

For Cranes use



For Crane use Variable Speed AC Drives



Improved Control Performance

Control method

<Induction motor>

- · Vector control with speed sensor
- · Speed sensorless vector control
- V/f Control
- <Synchronous motor>
- Vector control with speed sensor (including pole position detection)

Control Performance

- Achieved speed response: 600Hz (Unit type), 100Hz (Stack type)
- Speed control accuracy: ±0.005% of max. speed
- Torque control accuracy: ±3% of rated torque (When using vector control with speed sensor and controlling dedicated motor)

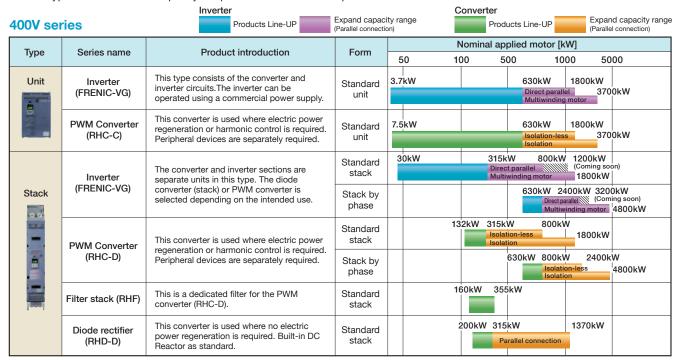
Functions for cranes

- Flux forcing function
- Load adaptive Control
- Braking control signal

Comprehensive Line-up

Inverter, converter line-up

- Line-up features unit type and stack type, facilitating easy construction of large-capacity systems.
- Stack type offers maximum capacity of up to 2400kW with direct parallel connection.



^{*}Unit type:Having a standard built-in brake circuit (with 160kW or below). *Standard stack:Can be used by one set. Stack by phase:One set of the inverter consists of three stacks.

*Combination of inverters can be used with one converter (PWM converter, Diode rectifier). *Inverter:DC power can also be supplied without using the converter circuit.

*Refer to the 6,7 page for the capacity expansion method.

690V series

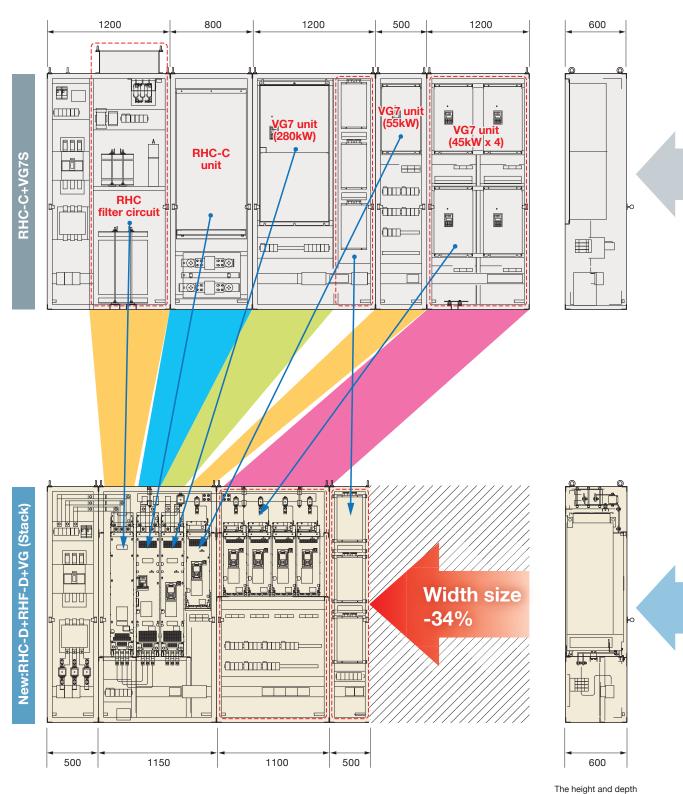
T	C	Due do et interedo etica	Ганна		N	lominal	applied r	notor [kW	/]	
Туре	Series name	Product introduction	Form	50	0 10	00	500	100	0 50	00
Stack	Inverter (FRENIC-VG)	The converter and inverter sections are separate units in this type. The diode converter (stack) or PWM converter is selected depending on the intended use.	Standard stack		90	⟨W *1	Direct para	800kW	1200kW (Coming soc	, *
	PWM Converter (RHC-D) (Coming soon)	This converter is used where electric power regeneration or harmonic control is required. Peripheral devices are separately required.	Standard stack		13:	2kW	450kW Isolation Isolation	-less	200kW 2700kV	v
	Filter stack (RHF) (Coming soon)	This is a dedicated filter for the PWM converter (RHC-D).	Standard stack			160kW	450kW			
	Diode rectifier (RHD-D) (Coming soon)	This converter is used where no electric power regeneration is required. Built-in DC Reactor as standard.	Standard stack			220kW	450kW Parallel	connection	1800kW	

^{*1)} Coming soon (355kW to 450kW)

Dedicated design for panel installation (Stack Type)

New dedicated design (Stack Type) realize panel width shortening (34% reduction compared with conventional design).

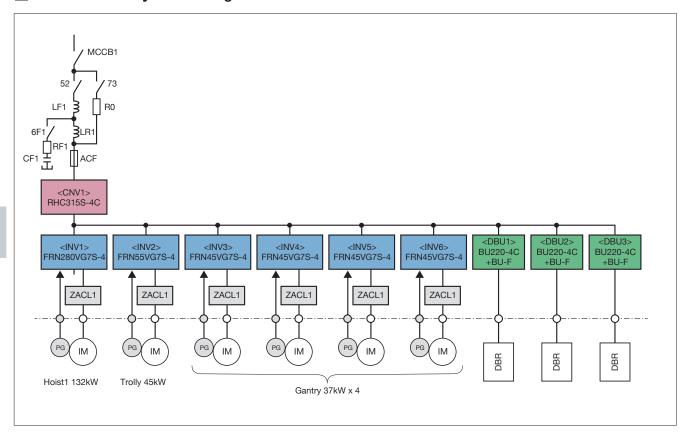
The width dimension in the crane system shown below has been reduced by 1650mm (4900mm → 3250mm).



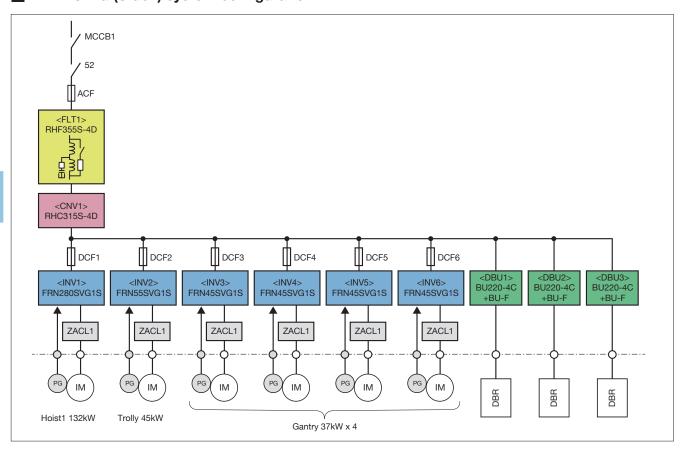


Crane system Diagrams

■ FRENIC-VG7S system configuration



FRENIC-VG (Stack) system configuration

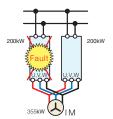


How to expand the capacity range of the inverters (Stack Type)

Direct parallel connection system and multiwinding motor drive system are provided for driving a large capacity motor.

S	System	Direct parallel connection system	Multiwinding motor drive system						
	Drive motor	Single-winding motor	Multiwinding motor (Exclusive use for multiwinding motors)						
Features	Restriction of wiring length	The minimum wiring length (L) varies with the capacity.	There is no particular limit.						
	Reduced capacity operation	Available	Available (However, the wiring should be switched over.)						
Number of inv	erters to be connected	2 to 3 inverters	2 to 6 inverters						
Arrangem	ent diagram	When 2 inverters are connected PP,NP,NP,NP,NP,NP,NP,NP,NP,NP,NP,NP,NP,N	When 2 inverters are connected P, N P, N P, N III						

- *1) OPC-VG1-TBSI is separately required.
- *2) Reduced capacity operation. If a stack fails in case of direct parallel connection, the operation continues with lower output power using the stacks that have not failed



Example) If one inverter fails when 200kW x 2 inverters are driving a 355kW motor, the operation can continue with the 200kW inverter (capacity of one inverter).

(Note) To start the reduced capacity operation, consideration is needed to the switch over operation of PG signals or motor constants and sequence circuit. For details, refer to the operation manual.

Configuration table for direct parallel connection

2 or even 3 inverters of the same capacity can be connected in parallel to increase capacity or facilitate system redundancy.

		Standard stack			Stack by phase											
Connection system	P P,N J,V,W	P P P N P N I M			P,N P,N P,N W	P,N P,N P,N P,										
Capacity [kW]	Applicable inverter	Applicable inverter	No. of units	Current [A]	Applicable inverter	Applicable inverter	No. of units	Current [A]								
30	FRN30SVG1S-4															
37	FRN37SVG1S-4															
45	FRN45SVG1S-4															
55	FRN55SVG1S-4															
75	FRN75SVG1S-4															
90	FRN90SVG1S-4															
110	FRN110SVG1S-4															
132	FRN132SVG1S-4															
160	FRN160SVG1S-4															
200	FRN200SVG1S-4															
220	FRN220SVG1S-4															
250	FRN250SVG1S-4															
280	FRN280SVG1S-4															
315	FRN315SVG1S-4															
355		FRN200SVG1S-4	2	716												
400		FRN220SVG1S-4	2	789												
500		FRN280SVG1S-4	2	988												
630		FRN220SVG1S-4	3	1183	FRN630BVG1S-4											
710		FRN280SVG1S-4	3	1482	FRN710BVG1S-4											
800		FRN280SVG1S-4	3	1482	FRN800BVG1S-4											
1000						FRN630BVG1S-4	2	2223								
1200						FRN630BVG1S-4	2	2223								
1500						FRN800BVG1S-4	2	2812								
1800						FRN630BVG1S-4	3	3335								
2000						FRN710BVG1S-4	3	3905								
2400						FRN800BVG1S-4	3	4218								

^{*1)} OPC-VG1-TBSI is required for each stack.



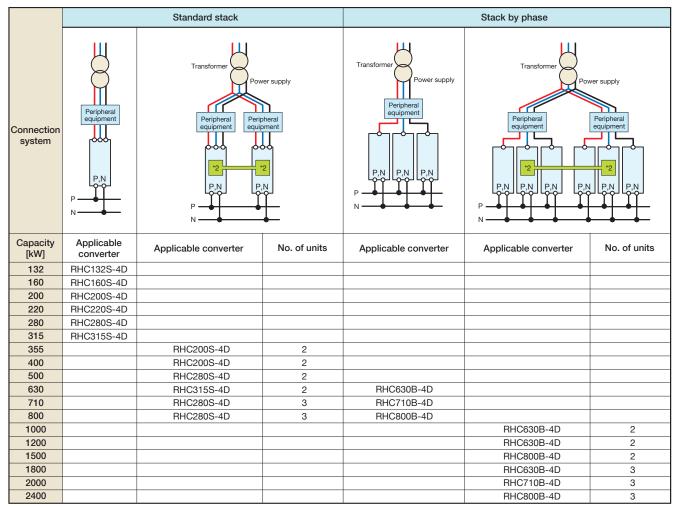
How to expand the capacity range of the PWM converters (Stack Type)

A "transformer-less parallel system" and "transformer insulation type parallel system" can be used to expand the total converter capacity.

	Transformer isolation-less parallel system	Transformer insulation type parallel system
System	This system involves connecting converter inputs to the power supply without isolating with a transformer, etc.	This system involves isolating respective converter inputs with a transformer.
Reduced capacity operation	Available	Available
Number of converter to be connected	2 to 3 converters	2 to 6 converters
Arrangement diagram	When 2 converters are connected Transformer Power supply Peripheral equipment Peripheral equipment Peripheral equipment	When 2 converters are connected Three-winding transformer (12 - pulse) Peripheral equipment Peripheral equipment Peripheral equipment Peripheral equipment

Configuration table for parallel connection (Transformer isolation-less parallel system)

2 or 3 converters of the same capacity can be connected in parallel to increase capacity or facilitate system redundancy.



^{*2)} OPC-VG7-SIR is required for each stack.

Easier Maintenance and Improved Reliability

Easy stack replacement

The inverters (stack type) have an arrangement with consideration for the installation of the product into the panel and easier change.

The inverters (stack type) (132 to 315 kW) can easily be installed or changed because they have caster.

With the inverters (stack type) (630 to 800 kW), stacks are divided for each output phase (U, V and W), which has realized the lighter weight.

Nominal applied motor capacity [kW]	30 to 110	132 to 315	630 to 800					
Туре	FRN30SVG1S-4□ to FRN110SVG1S-4□	FRN132SVG1S-4□ to FRN315SVG1S-4□	FRN630BVG1S-4□ to FRN800BVG1S-4□					
Categoly	Standard stack	Standard stack	Stack by phase					
Caster	Not provided	Provided	Provided					
Arrangement	P N U.V.W	P N N N N N N N N N N N N N N N N N N N	N Urphase Wythase Wythase					
Maintenance	The weight of one stack has been minimized (50 kg or less) in consideration of the replacement work.	The bigger (heavier) stack models have wheels in order to replace them easily. A lifter for the replacement is available.	The weight has been optimized by separating the inverter in three stacks (one for each output phase U, V and W). In the event of a breakdown, only the damaged stack (phase) needs to be replaced with a new one.					
Approx weight[kg]	30 to 45	95 to 135	135 × 3					

^{*1)} The lifter will be available soon.

Model compatibility

The FRENIC-VG is compatible with Fuji Electric's older vector controlled inverter models. Updating to the FRENIC-VG can be performed easily.

■ Compatibility with FRENIC5000VG7S

The FRENIC-VG function codes are compatible with VG7 function codes, allowing function codes from the VG7 to be set in the FRENIC-VG directly. Furthermore, function codes can be copied directly from the VG7 to the FRENIC-VG with the PC loader.

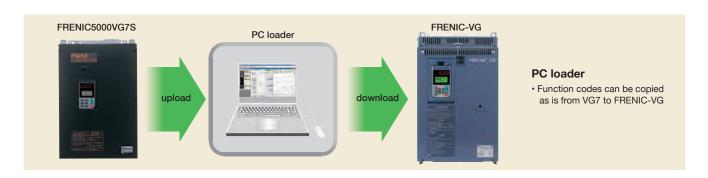
Furthermore, with the unit type, an adapter (conversion adapter) has been prepared for same capacities, in order to fit the same dimensions as for VG7S.

Compatibility with FRENIC5000VG5S

The function code numbers and data definitions differ between FRENIC-VG and VG5, so they can not be set from VG5 to FRENIC-VG directly.

Codes can be updated easily from VG5 to FRENIC-VG settings by using a function code conversion sheet.

Furthermore, with the unit type, an adapter (conversion adapter) has been prepared for some capacities, in order to fit the same dimensions as for VG5.





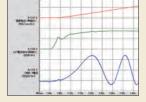
PC loader functions

PC Loader can be used via the USB connector (mini B) provided on the front cover.

- The front cover does not have to be removed.
- No RS-485 converter is needed.
- Commercial cables can be used.

[Fault diagnosis using the trace back function]





- Internal data, time and date around the fault are recorded.

