	8	12
FRN37VG7S-4	OFL-37-4A		220	190	220	75	150	95					15
FRN45VG7S-4	OFL-45-4A	D・E		195	265	70	155	140			8.4	10	17
FRN55VG7S-4	OFL-55-4A		260	200	275	85	160	150					22
FRN75VG7S-4	OFL-75-4A			210	290		170		233		10.5	12	25
FRN90VG7S-4	OFL-90-4A							155					28
FRN110VG7S-4	OFL-110-4A		300	230	330	100	190	170					38
FRN132VG7S-4	OFL-132-4A			240	340		200				13		42
FRN160VG7S-4	OFL-160-4A							180					48
FRN200VG7S-4	OFL-200-4A		320	270	350	105	220	190	333			15	60
FRN220VG7S-4	OFL-220-4A		340	300	390	115	250						70
FRN250VG7S-4	OFL-280-4A		350		430			200					78
FRN280VG7S-4	OFL-280-4A												

■ Power regenerative PWM converter, RHC series

■ Features

● **Possible to reduce power supply facility capacity**

Its power-factor control realizes the same phase current as the power-supply phase-voltage. The equipment, thus, can be operated with the power-factor of almost "1."
This makes it possible to reduce the power transformer capacity and downsize the other devices, compared with those required without the converter.

● **Upgraded braking performance**

Regenerated energy occurring at highly frequent accelerating and decelerating operation and elevating machine operation is entirely returned to power supply side.
Thus, energy saving during regenerative operation is possible.
As the current waveform is sinusoidal during regenerative operation, no troubles are caused to the power supply system.

Rated continuous regeneration :	100%
Rated regeneration for 1 min	150% (CT use)
	120% (VT use)

● **Enhanced maintenance/protective functions**

•Failure can be easily analyzed with the trace back function (option).

① The past 10 alarms can be displayed with the 7-segment LEDs.
This helps you analyze the alarm causes and take countermeasures.

② Even if the wiring on phase sequence at power supply side is wrong, correction is automatically made, so that normal operation is assured.

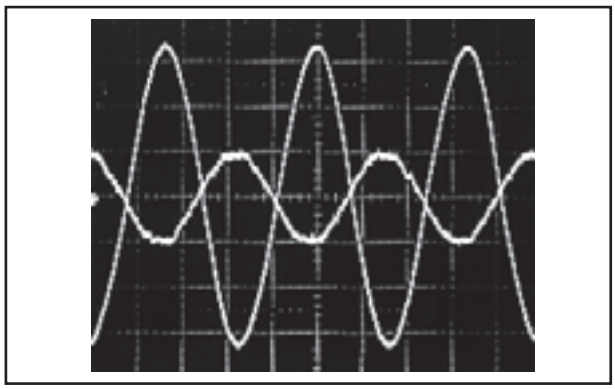
③ When momentary power failure occurs, the converter shuts out the gate to enable continuous operation after recovery.

④ The converter can issue warning signals like overload, heat sink overheating, or the end of service life prior to converter tripping.

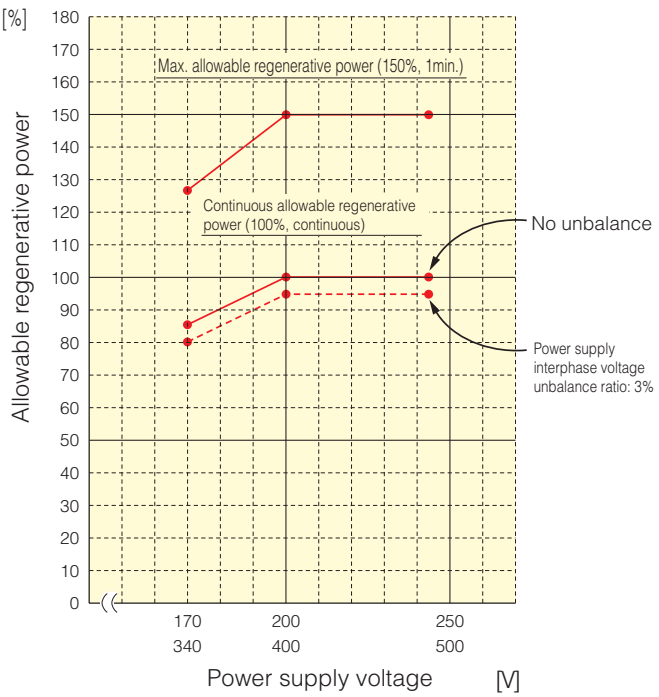
● **Enhanced network support**

•The converter can be connected to MICREX-SX, F series and CC-Link master devices (using option).
The RS-485 interface is provided as standard.

■ Example of waveform at power supply side during regenerative operation



■ Allowable characteristics of the RHC unit



Standard specifications • Common specifications

Standard specifictions

200V series

Item			Standard specification										
Type RHC□□□-2C			200V series										
			7.5	11	15	18.5	22	30	37	45	55	75	90
CT use	Applicable inverter capacity[kW]		7.5	11	15	18.5	22	30	37	45	55	75	90
	Output	Continuous capacity[kW]	8.8	13	18	22	26	36	44	53	65	88	103
		Overload rating	150% of rated current for 1min.										
		Voltage 200V	DC320 to 355V (Variable with input power supply voltage) (*3)										
		Rated input current	27	40	55	67	80	109	135	164	200	267	321
	Required power supply capacity[kVA]		9.5	14	19	24	29	38	47	56	69	93	111
	Carrier frequency		Standard 15kHz									Standard 10kHz	
VT use	Applicable inverter capacity[kW]		11	15	18.5	22	30	37	45	55	75	90	110
	Output	Continuous capacity[kW]	13	18	22	26	36	44	53	65	88	103	126
		Overload capability	120% of rated current for 1min.										
		Voltage 200V	DC320 to 355V (Variable with input power supply voltage) (*3)										
		Rated input current	40	55	67	80	109	135	164	200	267	321	392
	Required power supply capacity[kVA]		14	19	24	29	38	47	56	69	93	111	137
	Carrier frequency		Standard 10kHz									Standard 6kHz	
Power supply voltage	Number of phase/Voltage/Frequency		3-phase 3-wire, 200 to 220V 50Hz, 220 to 230V 50Hz(*1), 200 to 230V 60Hz										
	Voltage/Frequency variation		Voltage+10 to -15%, Frequency ±5%, Voltage unbalance: 3% or less										

400V series

Item			Standard specification																						
Type RHC□□□-4C			400V series																						
			7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	500	630	710B	800B
CT use	Applicable inverter capacity[kW]		7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	500	630	710	800
	Output	Continuous capacity[kW]	8.8	13	18	22	26	36	44	53	65	88	103	126	150	182	227	247	314	353	400	448	560	705	795	896
		Overload rating	150% of rated current for 1min.																						
		Voltage 400V	DC640 to 710V (Variable with input power supply voltage) (*3)																						
	Required power supply capacity(kVA)		9.5	14	19	24	29	38	47	57	70	93	111	136	161	196	244	267	341	383	433	488	610	762	858	967
	Carrier frequency		Standard 15kHz									Standard 10kHz												Standard 6kHz	
VT use	Applicable inverter capacity[kW]		11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	500				
	Output	Continuous capacity[kW]	13	18	22	26	36	44	53	65	88	103	126	150	182	227	247	314	353	400	448	560				
		Overload capability	120% of rated current for 1min.																						
		Voltage 400V	DC640 to 710V (Variable with input power supply voltage) (*3)																						
	Required power supply capacity(kVA)		14	19	24	29	38	47	57	70	93	111	136	161	196	244	267	341	383	433	488	610				
	Carrier frequency		Standard 10kHz									Standard 6kHz													
Power supply voltage	Number of phase/Voltage/Frequency		3-phase 3-wire, 380 to 440V 50Hz, 380 to 460V 60Hz(*2)																						
	Voltage/Frequency variation		Voltage+15 to -10%, Frequency ±5%, Voltage unbalance: 2% or less(*4)																						

(*1) 220 to 230V/50Hz model available on request.
(*2) The tap in the converter must be switched when the power supply voltage is 380 to 398V/50Hz or 380 to 430V/60Hz. The capacity must be reduced when the power supply voltage is less than 400V.
(*3) The output voltage is 320/640 VDC, 343/686 VDC, 355/710 VDC when the power supply voltage is 200/400V, 220/440V and 230/460V, respectively.
(*4) Voltage unbalance [%] = (Max. voltage [V] - Min. voltage [V])/Three-phase average voltage [V] × 67

Common specifications

Item		specification
Control	Control method	AVR constant control with DC ACR minor
	Running	Rectification starts with power ON after connected.Pressurization starts with the running signal (RUN-CM short-circuit or running command from communications). Then, preparation for operation is completed.
	Running status signal	Running, driving, regenerating, operation ready, alarm relay output (for any fault), etc.
	CT/VT switching	Selecting from CT: Overload rating 150% (1min.) and VT: Overload rating 120% (1min.)
	Carrier frequency	Fixed to high carrier frequency
	Input power factor	Above 0.99
	Input high-frequency current	According to the guideline for suppressing harmonics issued by the Ministry of Economy, Trade and Industry, the converter factor (Ki) can be set to 0.
	Restart mode after momentary power failure	Shields the gate when the voltage level reaches undervoltage level if momentary power failure occurs, and the converter can automatically restart after the power recovers.
	Power limit control	Controls the power not to exceed the preset limit value.
Display	Alarm display (protective functions)	AC fuse blown, AC overvoltage, AC undervoltage, AC overcurrent, AC input current error, Input phase loss, Synchronous power supply frequency error, DC fuse blown, DC overvoltage, DC undervoltage, Charge circuit error, Heat sink overheat, External alarm, Converter overheat, Overload, Memory error, Keypad communication error, CPU error, Network device error, Operation procedure error, A/D converter error, Optical network error, IPM error
	Alarm history	Records and displays the last 10 alarms. The detailed information of the trip cause for the previous alarm is stored and displayed.
	Monitor	Displays input power, input effective current, input effective voltage, DC intermediate current and power supply frequency.
	Load factor	The load rate can be measured by using the keypad.
	Display language	Function codes can be set or referred to in Japanese, English and Chinese (3 languages).
	Charge lamp	Lights when the main circuit condenser is charged.

