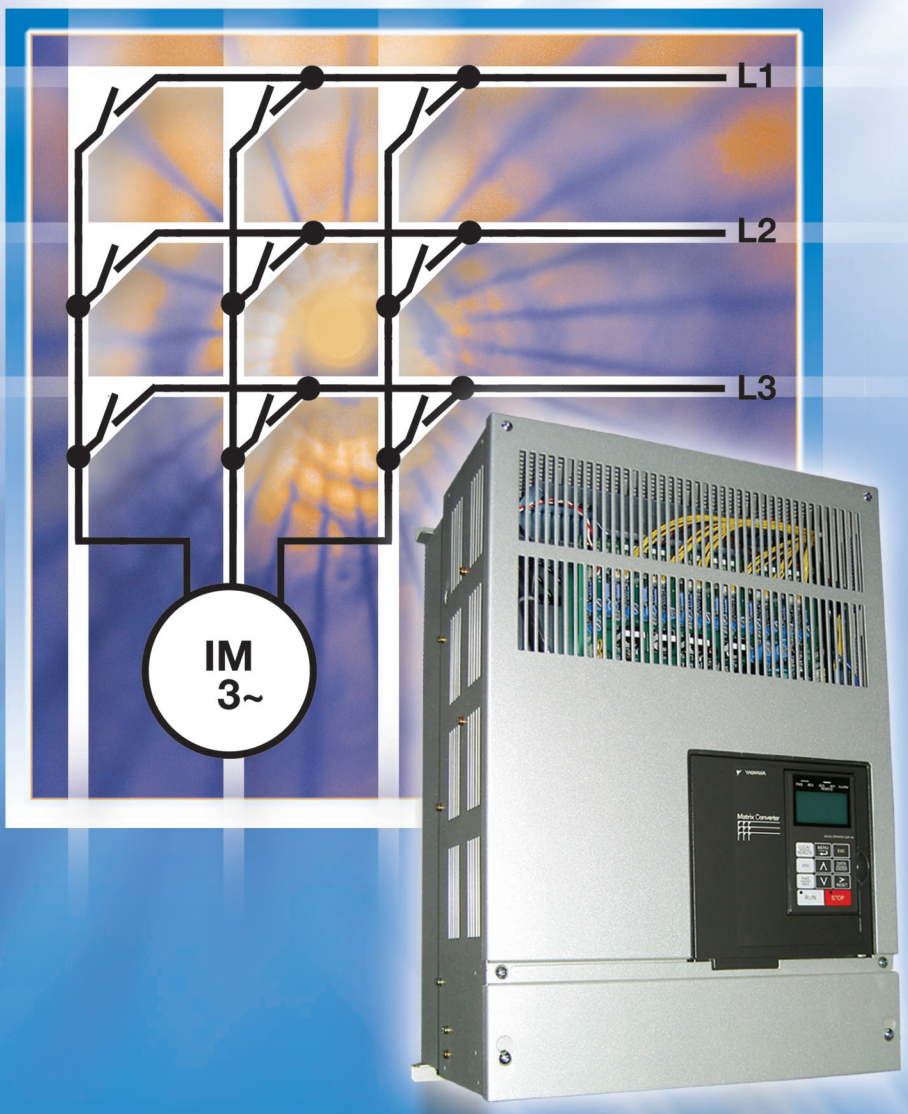
YASKAWA
Mechatronics Solutions

Matrix Converter



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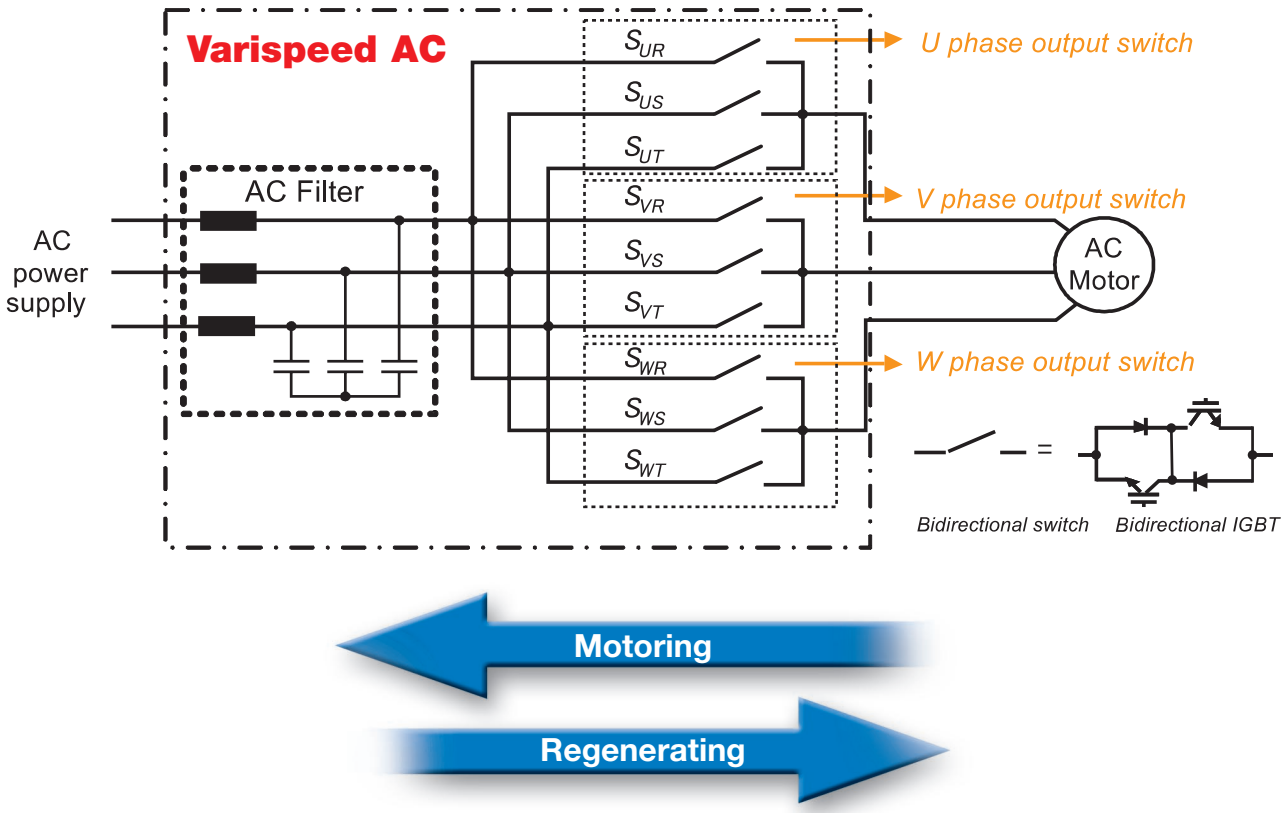
Main Features of Varis

Feature 1: Matrix Converter Technology

AC Converter

High efficiency

Because of its basic construction, without use of the conventional Rectifier-DC-Bus configuration, the Matrix Converter provides the ability for regenerative power supply. The main