 The real-time clock (clock function) is built-in as standard.
- Data are backed up by battery.

 *Battery: 30kW or above (built-in as standard), 22kW or below (available as option: OPK-BP)
- Trace waveform can be checked on the PC loader

USB cable Connection available in the inverter front.

FRENIC-VG

[Easy edit and detail monitor]

Data editing and detailed data monitor analysis operations are much easier than with a conventional PC loader.

Function code setting

User-defined displays (customized displays), data explanation display for each code.

Trace function

Real-time trace: for long-term monitoring Historical trace: for detailed data diagnosis for short periods

Trace back: for fault analysis (last 3 occurrences)

*The paid-for loader software (WPS-VG1-PCL) supports real-time tracing and historical tracing. Trace data can be stored in the memory even while the power is off. With 22kW or below capacity inverters, optional memory back-up battery must be installed.

Keypad

- Wide 7-segment LED ensures comfortable view.
- The back-light is incorporated in the LCD panel, which allows the use of the keypad even in the dark.
- Enhanced copy function

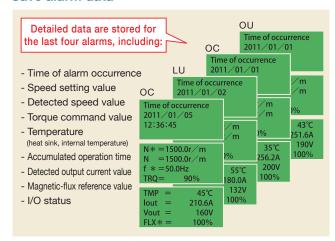
The function codes can be copied to other inverters easily. (Three patterns of function codes can be stored.) Copying data in advance reduces restoration time when problems occur, by exchanging the keypad when replacing the unit.

- Remote control operation is available.
 The Keypad can be remotely installed and operated by connecting the keypad with a standard LAN cable.
- JOG (jogging) operation can be executed using the Keypad.
- The HELP key displays operation guidance.



Simple fault diagnosis

Save alarm data



- The number of alarm data to be stored has been increased from the previous model.

Thanks to the real-time clock function built-in as standard, the complete data of the latest and last 3 alarm occurrences is stored: time, speed command, torque, current and others. This enables machine units to be checked for abnormalities.

Alarm severity selection

Alarm severity (light-alarm and heavy-alarm) can be selected, eliminating the risk of critical facility stoppage due to a minor fault.

	30-relay output	Y-terminal output	Inverter operation	Selection	
Motor overload, communications error,	No output (minor fault)	Provided	Operation continued	Can be selected	
DC fan lock, etc.	Output	Not provided	Shut off	for each function.	
Blown fuse, overcurrent ground fault, etc.	Output	Not provided	Shut off	Fixed	

PG fault diagnosis

- The PG interface circuit incorporated as standard detects disconnection of the power supply line as well as the PG signal line.
- Operation can be continued in sensorless mode during PG disconnection or fault (Coming soon).

Old model: The inverter was stopped by a trip and the motor coast to a stop.

New model: The mode is automatically switched to sensorless vector control mode when a

PG fault is detected, minimizing effect to the production process.

(Sensorless control shows lower control performance than vector control with a speed sensor. Combine equipment and machines to be used and check their operation in advance for insufficient torque at low speed, etc.)

 A mode was added that judges if it is a PG fault or a fault on the inverter side Simulated output mode is provided at the PG pulse output terminal (FA and FB).
 Operation can be checked by connecting this to the PG input terminal.

^{*} If data exists, it can be analyzed anywhere

Easy change of the cooling fan

Unit Type

The cooling fan can easily be changed without removing the front cover and printed circut board.

Applicable models : FRENIC-VG

(excluding converter RHC-C)



Fan body



Stack Type

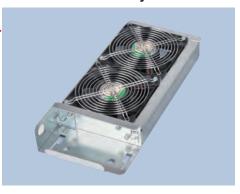
The cooling fan installed at the top can easily be changed without drawing the stacks. However, for the 220 to 315kW inverter, the 2 connection bars of the DC side have to be removed to change the cooling fan.

Applicable models : FRENIC-VG

Converter (RHC-D, RHF-D, RHD-D)



Fan body



Components with a long life

For the various consumable parts inside the inverter, their designed lives have been extended to 10 years.

This also extended the equipment maintenance cycles.

Life conditions

Ambient temperature: 40°C°2, load factor: 100% (HD spec), 80% (MDspecs)

- *1) The planned life is determined by calculation, and is not the guaranteed value.
- *2) For the stack type, the ambient temperature is 30°C.

Life-limited component	Design lifetime ^{¹¹}
Cooling fan	
Smoothing capacitor on main circuit	10 years
Electrolytic capacitors on PCB	

Applicable models : FRENIC-VG

Converter (RHC-D, RHF-D, RHD-D) (excluding FRENIC-VG7, RHC-C)

Enhanced lifetime alarm

- Lifetime alarms can be checked rapidly on the Keypad and PC loader (optional).
- Facility maintenance can be performed much easier thanks to lifetime alarms.

	Ite	ms	
Inverter accumulated time (h)	No. of inverter starts (times)	Facility maintenance warning Accumulated time (h) No. of starts (times)	Inverter lifetime alarm information is displayed.

Applicable models: FRENIC-VG

Useful functions for test run and adjustment

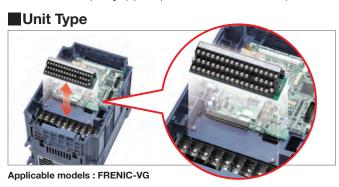
- Customization of functions for test run and adjustment (Individual items on the loader can be set to be displayed or not.)
- Each communications I/O map input/output status is displayed (for PLC software debug) on the loader or the keypad (Soon to be supported).
- Simulated fault alarm issued by a special function on the Keypad
- Monitor data hold function
- Simulated operation mode
 - Simulated connection allows the inverter to be operated with internal parts in the same way as if they were connected to the motor, without actually being connected.
- The externally input I/O monitor and PG pulse states can be checked on the Keypad.
- ASR auto tuning (Soon to be supported).

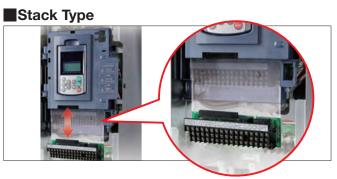
Applicable models : FRENIC-VG



Easy wiring (removable control terminal block)

- The terminal block can be connected to the inverter after control wiring work is completed. Wiring work is simplified.
- Restoration time for updating equipment, problem occurrence, and inverter replacement has been drastically reduced. Just mount the wired terminal block board to the replaced inverter.





Adaptation to Environment and Safety

Compliance with overseas standards

Applicable models: FRENIC-VG (Unit Type)

- The FRENIC-VG complies with the following overseas standards in its standard configuration, allowing standardization of device and machinery specifications in Japan and overseas:
 EC directives: Low Voltage Directive, RoHS Directive, Machinery Directive, UL Standards, cUL Standards,
- KC Certification

 The FRENIC-VG also complies with the EMC

 Directive when the standard model is combined with an option (EMC filter).

EU EC Direct

EC Directive (CE marking)



US/Canada

UL Standards/ cUL Standards



KC certification



Safety standards

- The functional safety (FS) function STO that conforms to the FS standard EN61800-5-2 is incorporated as standard.
- The FS functions STO, SS1, SLS and SBC that conform to FS standard EN61800-5-2 can be also available by installing the option card OPC-VG1-SAFE. These functions are available only when controlling the motor using feedback encoder (closed loop).

Safety function STO: Safe Torque Off

This function shuts off the output of the inverter (motor output torque) immediately.

Safety function SS1: Safe Stop 1

This function decreases the motor speed to shut down the motor output torque (by STO FS function) after the motor reaches the specified speed or after the specified time has elapsed.

Safety function SLS: Safely Limited Speed

This function prevents the motor from rotating over the specified speed.

Safety function SBC: Safe Brake Control

This function outputs a safe signal of the motor brake control.

Enviroment

Environmental resistance has been enhanced compared to conventional inverters.

- (1) Environmental resistance of cooling fan has been enhanced.
- (2) Nickel and Tin plating are applied to copper bars.

Environmental resistance has been enhanced on the FRENIC-VG compared to conventional models; however, the following environments should be examined based on how the equipment is being used.

- a. Sulfidizing gas
- b. Conductive dust and foreign particles
- c. Others: unique environments not included under standard environments

Contact Fuji Electric before using the product in environments such as those indicated above. Salt resistant is option.

RoHS Directive compliance

FRENIC-VG complies with European regulations that limit the use of specific hazardous substances (RoHS) as a standard.

Applicable models : FRENIC-VG

Six hazardous substances

Lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl (PBB), polybrominated diphenyl ether (PBDE) *Contact Fuji Electric for detailed information.

About RoHS

Directive 2002/95/EC, promulgated by the European Parliament and European Council, limits the use of specific hazardous substances included in electrical and electronic devices.

System Configuration Overview

■ PWM converter + inverter

Note







Single winding motor



Multi winding motor

Filter circuit (individual) or filter stack

Converter unit(RHC-C) or stack(RHC-D)

Inverter unit or stack

Optical communication card (option)

Ideal for crane systems.

No.	System structure	System construction	Filter stack (RHF)(*1)	Filter for RHC-C series (individual type)	Motor capacity (Ex. FRN315SVG1-4 parallel use)
1	F C I TREST	O Available CNV: 6 pieces/max INV: 6 parallel connection/max	Available	■Converter unit (RHC-C)	~1800kW (6 winding motor)
2	F C I TBS	X Not available (Direct parallel connection. Use the No.3 connection.)	_	_	_
3	F C T TBSI TBSI TBSI TBSI TBSI TBSI TBSI TB	Available CNV: 6 parallel connection/max INV: 3 parallel connection/max	Available	■Converter unit (RHC-C) ② Available ■Converter stack (RHC-D) •RHC132S to 315S-4D	~800kW (INV: 3 parallel connection)
4	F C I TBSI TBSI TBSI	Available CNV: 6 pieces/max INV: 6 parallel connection/max	Available	→ X Not Available •RHC630B to 800B-4D → ⊚ Available	~1800kW (6 winding motor)
5	F C I TEST I TES	X Not available (If sharing converter output, use the No.7 connection.)	_	_	_
6	F C TRBSI TR	X Not available (If sharing converter output, use the No.8 connection.)	_	_	_
7	F C I TBSI TBSI TBSI TBSI TBSI TBSI TBSI TB	Available CNV: 3 parallel connection/max INV: 6 parallel connection/max	Available		~1800kW (6 winding motor)
8	F C I TBSI TBSI TBSI TBSI TBSI TBSI TBSI TB	Available CNV: 3 parallel connection/max INV: 3 parallel connection/max	Available	■Converter unit (RHC-C)	~800kW (INV: 3 parallel connection)
9	F C TESS TESS TESS TESS TESS TESS TESS TE	Available INV: 6 parallel connection/max		→ X Not Available •RHC630B to 800B-4D → ⊚ Available	~CNV capacity
10	F C TRSS	Available INV: 3 parallel connection/max			~CNV capacity

(*1) The filter stack (RHF) is for exclusive use with the converter stack (RHC-D). It cannot be used with the converter unit (RHC-C). (Note 1) Capacity of inverter should be same (Note 2) When several inverters are powered by one converter, converter capacity >= total inverter capacity Check in the manual the capability of converter charging circuit. (Note 3) When operating a motor using direct parallel system, a minimum wiring length between motor and inverter should be kept. Check the manual.

⁽Note 4) Power should be applied to all converters at the same time.



■ Diode Rectifier (RHD-D) + inverter



Transformer (12 phase) Power Supply





Single winding motor



Multi winding motor

______ ACL AC reactor

Diode rectifier (RHD-D)

Inverter unit or stack

TBSI Optical communication card (option)

No.		System structure	Applicable system Continous rating (total)	Remarks
1	RFI:INV= 1:N	RFI TEST Or Or	Direct parallel system Multiwinding system INV: Motor = 1:1 system Continous rating (total) 110 to 353kW	
2	RFI:INV= 2:2 RFI:INV= 3:3	RFI TBSI	Multiwinding system INV: Motor = 1:1 system Continous rating (total) 220 to 706kW	If common bus not applied for RFI output (DC output) Not applicable with direct parallel systems
3	RFI:INV= 2:N RFI:INV= 3:N	RFI TBSI Or TBSI	Direct parallel system Multiwinding system INV: Motor = 1:1 system Continous rating (total) 220 to 706kW	1) A common bus should be applied for RFI output (DC output). 2) Restrictions apply to wiring conditions from TR to INV. 3) Voltage distortion in input voltage (3%, from IEC standards) 4) Wiring restrictions apply from input power supply to DC common bus.
4	RFI:INV= 2:2 RFI:INV= 3:3	RFI TBSI	Multiwinding system INV: Motor = 1:1 system Continous rating (total) 220 to 706kW	I) If common bus not applied for RFI output (DC output) Not applicable with direct parallel systems
5	RFI:INV= 2:N	RFI TBSI Or J	Direct parallel system Multiwinding system INV: Motor = 1:1 system Continous rating (total) 220 to 585kW	
6	RFI:INV= 4:N RFI:INV= 6:N	ACL RFI I Or RFI I RFI I I	Direct parallel system Multiwinding system INV: Motor = 1:1 system Continous rating (total) 440 to 1031kW	If using RFI (x4, or 6) structure configuration 1) A common bus should be applied for RFI output (DC output). 2) Restrictions apply to wiring conditions from Transformer to Inverter. 3) Voltage distortion in input voltage (3%, from IEC standards) 4) Use an AC reactor.
7	RFI:INV= 6:N	RFI I I I I I I I I I I I I I I I I I I	Direct parallel system Multiwinding system INV: Motor = 1:1 system Continous rating (total) 660 to 1546kW	If using RFI (x6) structure 1) A common bus should be applied for RFI output (DC output). 2) Restrictions apply to wiring conditions from Transformer to Inverter. 3) Voltage distortion in input voltage (3%, from IEC standards) 4) Use an AC reactor.

(Note 1) Use inverters of the same capacity for direct parallel systems and multiwinding motor drive systems.
 (Note 2) Motor capacity is calculated based on a power supply voltage of 400 V.
 (Note 3) Turn ON the main power supply for all converters at the same time.