Terminal Functions

Terminal Functions

Division	Symbol	Terminal name	Functions
Main circuit	L1/R, L2/S, L3/T	Power input	Connects with a three-phase power supply via the dedicated reactor.
	P (+), N (-)	Converter output	Connects with the inverter power supply input terminal P (+), N (-).
	E (G)	Grounding	Ground terminal for inverter chassis (housing).
	R0, T0	Auxiliary control power supply	Connects with the same power circuit as that for the control power backup terminal and the main power circuit.
Voltage detection	R1, S1, T1	Synchronous power supply input for voltage detection	Voltage detection terminals for controlling the inside of the converter. These are connected with the power supply side of the dedicated reactor and filter.
	R2, T2	Control monitor input	Terminals that connect with the circuit for detecting disconnection caused by blown AC fuse.
Input signal	RUN	RUN command	The converter starts running when this command is ON between RUN and CM, and stops when OFF.
	RST	Alarm reset command	In case of alarm stop, eliminate the cause and turn on this command between RST and CM. The protective function is disabled and the alarm state is released.
	X1	General-purpose transistor input	0: External fault [THR], 1: Current limit cancel [LMT-CCL], 2: 73 answerback [73ANS], 3: Current limit switching [1-LIM], 4: Optional DI [OPY-DI]
	CM	Digital input common	Common terminal for digital input signals.
	PLC	PLC signal power supply	Connects with the PLC output signal power supply. (Rated voltage: 24V (22 to 27V) DC)
Output signal	30A, 30B, 30C	Alarm relay output (for any fault)	Outputs a signal when a protective function is activated to stop the converter. (Contact at 1C, Circuit between 30A and 30C comes ON when an alarm occurs) (Contact capacity: 250V AC, max 50mA.)
	Y1, Y2, Y3, Y11 to Y18	General-purpose transistor output	0: Inverter running [RUN] 1: Operation ready output [RDY] 2: Power supply current limiting [IL] 3: Lifetime alarm [LIFE] 4: Cooling fin overload [PRE-OH] 5: Overload alarm [PRE-OL] 6: Driving [DRV] 7: Regenerating [REG] 8: Current limit alarm [CUR] 9: Under restart [U-RES] 10: Power supply frequency synchronizing [SY-HZ] 11: Alarm indication [AL1] 12: Alarm indication 2 [AL2] 13: Alarm indication 4 [AL4] 14: Optional DO [OPT-DO] * With OPC-VG-AO option, 8-point expanded functions become available (DI function is not available.)
	CME	Digital output common	
	Y5A, Y5C	Relay output	
	A01, A04, A05	General-purpose analog output	0: Input power [PWR] 1: Input current rms [I-AC] 2: Input voltage rms [V-AC] 3: DC link circuit voltage [V-DC] 4: Power supply frequency [FREQ] 5: +10V output test [P10] -10V output test [N10] * With OPC-VG-AO option, 2-point expanded functions become available (Ai function is not usable.)
	M	Analog output common	Common terminal for analog input signals.
	73A, 73C	Charging resistance input relay output	Control output for the input relay of the external charging resistance (73)

Communications Specifications

Item			Specifications
Communication specification	General specifications for communication		Enables to show running information and running status, and to monitor the function code (polling), and to control (selecting) RUN, RST, and X1. * No function code can be written.
	RS-485 (standard)		Communicates with the PC or PLC (Fuji protocol and RTU are supported.)
	T-Link (optional)		OPC-VG7-TL option allows T-Link communication with the T-Link module in the MICREX-F or MICREX-SX.
	SX bus (optional)		OPC-VG7-SX option allows connection between SX bus and MICREX-SX.
	CC-Link (optional)		OPC-VG7-SX option allows connection with the CC link master device.
	PROFIBUS-DP (optional)		These options will be supported soon.
	DeviceNet (optional)		
	Trace back (optional)	Hardware	OPC-RHC-TR option allows trace-back of the converter operation status data. The software (WPS-LD-TR) is required.
		Software	WPS-RHC-TR software allows collecting the trace back data on the PC.
	Optical communications (optional)		OPC-VGS-SI option allows sharing the load of the concurrent multitasking system. Therefore, the capacity of up to 2400kW can be supported.

Function Settings

Function code	Name
F00	Data protection
F01	High-frequency filter selection
F02	Restart mode after momentary power failure (operation selection)
F03	Current rating switching
F04	LED monitor (Display selection)
F05	LCD monitor (Display selection)
F06	LCD monitor (Language selection)
F07	LCD monitor (Contrast adjusting)
F08	Carrier frequency
E01	X1 function selection
E02 to 13	Y1, Y2, Y3, Y5, Y11 to 18 function selection
E14	I/O function normally open/normally closed
E15	RHC overload early warning level
E16	Cooling fan ON-OFF control
E17	Output while limiting the current (hysteresis width)
E18 to 20	A01, A04, A05 function selection
E21 to 23	A01, A04, A05 gain setting
E24 to 26	A01, A04, A05 bias setting
E27	A01 to 5 filter setting
S01	Operation method
S02, 03	Power supply current limit (drive/ control)
H01	Station address
H02	Communication error processing
H03	Timer operation time
H04	Baud rate
H05	Data length selection
H06	Parity check
H07	Stop bit check
H08	No-response error detection time
H09	Response interval
H10	Protocol selection
H11	TL transmission format
H12	Parallel system
H13	Number of slave stations in parallel system
H14	Alarm data deletion
H15, 16	Power supply current limit (drive 1/2)
H17, 18	Power supply current limit (control 1/2)
H19, 20	Current limit early warning (level/ timer)
M09	Power supply frequency
M10	Input power
M11	Effective input current
M12	Effective input voltage
M13	Run command
M14	Running status
M15	Output terminals Y1 to Y18

Protective Functions

Item	LED monitor	Function	Remarks
AC fuse blown	ACF	When the AC fuse is blown (only R and T phases), the converter stops running.	
AC overvoltage	AOV	The converter stops running on detection of AC overvoltage.	
AC undervoltage	ALV	The converter stops running on detection of AC undervoltage.	
AC overcurrent	AOC	The converter stops running if the input current peak value exceeds the overcurrent level.	
AC input current error	ACE	The converter stops running on detection of excessive deviation between AC input and ACR.	
Input phase loss	LPV	The converter stops running if the input phase loss occurs in the power supply.	
Synchronous power supply frequency error	FrE	The power supply frequency is checked after "73" is input. If a frequency error is detected, the converter stops running. Error during converter running (such as momentary power failure) triggers no alarm.	
DC fuse blown	dCF	The converter stops running if the AC fuse is blown (P side).	Above 18.5kW
DC overvoltage	dOV	The converter stops running on detection of DC overvoltage. If the power failure takes long and the control power goes out, the converter is automatically reset.	200V series: Above 400V±3V 400V series: Above 800V±5V
DC undervoltage	dLV	The converter stops running on detection of DC undervoltage. If the power failure takes long and the control power goes out, the converter is automatically reset.	200V series: Runs at 185V and restarts at 208V 400V series: Runs at 371V and restarts at 417V
Charge circuit error	PbF	When the charge circuit error is detected while the answerback signal usage at input of 73 is specified, the converter stops running.	Condition: X1 "73 Answerback" is selected.
Cooling fin overheat	OH1	The converter stops running if the cooling fin overheat is detected.	
External alarm	OH2	The converter stops running if an external signal (THR) is input.	Condition: X1 "External alarm" is selected.
Converter internal overheat	OH3	When overheat is detected in the inverter, the converter stops running.	
Converter overload	OLU	When the output current exceeds the overload characteristic of the inverse time characteristic, the converter stops running.	Start point: 105%, 150% 1 minute
Memory error	Er1	When a fault such as "write error" occurs in the memory (checksum values in EEPROM and RAM do not match), the converter stops running.	
Keypad communication error	Er2	Activated if an error is detected during initial communication. The converter continues operating.	
CPU error	Er3	Activated if an error is detected in the CPU.	
Network device error	Er4	The converter stops running if a fatal error is detected in the master network device (including unconnected power supply).	Applicable to T-Link, SX and CC-Link
Operation procedure error	Er6	When an error is detected in operation procedure, the converter stops running.	
A/D converter error	Er8	When an error is detected in the A/D converter circuit, the converter stops running.	
Optical network error	Erb	The converter stops running if the optical cable is disconnected or a fatal error is detected in an optical device (optional)	
IPM error	IPE	Activated if IPM self-shutoff function is triggered by excessive current or overheat.	Less than 15kW