power supply is directly switched via 9 bidirectional switching semiconductors to the motor windings.



Power source regenerative function

The matrix converter works for motoring and regenerating without any additional equipment.

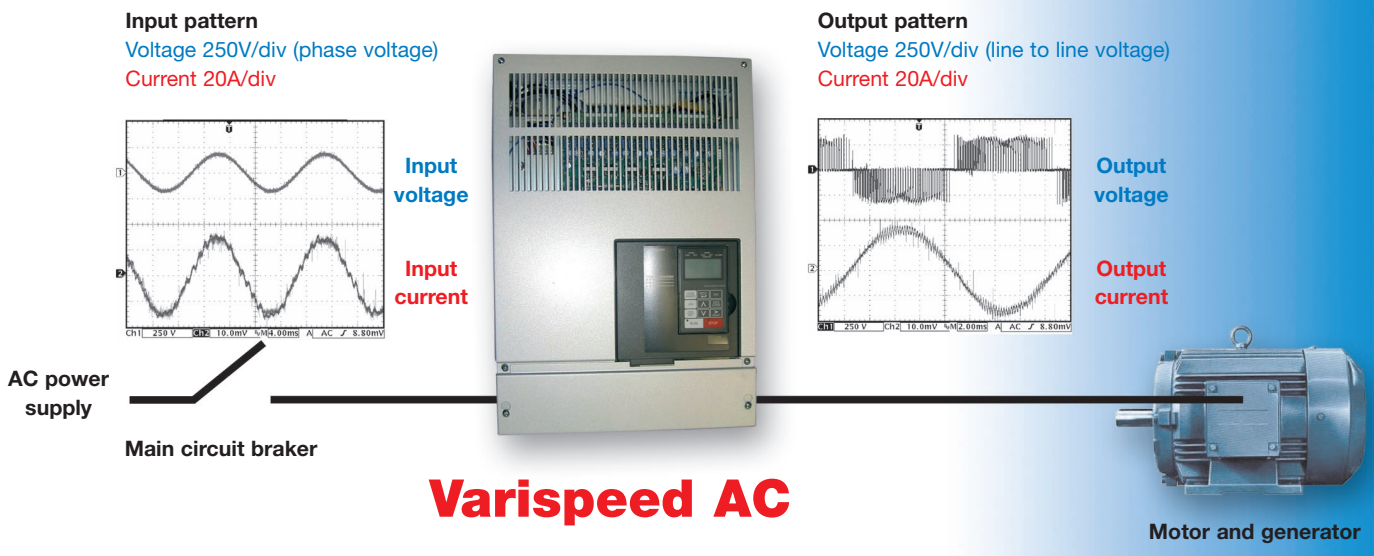
1. Space saving – no additional equipment for braking necessary
2. Energy and cost saving – the regenerative energy is fitted to the main power supply
3. No heat from braking resistor