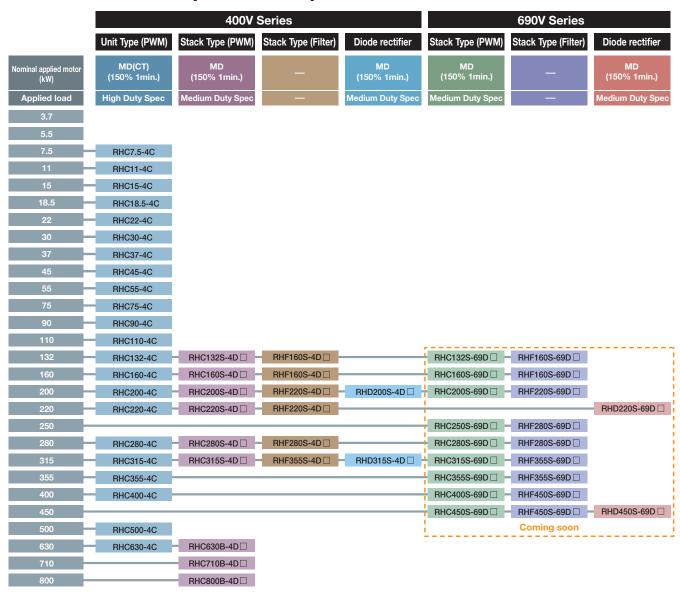
Model variation (Inverter)

		400V Series	690V Series				
	Unit T	/pe	Stack Type	Stack Type			
Nominal applied motor (kW)	HD (150%, 1 min./200%, 3sec.)	MD (150% 1min.)	MD (150% 1min.)	MD(CT) (150% 1min.)			
Applied load	High Duty Spec	Medium Duty Spec	Medium Duty Spec	Medium Duty Spec			
3.7	FRN3.7VG1S-4□						
5.5	FRN5.5VG1S-4□						
7.5	FRN7.5VG1S-4□						
11	FRN11VG1S-4□						
15	FRN15VG1S-4□						
18.5	FRN18.5VG1S-4 □						
22	FRN22VG1S-4□						
30	FRN30VG1S-4□		FRN30SVG1S-4□				
37	FRN37VG1S-4□		FRN37SVG1S-4□				
45	FRN45VG1S-4□		FRN45SVG1S-4□				
55	FRN55VG1S-4□		FRN55SVG1S-4□				
75	FRN75VG1S-4□		FRN75SVG1S-4□				
90	FRN90VG1S-4□		FRN90SVG1S-4□	FRN90SVG1S-69□			
110	FRN110VG1S-4 □	FRN90VG1S-4□	FRN110SVG1S-4□	FRN110SVG1S-69 □			
132	FRN132VG1S-4 □	FRN110VG1S-4□	FRN132SVG1S-4□	FRN132SVG1S-69 □			
160	FRN160VG1S-4□	FRN132VG1S-4□	FRN160SVG1S-4□	FRN160SVG1S-69 □			
200	FRN200VG1S-4 □	FRN160VG1S-4□	FRN200SVG1S-4□	FRN200SVG1S-69 □			
220	FRN220VG1S-4 □	FRN200VG1S-4□	FRN220SVG1S-4□				
250		FRN220VG1S-4□	FRN250SVG1S-4□	FRN250SVG1S-69 □			
280	FRN280VG1S-4 □		FRN280SVG1S-4□	FRN280SVG1S-69 □			
315	FRN315VG1S-4 □	FRN280VG1S-4□	FRN315SVG1S-4□	FRN315SVG1S-69 □			
355	FRN355VG1S-4 □	FRN315VG1S-4□		FRN355SVG1S-69 □			
400	FRN400VG1S-4 □	FRN355VG1S-4□		FRN400SVG1S-69 □			
450		FRN400VG1S-4□		FRN450SVG1S-69 □			
500	FRN500VG1S-4			Coming soon			
630	FRN630VG1S-4 □		FRN630BVG1S-4□				
710			FRN710BVG1S-4□				
800			FRN800BVG1S-4□				

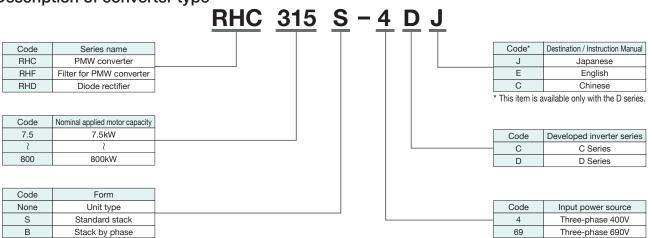
How to read the model number FRN 30 S VG1 S-Destination / Instruction Manual Code Series name Code FRENIC Series Japanese Е English Code Nominal applied motor capacity С Chinese 3.7 3.7kW Other Special specification 5.5kW 5.5 7.5 7.5kW Code Input power source Three-phase 400V 800 800kW 69 Three-phase 690V Code Form None Unit type Structure S Standard stack S Standard В Stack by phase Code Code Developed inverter series Application range VG High performance vector control 1 Series

Caution! The product detail described in this document is intended for selecting a model. When using a product, read the Instruction Manual carefully and use the product properly.

Model variation (Converter)



Description of converter type



Caution! The product detail described in this document is intended for selecting a model. When using a product, read the Instruction Manual carefully and use the product properly.

FRENIC-VG (Inverter)

Standard specifications

HD specification (Unit Type)

400V series

	Type FRN⊡VG1S-4⊡	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	500	630
Nor	ninal 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	280	315	355	400	500	630
Rated capacity [kVA] (*1)			10	14	18	24	29	34	45	57	69	85	114	134	160	192	231	287	316	396	445	495	563	731	891
Rated current [A]			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	585	650	740	960	1170
Overload current rating								-	150%	of ra	ated	curre	nt -1	min.	(*2)	200	% -3	s. (*3)						
	Main power Phase, Voltage, Frequency	3-р	3-phase 380 to 480V, 50Hz/60Hz 3-phase 380 to 440V/50Hz, 380 to 480V/60Hz (*4)																						
voltage	Auxiliary control power supply Phase, Voltage, Frequency	Sin	gle p	hase	380	to 48	0V, 5	0Hz/	60Hz																
hlddns	Auxiliary input for fan power Phase, Voltage, Frequency (*5)		_ Single phase 380 to 440V, 50Hz 380 to 480V/60Hz (*4)																						
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*6)																							
Power	Rated current [A] (with DCR)	7.5	10.6	14.4	21.1	28.8	35.5	42.2	57.0	68.5	83.2	102	138	164	210	238	286	357	390	500	559	628	705	881	1115
	(*7) (without DCR)	13.0	17.3	23.2	33	43.8	52.3	60.6	77.9	94.3	114	140	-	_	-	-	_	_	-	_	_	-	-	_	_
	Required power supply capacity [kVA] (*8)	5.2	7.4	10	15	20	25	30	40	48	58	71	96	114	140	165	199	248	271	347	388	436	489	610	773
Bra	king method /braking torque	Braki	ng resis	tor disc	harge o	control:	150% b	raking	torque,	Separa	tely inst	alled b	aking r	esistor	(option)	, Separa	ately in:	stalled b	oraking	unit (op	tion for	FRN20	0VG1S-	-4J or h	igher)
Car	rier frequency [kHz] (*9)					2	2 to 1	5									2	2 to 1	0					2 to	0 5
App	rox.weight [kg]	6.2	6.2	6.2	11	11	11	11	25	26	31	33	42	62	64	94	98	129	140	245	245	330	330	555	555
Enc	losure	IP2	0 clo	sed t	ype l	JL op	oen ty	/ре		IPO	00 op	en ty	pe U	IL op	en ty	pe (IF	P20 c	losed	d typ	e is a	ıvaila	ble a	s opt	ion)	
App	Applicable safety standards			C, C2	2.2 N	lo.14	(*10)	, IEC	/EN (3180	0-5-1	(Ove	ervolt	tage	cate	gory:	3)								

Note 1) The specification above are established when the function code F80 = 0 (HD specification) is applied. Note 2) When using DC reactor, note the followings.

- •Type FRN UG1S-4J: 55kW or below: provided as option, 75kW or above: Provided as standard.
- •Type FRN UG1S-4E, -4C: Provided as option.
- *1) The rated output voltage is 440V for 400V series.
- *2) When the inverter output frequency converter value is 10Hz or less, the inverter may trip early due to overload depending on the conditions such as ambient temperature.
- *3) When the inverter output frequency converter value is 5Hz or less, the inverter may trip early due to overload depending on the conditions such as ambient temperature.
- *4) The inverters with the power supply of 380 to 398V/50Hz and 380 to 430V/60Hz must be switched using a connector inside the inverter. The output power of the inverter with 380V may drop depending on situations. For details, refer to the FRENIC-VG User Manual chapter 10.5.
- *5) This input is used to supply the AC fan when supplying the inverter from DC inputs, like when combining the inverter with RHC or RHD converter (therefore it is not always used).
- *6) Voltage unbalance [%] = $\frac{\text{Max. voltage [V]} \text{Min. voltage [V]}}{\text{Three-phase average voltage [V]}} \times 67$

Use an AC reactor if the voltage unbalance exceeds 2%.

- *7) The value is calculated on assumption that the inverter is connected with a power supply capacity of 500kVA (or 10 times the inverter capacity if the inverter capacity exceeds 50kVA) and %X is 5%.
- *8) The values shown apply when DC reactor is used.
- *9) The inverter may automatically reduce carrier frequency in accordance with ambient temperature or output current in order to protect itself.
- *10) The FRN75/160/200/220/355/400VG1S-4□ do not conform to C22.2 No.14. If necessary, please contact Fuji Electric.



MD specification (Unit Type)

400V series

	Type FRN⊡VG1S-4⊡	90	110	132	160	200	220	280	315	355	400
Nor	minal applied motor [kW] (*8)	110	132	160	200	220	250	315	355	400	450
Rat	ed capacity [kVA] (*1)	160	192	231	287	316	356	445	495	563	640
Rat	ed current [A]	210	253	304	377	415	468	585	650	740	840
Ove	erload current rating				150%	6 of rated c	urrent -1mir	า. (*2)			
	Main power Phase, Voltage, Frequency		380 to 440V 380 to 480V	,							
voltage	Auxiliary control power supply Phase, Voltage, Frequency	Single ph	ase 380 to 4	480V, 50Hz/	60Hz						
Power supply voltage	Auxiliary input for fan power Phase, Voltage, Frequency (*4)	Single ph	ase 380 to 4 380 to 4	140V, 50Hz 180V/60Hz ((*3)						
Ver	Voltage/frequency variation	Voltage: -	⊦10 to -15%	, Frequency	y: +5 to -5%	, Voltage ur	nbalance: 29	% or less (*	5)		
Pov	Rated current [A] (with DCR)	210	238	286	357	390	443	559	628	705	789
	(*6) (without DCR)					-	_				
	Required power supply capacity [kVA] (*7)	140	165	199	248	271	312	388	436	489	547
Bral	king method /braking torque		stor discharge on the stalled braking			Separatel	y installed b	harge contro oraking resis oraking unit	stor (option)	aking torque	,
Carı	rier frequency [kHz]					2 t	o 4				
App	rox.weight [kg]	62	64	94	98	129	140	245	245	330	330
Enc	losure	IP00 ope	n type UL o	oen type (IP	20 closed ty	pe is availa	ble as optic	on)			
App	licable safety standards	UL 508C,	C22.2 No.1	4 (*9), IEC/I	EN 61800-5	-1 (Overvolt	age catego	ry: 3)			

Note 1) The specifications above are established when the function code F80 = 3 (MD specification) is applied.

Note 2) When using DC reactor, note the followings.

- •Type FRN VG1S-4J: Provided as standard.
 •Type FRN VG1S-4E, -4C: Provided as option.
- *1) When the rated output voltage is 440V
- "2) When the converted inverter output frequency is less than 1Hz, the inverter may trip earlier in some ambient temperature conditions if the motor is overloaded
- *3) When the power supply is 380 to 398V at 50 Hz or 380 to 430V at 60Hz, a connector inside the inverter must be reconnected accordingly.
- The output of the inverter with 380V may drop depending on situations. For the detail, refer to the FRENIC-VG User Manual 10.5.

 *4) This input is used to supply the AC fan when supplying the inverter from DC inputs, like when combining the inverter with RHC or RHD converter (therefore it is not always used).
- *5) Voltage unbalance [%] = $\frac{\text{Max. voltage [V]} \text{Min. voltage [V]}}{\text{Three-phase average voltage [V]}} \times 6$

Use an AC reactor if the voltage unbalance exceeds 2%.

- *6) The value is calculated on assumption that the inverter is connected with a power supply capacity of 10 times the inverter capacity and %X is 5%.
- *7) The values shown apply when DC reactor is used.
- *8) Since heat generation of the motor due to low carrier may be increased depending on the load condition, designate the MD specification when ordering the motor.
- *9) The FRN160/200/220/355/400VG1S-4 do not conform to C22.2 No.14. If necessary, please contact Fuji Electric.

FRENIC-VG (Inverter)

Standard specifications

MD specifications (Stack Type)

400V series

1	γpe FRN□○V1S-4□	308	37S	45S	55S	75S	908	110S	132S	160S	2008	220S	250S	280S	315S	630B(*5)	710B(*5)	800B(*5)
Nor	ninal applied motor [kW]	30	37	45	55	75	90	110	132	160	200	220	250	280	315	630	710	800
Rat	ed capacity [kVA] (*1)	45	57	69	85	114	134	160	192	231	287	316	356	396	445	891	1044	1127
Rat	ed current [A]	60	75	91	112	150	176	210	253	304	377	415	468	520	585	1170	1370	1480
Ove	erload current rating							150	% of ra	ted curi	rent -1n	nin. (*2)						
e de	Main power	Refer t	to the s	pecifica	ations o	f PWM	conver	ter of D	C input	type.								
y voltage	Auxiliary control power supply Phase, Voltage, Frequency	Single	Single phase 380 to 480V, 50/60Hz															
Power supply	Auxiliary input for fan power Phase, Voltage, Frequency	Auxilia	ıry inpu	t for far	power		Single	•	380 to 4			1						
ď	Voltage/frequency variation	Voltag	e: +10 t	o -15%	, Frequ	iency: +	-5 to -5	%										
Car	rier frequency [kHz] (*4)									2								
App	prox. weight [kg]	30	30	30	37	37	45	45	95	95	95	125	135	135	135	135×3(*6)	135×3(*6)	135×3(*6)
Enc	losure								IP	00 oper	type							

Note 1) The above specifications are for Function Code F80=0, 2 and 3 (MD specification). Default setting=0. 0 and 2 are displayed as HD on keypad.

^{*6)} This weight may be changed. For details, contact the Sales Department at Fuji.

69	0V series									C	Coming soo	n
Т	ype FRN□○VG1S-69□	908	110S	132S	160S	200S	250S	280S	315S	355S	400S	450S
No	minal applied motor [kW]	90	110	132	160	200	250	280	315	355	400	450
Rat	ed capacity [kVA] (*1)	120	155	167	192	258	317	353	394	436	490	550
Rat	ed current [A]	100	130	140	161	216	265	295	330	365	410	460
Ov	erload current rating											
ige												
oly voltage	Main power Refer to the specifications of PWM converter of DC input type. (690V series) Auxiliary control power supply Phase, Voltage, Frequency Single phase 575 to 690V, 50/60Hz											
Power supply	Auxiliary input for fan power Phase, Voltage, Frequency	, ,	se 660 to 6 se 575 to 6									
Po	Voltage/frequency variation	Voltage:+1	0 to -15%,	Frequency:	+5 to -5%							
Ca	rrier frequency [kHz] (*4)						2					
Ap	orox. weight [kg]	45	45	95	95	95	135	135	135	135	135	135
End	closure					IP	00 open typ	ре				

Note 1) The above specifications are for Function Code F80=0, 2 and 3 (MD specification). Default setting=0. 0 and 2 are displayed as HD on keypad.

^{*1)} When the rated output voltage is 440V

^{*2)} When the converted inverter output frequency is less than 1Hz, the inverter may trip earlier in some ambient temperature conditions if the motor is overloaded.

^{*3)} When the power supply is 380 to 398V at 50Hz or 380 to 430V at 60Hz, a connector inside the inverter must be reconnected accordingly.

^{*4)} When the synchronous motor is run at a low carrier frequency, the permanent magnet may be over-heated and demagnetized by harmonic components of the output current. Be sure to check the permissible carrier frequency of the motor.

^{*5)} One set of the inverter consists of three stacks.

 $^{^{\}star} 1)$ When the rated output voltage is 690V

^{*2)} When the converted inverter output frequency is less than 1Hz, the inverter may trip earlier in some ambient temperature conditions if the motor is overloaded.