Structure and environment

Item		Structure, environment and standard
Structure specifications	Structure	Installed in the panel and cooled by external device
	Protective structure	IP00
	Cooling system	Forced air cooling
	Installation method	Vertical installation
	Color	Same color as inverter FRENIC 5000VG7S series (Munsell 5Y3/0.5 half-burnished)
	Maintainability	Structure designed for easy parts change
Environment	Location	Indoor, location free from corrosive gas, flammable gas, dust and direct light
	Ambient temperature	-10 to 50℃
	Humidity	5 to 95%RH Without condensing
	Altitude	Less than 3000m (output reduction may occur if the altitude is in the range between 1001 and 3000m)
	Vibration	2 to 9Hz: Amplitude=3mm, 9 to 20Hz: 9.8m/s², 20 to 55Hz: 2m/s² (9 to 55Hz: 2m/s² is used if the power is higher than 90kW.)
	Storage temperature	-20 to 55℃
	Storage humidity	5 to 95%RH

Options

Equipment Configuration List

CT use

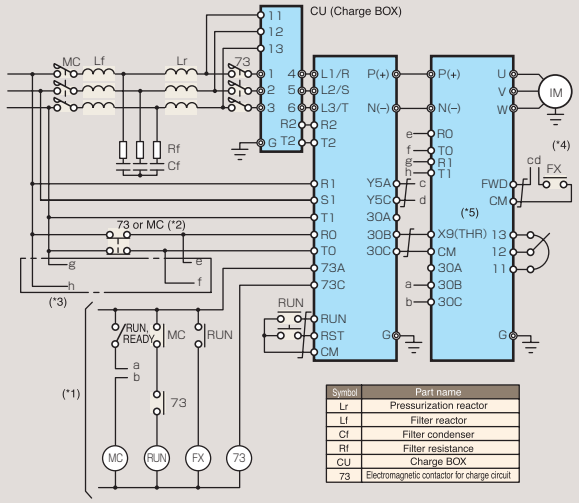
Voltage	Nominal applied motor[kw]	PWM converter type	Charging circuit contactor		Contactor for powersource		Charging circuit box(*1)						Reactor for pressurizing		Resistance for filter		Reactor for filter		Capacitor for filter		Filtering circuit contactor	
									Charging resistance		Fuse											
			(73)	Q'ty	(52)	Q'ty	(CU)	Q'ty	(R0)	Q'ty	(F)	Q'ty	(Lr)	Q'ty	(Rf)	Q'ty	(Lf)	Q'ty	(Cf)	Q'ty	(6F)	Q'ty
200V series	7.5	RHC7.5-2C	SC-5-1	1			CU7.5-2C	1	(80W 7.5Ω)	(3)	(CR2LS-50/UL)	(2)	LR2-7.5C	1	GRZG80 0.42Ω	3	LFC2-7.5C	1	CF2-7.5C	1		
	11	RHC11-2C	SC-N1	1			CU11-2C	1	(HF5C5504)		(CR2LS-75/UL)	(2)	LR2-15C	1	GRZG150 0.2Ω	3	LFC2-15C	1	CF2-15C	1		
	15	RHC15-2C	SC-N2	1			CU15-2C	1			(CR2LS-100/UL)	(2)										
	18.5	RHC18.5-2C	SC-N3	1			CU18.5-2C	1	(GRZG120 2Ω)	(3)			LR2-22C	1	GRZG200 0.13Ω	3	LFC2-22C	1	CF2-22C	1		
	22	RHC22-2C					CU22-2C	1			(CR2L-150/UL)	(2)										
	30	RHC30-2C	SC-N4	1			CU30-2C	1			(CR2L-200/UL)	(2)	LR2-37C	1	GRZG400 0.1Ω	3	LFC2-37C	1	CF2-37C	1		
	37	RHC37-2C	SC-N5	1			CU45-2C	1			(CR2L-260/UL)	(2)										
	45	RHC45-2C	SC-N7	1									LR2-55C	1			LFC2-55C	1	CF2-55C	1		
	55	RHC55-2C	SC-N8	1			CU55-2C	1			(CR2L-400/UL)	(2)										
	75	RHC75-2C	SC-N11	1			CU75-2C	1					LR2-75C	1			LFC2-75C	1	CF2-75C	1		
	90	RHC90-2C					CU90-2C	1	(GRZG400 1Ω)	(3)	(A50P600-4)	(2)	LR2-110C	1	GRZG400 0.12Ω (2 parallels)	6	LFC2-110C	1	CF2-110C	1		
400V series	7.5	RHC7.5-4C	SC-05	1			CU7.5-4C	1	(TK50B 30ΩJ)	(3)	(CR6L-30/UL)	(2)	LR4-7.5C	1	GRZG80 1.74Ω	3	LFC4-7.5C	1	CF4-7.5C	1		
	11	RHC11-4C	SC-4-0	1			CU15-4C	1	(HF5B0416)		(CR6L-50/UL)	(2)	LR4-15C	1	GRZG150 0.79Ω	3	LFC4-15C	1	CF4-15C	1		
	15	RHC15-4C	SC-5-1	1																		
	18.5	RHC18.5-4C	SC-N1	1			CU18.5-4C	1	(80W 7.5Ω)	(3)			LR4-22C	1	GRZG200 0.53Ω	3	LFC4-22C	1	CF4-22C	1		
	22	RHC22-4C					CU22-4C	1	(HF5C0416)		(CR6L-75/UL)	(2)										
	30	RHC30-4C	SC-N2	1			CU30-4C	1			(CR6L-100/UL)	(2)	LR4-37C	1	GRZG400 0.38Ω	3	LFC4-37C	1	CF4-37C	1		
	37	RHC37-4C	SC-N2S	1			CU45-4C	1			(CR6L-150/UL)	(2)										
	45	RHC45-4C	SC-N3	1									LR4-55C	1	GRZG400 0.26Ω	3	LFC4-55C	1	CF4-55C	1		
	55	RHC55-4C	SC-N4	1			CU55-4C	1			(CR6L-200/UL)	(2)										
	75	RHC75-4C	SC-N5	1			CU75-4C	1					LR4-75C	1	GRZG400 0.38Ω	3	LFC4-75C	1	CF4-75C	1		
	90	RHC90-4C	SC-N7	1			CU90-4C	1			(CR6L-300/UL)	(2)	LR4-110C	1	GRZG400 0.53Ω (2 parallels)	6	LFC4-110C	1	CF4-110C	1		
	110	RHC110-4C	SC-N8	1			CU110-4C	1	(GRZG120 2Ω)	(3)												
	132	RHC132-4C					CU132-4C	1			(A50P400-4)	(2)	LR4-160C	1	RF4-160C	1	LFC4-160C	1	CF4-160C	1		
	160	RHC160-4C	SC-N11	1			CU160-4C	1			(A50P600-4)	(2)										
	200	RHC200-4C	SC-N12	1			CU200-4C	1	(GRZG400 1Ω)	(3)			LR4-220C	1	RF4-220C	1	LFC4-220C	1	CF4-220C	1		
	220	RHC220-4C					CU220-4C	1			(A70QS800-4)	(2)										
	280	RHC280-4C	SC-N3	1	SC-N14	1			GRZG400 1Ω	6	A70QS800-4	2	LR4-280C	1	RF4-280C	1	LFC4-280C	1	CF4-280C	1	SC-N4	1
	315	RHC315-4C							(2 parallels)		A70P1600-4TA	2	LR4-315C	1	RF4-315C	1	LFC4-315C	1	CF4-315C	1		
	355	RHC355-4C											LR4-355C	1	RF4-355C	1	LFC4-355C	1	CF4-355C	1		
	400	RHC400-4C			SC-N16	1							LR4-400C	1	RF4-400C	1	LFC4-400C	1	CF4-400C	1		
	500	RHC500-4C			SC-N11	3							LR4-500C	1	RF4-500C	1	LFC4-500C	1	CF4-500C	1(*2)		
	630	RHC630-4C			SC-N12	3					A70P2000-4	2	LR4-630C	1	RF4-630C	1	LFC4-630C	1	CF4-630C	1(*2)	SC-N7	1
	710	RHC710B-4C	SC-N4	1							HF5G2655	2	LR4-710C	1	RF4-710C	1	LFC4-710C	1	CF4-710C	1	SC-N8	1
	800	RHC800B-4C			SC-N14	3							LR4-800C	1	RF4-800C	1	LFC4-800C	1	CF4-800C	1		