peed AC Converter

Feature 2:
Less Harmonic Distortion

Friendly to the power supply environment

Without any additional equipment the matrix converter keeps the input current very similar to the sinus. This helps to reduce the installed power supply and correspondence to the harmonic guideline becomes easy.



Feature 3:
High Perfomance

Same performance and handling as Yaskawa Varispeed 7 series

1. Ecologically friendly
2. High dynamic and precise control
3. User friendly
4. Customisable
5. Global specifications

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AC Converter

Description of Digital Operator

Overview of display and keypad

Data display

MENU button

Switches menu within the hierarchy.

LOCAL/REMOTE button

Switches between control with the digital operator and control via the terminal block.

JOG button

Enables JOG speed, which has top priority.

FWD/REV button

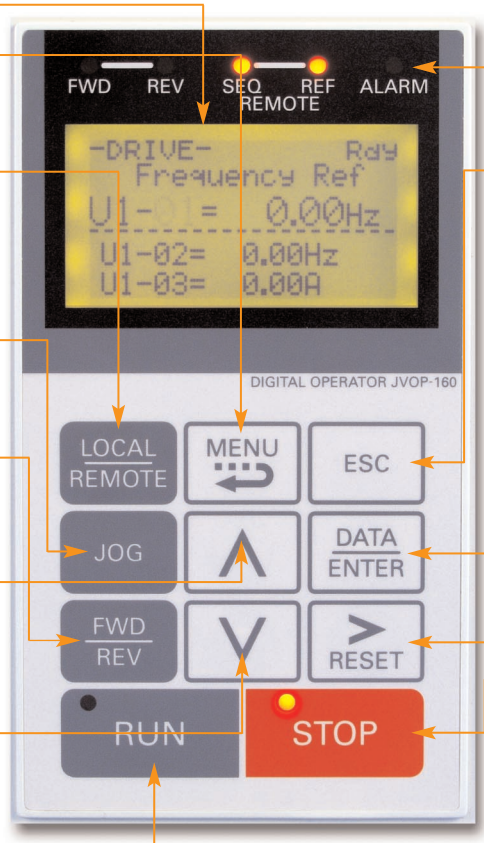
Reverses the direction of rotation of the motor.

ARROW UP button

Increases the parameter number or data value.

ARROW DOWN button

Decreases the parameter number or data value.



Status LEDs

Indicate the inverter status.

ESC button

Returns to previous menu in the hierarchy without saving.

ENTER button

Saves data when setting parameters. Entering a parameter number in the PRGM mode displays the associated data.

>/Reset button

Shifts the digit of the value to be changed. Pressing this button when a fault arises, resets the inverter (acknowledgement).

STOP button

Stops the motor.

RUN button

Starts the motor. The LED in the top left corner of the button lights up to indicate that the motor is running.