^{*3)} When the power supply is 575 to 600V at 50Hz, 60Hz, a connector inside the inverter must be reconnected accordingly.

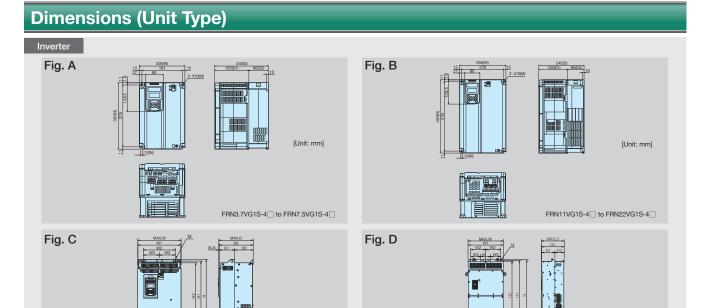
^{*4)} When the synchronous motor is run at a low carrier frequency, the permanent magnet may be over-heated and demagnetized by harmonic components of the output current. Be sure to check the permissible carrier frequency of the motor.

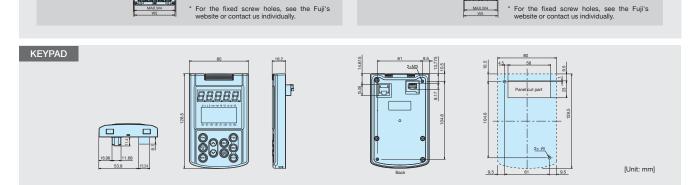


[Unit: mm]

3-hole:FRN280VG1S-4 to FRN315VG1S-4 4-hole:FRN355VG1S-4 to FRN630VG1S-4

Dimensions





[Unit: mm]

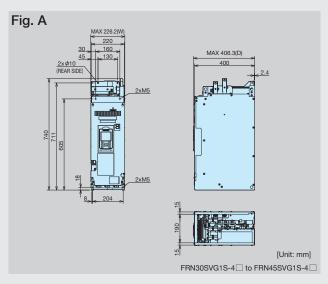
2-hole:FRN30VG1S-4 to FRN160VG1S-4 3-hole:FRN200VG1S-4 to FRN220VG1S-4

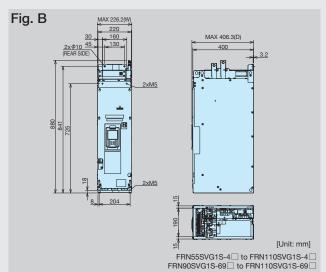
	I								D:							[U	Init: mm]
Series	Inverter type	Fig							Dim	ensions	; 						
Selles	iliverter type	lig	W	W1	W2	W3	W4	W5	Н	H1	H2	D	D1	D2	D3	М	N
	FRN3.7VG1S-4	А															
	FRN5.5VG1S-4□	А	205						300								
	FRN7.5VG1S-4□	Α															
	FRN11VG1S-4□	В		-	-		-	-		-	-	245	155	90	-		
	FRN15VG1S-4□	В	250						400								
	FRN18.5VG1S-4	В	250						400							2X φ10	10
	FRN22VG1S-4□	В															'0
	FRN30VG1S-4	С	326.2	320	240	_	310.2	304	550	530	500	261.3		140	255		
	FRN37VG1S-4□	С	020.2	020	240		010.2	504	330	300	300	201.0		140	200		
	FRN45VG1S-4	С							615	595	565		115				
	FRN55VG1S-4□	С	361.2	355	275		345.2	339	675	655	625	276.3		155	270		
400V	FRN75VG1S-4	С								720	690						
series	FRN90VG1S-4□	С							740	710	678.7	321.3	135		315		
	FRN110VG1S-4	С	536.4	530	430		506.4	500.6		710	070.7	021.0	100		010	2X Φ15	
	FRN132VG1S-4□	С	300.4	350	450		300.4	300.0								27,413	
	FRN160VG1S-4	С							1000	970	939.5	366.3	180		360		
	FRN200VG1S-4□	С			_	290	656.4	650.6	1000	370	959.5	300.3	100	180	300		
	FRN220VG1S-4□	С	686.4	680		230	050.4	030.0						100		3X φ15	15
	FRN280VG1S-4□	D	000.4	000	290	_	659	653				445.5				ΟλΨΙΟ	'3
	FRN315VG1S-4□	D			230		055	050	1400	1370	1330	440.0	260		440		
	FRN355VG1S-4□	D	886.4	880		260	859.1	853	1400	1070	1300	446.3	230		1-10		
	FRN400VG1S-4	D	300.4	000	_	200	333.1	000				170.0				4Χ φ15	
	FRN500VG1S-4	D	1006	1000		300	972	966	1550	1520	1480	505.9	313.2	186.8	500	-17. Ψ10	
	FRN630VG1S-4□	D	1300	1300		000	572	000	1000	1020	1-700	000.0	010.2	100.0	000		

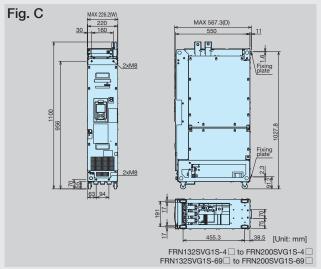
FRENIC-VG (Inverter)

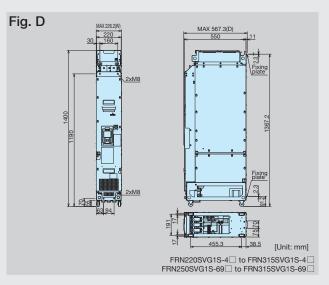
Dimensions

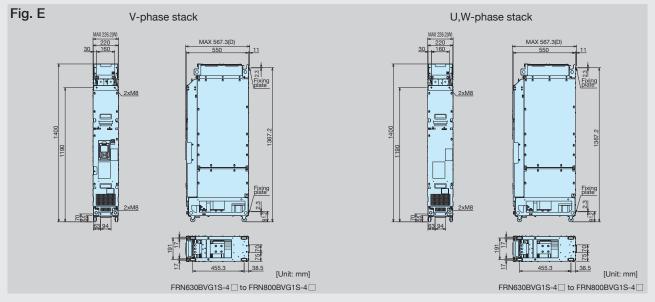
Dimensions (Stack Type)













				Dimensions	[Unit: mn
Series	Inverter type	Fig	w	H	D
	FRN30SVG1S-4□	A			
	FRN37SVG1S-4	A	226.2	740	406.3
	FRN45SVG1S-4	A			
	FRN55SVG1S-4	В			
	FRN75SVG1S-4□	В	226.2	880	406.3
	FRN90SVG1S-4	В	226.2	880	406.3
	FRN110SVG1S-4	В			
40014	FRN132SVG1S-4	С			
400V series	FRN160SVG1S-4	С	226.2	1100	567.3
Series	FRN200SVG1S-4	С			
	FRN220SVG1S-4	D			
	FRN250SVG1S-4	D	226.2	1.100	507.0
	FRN280SVG1S-4	D	226.2	1400	567.3
	FRN315SVG1S-4	D			
	FRN630BVG1S-4 (*1)	E			
	FRN710BVG1S-4□(*1)	E	226.2	1400	567.3
	FRN800BVG1S-4 (*1)	E			
	FRN90SVG1S-69□	В	000.0	000	400.0
	FRN110SVG1S-69	В	226.2	880	406.3
	FRN132SVG1S-69□	С			
	FRN160SVG1S-69	С	226.2	1100	567.3
0001/	FRN200SVG1S-69	С			
690V series	FRN250SVG1S-69	D			
SELLES	FRN280SVG1S-69	D	226.2	1400	567.3
	FRN315SVG1S-69	D			
	FRN355SVG1S-69	-	-	-	-
	FRN400SVG1S-69	-	-	-	-
	FRN450SVG1S-69	-	-	-	-

^{*1)} One set of the inverter consists of three stacks. The touch panel is connected to the V phase only.

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.

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% MD/CT spec.

■ Maintenance/protective functions

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

- ①The past 10 alarms can be displayed with the keypad LED display. This helps you analyze the alarm causes and take countermeasures.
- When momentary power failure occurs, the converter turns off the gates to enable continuous operation after recovery.
- 3The converter can issue warning signals like overload, heat sink overheating, or the end of service life prior to converter tripping.

Network

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

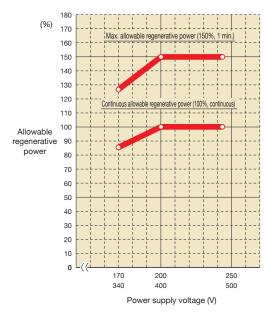


Comparison of input current waveform

<Without PWM converter>

With PWM converter>
With PWM converter>

Allowable characteristics of the RHC unit





Standard Specifications

CT specifications (Unit Type)

400V series

Ту	rpe RHC□□□-4C	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	280	315	355	400	500	630
Applicab	le 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
	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
Output	Overload rating	150	% of	rated	currer	nt for	1 min																
	Voltage	DC6	40 to	710V	(Varia	ble w	ith inp	out po	wer s	upply	volta	ige) (*:	2)										
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
Carrier fr	requency (*4)	Stan	dard	15kH	Z						Stan	dard	10kHz	<u>z</u>								Standa	ırd 6kHz
Power supply	Number of phase/Voltage/Frequency	3-ph	ase, 3	380 to	440V	50Hz	z, 380	to 46	60V 60)Hz (*	1)												
voltage	Voltage/Frequency variation	Volta	ge: +	10 to	-15%	, Frec	uenc	y: ±59	%, Vo	ltage ı	unbal	ance:	2% o	r less	(*3)								
Enclosur	е	IP00	open	type																			

- (*1) A connector inside converter must be reconnected accordingly 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.
- (*2) The output voltage is 640V DC, 686V DC, 710V DC when the power supply voltage is 400V, 440V and 460V, respectively.
- (*3) Voltage unbalance [%] = (Max. voltage [V] Min. voltage [V])/Three-phase average voltage [V] × 67
- (*4) Transformer isolation-less parallel system is used: 5kHz
- (*5) When inverter and converter are the same capacity, and an overload current uses it exceed 150%, select a converter with one rank higher capacity.

MD specifications (Stack Type)

400V series

Т	Гуре RHC⊡⊜-4D⊟	1328	160S	2008	220S	280S	315S	630B	710B	800B
Applicab	ole inverter capacity [kW]	132	160	200	220	280	315	630	710	800
	Continuous capacity [kW]	150	182	227	247	314	353	705	795	896
Output	Overload rating	150% of con	tinuous rating	for 1 min.						
	Voltage	DC640 to 71	0V (variable w	vith input pow	er supply volt	age) (*2)				
Required	power supply capacity [kVA]	161	196	244	267	341	383	762	858	967
	requency (*4)	Standard 5kl	Нz							
Input supply	Number of phase/Voltage/Frequency	3-phase, 380	to 440V 50H	Iz, 380 to 460'	V 60Hz (*1)					
voltage	Voltage/Frequency variation	Voltage: -10	to +15%, Fre	quency:±5%,	Voltage unba	ance: 2% or I	ess (*3)			
Enclosur	re	IP00 open ty	ре							

690V series (Coming soon)

Ту	ype RHC□○-69D□	132S	160S	200S	250S	280S	315S	355S	400S	450S
Applicab	ole inverter capacity [kW]	132	160	200	250	280	315	355	400	450
	Continuous capacity [kW]	150	182	227	280	314	353	400	448	504
Output	Overload rating	150% of con	tinuous rating	for 1 min.						
	Voltage	DC920 to 10	65V (variable	with input pov	wer supply vo	Itage) (*2)				
Required	power supply capacity [kVA]	161	196	244	302	341	383	433	488	544
	requency (*4)	Standard 5kl	Hz							
Power supply	Number of phase/Voltage/Frequency	3-phase, 575	to 690V, 50H	Hz/60Hz (*1)						
voltage	Voltage/Frequency variation	Voltage: -15	to +10%, Fre	quency: -5 to	+5%, Voltage	unbalance: 2	% or less (*3)			
Enclosur	re	IP00 open ty	ре		·					

- (*1) 400V series: A connector inside converter must be reconnected accordingly 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.
 - 690V series: When the power supply voltage is 575 to 629V/50Hz, 60Hz, a connector inside converter must be reconnected accordingly.

When the power supply voltage is less than 575V, the capacity needs to be reduced.

- (*2) 400V series. The output voltage is 640V DC, 686V DC, 710V DC when the power supply voltage is 400V, 440V and 460V, respectively.
- 690V series: When the power supply voltage is 575V and 690V, the output voltage is 920 VDC and 1065 VDC, respectively (*3) Inter-phase voltage unbalance ratio [%] = (Max. voltage [V] - Min. voltage [V]) /3-phase average voltage x 67
- (*4) Transformer isolation-less parallel system is used : 2.5kHz

Specifications (Control and Displays of keypad)

	Item	Specifications
	Control method	AVR constant control with internal ACR.
	Running and operation	Rectification starts with power ON after connected. Boosting starts with the running signal (RUN-CM short-circuit
	Hulling and operation	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.
Control	Input power factor	Above 0.99 (for 100% load)
	Input harmonics 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	Stops the gates 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.
Dioplaya	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 (*1)
Displays of	Alarm history	Records and displays the last 10 alarms.
Keypad	Alarm history	The detailed information of the trip cause for the latest alarm is stored and displayed.
. to y pad	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	Text can displayed in 3 languages: Japanese, English and Chinese.
	Charge LED	Lights when the main circuit capacitor is charged.

Power regenerative PWM converter (RHC series)

Equipment Configuration List

Unit Type

Power	Nominal	PWM	Power su	pply	Contactor	r for			Charging circu	it bo)х ^(*1)		Boosting]	Filtering		Filterin	g	Filterin	g	Filtering of	circuit
Supply	applied	converter	contact	or	power sou	urce			Charger resist	or	AC Fuse		reactor		resistor		reacto	r	capacito	or	contac	tor
Voltage	motor [kW]	Type	(73)	Q'ty	(52)	Qʻty	(CU)	Q'ty	(R0)	Q'ty	(Fac)	Qty	(Lr)	Qʻty	(Rf)	Q'ty	(Lf)	Qʻty	(Cf)	Q'ty	(6F)	Q'ty
	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	(HF5C5504)		(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		
400V	90	RHC90-4C	SC-N7	1]		CU90-4C	1			(CR6L-300/UL)	(2)	LR4-110C	1	GRZG400 0.53Ω	6	LFC4-110C	1	CF4-110C	1		
series	110	RHC110-4C	SC-N8	1			CU110-4C	1	(GRZG120 2Ω)	(3)				L_	[2 parallel]							
	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 parallel]		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)	SC-N4(*3)	1
	630	RHC630-4C			SC-N12	3					A70P2000-4	2	LR4-630C	1	RF4-630C	1	LFC4-630C	1	CF4-630C	1(*2)	SC-N7(*3)	1

Stack Type

Power	Nominal		Power su		Contacto power so				Charging circu				Boosting reactor)	Filtering resistor		Filtering reactor	_	Filtering capacito		Filtering ci	
Supply	applied	converter	Contact		power so	uioc			Charger resist	or	AC Fuse		reactor		10010101		redeter		oupuono	"	oontaot	OI .
voitage	motor [kW]	Туре	(73)	Q'ty	(52)	Q'ty	(CU)	Q'ty	(R0)	Q'ty	(Fac)	Q'ty	(Lr)	Q't	(Rf)	Qʻty	(Lf)	Q'ty	(Cf)	Q'ty	(6F)	Q'ty
	132	RHC132S-4D□																				
	160	RHC160S-4D																				
	200	RHC200S-4D					Dloop	<u> </u>	oo Eiltor S	٠+۵	ak (DUE S	~ri	00) E0		details, refer	٠.	2000	0				
400V	220	RHC220S-4D□					rieas	. u	se riitei s	ıa	CK (NITE 3	- H	es). Fo	1 (details, refer	ιO	page 3	o.				
series	280	RHC280S-4D																				
	315	RHC315S-4D□																				
	630	RHC630B-4D	SC-N3	1	SC-N12	3			GRZG400 1Ω	6	SA598473	2	LR4-630C	1	RF4-630C	1	LFC4-630C	1	CF4-630C	1(*2)	SC-N7(*3)	1
	710	RHC710B-4D	SC-N4	1					[2 parallel]		HF5G2655	2	LR4-710C	1	RF4-710C	1	LFC4-710C	1	CF4-710C	1(*2)	SC-N8	1
	800	RHC810B-4D			SC-N14	3							LR4-800C	1	RF4-800C	1	LFC4-800C	1	CF4-800C	1(*2)		

Note) If using the converter stack of 690V series, the filter stack (RHF) only used.