VT use

Voltage	Nominal applied motor[kw]	PWM converter type	Reactor for pressurizing		Reactor for filter		Capacitor for filter		Resistance for filter		Charging resistance		Fuse		Charging circuit contactor		Contactor for powersource		Filtering circuit contactor	
			(Lr)	Q'ty	(Lf)	Q'ty	(Cf)	Q'ty	(Rf)	Q'ty	(R0)	Q'ty	(F)	Q'ty	(73)	Q'ty	(52)	Q'ty	(6F)	Q'ty
200V series	11	RHC7.5-2C	LR2-15C	1	LFC2-15C	1	CF2-15C	1	GRZG150 0.2Ω	3	80W7.5Ω (HF5C5504)	3	CR2LS-50/UL	2	SC-N1	1	—	—	—	—
	15	RHC11-2C											CR2LS-75/UL	2	SC-N2	1				
	18.5	RHC15-2C	LR2-22C	1	LFC2-22C	1	CF2-22C	1	GRZG200 0.13Ω	3			CR2LS-100/UL	2	SC-N3	1				
	22	RHC18.5-2C									GRZG120 2Ω	3								
	30	RHC22-2C	LR2-37C	1	LFC2-37C	1	CF2-37C	1	GRZG400 0.1Ω	3			CR2L-150/UL	2	SC-N4	1				
	37	RHC30-2C											CR2L-200/UL	2	SC-N5	1				
	45	RHC37-2C	LR2-55C	1	LFC2-55C	1	CF2-55C	1	GRZG400 0.1Ω	3			CR2L-260/UL	2	SC-N7	1				
	55	RHC45-2C													SC-N8	1				
	75	RHC55-2C	LR2-75C	1	LFC2-75C	1	CF2-75C	1	GRZG400 0.1Ω	3			CR2L-400/UL	2	SC-N11	1				
	90	RHC75-2C	LR2-110C	1	LFC2-110C	1	CF2-110C	1	GRZG400 0.12Ω (2 parallels)	6										
	110	RHC90-2C									GRZG400 1Ω	3	A50P600-4	2	SC-N12	1				
400V series	11	RHC7.5-4C	LR4-15C	1	LFC4-15C	1	CF4-15C	1	GRZG150 0.79Ω	3	TK50B 30ΩJ (HF5B0416)	3	CR6L-30/UL	2	SC-4-0	1	—	—	—	—
	15	RHC11-4C											CR6L-50/UL	2	SC-5-1	1				
	18.5	RHC15-4C	LR4-22C	1	LFC4-22C	1	CF4-22C	1	GRZG200 0.53Ω	3					SC-N1	1				
	22	RHC18.5-4C									80W 7.5Ω (HF5C5504)	3								
	30	RHC22-4C	LR4-37C	1	LFC4-37C	1	CF4-37C	1	GRZG400 0.38Ω	3			CR6L-75/UL	2	SC-N2	1				
	37	RHC30-4C											CR6L-100/UL	2	SC-N2S	1				
	45	RHC37-4C	LR4-55C	1	LFC4-55C	1	CF4-55C	1	GRZG400 0.26Ω	3			CR6L-150/UL	2	SC-N3	1				
	55	RHC45-4C													SC-N4	1				
	75	RHC55-4C	LR4-75C	1	LFC4-75C	1	CF4-75C	1	GRZG400 0.38Ω	3			CR6L-200/UL	2	SC-N5	1				
	90	RHC75-4C	LR4-110C	1	LFC4-110C	1	CF4-110C	1	GRZG400 0.53Ω (2 parallels)	6					SC-N7	1				
	110	RHC90-4C											CR6L-300/UL	2	SC-N8	1				
	132	RHC110-4C	LR4-160C	1	LFC4-160C	1	CF4-160C	1	RF4-160C	1	GRZG120 2Ω	3								
	160	RHC132-4C											A50P400-4	2	SC-N11	1				
	200	RHC160-4C	LR4-220C	1	LFC4-220C	1	CF4-220C	1	RF4-220C	1			A50P600-4	2	SC-N12	1				
	220	RHC200-4C									GRZG400 1Ω	3								
	280	RHC220-4C	LR4-280C	1	LFC4-280C	1	CF4-280C	1	RF4-280C	1			A70QS800-4	2	SC-N14	1				
	315	RHC280-4C	LR4-315C	1	LFC4-315C	1	CF4-315C	1	RF4-315C	1	GRZG400 1Ω	6			SC-N3	1	SC-N14	1	SC-N4	1
	355	RHC315-4C	LR4-355C	1	LFC4-355C	1	CF4-355C	1	RF4-355C	1	(2 parallels)		A70P1600-4TA	2			SC-N16	1		
	400	RHC355-4C	LR4-400C	1	LFC4-400C	1	CF4-400C	1	RF4-400C	1										
	500	RHC400-4C	LR4-500C	1	LFC4-500C	1	CF4-500C	1	RF4-500C	1							610CM-3FS	1		

Basic Wiring Diagram

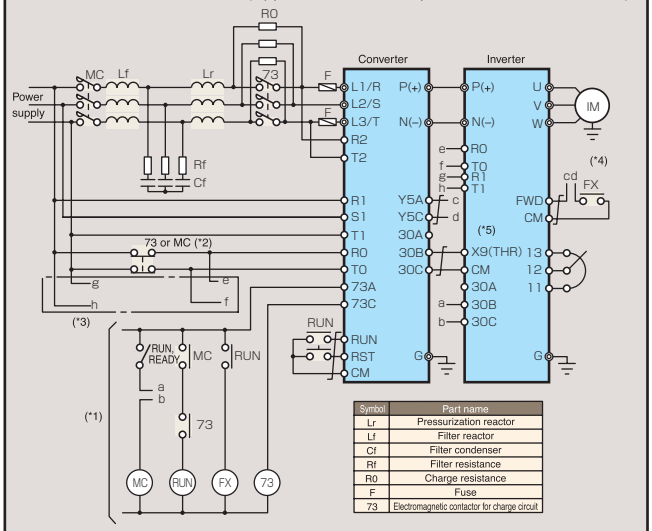
■RHC7.5-2C to RHC90-2C (Applicable inverter: 3-phase 200V, 7.5 to 90kW)
■RHC7.5-4C to RHC220-4C (Applicable inverter: 3-phase 400V, 7.5 to 220kW)
*When adapting a charge BOX



Symbol	Part name
Lr	Pressurization reactor
Lf	Filter reactor
Cf	Filter condenser
Rf	Filter resistance
CU	Charge BOX
73	Electromagnetic contactor for charge circuit

(*1) If the main power supply is 400V series, connect the step-down transformer to limit the voltage of the sequence circuit lower than 220V.
(*2) The auxiliary power supply input terminal for the PWM converter (R0, T0) must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (73 or MC).
If 73 is SC-05, SC-4-0, or SC-5-1, use the auxiliary contact unit for the contact “b” of MC or 73.
(*3) If the inverter is G11S or P11S with a capacity less than 22kW or VG7S with less than 15kW, the auxiliary power supply input of the inverter must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (73 or MC). If the inverter has larger capacity, connect the inverter without passing the contact “b” of 73 or MC.
(*4) Use the sequence that a running signal is input in the inverter after the PWM converter becomes ready.
(*5) One of terminals (X1 to X9) on the inverter unit must be set to external alarm (THR).

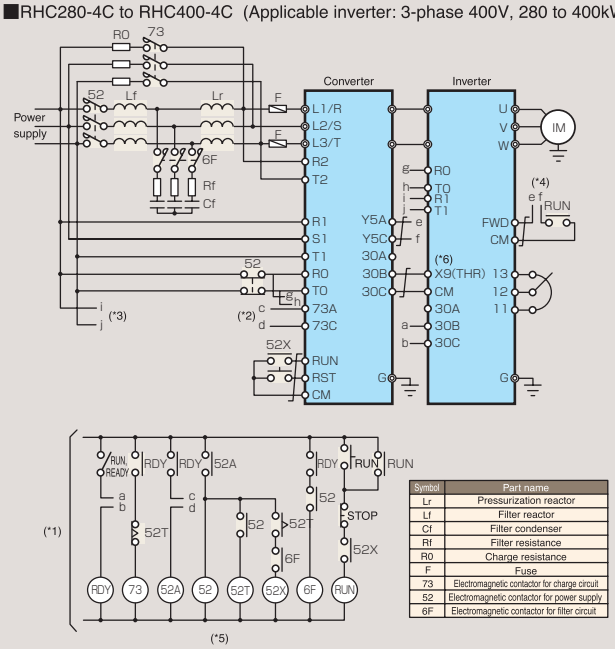
■RHC7.5-2C to RHC90-2C (Applicable inverter: 3-phase 200V, 7.5 to 90kW)
■RHC7.5-4C to RHC220-4C (Applicable inverter: 3-phase 400V, 7.5 to 220kW)



Symbol	Part name
Lr	Pressurization reactor
Lf	Filter reactor
Cf	Filter condenser
Rf	Filter resistance
R0	Charge resistance
F	Fuse
73	Electromagnetic contactor for charge circuit

(*1) If the main power supply is 400V series, connect the step-down transformer to limit the voltage of the sequence circuit lower tan 220V.
(*2) The auxiliary power supply input terminal for the PWM converter (R0, T0) must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (73 or MC).
If 73 is SC-05, SC-4.0, or SC-5-1, use the auxiliary contact unit for the contact “b” of MC or 73.
(*3) If the inverter is G11S or P11S with a capacity less than 22kW or VG7S with less than 15kW, the auxiliary power supply input of the inverter must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (73 or MC). If the inverter has larger capacity, connect the inverter without passing the contact “b” of 73 or MC.
(*4) Use the sequence that a running signal is input in the inverter after the PWM converter becomes ready.
(*5) One of terminals (X1 to X9) on the inverter unit must be set to external alarm (THR).