Specification/Nameplate

CIMR - AC C 4 5P5 0

Inverter

Varispeed Matrix Converter Series

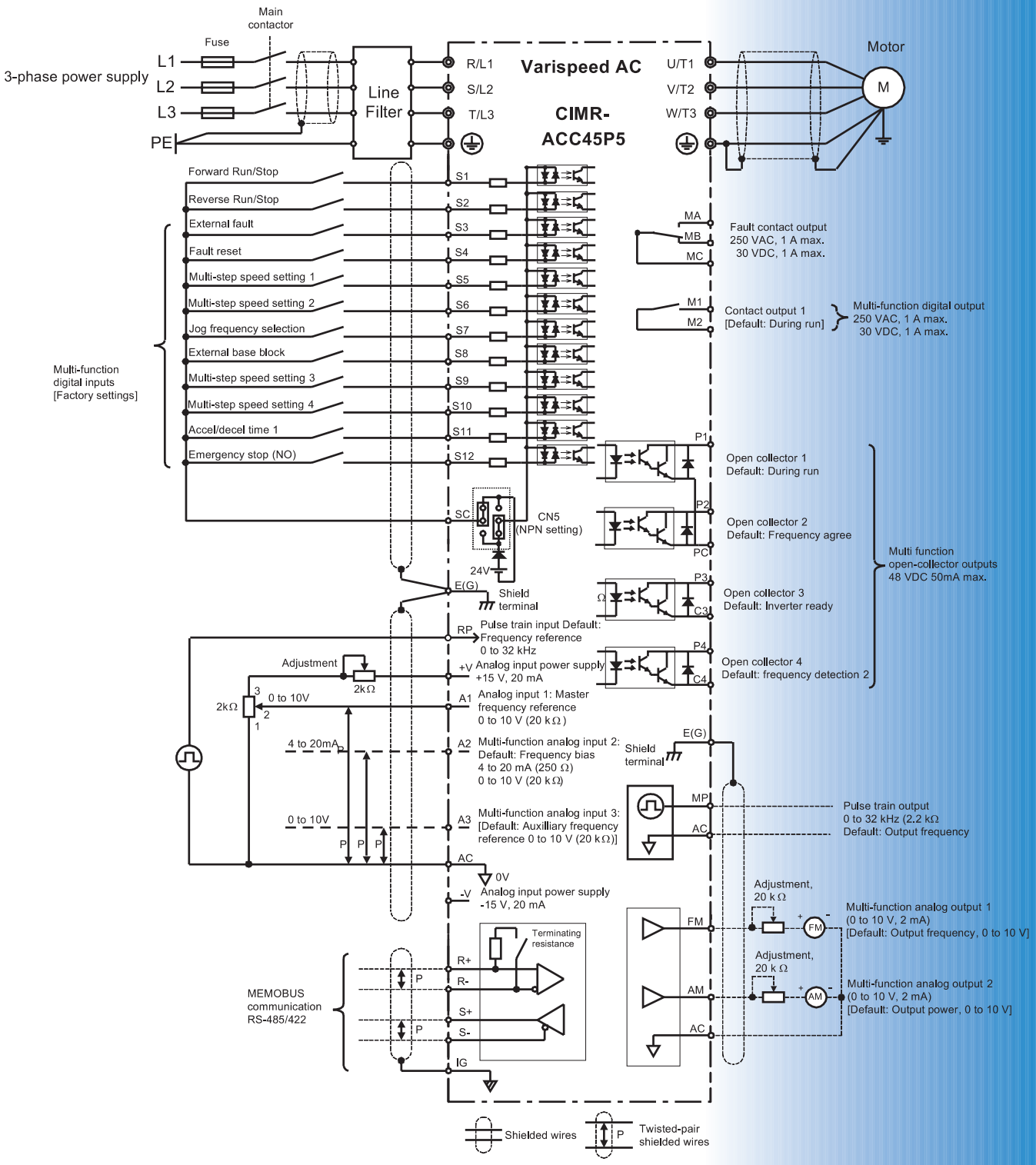
Code	Specification
A	Japanese Standard
C	European Standard (under development)
U	American Standard (under development)