Optional card

Name	Туре	Specifications
Optical communication	OPC-VG7-SIR	Using this option card makes possible to perform the load sharing control in a parallel connection system.

^(*1) The charging box (CU) contains a combination of a charging resistor (R0) and a fuse (Fac). If no CU used, it is necessary to prepare the charging resistor (R0) and fuse (F) at your end.

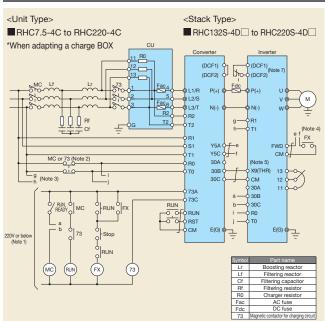
^(*2) The filtering capacitor consists of two pieces of capacitors. For an order of quantity "1," two pieces of capacitors are to be delivered.

^(*3) When changing the carrier frequency from the factory default, it is necessary to change the filtering circuit contactor (6F). For details, refer to the PWM converter Instruction Manual.



Wiring Diagram

Basic Wiring Diagram



- Converter becomes ready to run.

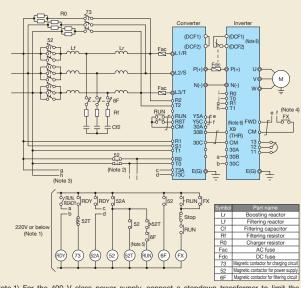
 (Note 5) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter.

 (Note 6) Wiring for terminals L1/R, L2/S, L3/T, R2, T2, R1, S1, and T1 should match with the phase sequence.

 (Note 7) Not available in the unit type inverter.

<Unit Type>

■RHC280-4C to RHC400-4C



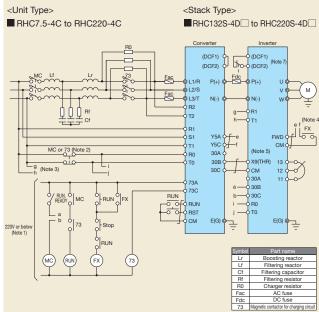
- (Note 1) For the 400 V class power supply, connect a stepdown transformer to limit the voltage of the sequence circuit to 220 V or below.

 (Note 2) Be sure to connect the auxiliary power input terminals R0 and T0 of the PWM converter to the main power input lines via B contacts of magnetic contactors of the charging circuit (52). Note that when applied to an ungrounded power supply, an insulated transformer is required. For the details, refer to the "PWM Converter Instruction Manual".

 (Note 3) Be sure to connect the fan power input terminals R1 and T1 of the inverter to the main power input lines without going through the MC's B contacts or 73.

 (Note 4) Construct a sequence in which a run command is given to the inverter after the PWM converter becomes ready to run.

- (Note 4) Construct a sequence in which a run command is given to the inverter after the PWM converter becomes ready to run.
 (Note 5) Set the timer 52T at 1 sec.
 (Note 6) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter.
 (Note 7) Wiring for terminals L1/R, L2/S, L3/T, R2, T2, R1, S1, and T1 should match with the phase sequence.
 (Note 8) Not available in the unit type inverter.

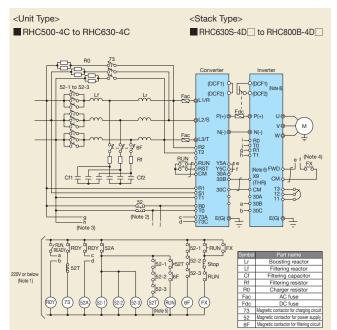


- (Note 1) For the 400 V class power supply, connect a stepdown transformer to limit the voltage of the sequence circuit to 220 V or below.

 (Note 2) Be sure to connect the auxiliary power input terminals R0 and T0 of the PWM converter to the main power input lines via B contacts of magnetic contactors of the charging circuit (73 or MC). Note that when applied to an ungrounded power supply, an insulated transformer is required. For the details, refer to the "PWM Converter Instruction Manual".

 (Note 3) Be sure to connect the auxiliary power input terminals R0 and T0 of the inverter to the main power input lines via B contacts of magnetic contactors of the charging circuit (73 or MC). For the capacities FRN75VG1S-4□ or higher and stack type inverter (all capacity range), connect the fan power input terminals R1 and T1 of the inverter to the main power input lines without going through the MC's B contacts or 73.

 (Note 4) Construct a sequence in which a run command is given to the inverter after the PVM converter becomes ready to run.
- (Note 4) Construct a sequence in which a run command is given to the inveter after the PWM converter becomes ready to run. (Note 5) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter. (Note 6) Wing for terminals L17k, L27k, L37, R2, T2, R1, S1, and T1 should match with the phase sequence. (Note 7) Not available in the unit type inverter.



- (Note 1) For the 400 V class power supply, connect a stepdown transformer to limit the voltage of the sequence circuit to 220 V or below.

 (Note 2) Be sure to connect the auxiliary power input terminals R0 and T0 of the PWM converter to the main power input lines via B contacts of magnetic contactors of the charging circuit (52). Note that when applied to an ungrounded power supply, an insulated transformer is required. For the details, refer to the "PWM Converter Instruction Manual".

 (Note 3) Be sure to connect the fan power input terminals R1 and T1 of the inverter to the main power input lines without going through the MC's B contacts or 73.

 (Note 4) Construct a sequence in which a run command is given to the inverter after the PWM converter becomes ready to run.
- (Note 4) Construct a sequence in which a run command is given to the inverter after the PWM converter becomes ready to run.

 (Note 5) Set the timer 52T at 1 sec.

 (Note 6) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter.

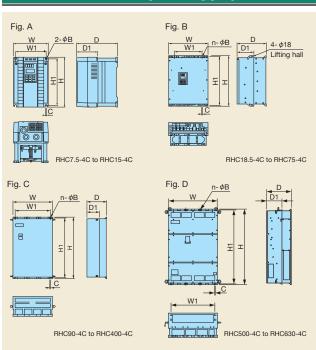
 (Note 7) Wiring for terminals L1/R, L2/S, L3/T, R2, T2, R1, S1, and T1 should match with the phase sequence.

 (Note 8) Not available in the unit type inverter.

Power regenerative PWM converter (RHC series)

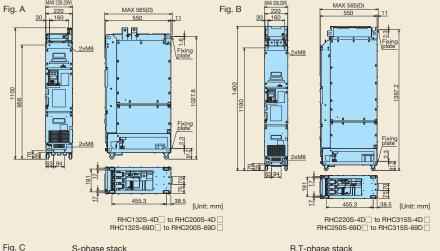
Dimensions

PWM converter (Unit Type)



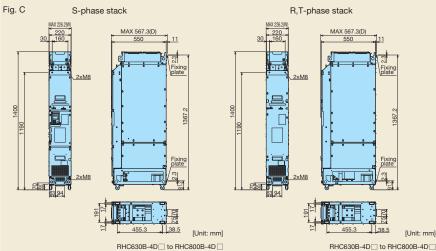
DWA -	converter type	_				Dime	ensions	[mm]				Approx.
PVVIVIC	converter type	Fig	w	W1	Н	H1	D	D1	n	В	С	weight [kg]
	RHC7.5-4C	Α	250	226	380	358	245	125	2	10	10	12.5
	RHC11-4C											
	RHC15-4C											
	RHC18.5-4C	В	340	240	480	460	255	145	2	10	10	24
	RHC22-4C											
	RHC30-4C	В	340	240	550	530	255	145	2	10	10	29
	RHC37-4C	В	375	275	550	530	270	145	2	10	10	34
	RHC45-4C	В	375	275	675	655	270	145	2	10	10	38
	RHC55-4C	В	375	275	675	655	270	145	2	10	10	39
	RHC75-4C	В	375	275	740	720	270	145	2	10	10	48
400V	RHC90-4C	С	530	430	740	710	315	175	2	15	15	70
series	RHC110-4C											
	RHC132-4C	С	530	430	1000	970	360	220	2	15	15	100
	RHC160-4C											
	RHC200-4C	С	680	580	1000	970	360	220	3	15	15	140
	RHC220-4C											
	RHC280-4C	С	680	580	1400	1370	450	285	3	15	15	320
	RHC315-4C											
	RHC355-4C	С	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											

PWM converter (Stack Type)



Series	PWM converter type	Fig	Dime	ensions	[mm]	Approx.
Series	P www converter type	rig	W	Н	D	weight [kg]
	RHC132S-4D	Α	226.2	1100	565	95
	RHC160S-4D	Α]			
400V series	RHC200S-4D□	Α				
	RHC220S-4D□	В	226.2	1400	565	125
	RHC280S-4D	В				135
	RHC315S-4D	В				
	RHC630B-4D(*1)	С	226.2	1400	567.3	135×3
	RHC710B-4D(*1)	С				
	RHC800B-4D(*1)	С				
	RHC132S-69D□	Α	226.2	1100	565	95
	RHC160S-69D	Α				
	RHC200S-69D	Α	1			
	RHC250S-69D	В	226.2	1400	565	135
690V series	RHC280S-69D	В]			
001100	RHC315S-69D	В				
	RHC355S-69D	-]			
	RHC400S-69D	-]			
	RHC450S-69D	-]			

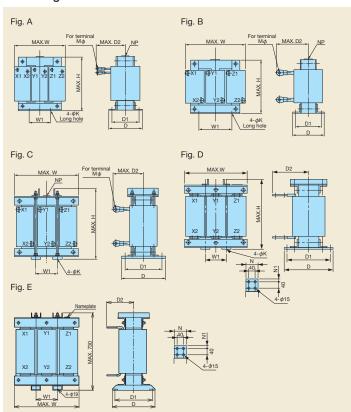
*1) Each stack corresponds to one phase, and one set of the inverter consists of three stacks. The keypad is attached only to the S phase.





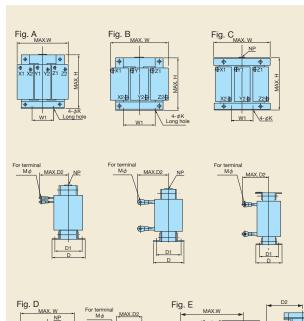
Peripheral equipment

<Boosting reactor>



D#:-						D	imensi	ons [mr	n]				Approx weight
Boostin	g reactor type	Fig	W	W1	Н	D	D1	D2	К	М	N	N1	[kg]
	LR4-7.5C	В	180	75	205	105	85	90	7	M4	-	-	12
	LR4-15C	Α	195	75	215	131	110	120	7	M5	-	-	18
	LR4-22C	С	240	80	340	215	180	120	10	M6	-	-	33
	LR4-37C	С	285	95	405	240	205	130	12	M8	-	-	50
	LR4-55C	С	285	95	415	250	215	145	12	M10	-	-	58
	LR4-75C	С	330	110	440	255	220	150	12	M10	-	-	70
	LR4-110C	С	345	115	490	280	245	170	12	M12	-	-	100
	LR4-160C	С	380	125	550	300	260	185	15	M12	-	-	140
400V series	LR4-220C	С	450	150	620	330	290	230	15	M12	-	-	200
001100	LR4-280C	С	480	160	740	330	290	240	15	M16	-	-	250
	LR4-315C	С	480	160	760	340	300	250	15	M16	-	-	270
	LR4-355C	С	480	160	830	355	315	255	15	M16	-	-	310
	LR4-400C	С	480	160	890	380	330	260	19	M16	-	-	340
	LR4-500C	С	525	175	960	410	360	290	19	M16	-	-	420
	LR4-630C	D	600	200	640	440	390	290	19	-	75	17.5	450
	LR4-710C	Е	645	215	730	440	390	295	19	-	100	30	510
	LR4-800C	Е	690	230	850	450	400	290	19	-	100	30	600

<Filtering reactor>



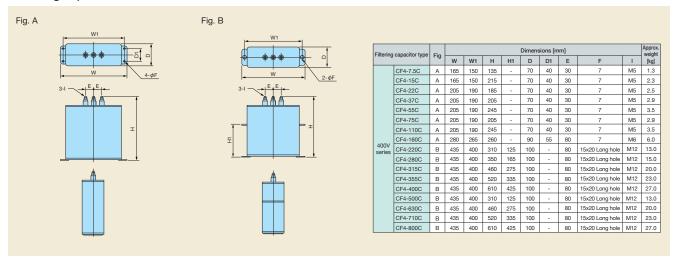
Filter	reactor type	Fia				D	imensi	ons [mn	Dimensions [mm]								
	rodotor type	rig	W	W1	Н	D	D1	D2	K	М	N	N1	weight [kg]				
	LFC4-7.5C	Α	125	40	100	85	67	75	6	M4	-	-	2.2				
	LFC4-15C	Α	125	40	100	93	75	90	6	M5	-	-	2.5				
	LFC4-22C	Α	125	40	100	93	75	95	6	M6	-	-	3.0				
	LFC4-37C	В	150	60	115	108	90	110	6	M8	-	-	5.0				
	LFC4-55C	В	175	60	145	110	90	120	6	M10	-	-	8.0				
	LFC4-75C	В	195	80	200	113	93	130	7	M10	-	-	12				
	LFC4-110C	С	255	85	220	113	90	145	7	M12	-	-	19				
40017	LFC4-160C	С	255	85	245	137	110	150	7	M12	-	-	22				
400V series	LFC4-220C	D	300	100	320	210	180	170	10	M12	-	-	35				
	LFC4-280C	D	330	110	320	230	195	195	12	M16	-	-	43				
	LFC4-315C	D	315	105	365	230	195	200	12	M16	-	-	48				
	LFC4-355C	D	315	105	395	235	200	210	12	M16	-	-	53				
	LFC4-400C	D	345	115	420	235	200	235	12	M16	-	-	60				
	LFC4-500C	D	345	115	480	240	205	240	12	M16	-	-	72				
	LFC4-630C	Е	435	145	550	295	255	200	15	-	75	17.5	175				
	LFC4-710C	Е	480	160	570	295	255	215	15	-	100	30	190				
	LFC4-800C	Е	480	160	600	320	270	220	15	-	100	30	220				

Power regenerative PWM converter (RHC series)