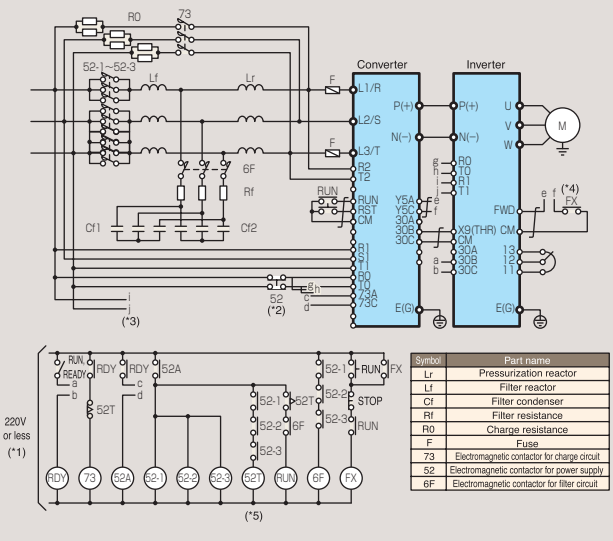
■RHC280-4C to RHC400-4C (Applicable inverter: 3-phase 400V, 280 to 400kW)



Symbol	Part name
Lr	Pressurization reactor
Lf	Filter reactor
Cf	Filter condenser
Rf	Filter resistance
R0	Charge resistance
F	Fuse
73	Electromagnetic contactor for charge circuit
52	Electromagnetic contactor for power supply
6F	Electromagnetic contactor for filter circuit

(*1) Connect the step-down transformer to limit the voltage of the sequence circuit lower than 200V.
(*2) The auxiliary power supply input terminal for the PWM converter (R0, T0) must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (52).
(*3) Since the AC fan power supply receives power from R0 and T0 terminals, the power supply must be connected without passing the contact “b” of 52.
(*4) Use the sequence that a running signal is input in the inverter after the PWM converter becomes ready.
(*5) The 52T timer must be set to 1 sec.
(*6) One of terminals (X1 to X9) on the inverter must be set to external alarm (THR).

■RHC400-4C with VT specification (Applicable inverter: 3-phase 400V, 400kW)
■RHC500-4C, RHC630-4C (Applicable inverter: 3-phase 400V, 500, 630kW)



Symbol	Part name
Lr	Pressurization reactor
Lf	Filter reactor
Cf	Filter condenser
Rf	Filter resistance
R0	Charge resistance
F	Fuse
73	Electromagnetic contactor for charge circuit
52	Electromagnetic contactor for power supply
6F	Electromagnetic contactor for filter circuit

(*1) Connect the step-down transformer to limit the voltage of the sequence circuit lower than 200V.
(*2) The auxiliary power supply input terminal for the PWM converter (R0, T0) must be connected to the main power supply via the contact “b” of the electromagnetic contactor for charge circuit (52).
(*3) Since the AC fan power supply receives power from R0 and T0 terminals, the power supply must be connected without passing the contact “b” of 73 or 52.
(*4) Use the sequence that a running signal is input in the inverter after the PWM converter becomes ready.
(*5) The 52T timer must be set to 1 sec.
(*6) One of terminals (X1 to X9) on the inverter must be set to external alarm (THR).
(*7) Be sure to arrange the phase sequence in the same order when wiring for terminals L1/R, L2/S, L3/T, R2, T2, R1, S1 and T1.

External Dimensions

PMW converter main body

Fig.A

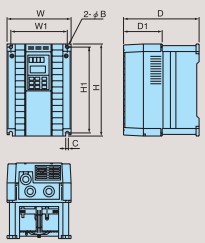


Fig.B

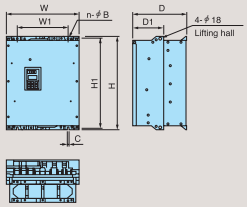


Fig.C

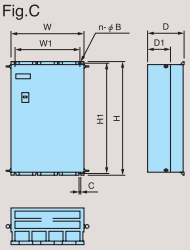


Fig.D

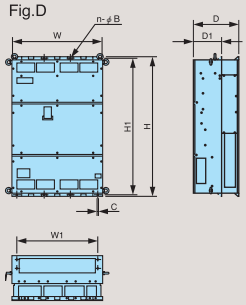
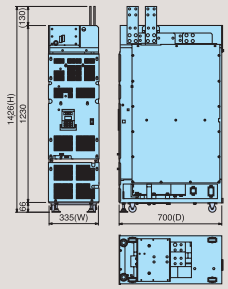


Fig.E



PWM converter type		Fig.	Dimensions[mm]									Mass [kg]
			W	W1	H	H1	D	D1	n	B	C	
200V series	RHC7.5-2C	A	250	226	380	358	245	125	2	10	10	12.5
	RHC11-2C											
	RHC15-2C											
	RHC18.5-2C	B	340	240	480	460	255	145	2	10	10	24
	RHC22-2C											
	RHC30-2C	B	340	240	550	530	255	145	2	10	10	29
	RHC37-2C	B	375	275	615	595	270	145	2	10	10	36
	RHC45-2C	B	375	275	740	720	270	145	2	10	10	42
	RHC55-2C	B	375	275	740	720	270	145	2	10	10	44
	RHC75-2C	C	530	430	750	720	285	145	2	15	15	70
	RHC90-2C	C	680	580	880	850	360	220	3	15	15	115
400V series	RHC7.5-4C	A	250	226	380	358	245	125	2	10	10	8
	RHC11-4C											
	RHC15-4C											
	RHC18.5-4C	B	340	240	480	460	255	145	2	10	10	24
	RHC22-4C											
	RHC30-4C	B	340	240	550	530	255	145	2	10	10	29
	RHC37-4C	B	375	275	550	530	270	145	2	10	10	34
	RHC45-4C	B	375	275	675	655	270	145	2	10	10	38
	RHC55-4C											
	RHC75-4C	B	375	275	740	720	270	145	2	10	10	48
	RHC90-4C	C	530	430	740	710	315	175	2	15	15	70
	RHC110-4C											
	RHC132-4C	C	530	430	1000	970	360	220	2	15	15	100
	RHC160-4C											
	RHC200-4C	C	680	580	1000	970	360	220	3	15	15	140
	RHC220-4C											
	RHC280-4C	C	680	580	1400	1370	450	285	3	15	15	320
	RHC315-4C											
	RHC355-4C	C	880	780	1400	1370	450	285	4	15	15	410
	RHC400-4C											
	RHC500-4C	D	999	900	1550	1520	500	313.2	4	15	15	525
	RHC630-4C											
	RHC710B-4C	E										225
	RHC800B-4C											

〈Reactor for step-up〉

Fig.A

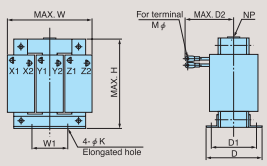


Fig.B

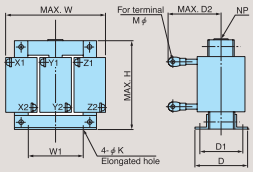


Fig.C

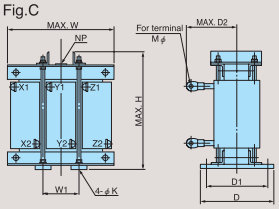
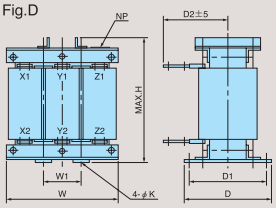


Fig.D



Reactor for step-up Type		Fig.	Dimensions[mm]								Mass [kg]
			W	W1	H	D	D1	D2	K	M	
200V series	LR2-7.5C	A	180	75	205	105	85	95	7	M5	12
	LR2-15C	B	195	75	215	131	110	130	7	M8	18
	LR2-22C	C	240	80	340	215	180	145	10	M8	33
	LR2-37C	C	285	95	420	240	205	150	12	M10	50
	LR2-55C	C	285	95	420	250	215	160	12	M12	58
	LR2-75C	C	330	110	440	255	220	165	12	M12	70
	LR2-110C	C	345	115	500	280	245	185	12	M12	100
400V series	LR4-7.5C	B	180	75	205	105	85	90	7	M4	12
	LR4-15C	A	195	75	215	131	110	120	7	M5	18
	LR4-22C	C	240	80	340	215	180	120	10	M6	33
	LR4-37C	C	285	95	405	240	205	130	12	M8	50
	LR4-55C	C	285	95	415	250	215	145	12	M10	58
	LR4-75C	C	330	110	440	255	220	150	12	M10	70
	LR4-110C	C	345	115	490	280	245	170	12	M12	100
	LR4-160C	C	380	125	550	300	260	185	15	M12	140
	LR4-220C	C	450	150	620	330	290	230	15	M12	200
	LR4-280C	C	480	160	740	330	290	240	15	M16	250
	LR4-315C	C	480	160	760	340	300	250	15	M16	270
	LR4-355C	C	480	160	830	355	315	255	15	M16	310
	LR4-400C	C	480	160	890	380	330	260	19	M16	340
	LR4-500C	C	525	175	960	410	360	290	19	M16	420
	LR4-630C	D	600	200	640	440	390	285	19	No terminal	450
	LR4-710C	D	645	215	730	440	390	295	19	No terminal	510
	LR4-800C	D	690	230	850	450	400	290	19	No terminal	600

*Please contact the Fuji's sales division.