Code	Power supply
2	three phase 200V AC
4	three phase 400V AC

No.	Rated output of Motor
5P5	5.5 kW
11	11 kW
22	22 kW
45	45 kW
75	75 kW

Code	Protection
0	IP00
1	NEMA1/IP20

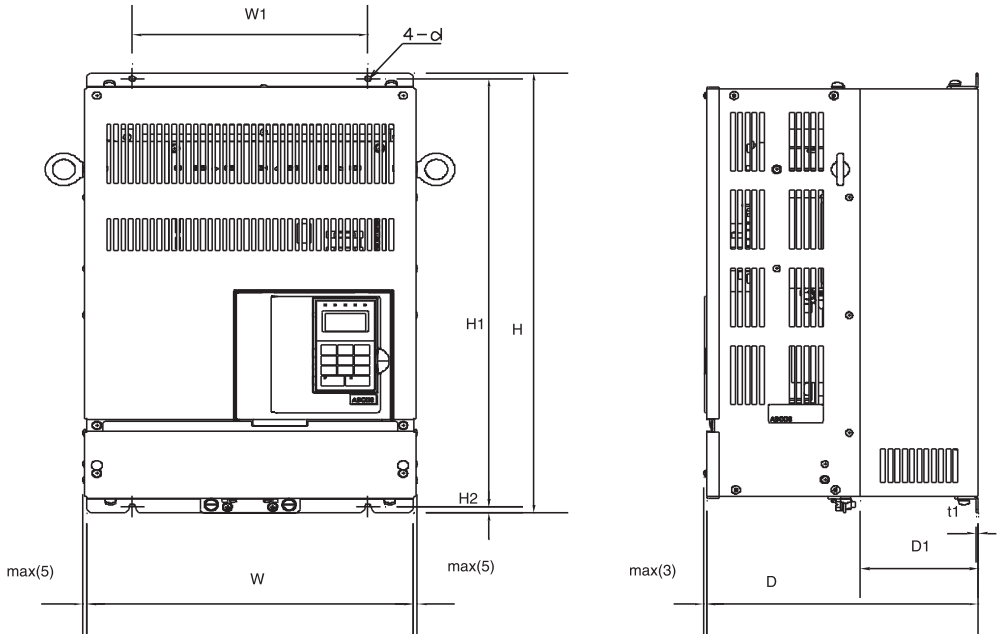
Standard Connection Diagram for Varispeed AC



Dimensions and Heat loss

AC Converter

IP00 Protection



Voltage class	Model: CIMR-ACC	Dimensions (mm)										Heat loss (W)			Cooling system
		Open CassisBoard inside installation shape (IP00)										Heat sink	Interior	Total	
		W	H	D	W1	H1	H2	D1	t1	Weight (kg)	d				
200V class	25P5	270	530	290	180	514	8	85	2.3	29	M6	160	143	303	Fan
	2011	270	530	290	180	514	8	85	2.3	29	M6	326	200	526	
	2022	360	560	302	260	545	7.5	130	2.3	50	M6	615	314	929	
	2045	under development													
400V class	45P5	270	530	290	180	514	8	85	2.3	29	M6	160	138	298	
	4011	270	530	290	180	514	8	85	2.3	29	M6	303	185	488	
	4022	360	560	302	260	545	7.5	130	2.3	50	M6	665	310	975	
	4045	under development													
	4075														

Filter

Radio interference suppression filters

For conformity with the EMC Directive (CE)

Inverter Model	Filter Modell	EN 55011 class	Current (A)	Weight (kg)	Dimensions WxHxD (mm)
CIMR-ACC25P5	under development				
CIMR-ACC2011					
CIMR-ACC2022					
CIMR-ACC2045					
CIMR-ACC45P5	under development				
CIMR-ACC4011					
CIMR-ACC4022					
CIMR-ACC4045					
CIMR-ACC4075					