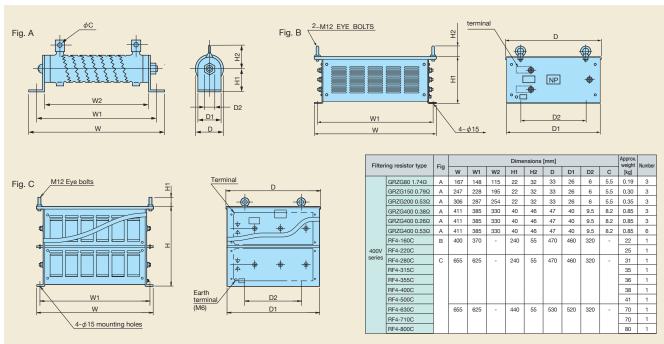
Dimensions

Peripheral equipment

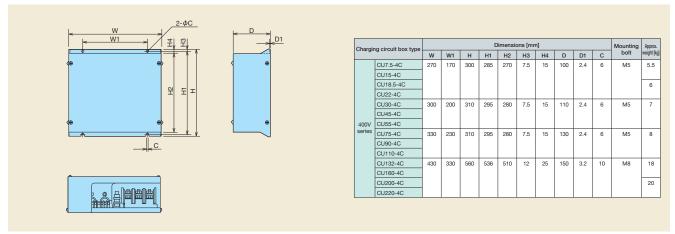
<Filtering capacitor>



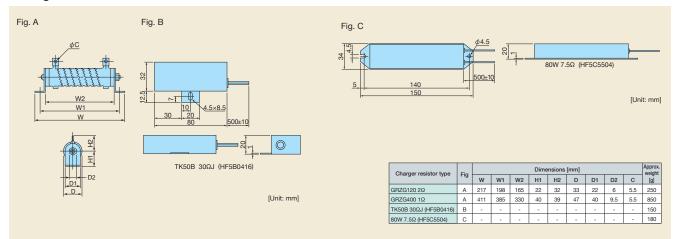
<Filtering resistor>



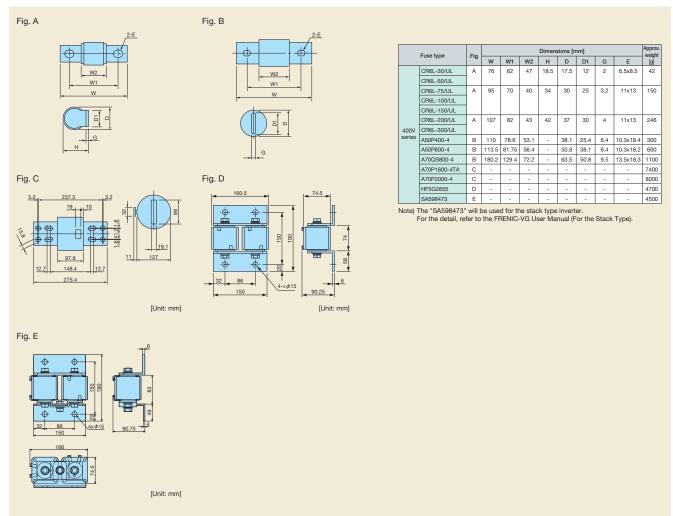
<Charging circuit box>



<Charger resistor>



<Fuse>



Filter stack (RHF series) for Power regenerative PWM converter (RHC-D)

Features

This is a filter assembled in a stack type construction, to be used together with stack type PWM converter (RHC-D).

Specifications (RHF series)

400V series

Type RHF□S-4D□	160	220	280	355			
Rated current [A]	282	384	489	619			
Main power Phase, Voltage, Frequency	3-Phase 380 to 440V/50Hz, 380 to 460V/60Hz Voltage: +10 to -15%, Frequency: +5 to -5%						
Approx. weight [kg]	155	195	230	250			
Enclosure	IP00 open type						

690V series (Coming soon)

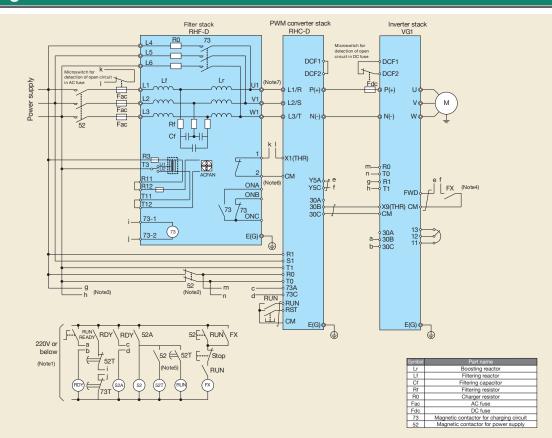
Type RHF□S-69D□	160	220	280	355	450			
Rated current [A]	163	223	283	359	455			
Main power	3-Phase 575 to 690V,	3-Phase 575 to 690V, 50Hz/60Hz						
Phase, Voltage, Frequency	Voltage: +10 to -15%,	Frequency: +5 to -5%						
Approx. weight [kg]	155	195	230	250	-			
Enclosure	IP00 open type							

Terminal Functions

Category	Symbol	Name	Functions			
	L1, L2, L3	Main Power input	Connects a 3-phase power supply.			
	U1, V1, W1	Filter output	Connect to PWM converter power input terminals L1/R,L2/S, and L3/T.			
	L4, L5, L6	Charging circuit input	Connects a 3-phase power supply.			
Main circuit	E(G)	Grounding	Ground terminal for filter stack chassis (housing).			
	R3, T3	Fan power supply input (at input of 400 V)	To be used as supply input of AC cooling fan inside of filter stack.			
	R11, R12	F				
	T11, T12	For manufacturer use				
			Input control signal for contactor for charging circuit.			
Input signal	73-1	Control input of contactor for	<rated capacity="" coil="" of=""></rated>			
input signal	73-2	charging circuit	• At power on 200 V/50 Hz: 120 VA, 220 V/60 Hz: 135 VA			
			• At power hold 200 V/50 Hz: 12.7 VA, 220 V/60 Hz: 12.4 VA			
	ONA		Auxiliary contact of contactor for charging circuit			
	ONB	Operation signal of charging	To be used as signal for operational check of charging circuit.			
Output signal	ONC	circuit	Contact rating: 24 VDC 3 A			
Output signal	ONC		* Min. working voltage/current: 5 VDC 3 mA			
	1	Alexander of the city	Signal is output when internal parts of filter stack are overheated.			
	2	Alarm output	Contact rating: 24 VDC, 3 mA /max			



Wiring Diagram



(Note 1) For the 400 V class power supply, connect a stepdown transformer to limit the voltage of the sequence circuit to 220 V or below.

(Note 2) Be sure to connect the auxiliary power input terminals R0 and T0 of the PWM converter to the main power input lines via B contacts of magnetic contactors of the charging circuit (73 or MC). Note that when applied to an ungrounded power supply, an insulated transformer is required. For the details, refer to the "PWM Converter Instruction Manual".

(Note 3) Be sure to connect the fan power input terminals R1 and T1 of the inverter to the main power input lines without going through the MC's B contacts or 73.

(Note 4) Construct a sequence in which a run command is given to the inverter after the PWM converter becomes ready to run.

(Note 5) Set the timer 52T at 1 sec.

(Note 6) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter.

(Note 6) Assign the external alarm THR to any of terminals [X1] to [X9] on the inverter.

(Note 7) Wiring for terminals L1/R, L2/S, L3/T, R2, T2, R1, S1, and T1 should match with the phase sequence.

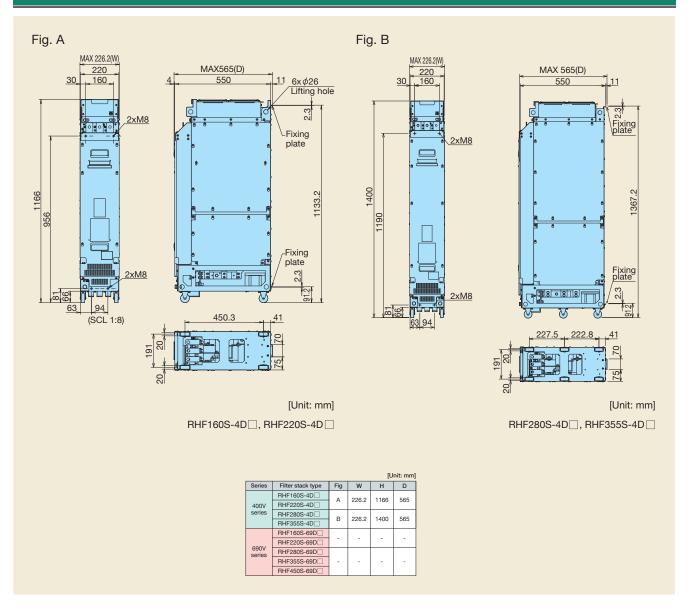
(Note 8) Set the 73T timer to 5seconds.

RHC-D application table

DHC	-D Type	RHF-D		MCCB, ELCB	Magnetic contactor		Fu	se	Microswitch	
HIIC-	-ы туре	Type	Q'ty	Rated current [A]	Type	Q'ty	Type	Q'ty	Type	Q'ty
RHC132	2S-4D	RHF160S-4D□	1	300	SC-N8	1	170M5446	3		
RHC160	DS-4D□	RHF160S-4D□	1	350	SC-N11	1	170M6546	3		
RHC200	DS-4D□	RHF220S-4D□	1	500	SC-N12	1	170M6547	3	170110007	3
RHC220	DS-4D□	RHF220S-4D	1	500	SC-N12	1	170M6547	3	170H3027	
RHC280	DS-4D□	RHF280S-4D□	1	600	SC-N14	1	170M6499	3		
RHC315	5S-4D□	RHF355S-4D□	1	700	SC-N14	1	170M6500	3		

Filter stack (RHF series) for Power regenerative PWM converter (RHC-D)

Dimensions



Diode rectifier (RHD-D)



Features

Converter type

Diode rectifier converts AC power to DC power, then supplies DC power to inverter.

Substantial applicable capacity

A large capacity system may be constructed by connecting converters in parallel. (3-parallel, 12-pulse rectifying system: using 6 units of diode rectifiers) Max:1370kW (400V series)

Suppression of harmonic currents

This unit is equipped with DC reactor for suppression of the harmonic currents. Further suppression of harmonic currents is made possible by creating a 12-pulse rectifier system in combination with power transformer, when connecting more than one unit in parallel.

Control device

A control device for regenerative energy processing (attached externally) is available for equipment which generate regenerative energy from motor, offering a selection of capacities required for the amount of regenerative energy for construction of a compact system.

Standard Specifications

400V series

	Model	RHD200S-4D□	RHD315S-4D□			
Max. connec	ction capacity [kW] (*1)	600	945			
Min. connec	tion capacity [kW] (*2)	110	180			
	Continuous rating [kW]	227	353			
Output	Overload rating	150% of continuous rating for 1 minute				
	Voltage	DC 436 to 747V (variable with input power supply voltage and load)				
Required po	ower supply capacity [kVA] 248 388					
	Main power	2 phase 200 to 440\//E01 to 200 to 400\/ 601 to (*0\				
	Phase, Voltage, Frequency	3-phase, 380 to 440V/50Hz, 380 to 480V 60Hz (*3)				
Input power supply	Auxiliary input for fan power	Single phase 200 to 440\//50 - 200 to 400\/ 60 - //	(4)			
Supply	Phase, Voltage, Frequency	Single-phase, 380 to 440V/50Hz, 380 to 480V 60Hz (*	4)			
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*5)				
Approximate	weight [kg]	125	160			
Enclosure		IP00				

690V series (Coming soon)

	Model	RHD220S-69D□	RHD450S-69D□				
Max. connec	tion capacity [kW] (*1)	660	1350				
Min. connect	tion capacity [kW] (*2)	132	250				
	Continuous rating [kW]	252	504				
Output	Overload rating	150% of continuous rating for 1 minute					
	Voltage	DC 776 to 1091V (variable with input power supply voltage and load)					
Required pov	wer supply capacity [kVA]	270	549				
	Main power	3-phase, 575 to 690V/50Hz, 60Hz (*3)					
Innut name	Phase, Voltage, Frequency						
Input power supply	Auxiliary input for fan power	Single-phase, 660 to 690V, 50/60Hz					
Cappiy	Phase, Voltage, Frequency	Single-phase, 575 to 600V, 50/60Hz (*4)					
	Voltage/frequency variation	Voltage: +10 to -15%, Frequency: +5 to -5%, Voltage unbalance: 2% or less (*5)					
Approximate	weight [kg]	125	160				
Enclosure		IP	00				

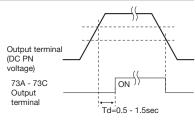
- (*1) Represents the total capacity of connectable inverters; however, capacity which may be operated simultaneously in driving mode is continuous rating.
- (*2) Represents the minimum capacity of connectable inverters. For less capacity the power factor decreases remarkably.
- (*3) 400V series: Suppression of capacity is required for supply voltage under 400V.
- 690V series: Suppression of capacity is required for supply voltage under 690V.
- (*4) 400V series: Connector inside the diode rectifier needs to be switched in case of 380 to 398V/50Hz and 380 to 430V/60Hz power supplies.
- 690V series: Connector inside the diode rectifier needs to be switched in case of 575 to 600V/50Hz, 60Hz power supplies
- (*5) Interphase unbalance rate (%) = max. voltage [V] min. voltage [V] × 67 3-phase average voltage

Diode rectifier (RHD-D)

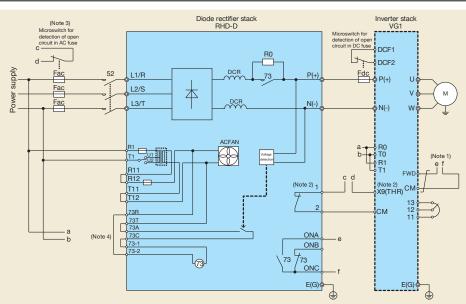
Terminal Functions

Category	Symbol	Name	Functions			
	L1/R, L2/S, L3/T	Main supply input	Connect to 3-phase power supply.			
	P(+), N(-)	Converter output	Connect to inverter power input terminals P (+) and N (-).			
	E(G)	Ground terminal	Ground terminal of diode rectifier chassis (case)			
	R1, T1	Fan power supply input	To be used as supply input of AC cooling fan inside of diode rectifier.			
Main circuit		(at input of 400 V)	Internal switching connector needs to be changed to meet supply voltage.			
	R11, R12	For manufacturer use				
	T11, T12	For manufacturer use				
	73R	Power supply for charging circuit	Coil supply of charging circuit contactor for charging circuit.			
	73T	rower supply for charging circuit	Not to be used as power supply for external circuit.			
			Input control signal for charging circuit contactor.			
	73-1 73-2	Control input of contactor for	Control signal may also be input externally.			
Input signal		charging circuit	<rated capacity="" coil="" of=""></rated>			
	75-2	charging circuit	• At power on 200 V/50 Hz: 380 VA, 220 V/60 Hz: 460 VA			
			• At power hold 200 V/50 Hz: 26.6 VA, 220 V/60 Hz: 26.8 VA			
	73A	Output of control signal for	Control signal of charging circuit			
	73C	charging circuit	Contact rating : 250 VAC 0.5 A cos <i>ϕ</i> = 0.3, 30 VDC 0.5 A			
	ONA		Auxiliary contact of charging circuit contactor.			
Output signal	ONB	Operation signal of charging	To be used as signal for operational check of charging circuit.			
Julput digital	ONC	circuit	Contact rating: 24 VDC 3 A			
	ONO		* Min. working voltage/current: 5 VDC 3 mA			
	1	Output of bulk alarm	Signal is output when internal parts of diode rectifier are overheated.			
	2	Output of bulk alaitif	Contact rating: 24 VDC, 3 mA /max			

^(*1) See below for timing chart of output signal, and DC PN voltage at signal output.