Wiring equipment / wire sizes (Main circuit use)

Power supply voltage	Nominal applied motor [kW]	Inverter type		MCCB or ELCB rated current [A]		Magnetic contactor type			Recommended wire size [mm²]							
						For the input circuit		For the output circuit	Input circuit (L1/R, L2/S, L3/T)		Output circuit (U, V, W)		DC link circuit (P1, P(+))		Braking circuit (P(+), DB, N(-))	
		CT/HT use [150%]	VT use [110%]	With DCR	Without reactor	With DCR	Without reactor	CT/HT/VT use	With DCR	Without reactor	CT/HT use	VT use	CT/HT use	VT use	CT/HT use	VT use
200V	0.75	FRN0.75VG7S-2	—	5	10	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	—	2.0	—
	1.5	FRN1.5VG7S-2	FRN0.75VG7S-2	10	15							2.0		2.0		2.0
	2.2	FRN2.2VG7S-2	FRN1.5VG7S-2	10	20											
	3.7	FRN3.7VG7S-2	FRN2.2VG7S-2	20	30		SC-5-1			3.5						
	5.5	FRN5.5VG7S-2	FRN3.7VG7S-2	30	50		SC-N1			5.5	3.5	3.5				
	7.5	FRN7.5VG7S-2	FRN5.5VG7S-2	40	75	SC-5-1	SC-N2	SC-N1	3.5	8	5.5	5.5	3.5	3.5		2.0
	11	FRN11VG7S-2	FRN7.5VG7S-2	50	100	SC-N1	SC-N2S		5.5	14	8	8	8	8		
	15	FRN15VG7S-2	FRN11VG7S-2	75	125	SC-N2	SC-N3	SC-N2S	8	22	14	14	14	14		
	18.5	FRN18.5VG7S-2	FRN15VG7S-2	100	150	SC-N2S	SC-N4		14	38 (*1)			22	22		
	22	FRN22VG7S-2	FRN18.5VG7S-2	100	175		SC-N5	SC-N3			22	22				
	30	FRN30VG7S-2	FRN22VG7S-2	150	200	SC-N4	SC-N7	SC-N4	38 (*1)	60 (*3)	38	38 (*1)	38	38 (*1)	3.5	2.0
	37	—	FRN30VG7S-2	175	250	SC-N5	SC-N8	SC-N5	38	60		38	60	60		
		FRN37VG7S-2	—												5.5	3.5
	45	FRN45VG7S-2	FRN37VG7S-2	200	300	SC-N7		SC-N7	60	100	60	60	100	100		
	55	FRN55VG7S-2	FRN45VG7S-2	250	350	SC-N8	SC-N11	SC-N8	100		100	100			8	5.5
	75	FRN75VG7S-2	FRN55VG7S-2	350	—	SC-N11	—	SC-N11		—	150		150	150 (*2)	14	8
	90	FRN90VG7S-2	FRN75VG7S-2	400					150			150	200	200	22	14
	110	—	FRN90VG7S-2	500		SC-N12		SC-N12	200		—	200	—	250	—	
400V	3.7	FRN3.7VG7S-4	—	10	20	SC-05	SC-05	SC-05	2.0	2.0	2.0	—	2.0	—	2.0	—
	5.5	FRN5.5VG7S-4	FRN3.7VG7S-4	15	30		SC-4-0					2.0		2.0		2.0
	7.5	FRN7.5VG7S-4	FRN5.5VG7S-4	20	40		SC-5-1			3.5						
	11	FRN11VG7S-4	FRN7.5VG7S-4	30	50		SC-N1	SC-4-0		5.5	3.5	3.5	3.0			
	15	FRN15VG7S-4	FRN11VG7S-4	40	60	SC-5-1		SC-5-1	3.5	8			3.5	3.5		
	18.5	FRN18.5VG7S-4	FRN15VG7S-4	40	75	SC-N1	SC-N2	SC-N1	5.5	14	5.5	5.5	5.5	5.5	2.0	2.0
	22	FRN22VG7S-4	FRN18.5VG7S-4	50	100		SC-N2S				8	8	8	8		
	30	FRN30VG7S-4	FRN22VG7S-4	75	125	SC-N2	SC-N3	SC-N2	8	22	14	14	14	14		
	37	FRN37VG7S-4	FRN30VG7S-4	100	125	SC-N2S	SC-N4	SC-N2S	14				22	22		
	45	FRN45VG7S-4	FRN37VG7S-4	100	150	SC-N3		SC-N3	22	38	22	22				
	55	FRN55VG7S-4	FRN45VG7S-4	125	200		SC-N5	SC-N4		60	38	38	38	38	3.5	
	75	FRN75VG7S-4	FRN55VG7S-4	175	—	SC-N4	—	SC-N5	38	—	60	60	60	60	5.5	3.5
	90	FRN90VG7S-4	FRN75VG7S-4	200		SC-N7		SC-N7	60							
	110	FRN110VG7S-4	FRN90VG7S-4	250				SC-N8			100	100	100	100	8	5.5
	132	FRN132VG7S-4	FRN110VG7S-4	300		SC-N8			100				150		14	8
	160	FRN160VG7S-4	FRN132VG7S-4	350		SC-N11		SC-N11	150		150	150		150		14
	200	FRN200VG7S-4	FRN160VG7S-4	500		SC-N12		SC-N12			200	200	250	200	22	
	220	FRN220VG7S-4	FRN200VG7S-4	500					200					250		22
	250	FRN250VG7S-4	—	600				SC-N14	250		250	250	325	325	38	
	280	FRN280VG7S-4	FRN220VG7S-4			SC-N14					150×2	325	200×2			
	300	—	FRN250VG7S-4	700					325		325			200×2		
	315	FRN315VG7S-4	FRN280VG7S-4						150×2		150×2	150×2				
	355	FRN355VG7S-4	FRN315VG7S-4	800					200×2		200×2	200×2	250×2	250×2		38
	400	FRN400VG7S-4	FRN355VG7S-4	1000		SC-N16		SC-N16			250×2	250×2	325×2	325×2	60	60
	500	FRN500VG7S-4	FRN400VG7S-4	1200		(*3)		(*3)	325×2		325×2	325×2			100	
	630	FRN630VG7S-4	FRN500VG7S-4	1400					325×3		325×3	325×3	325×3	325×3	150	100
	710	—	FRN630VG7S-4	1600					325×4		325×4	325×4	325×4	325×4		
	710	FRN710BVG7S-4DC	—	—		—			—				10t×100mm Copper bar wiring		—	—
	800	FRN800BVG7S-4DC	—	—		—			—						—	—

NOTES :

- For molded-case circuit breakers (MCCBs) or earth-leakage circuit breakers (ELCBs), the required frame type and series depends on factors such as the transformer capacity of the facility. Refer to catalogs and data sheets to select optimal ones. Also, refer to data sheets on ECLB for rated sensitive current. The rated currents for MCCB and ELCB on the table above are for FUJI SA□B/□ and SA□R/□.
- The recommended wire sizes are based on a condition where the temperature inside the panel is 50˚C or less.
- Data on the table above are obtained with 600V HIV insulation cables (Allowable temp. 75˚C).
- Data on the table above may change under different conditions such as different ambient temperature or different power supply voltage.

*1) Use the crimp terminal 38-S6 made by J.S.T. Mfg Co., Ltd.
*2) Use the crimp terminal CB150-10 for low-voltage switch specified in JEM1399.
*3) Please contact the Fuji's sales division.

Guideline for Suppressing Harmonics

Application to "Guideline for Suppressing Harmonics by the Users Who Receive High Voltage or Special High Voltage"

Our FRENIC-5000VG7 series are the products specified in the "Guideline for Suppressing Harmonics by Customers Receiving High Voltage or Special High Voltage." When you enter into a new contract with an electric power company or update a contract, you are requested by the electric power company to submit an accounting statement form.

(1) Scope of regulation

In principle, the guideline applies to the customers that meet the following two conditions:

- The customer receives high voltage or special high voltage.
- The "equivalent capacity" of the converter load exceeds the standard value for the receiving voltage (50kVA at a receiving voltage of 6.6kV).

(2) Regulation method

The level (calculated value) of the harmonic current that flows from the customer's receiving point out to the system is subjected to the regulation. The regulation value is proportional to the contract demand. The regulation values specified in the guideline are shown in Table 1.

Table 1 Upper limits of harmonic outflow current per kW of contract demand [mA/kW]

Receiving voltage	5th	7th	11th	13th	17th	19th	23th	Over 25th
6.6kV	3.5	2.5	1.6	1.3	1.0	0.90	0.76	0.70
22kV	1.8	1.3	0.82	0.69	0.53	0.47	0.39	0.36

1. Calculation of Equivalent Capacity (Pi)

Although the equivalent capacity (Pi) is calculated using the equation of (input rated capacity) x (conversion factor), catalog of conventional inverters do not contain input rated capacities. A description of the input rated capacity is shown below:

(1) "Inverter rated capacity" corresponding to "Pi"

- Calculate the input fundamental current I1 from the kW rating and efficiency of the load motor, as well as the efficiency of the inverter. Then, calculate the input rated capacity as shown below:
  Input rated capacity $=\sqrt{3}$ x (power supply voltage) x I1 x 1.0228/1000[kVA]
  Where 1.0228 is the 6-pulse converter's value obtained by (effective current) / (fundamental current).
- When a general-purpose motor or inverter motor is used, the appropriate value shown in Table 2 can be used. Select a value based on the kW rating of the motor used, irrespective of the inverter type.