Specifications

AC Converter

Type CIMR-ACC □		25P5	2011	2022	2045	45P5	4011	4022	4045	4075
Recommended maximum motor output (kW) *1		5.5	11	22	45	5.5	11	22	45	75
Inverter Output	Rated Output (kVA)	10	19	37	NA	11	21	40	NA	NA
	Rated Current (A)	27	49	96	NA	15	27	52	NA	NA
	Max output voltage	95% of input potential				95% of input potential				
	Max output frequency	120Hz				120Hz				
Mains input	Rated input voltage and frequency	Three phase 200/208/220V 50/60Hz				three phase 380/400/415/440V 50/60Hz				
	Allowance voltage fluctuation	+10% / –15%				+10% / –15%				
	Allowance frequency fluctuation	Below ±3%, frequency coefficient of fluctuation 1Hz/100ms				Below ±3%, frequency coefficient of fluctuation 1Hz/100ms				
Control characteristic	Control method	Sinusoidal pulse width modulation [Flux vector control with pulse generator, current vector control without pulse generator, V/f control without pulse generator (to select by parameter)]								
	Starting torque	150%/0min^{-1} (Flux vector control with pulse generator)								
	Speed control range	1:1000 (Flux vector control with pulse generator) *2								
	Speed control accuracy*3	±0.02% (Flux vector control with pulse generator, 25°C ±10°C) *2								
	Speed response	40Hz (Flux vector control with pulse generator) *2								
	Torque limits	Provided for vector control only (4 quadrant steps can changed by parameter settings)								
	Torque accuracy	±5% (Flux vector control with pulse generator)								
	Frequency control range	0.01 to 120Hz(Flux vector control with pulse generator)								
	Frequency accuracy (temperature characteristcs)	Digital references ±0.01% (–10°C / +40°C). Analogue references ±0.1% (25°C, ±10°C).								
	Frequency setting resolution	Digital references 0.01Hz Analogue references 0.03Hz/60Hz (11bit with no sign)								
	Output frequency resolution (operational resolution)	0.001Hz								
	Overload capacity largest electric current *4	150% of the inverter output current for 1 min.*5								
	Analog inputs	–10 to +10V, 0 to 10V, 4 to 20mA, pulse train								
	Acceleration and deceleration time	0.01～6000.0 sec. (Acceleration and deceleration separate setting: 4 kind changes)								
	Braking torque	Constant: –100%, Overload: –150% for 1 min. of rated torque								
	Important functions	Restarting after power loss, speed search, overtorque detection, torque limits, 17 step speed settings, 4 acceleration and deceleration times changes, S curve acceleration/deceleration, auto tuning (rotating and non rotating), dwell function, cooling fan ON/OFF control, slip compensation, torque compensation, jump frequencies, frequency reference limits, DC injection at start and stop, PID controller, (with sleep function), energy-saving function, MEMOBUS communication (RS-485/422 maximum 19.2kbps), fault reset, droop control, copy function, torque control, changing between torque and speed control, 2 switchable sets of motor parameters, etc.								
	Total Harmonic Distortion	THD is 7% if the power supply has the same capacity than the inverter.								
Protective function	Motor protection	Electronic thermal overload relay function								
	Instantaneous overcurrent	Approximately 200% or more of rated output electric current								
	Overload protection	150% of rated output current for 60 seconds								
	Overvoltage protection	200V Class Voltage for control power source: It stops above approximately DC410V								
		400V Class Voltage for control power source: It stops above approximately DC820V								
	Undervoltage protection	200V Class Voltage for control power source: It stops below approximately DC190V								
		400V Class Voltage for control power source: It stops below approximately DC380V								
	Instantaneous power failure compensation	Stops for 15ms or more. By selecting the momentary power loss method, operation can be continued if power is restored within 2 s.								
	Cooling fin overheating	Protection by thermistor								
	Stall prevention	Stall prevention during acceleration, deceleration, or running								
	Ground protection*6	The protection with the electronic circuit								
	Charge indicator	Lit when the control circuit DC voltage is approx. 50V or more								
Environment	Ambient temperature	–10 to +40°C (enclosed wall-mounted type), –10 to +45°C (open chassis type)								
	Humidity	Below 95%RH (with no condensation)								
	Storage temperature	–20°C to +60°C (short term temperature during transportation)								
	Service space	Indoor (no corrosiveness gas, dust, etc.)								
	Altitude	1000m max								
	Vibration	10 to 20 Hz: 9.8 m/s^2 max.; 20 to 55Hz: 5,9 m/s^2								

*1. The recommended maximum connected load is specified for a four pole standard motor. Choose the version of converter that does not exceed the rated current of the motor.
*2. Only if control method is flux vector control with PG feedback and after rotating auto tuning this condition can be achieved.
*3. Precision differs to installation circumstances and motor types etc and load.
*4. When these current values is supposed, please increase capacity.
*5. In case of applications with repetition load, derating is necessary.
*6. Protection against ground fault is assumed inside of motor winding during running. There are some conditions, low resistance ground fault at terminals or motor cable and during power on of inverter, where the inverter is sometimes not protected against ground fault.

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