Wiring Diagram



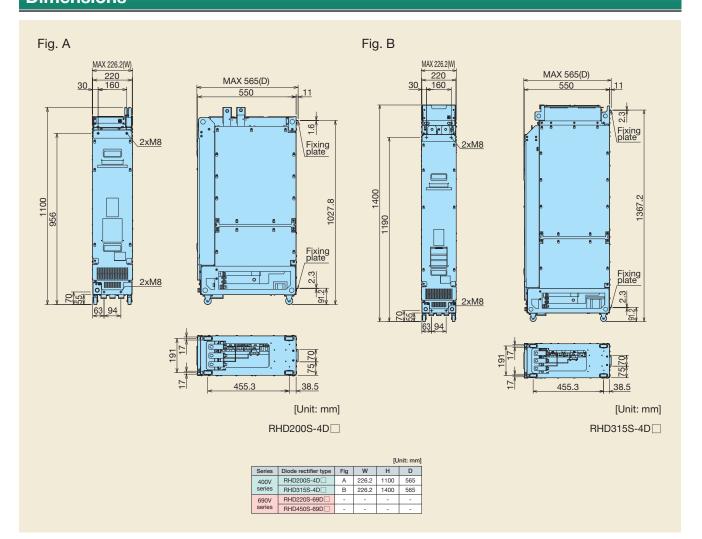
Note 1) Construct a sequence so that the run command is input to the inverter after the initial charging of the diode rectifier has been completed.

Note 2) The overheat signal of the diode rectifier is output. Connect after setting any one of X1 - X9 terminals of inverter to external alarm (THR) or coast-to-a-stop command (BX). THR setting is shown in this diagram.

Note 3) Connect after setting any one of X1 - X9 terminals of inverter to external alarm (THR) or coast-to-a-stop command (BX) when detecting open circuit in AC fuse. THR setting is shown in this

Note 4) The control signals and drive power supply for charging circuit contactors (73) can be input externally. Refer to the User's Manual for details.



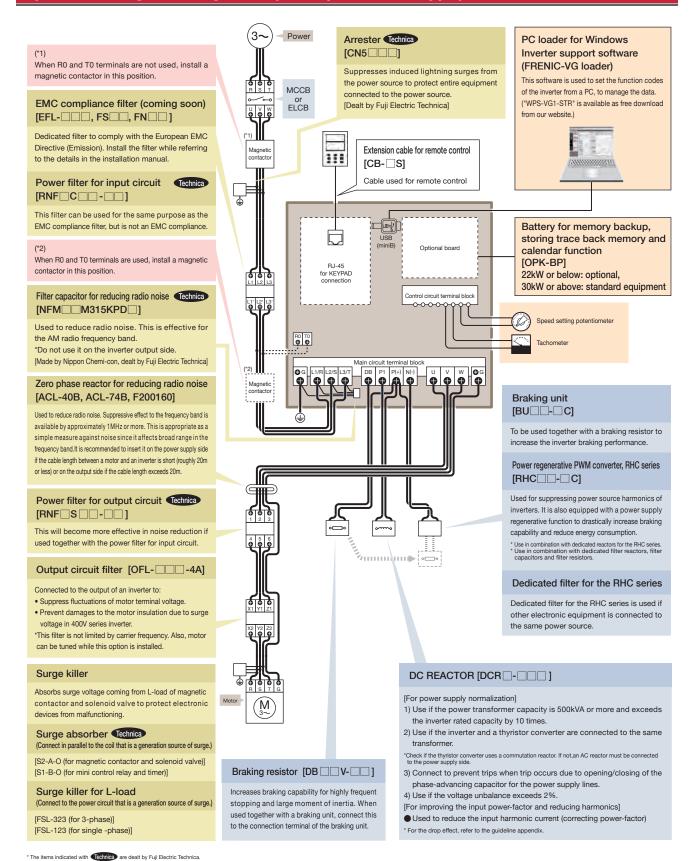


RHD-D application table <MD mode>

RHD-D Type	MCCB	Electromagnetic contactor	Fuse	Microswitch	
	Rated current [A]	Type	Type	Туре	
RHD200S-4D□	500	SC-N12	170M6547	170H3027	
RHD315S-4D□	700	SC-N12	170M6500	170H3027	

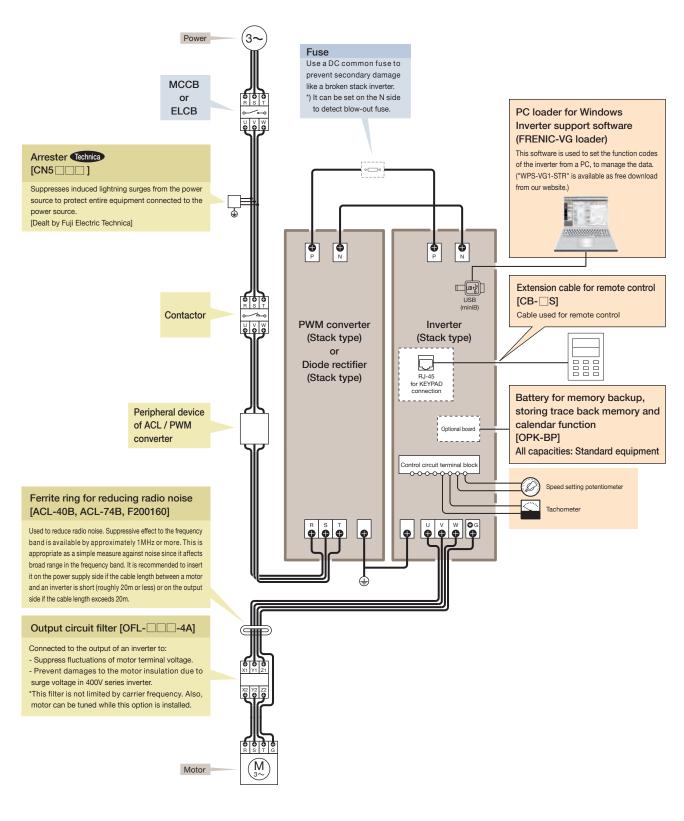
System configuration guides

System configuration guides (Example of Unit Type)



36

System configuration guides (Example of Stack Type)



^{*} The items indicated with Technica are dealt by Fuji Electric Technica.

Options

The options for inverter.

Optional card

Category	Name	Type	Switch with SW on the Pt board	Specificat	ions	Remarks
Analog card	Aio extension card	OPC-VG1-AIO		Extension card of Ai 2 points	+ Ao 2 points	
Digital card	Di interface card	OPC-VG1-DI	OPC-VG1-DI (A)	16 bit Di of binary or 4-digit E	BCD + sign	
(for 8 bit bus)			OPC-VG1-DI (B)	For setting the speed, torque and the	torque current reference.	
	Dio extension card	OPC-VG1-DIO	OPC-VG1-DIO (A)	Extension of Di (4bits) and Do (8bits)	for function selection.	
				Dio option card for direct landing control. Di x 16 bit + Do x10		
			OPC-VG1-DIO (B)	UPAC exclusive use		
	PG interface expansion card	OPC-VG1-PG	OPC-VG1-PG (SD)	+ 5V line driver type, voltage	output PGs	
			OPC-VG1-PG (LD)	(A,B and Z-phase signals).		
			OPC-VG1-PG (PR)	Used for detecting motor spee	ed, line speed, position	
			OPC-VG1-PG (PD)	reference and position detecti	on.	
		OPC-VG1-PGo	OPC-VG1-PGo (SD)	Open collector type voltage of	output PGs	
			OPC-VG1-PGo (LD)	(A,B and Z-phase signals).		
			OPC-VG1-PGo (PR)	Used for detecting motor speed, line speed, position		
			OPC-VG1-PGo (PD)	reference and position detection.		
		OPC-VG1-SPGT		ABS encoder with 17 bit reso	lution	
	PG card for synchronous motor drive	OPC-VG1-PMPG		+5V line driver type	A, B + magnetic pole position	
		OPC-VG1-PMPGo		Open collector type	(Max. 4bit)	
	T-Link interface card	OPC-VG1-TL		T-Link interface card		
	CC-Link interface card	OPC-VG1-CCL		CC-Link compliant card (Ver2	2.00)	
	High-speed serial connections for UPAC	OPC-VG1-SIU		Use for UPAC communication	n system	
Digital card	SX bus communication card	OPC-VG1-SX		SX bus communication card		
(for 16 bit bus)	E-SX bus communication card	OPC-VG1-ESX		E-SX bus communication car	rd	
	PROFINET-IRT	OPC-VG1-PNET		PROFINET-IRT communication	on card	
	User Programmable Application Card	OPC-VG1-UPAC		Technology card		
Fieldbus	PROFIBUS-DP	OPC-VG1-PDP		PROFIBUS-DP interface card	1	
interface card	DeviceNet	OPC-VG1-DEV		DeviceNet interface card		
Safety card	Functional safety card	OPC-VG1-SAFE		Safety standard compliant ca		
Control circuit terminal	Terminal block for high-speed serial communications	OPC-VG1-TBSI		Used for multiple-winding motor drive system	, direct parallel connection system	
Loader	Inverter support loader	WPS-VG1-STR		For Windows (Free version).		
		WPS-VG1-PCL		For Windows (Paid version).		

Cable

Category	Name	Туре	Length (m)	Specifications
Cable	Extension cable for remote control	CB-5S	5m	Connection cable between an inverter and the KEYPAD panel
		CB-3S	3m	
		CB-1S	1m	
	Encoder cable for GNF2	CB-VG1-PMPG-05S	5m	Straight plug
		CB-VG1-PMPG-15S	15m	
		CB-VG1-PMPG-30S	30m	
		CB-VG1-PMPG-50S	50m	
		CB-VG1-PMPG-05A	5m	Angle plug
		CB-VG1-PMPG-15A	15m	
		CB-VG1-PMPG-30A	30m	
		CB-VG1-PMPG-50A	50m	

Dedicated lifter for Inverter (Stack Type)

Coming soon

Applicable models: FRENIC-VG (Stack type), Converter (RHC-D, RHF-D, RHD-D)





Example of use of lifter



T1 2

Repeat cycle



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

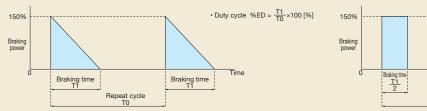


-		Inverter type	Braking ur	nit	Braking	rocietor		Cor	tinuous bra	king		e braking
Power supply	Nominal applied motor	inverter type	For unit type	ре	Diaking	16313101		(150% tor	que conver	sion value)	(100s or le	ess cycle)
voltage	[kW]	Unit type * (HD spec)	Туре	Q'ty	Туре	Ohmic value	Q'ty	Max. braking torque [%]	Braking time [s]	Discharging capability [kWs]	Duty cycle [%ED]	Average loss [kW]
	3.7	FRN3.7VG1S-4		•	DB3.7V-41B	96Ω	1			27.75		0.2775
	5.5	FRN5.5VG1S-4			DB5.5V-41B	64Ω	1			41.25		0.4125
	7.5	FRN7.5VG1S-4			DB7.5V-41B	48Ω	1			56.25		0.5625
	11	FRN11VG1S-4□			DB11V-41B	32Ω	1			82.5		0.825
	15	FRN15VG1S-4□			DB15V-41B	24Ω	1			112.5		1.125
	18.5	FRN18.5VG1S-4			DB18.5V-41B	18Ω	1			138.75		1.3875
	22	FRN22VG1S-4			DB22V-41B	16Ω	1			165		1.65
	30	FRN30VG1S-4	D 111 11		DB30V-41B	10Ω	1			225		2.25
	37	FRN37VG1S-4□	Built-in unit		DB37V-41B	9Ω	1			277.5		2.775
	45	FRN45VG1S-4			DB45V-41B	8Ω	1			337.5		3.375
	55	FRN55VG1S-4			DB55V-41C	6.5Ω	1			412.5		4.125
400V	75	FRN75VG1S-4			DB75V-41C	4.7Ω	1	150%		562.5	10%ED	5.625
series	90	FRN90VG1S-4			DB90V-41C	3.9Ω	1		10s	675		6.75
Series	110	FRN110VG1S-4			DB110V-41C	3.2Ω	1			825		8.25
	132	FRN132VG1S-4			DB132V-41C	2.6Ω	1			990		9.9
	160	FRN160VG1S-4			DB160V-41C	2.2Ω	1			1200		12.0
	200	FRN200VG1S-4	BU220-4C	2	DB200V-41C	3.5Ω/2	1			1500		15.0
	220	FRN220VG1S-4□	B0220-4C		DB220V-41C	3.2Ω/2	1			1650		16.5
	250		-	-								
	280	FRN280VG1S-4	BU220-4C	2	DB160V-41C	2.2Ω/2	2			2100		21.0
	315	FRN315VG1S-4	DU22U-4U		DB160V-41C	2.2Ω/2	2			2363		23.6
	355	FRN355VG1S-4□		3	DB132V-41C	2.6Ω/3	3			2663		26.6
	400	FRN400VG1S-4	BU220-4C	3	DB132V-41C	2.6Ω/3	3			3000		30.0
	500	FRN500VG1S-4	DU22U-4U	4	DB132V-41C	2.6Ω/4	4			3750		37.5
	630	FRN630VG1S-4		4	DB160V-41C	2.2Ω/4	4			4725		47.3

^{*} For the unit type (MD) specification, refer to the User Manual.

(Note 1) The duty cycle [%ED] are calculated as the 150% torque braking used for deceleration as described below. (Note 2) Two braking resistors are required for each of DB160V-41C, DB200V-41C, or DB220V-41C.

(Note 3) When connecting three braking units or more in parallel, refer to the supplement document of the DB Unit instruction manual (notes in connecting multiple units) INR-HF51614*.



[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.

^{*} Please refer to the FRENIC-VG catalog for external dimensions.