Table 2 "Input rated capacities" of general-purpose inverters determined by the nominal applied motors

Nominal applied motor [kW]		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Pi [kVA]	200V	0.57	0.97	1.95	2.81	4.61	6.77	9.07	13.1	17.6	21.8	25.9
	400V	0.57	0.97	1.95	2.81	4.61	6.77	9.07	13.1	17.6	21.8	25.9

Nominal applied motor [kW]		30	37	45	55	75	90	110	132	160	200	220
Pi [kVA]	200V	34.7	42.8	52.1	63.7	87.2	104	127				
	400V	34.7	42.8	52.1	63.7	87.2	104	127	153	183	229	252

Nominal applied motor [kW]		250	280	315	355	400	450	500	530	560	630
Pi [kVA]	200V										
	400V	286	319	359	405	456	512	570	604	638	718

(2) Values of "Ki (conversion factor)"

- Depending on whether an optional ACR (AC REACTOR) or DCR (DC REACTOR) is used, apply the appropriate conversion factor specified in the appendix to the guideline. The values of the converter factor are shown in Table 3.

Table 3 "Conversion factors Ki" for general-purpose inverters determined by reactors

Circuit category	Circuit type		Conversion factor Ki	Main applications
3	Three-phase bridge 3 (capacitor smoothing)	Without a reactor	K31=3.4	• General-purpose inverters • Elevators • Refrigerators, air conditioning systems • Other general appliances
		With a reactor (ACR)	K32=1.8	
		With a reactor (DCR)	K33=1.8	
		With reactors (ACR and DCR)	K34=1.4	

2. Calculation of Harmonic Current

(1) Value of "input fundamental current"

- Apply the appropriate value shown in Table 4 based on the kW rating of the motor, irrespective of the inverter type or whether a reactor is used.

* If the input voltage is different, calculate the input fundamental current in inverse proportion to the voltage.

Table 4 "Input fundamental currents" of general-purpose inverters determined by the nominal applied motors

Nominal applied motor [kW]		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
Input fundamental current [A]	200V	1.62	2.74	5.50	7.92	13.0	19.1	25.6	36.9	49.8	61.4	73.1
	400V	0.81	1.37	2.75	3.96	6.50	9.55	12.8	18.5	24.9	30.7	36.6
6.6 kV converted value [mA]		49	83	167	240	394	579	776	1121	1509	1860	2220

Nominal applied motor [kW]		30	37	45	55	75	90	110	132	160	200	220
Input fundamental current [A]	200V	98.0	121	147	180	245	293	357				
	400V	49.0	60.4	73.5	89.9	123	147	179	216	258	323	355
6.6 kV converted value [mA]		2970	3660	4450	5450	7450	8910	10850	13090	15640	19580	21500

Nominal applied motor [kW]		250	280	315	355	400	450	500	530	560	630
Input fundamental current [A]	200V										
	400V	403	450	506	571	643	723	804	852	900	1013
6.6 kV converted value [mA]		24400	27300	30700	34600	39000	43800	48700	51600	54500	61400

(2) Calculation of harmonic current

Table 5 Generated harmonic current [%], 3-phase bridge (capacitor smoothing)

Degree	5th	7th	11th	13th	17th	19th	23th	25th
Without a reactor	65	41	8.5	7.7	4.3	3.1	2.6	1.8
With a reactor (ACR)	38	14.5	7.4	3.4	3.2	1.9	1.7	1.3
With a reactor (DCR)	30	13	8.4	5.0	4.7	3.2	3.0	2.2
With reactors (ACR and DCR)	28	9.1	7.2	4.1	3.2	2.4	1.6	1.4

- ACR: 3%
- DCR: Accumulated energy equal to 0.08 to 0.15ms (100% load conversion)
- Smoothing capacitor: Accumulated energy equal to 15 to 30ms (100% load conversion)
- Load: 100%

$$\text{n nth harmonic current [A]} = \text{Fundamental current [A]} \times \frac{\text{Generated nth harmonic current [\%]}}{100}$$

Calculate the harmonic current of each degree using the following equation:

(3) Maximum availability factor

- For a load for elevators, which provides intermittent operation, or a load with a sufficient designed motor rating, reduce the current by multiplying the equation by the "maximum availability factor" of the load.
- The "maximum availability factor of an appliance" means the ratio of the capacity of the harmonic generator in operation at which the availability reaches the maximum, to its total capacity, and the capacity of the generator in operation is an average for 30 minutes.
- In general, the maximum availability factor is calculated according to this definition, but the standard values shown in Table 6 are recommended for inverters for building equipment.

Table 6 Availability factors of inverters, etc. for building equipment (standard values)

Equipment type	Inverter capacity category	Single inverter availability factor
Air conditioning system	200kW or less	0.55
	Over 200kW	0.60
Sanitary pump	———	0.30
Elevator	———	0.25
Refrigerator, freezer	50kW or less	0.60
UPS (6-pulse)	200kVA	0.60

[Correction coefficient according to contract demand level]

ï Since the total availability factor decreases with increase in the building scale, calculating reduced harmonics with the correction coefficient s defined in Table 7 below is permitted.

Table 7 Correction coefficient according to the building scale

Contract demand [kW]	Correction coefficient b
300	1.00
500	0.90
1000	0.85
2000	0.80

*If the contract demand is between two specified values shown in Table 7, calculate the value by interpolation.

(4) Degree of harmonics to be calculated

Calculate only the "5th and 7th" harmonic currents

To all our customers who purchase Fuji Electric products included in this catalog:

Please take the following items into consideration when placing your order.

When requesting an estimate and placing your orders for the products included in these materials, please be aware that any items such as specifications which are not specifically mentioned in the contract, catalog, specifications or other materials will be as mentioned below.
In addition, the products included in these materials are limited in the use they are put to and the place where they can be used, etc., and may require periodic inspection. Please confirm these points with your sales representative or directly with this company.
Furthermore, regarding purchased products and delivered products, we request that you take adequate consideration of the necessity of rapid receiving inspections and of product management and maintenance even before receiving your products.

1. Free of Charge Warranty Period and Warranty Range

1-1 Free of charge warranty period

(1) The product warranty period is "1 year from the date of purchase" or 24 months from the manufacturing date imprinted on the name place, whichever date is earlier.
(2) However, in cases where the use environment, conditions of use, use frequency and times used, etc., have an effect on product life, this warranty period may not apply.
(3) Furthermore, the warranty period for parts restored by Fuji Electric's Service Department is "6 months from the date that repairs are completed."

1-2 Warranty range

(1) In the event that breakdown occurs during the product's warranty period which is the responsibility of Fuji Electric, Fuji Electric will replace or repair the part of the product that has broken down free of charge at the place where the product was purchased or where it was delivered. However, if the following cases are applicable, the terms of this warranty may not apply.
1) The breakdown was caused by inappropriate conditions, environment, handling or use methods, etc. which are not specified in the catalog, operation manual, specifications or other relevant documents.
2) The breakdown was caused by the product other than the purchased or delivered Fuji's product.
3) The breakdown was caused by the product other than Fuji's product, such as the customer's equipment or software design, etc.
4) Concerning the Fuji's programmable products, the breakdown was caused by a program other than a program supplied by this company, or the results from using such a program.
5) The breakdown was caused by modifications or repairs affected by a party other than Fuji Electric.
6) The breakdown was caused by improper maintenance or replacement using consumables, etc. specified in the operation manual or catalog, etc.
7) The breakdown was caused by a chemical or technical problem that was not foreseen when making practical application of the product at the time it was purchased or delivered.
8) The product was not used in the manner the product was originally intended to be used.
9) The breakdown was caused by a reason which is not this company's responsibility, such as lightning or other disaster.

(2) Furthermore, the warranty specified herein shall be limited to the purchased or delivered product alone.
(3) The upper limit for the warranty range shall be as specified in item (1) above and any damages (damage to or loss of machinery or equipment, or lost profits from the same, etc.) consequent to or resulting from breakdown of the purchased or delivered product shall be excluded from coverage by this warranty.

1-3. Trouble diagnosis

As a rule, the customer is requested to carry out a preliminary trouble diagnosis. However, at the customer's request, this company or its service network can perform the trouble diagnosis on a chargeable basis. In this case, the customer is asked to assume the burden for charges levied in accordance with this company's fee schedule.

2. Exclusion of Liability for Loss of Opportunity, etc.

Regardless of whether a breakdown occurs during or after the free of charge warranty period, this company shall not be liable for any loss of opportunity, loss of profits, or damages arising from special circumstances, secondary damages, accident compensation to another company, or damages to products other than this company's products, whether foreseen or not by this company, which this company is not be responsible for causing.