Options

Braking resistor (max. 150% torque, 30%ED)

Power	Nominal applied motor	Inverte	Inverter type		resistor			us braking onversion value)	Repetitive braking (100s or less cycle)	
voltage	[kW]	Unit type HD spec (Stack type MD spec)	Unit type MD spec	Туре	Ohmic value	Q'ty	Max. braking torque [%]	Discharging capability [kWs]	Duty cycle [%ED]	Average loss [kW]
	3.7	FRN3.7VG1S-4		DB003V-430SA	96Ω	1		167		1.67
	5.5	FRN5.5VG1S-4□		DB005V-430SA	64Ω	1		248		2.48
	7.5	FRN7.5VG1S-4□		DB007V-430SA	48Ω	1		338		3.38
	11	FRN11VG1S-4□		DB011V-430SA	32Ω	1		495		4.95
	15	FRN15VG1S-4□		DB015V-430SA	24Ω	1		675		6.75
	18.5	FRN18.5VG1S-4□		DB018V-430SA	18Ω	1		833		8.33
	22	FRN22VG1S-4□		DB022V-430SA	16Ω	1		990		9.90
	30	FRN30VG1S-4□		DB030V-430SA	12Ω	1	150%	1350	30%ED	13.50
	37	FRN37VG1S-4□		DB037V-430SA	9Ω	1	150%	1665		16.65
	45	FRN45VG1S-4□		DB045V-430SA	8Ω	1		2025	*Note	20.25
	55	FRN55VG1S-4□		DB055V-430SA	6.5Ω	1		2475	Note	24.75
	75	FRN75VG1S-4□		DB075V-430SA	4.7Ω	1		3375		33.75
400V	90	FRN90VG1S-4□		DB045V-430SA (2P)	4Ω	2		4050		40.50
series	110	FRN110VG1S-4□	FRN90VG1S-4□	DB055V-430SA (2P)	3.25Ω	2		4950		49.50
	132	FRN132VG1S-4□	FRN110VG1S-4□	DB045V-430SA (3P)	2.7Ω	3		6075		60.75
	160	FRN160VG1S-4□	FRN132VG1S-4□	DB055V-430SA (3P)	2.2Ω	3		7425		74.25
	200	FRN200VG1S-4	FRN160VG1S-4□							
	220	FRN220VG1S-4□	FRN200VG1S-4□							
	250		FRN220VG1S-4□							
	280	FRN280VG1S-4								
	315	FRN315VG1S-4□	FRN280VG1S-4□			0-	nsult with F			
	355	FRN355VG1S-4□	FRN315VG1S-4□			CC	msuit with F	uji		
	400	FRN400VG1S-4	FRN355VG1S-4							
	450		FRN400VG1S-4□							
	500	FRN500VG1S-4								
	630	FRN630VG1S-4								

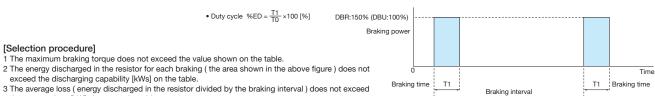
^{*} Inverters with a capacity of 160kW or below have a built-in braking circuit.

Braking resistor (max. 150% torque, 40%ED)

Power	Nominal applied motor	Inverte	er type	Braking	resistor		Continuo (150% torque co	us braking onversion value)	Repetitive (100s or le	
voltage	[kW]	Unit type HD spec (Stack type MD spec)	Unit type MD spec	Туре	Ohmic value	Q'ty	Max. braking torque [%]	Discharging capability [kWs]	Duty cycle [%ED]	Average loss [kW]
	3.7	FRN3.7VG1S-4		DB003V-440SA	96Ω	1		222		2.22
	5.5	FRN5.5VG1S-4□		DB005V-440SA	64Ω	1		330		3.30
	7.5	FRN7.5VG1S-4□		DB007V-440SA	48Ω	1		450		4.50
	11	FRN11VG1S-4□		DB011V-440SA	32Ω	1		660		6.60
	15	FRN15VG1S-4□		DB015V-440SA	24Ω	1		900		9.00
	18.5	FRN18.5VG1S-4		DB018V-440SA	18Ω	1		1110		11.10
	22	FRN22VG1S-4□		DB022V-440SA	16Ω	1		1320		13.20
	30	FRN30VG1S-4		DB030V-440SA	12Ω	1	150%	1800	40%ED	18.00
	37	FRN37VG1S-4		DB037V-440SA	9Ω	1	150%	2220	40%ED	22.20
	45	FRN45VG1S-4□		DB045V-440SA	8Ω	1		2700	*Note	27.00
	55	FRN55VG1S-4□		DB055V-440SA	6.5Ω	1		3300	Note	33.00
	75	FRN75VG1S-4□		DB075V-440SA	4.7Ω	1		4500		45.00
400V	90	FRN90VG1S-4□		DB045V-440SA (2P)	4Ω	2		5400		54.00
series	110	FRN110VG1S-4□	FRN90VG1S-4	DB055V-440SA (2P)	3.25Ω	2		6600		66.00
	132	FRN132VG1S-4□	FRN110VG1S-4	DB045V-440SA (3P)	2.7Ω	3		8100		81.00
	160	FRN160VG1S-4□	FRN132VG1S-4	DB055V-440SA (3P)	2.2Ω	3		9900		99.00
	200	FRN200VG1S-4□	FRN160VG1S-4							
	220	FRN220VG1S-4□	FRN200VG1S-4							
	250		FRN220VG1S-4							
	280	FRN280VG1S-4□								
	315	FRN315VG1S-4□	FRN280VG1S-4			0				
	355	FRN355VG1S-4□	FRN315VG1S-4			Co	nsult with F	uji		
	400	FRN400VG1S-4□	FRN355VG1S-4							
	450		FRN400VG1S-4							
	500	FRN500VG1S-4								
	630	FRN630VG1S-4□								

^{*} Inverter with a capacity of 160kW or below have a built-in braking circuit.

(Note) *The braking time and duty cycle [%ED] are calculated as the constant-power braking as described below.



[Selection procedure]

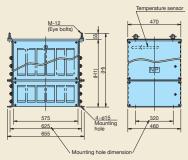
exceed the discharging capability [kWs] on the table.

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.



Dimensions (Braking resistor max.150% torque, 30%, 40%ED Spec.)





30%ED/constant-power (100s cycle)

	_	Dimensio	ons [mm]	Mass
Voltage	Type	Н	H1	[kg]
	DB003V-430SA	725	670	60
	DB005V-430SA			40
	DB007V-430SA			38
	DB011V-430SA			30
	DB015V-430SA	525	470	41
400V	DB018V-430SA	323		50
series	DB022V-430SA			60
	DB030V-430SA			63
	DB037V-430SA			80
	DB045V-430SA	725	670	125
	DB055V-430SA	925	870	138
	DB075V-430SA	1125	1070	230

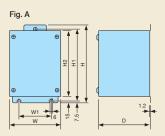
40%ED/constant-power (100s cycle)

\/- lt	T		Dimensio	ons [mm]	Mass
Voltage	Туре		Н	H1	[kg]
	DB003V-440SA		725	670	60
	DB005V-440SA				40
	DB007V-440SA				38
	DB011V-440SA				30
	DB015V-440SA		525	470	41
400V	DB018V-440SA				50
series	DB022V-440SA				60
	DB030V-440SA				76
	DB037V-440SA		725	670	110
	DB045V-440SA		925	870	140
	DB055V-440SA		1125	1070	200
	DB075V-440SA	*Note	925	870	365

Note: DB075V-440SA is composed of 2 resistors of the described size. Mass shows the total weight.

Braking unit (BU□□-□)



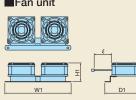


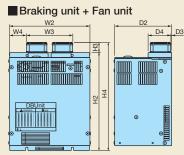
	-			Dimensions [mm]							
Voltage	Туре	Fig	W	W1	Н	H1	H2	D	weight [kg]		
	BU37-4C		150	100	280	265	250		4		
400)/	BU55-4C		230	130	280	265	250		5.5		
400V series	BU90-4C	Α	230	130	280	265	250	160	5.5		
361163	BU132-4C		250	150	370	355	340		9		
	BU220-4C		250	150	450	435	420		13		

Fan unit for braking unit (BU-F)



Fan unit





The duty cycle [%ED] of the model with an external braking unit is increased from 10% ED to 30% ED by using this option.

[Fan unit]

T	Dimensions [mm]						
Туре	W1	H1	D1	${\cal L}$ (Fan power supply cable)			
BU-F	149	44	76	320			

[Braking unit + Fan unit]

Didwing dilic i i dilicij										
Valtaga	Tuna	Dimensions [mm]								
Voltage	Туре	W2	W3	W4	H2	НЗ	H4	D2	D3	D4
	BU37-4C+BU-F	150		7.5	280		310			
	BU55-4C+BU-F	230		47.5	280		310			
400V	BU90-4C+BU-F	230	135	47.5	280	30	310	160	1.2	64
series	BU132-4C+BU-F	250		57.5	370		400			
	BU220-4C+BU-F	250		57.5	450		480			

Options

The DC reactor is mainly used for the unit type. With the stack type, the DC reactor is built into the diode converter.

* For details, refer to the Stack Type User Manual.

DC Reactor (DCR - DC)



*For models with a standard motor of 75kW or more, it is included as a standard.

Voltage	Nominal applied	Inverte	er type	Reactor
voitage	motor [kW]	HD Specification	MD Specification	type
	3.7	FRN3.7VG1S-4	-	DCR4-3.7
	5.5	FRN5.5VG1S-4	-	DCR4-5.5
	7.5	FRN7.5VG1S-4	-	DCR4-7.5
	11	FRN11VG1S-4	-	DCR4-11
	15	FRN15VG1S-4□	-	DCR4-15
	18.5	FRN18.5VG1S-4	_	DCR4-18.5
	22	FRN22VG1S-4	-	DCR4-22A
	30	FRN30VG1S-4	-	DCR4-30B
	37	FRN37VG1S-4	-	DCR4-37B
	31	FRINS/VG15-4	_	DCR4-37C
	45	FRN45VG1S-4	-	DCR4-45B
	45	FRIN43VG15-4	-	DCR4-45C
	55	FRN55VG1S-4	-	DCR4-55B
400V	33	FRINDOVG15-4	-	DCR4-55C
	75	FRN75VG1S-4	-	DCR4-75C
series	90	FRN90VG1S-4	-	DCR4-90C
	110	FRN110VG1S-4	FRN90VG1S-4	DCR4-110C
	132	FRN132VG1S-4	FRN110VG1S-4	DCR4-132C
	160	FRN160VG1S-4	FRN132VG1S-4	DCR4-160C
	200	FRN200VG1S-4	FRN160VG1S-4	DCR4-200C
	220	FRN220VG1S-4	FRN200VG1S-4	DCR4-220C
	250	-	FRN220VG1S-4	DCR4-250C
	280	FRN280VG1S-4	-	DCR4-280C
	315	FRN315VG1S-4	FRN280VG1S-4	DCR4-315C
	355	FRN355VG1S-4	FRN315VG1S-4	DCR4-355C
	400	FRN400VG1S-4	FRN355VG1S-4	DCR4-400C
	450	-	FRN400VG1S-4	DCR4-450C
	500	FRN500VG1S-4	-	DCR4-500C
	630	FRN630VG1S-4	-	DCR4-630C

DC Reactor type	Remarks
Input power factor of DCR4-_\/_A/_B: approx. 90 to 95%	The letter at the end of the type code varies depending on the capacity.
Input power factor of the DCR4- C: about 86 to 90%	This can be selected with the inverter of 37kW or above.

- •The DC Reactor (DCR) in thick-frame are provided as standard (supplied adding to the unit). Inverter types with -4E and -4C on the end are not available as standard. Please purchase as options.
- *The DCR4- B type is also prepared for motors of 75kW or above capacities, which are applicable as standard. Contact Fuji Electric for ordering product separately.
- * Please refer to the FRENIC-VG catalog for external dimensions.

AC Reactor (ACR □-□□□)



Voltage	Reactor type	
	ACR4-110	
	ACR4-132	
400V	ACR4-220	
	ACR4-280	
series	ACR4-355	
	ACR4-450	
	ACR4-530	
	ACR4-630	

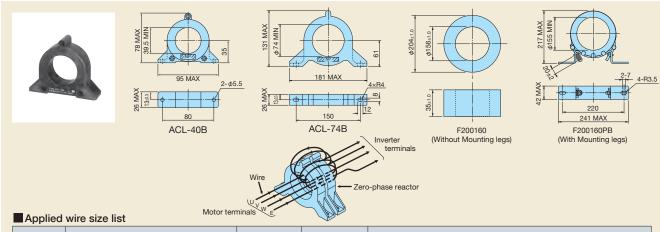
Note) It is not necessary to use the reactor unless a particularly stable power supply is required, i.e., DC bus connection operation (PN connection operation).

Use the DC reactor (DCR) as a measure against harmonics.

* Please refer to the FRENIC-VG catalog for external dimensions.



Zero-phase reactor for reducing radio noise (ACL-40B, ACL-74B, F200160)



Voltage	Zero-phase reactor for reducing radio noise	Q'ty	No. of turns	Recommended wire size [mm²] Note)
400V series	ACL-40B	1	4	2.0, 3.5, 5.5
		2	2	8, 14
		4	1	22, 38, 5.5×2, 8×2, 14×2, 22×2
	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, 38×2, 60×2, 100×2
	F200160 F200160PB	1	4	150×2, 200×2, 250×2, 325×2
				150×3, 200×3, 250×3, 325×3
				250×4, 325×4

NOTE) Use a 600V HIV insulation cable (Allowable temp. 75°C).

Output circuit filter (OFL- 4A)



	Nominal		F.11			
Voltage	applied	Unit	type	Stack type	Filter Type	
_	motor [kW]	HD Specification	MD Specification	MD Specification		
	3.7	FRN3.7VG1S-4	_	_	OFL-3.7-4A	
	5.5	FRN5.5VG1S-4	-	-	OFL-7.5-4A	
	7.5	FRN7.5VG1S-4	-	_		
	11	FRN11VG1S-4	-	-	OFL-15-4A	
	15	FRN15VG1S-4	-	-		
	18.5	FRN18.5VG1S-4			051 00 44	
	22	FRN22VG1S-4		-	OFL-22-4A	
	30	FRN30VG1S-4	-	FRN30SVG1S-4	OFL-30-4A	
	37	FRN37VG1S-4	-	FRN37SVG1S-4	OFL-37-4A	
	45	FRN45VG1S-4	-	FRN45SVG1S-4	OFL-45-4A	
	55	FRN55VG1S-4	-	FRN55SVG1S-4	OFL-55-4A	
	75	FRN75VG1S-4	-	FRN75SVG1S-4	OFL-75-4A	
400V	90	FRN90VG1S-4	-	FRN90SVG1S-4	OFL-90-4A	
series	110	FRN110VG1S-4	FRN90VG1S-4	FRN110SVG1S-4	OFL-110-4A	
	132	FRN132VG1S-4	FRN110VG1S-4	FRN132SVG1S-4	OFL-132-4A	
	160	FRN160VG1S-4	FRN132VG1S-4	FRN160SVG1S-4	OFL-160-4A	
	200	FRN200VG1S-4	FRN160VG1S-4	FRN200SVG1S-4	OFL-200-4A	
	220	FRN220VG1S-4	FRN200VG1S-4	FRN220SVG1S-4	OFL-220-4A	
	250	_	FRN220VG1S-4	FRN250SVG1S-4	OFL-280-4A	
	280	FRN280VG1S-4	-	FRN280SVG1S-4		
	315	FRN315VG1S-4	FRN280VG1S-4	FRN315SVG1S-4	OFL-315-4A	
	355	FRN355VG1S-4	FRN315VG1S-4	-	OFL-355-4A	
	400	FRN400VG1S-4	FRN355VG1S-4	ı	OFL-400-4A	
	450	_	FRN400VG1S-4	-	OFL-450-4A	
	500	FRN500VG1S-4	-	_	OFL-500-4A	
	630	FRN630VG1S-4	-	FRN630BVG1S-4	OFL-630-4A	
	710		_	FRN710BVG1S-4	-	
	800	_	-	FRN800BVG1S-4		

^{*} Carrier frequency is not limited with OFL-*** -4A.

^{*} Please refer to the FRENIC-VG catalog for external dimensions.



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 frequencies 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

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.

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 oillubricated gearbox or speed changer/reducer, then continuous motor operation at low speed may cause poor lubrication. Avoid such operation.

Single-phase motors

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

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 general-purpose 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 a DC reactor to

the inverter (primary) circuit. Use a 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 twisted shielded 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 sensorless vector control or vector control with speed sensor 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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