3. Repair Period after Production Stop, Spare Parts Supply Period (Holding Period)

Concerning models (products) which have gone out of production, this company will perform repairs for a period of 7 years after production stop, counting from the month and year when the production stop occurs. In addition, we will continue to supply the spare parts required for repairs for a period of 7 years, counting from the month and year when the production stop occurs. However, if it is estimated that the life cycle of certain electronic and other parts is short and it will be difficult to procure or produce those parts, there may be cases where it is difficult to provide repairs or supply spare parts even within this 7-year period. For details, please confirm at our company's business office or our service office.

4. Transfer Rights

In the case of standard products which do not include settings or adjustments in an application program, the products shall be transported to and transferred to the customer and this company shall not be responsible for local adjustments or trial operation.

5. Service Contents

The cost of purchased and delivered products does not include the cost of dispatching engineers or service costs. Depending on the request, these can be discussed separately.

Variation

●The rich lineup of the active Fuji inverter family

Applications	Series Name (Catalog No.)	Features
General Industrial equipment	FRENIC5000VG7S (MEH405)	**High performance, vector control inverter** Capacity range expanded (Three-phase 200V: 0.75 to 90kW, Three-phase 400V: 3.7 to 630kW) ● A high precision inverter with rapid control response and stable torque characteristics. ● Abundant functions and a full range of options make this inverter ideal for a broad range of general industrial systems. ● The auto tuning function makes vector control operation possible even for general-purpose motors.
	FRENIC-MEGA (MEH642 for Asian models) (MEH655 for European models) NEW	**High-performance, multi-functional inverter** (Three-phase 400V: 0.4 to 630kW,Three-phase 200V: 0.4 to 90kW) ● Loaded with vector control which is the peak of general purpose inverters. ● Prepared three types; the basic type, EMC filter built-in type. ● Maintainability is further improved with built-in USB port(option). ● The short-time acceleration and deceleration become enabled with achieving better rating of overload ratings at HD spec: 200% for 3 sec and 150% for 1 min and at LD spec: 120% for 1 min.
	FRENIC-Eco (MEH442)	**Fan, pump inverter (for variable torque load)** Capacity range expanded (Three-phase 200V: 0.75 to 110kW, Three-phase 400V: 0.75 to 560kW) ● Developed exclusively for controlling variable torque load like fans and pumps. ● Full of new functions such as auto energy saving, PID control, life warning, and switching sequence to the commercial power supply. ● Ideal for air conditioners, fans, pumps, etc. which were difficult to use with conventional general-purpose inverters because of cost or functions.
	FRENIC-Lift (MEH426)	**Inverter designed for elevator** (Three-phase 400V: 5.5 to 22kW) The inverter provides optimal control of passenger elevators. ● PG feedback provided as a standard function ● Overload rating: 200% for 10s ● High performance vector control Current response (ACR): 500Hz
	FRENIC-Multi (MEH652)	**High performance, compact inverter** (Three-phase 200V: 0.1 to 15kW, Single-phase 200V: 0.1 to 2.2kW, Three-phase 400V: 0.4 to 15kW) ● The inverter featuring environment-friendly and long life design (10 years) complies with R0HS Directives (products manufactured beginning in the autumn of 2005). ● With expanded capacity range, abundant model variation, and simple and thorough maintenance, the Multi is usable for a wide range of applications. ● Equipped with the functions optimum for the operations specific to vertical and horizontal conveyance, such as hit-and-stop control, brake signal, torque limit, and current limit.
	FRENIC-Mini (MEH451 for EN)	**Compact inverter** (Three-phase 200V: 0.1 to 3.7kW, Three-phase 400V: 0.4 to 3.7kW, Single-phase 200V: 0.1 to 2.2kW, Single-phase 100V: 0.1 to 0.75kW) A frequency setting device is standard-equipped, making operation simple. Loaded with auto torque boost, current limiting, and slip compensation functions, all of which are ideal for controlling traverse conveyors. Loaded with the functions for auto energy saving operation and PID control, which are ideal for controlling fans and pumps.

NOTES

When running general-purpose motors

• Driving a 400V general-purpose motor
When driving a 400V general-purpose motor with an inverter using extremely long cables, damage to the insulation of the motor may occur. Use an output circuit filter (OFL) if necessary after checking with the motor manufacturer. Fuji's motors do not require the use of output circuit filters because of their reinforced insulation.

• Torque characteristics and temperature rise
When the inverter is used to run a general-purpose motor, the temperature of the motor becomes higher than when it is operated using a commercial power supply. In the low-speed range, the cooling effect will be weakened, so decrease the output torque of the motor. If constant torque is required in the low-speed range, use a Fuji inverter motor or a motor equipped with an externally powered ventilating fan.

• Vibration
When the motor is mounted to a machine, resonance may be caused by the natural frequencies, including that of the machine. Operation of a 2-pole motor at 60Hz or more may cause abnormal vibration.
* Study use of tier coupling or dampening rubber.
* It is also recommended to use the inverter jump frequency control to avoid resonance points.

• Noise
When an inverter is used with a general-purpose motor, the motor noise level is higher than that with a commercial power supply. To reduce noise, raise carrier frequency of the inverter. High-speed operation at 60Hz or more can also result in more noise.

When running special motors

• High-speed motors
When driving a high-speed motor while setting the frequency higher than 120Hz, test the combination with another motor to confirm the safety of high-speed 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.

• Submersible motors and pumps
These motors have a larger rated current than general-purpose motors. Select an inverter whose rated output current is greater than that of the motor.
These motors differ from general-purpose motors in thermal characteristics. Set a low value in the thermal time constant of the motor when setting the electronic thermal facility.

• Brake motors
For motors equipped with parallel-connected brakes, their braking power must be supplied from the primary circuit (commercial power supply). If the brake power is connected to the inverter power output circuit (secondary circuit) by mistake, problems may occur.
Do not use inverters for driving motors equipped with series-connected brakes.

• Geared motors
If the power transmission mechanism uses an oil-lubricated gearbox or speed changer/reducer, then continuous motor operation at low speed may cause poor lubrication. Avoid such operation.

• Synchronous motors
It is necessary to use software suitable for this 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 as the inverter provides three-phase output.

Environmental conditions

• Installation location
Use the inverter in a location with an ambient temperature range of -10 to 50˚C.
The inverter and braking resistor surfaces become hot under certain operating conditions. Install the inverter on nonflammable material such as metal.
Ensure that the installation location meets the environmental conditions specified in "Environment" in inverter specifications.

Combination with peripheral devices

• Installing a molded case circuit breaker (MCCB)
Install a recommended molded case circuit breaker (MCCB) or an earth leakage circuit breaker (ELCB) in the primary circuit of each inverter to protect the wiring. Ensure that the circuit breaker capacity is equivalent to or lower than the recommended capacity.

• Installing a magnetic contactor (MC) in the output (secondary) circuit
If a magnetic contactor (MC) is mounted in the inverter's secondary circuit for switching the motor to commercial power or for any other purpose, ensure that both the inverter and the motor are fully stopped before you turn the MC on or off. Remove the surge killer integrated with the MC.

• Installing a magnetic contactor (MC) in the input (primary) circuit
Do not turn the magnetic contactor (MC) in the primary circuit on or off more than once an hour as an inverter fault may result. If frequent starts or stops are required during motor operation, use FWD/REV signals.

• Protecting the motor
The electronic thermal facility of the inverter can protect the motor. The operation level and the motor type (general-purpose motor, inverter motor) should be set. For high-speed motors or water-cooled motors, set a small value for the thermal time constant to protect the motor.
If you connect the motor thermal relay to the motor with a long cable, a high-frequency current may flow into the wiring stray capacitance. 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).

• Discontinuance of power-factor correcting capacitor
Do not mount power factor correcting capacitors in the inverter (primary) circuit. (Use the DC REACTOR to improve the inverter power factor.) Do not use power factor correcting capacitors in the inverter output circuit (secondary). An overcurrent trip will occur, disabling motor operation.

• Discontinuance of surge killer
Do not mount surge killers in the inverter output (secondary) circuit.

• Reducing noise
Use of a filter and shielded wires are typical measures against noise to ensure that EMC Directives are met.

• Measures against surge currents
If an overvoltage 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.
We recommend connecting a DC REACTOR to the inverter.

• Megger test
When checking the insulation resistance of the inverter, use a 500V megger and follow the instructions contained in the Instruction Manual.

Wiring

• Wiring distance of control circuit
When performing remote operation, use the twisted shield wire and limit the distance between the inverter and the control box to 20m.

• Wiring length between inverter and motor
If long wiring is used between the inverter and the motor, the inverter will overheat or trip as a result of overcurrent (high-frequency current flowing into the stray capacitance) in the wires connected to the phases. Ensure that the wiring is shorter than 50m. If this length 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 tuning.

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

• Wiring type
Do not use multicore cables that are normally used for connecting several inverters and motors.

• Grounding
Securely ground the inverter using the grounding terminal.

Selecting inverter capacity

• Driving general-purpose motor
Select an inverter according to the applicable motor ratings listed in the standard specifications table for the inverter. When high starting torque is required or quick acceleration or deceleration is required, select an inverter with a capacity one size greater than the standard.

• Driving special motors
Select an inverter that meets the following condition: Inverter rated current > Motor rated current.

Transportation and storage

When transporting or storing inverters, follow the procedures and select locations that meet the environmental conditions that agree with the inverter specifications.

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