Sumitomo Drive Technologies

Inverter for Gearmotor

HF-620 Series

Sumitomo Heavy Industries, Ltd.

No.D2501E-1

HF-620 series is the inverter for easy operation!
HF-620 is suitable for driving SUMITOMO gearmotor!

Easy Parameter setting using the Dial

Parameter setting and selection of monitoring is easy operation using the dial on the panel.
This will help to reduce parameter tuning and test run time.

Powerful inverter suitable for SUMITOMO gearmotor

Sensorless vector control allows for high starting torque (150% or more).
Since SUMITOMO motor parameter is built-in, HF-620 is suitable for driving SUMITOMO gearmotor.

Communication Function

Modbus-RTU (RS485) communication is standard equipment.
Communication option unit (C1-CCL-H) for CC-Link can be attached on the panel.

Friendly to the environment

HF-620 adapt recycled grade resin for the case, supports the realization of a recycling-oriented society.
HF-620 contribute to energy saving because it can drive the permanent magnet motor of high efficiency.

Corresponding to major standards of the world

CE c UL us LISTED

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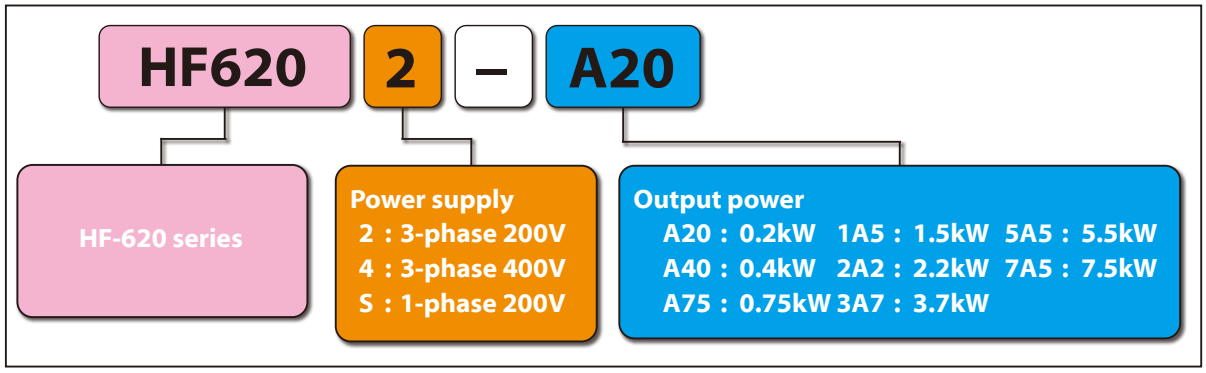
Power Range

Voltage Class (Input/Rated output)	Applicable Motor (kW)							
	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
3-phase 200V/3-phase 200V	■	■	■	■	■	■	■	■
3-phase 400V/3-phase 400V	■	■	■	■	■	■	■	■
1-phase 200V/3-phase 200V	■	■	■	■	■			

Model No.

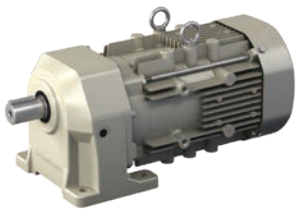


Gearmotor Product Lineup

CYCLO® Drive

HYPONIC Gearmotor®

PREST® NEO Gearmotor



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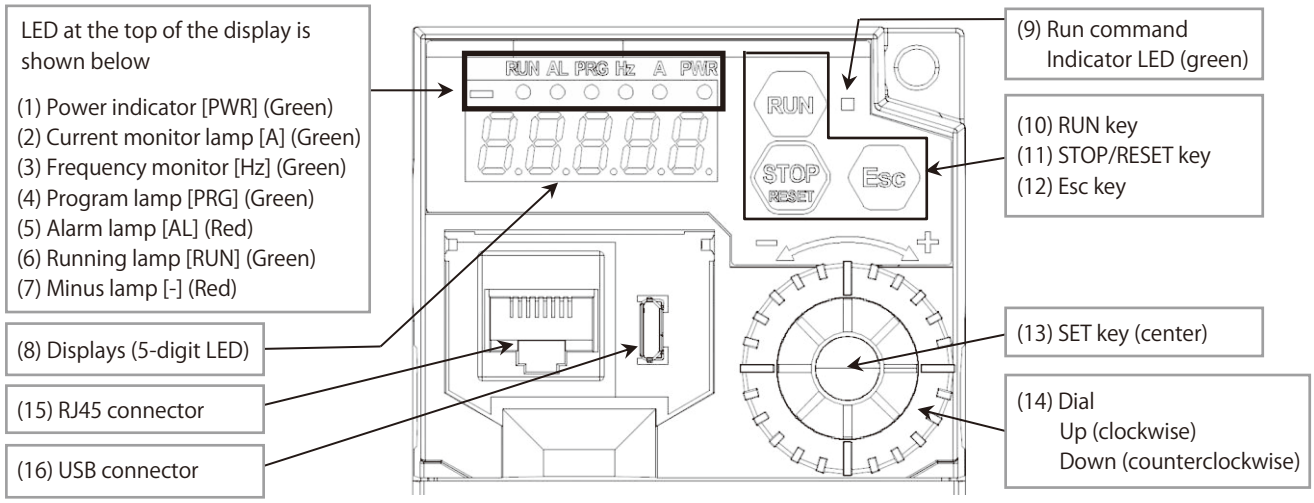
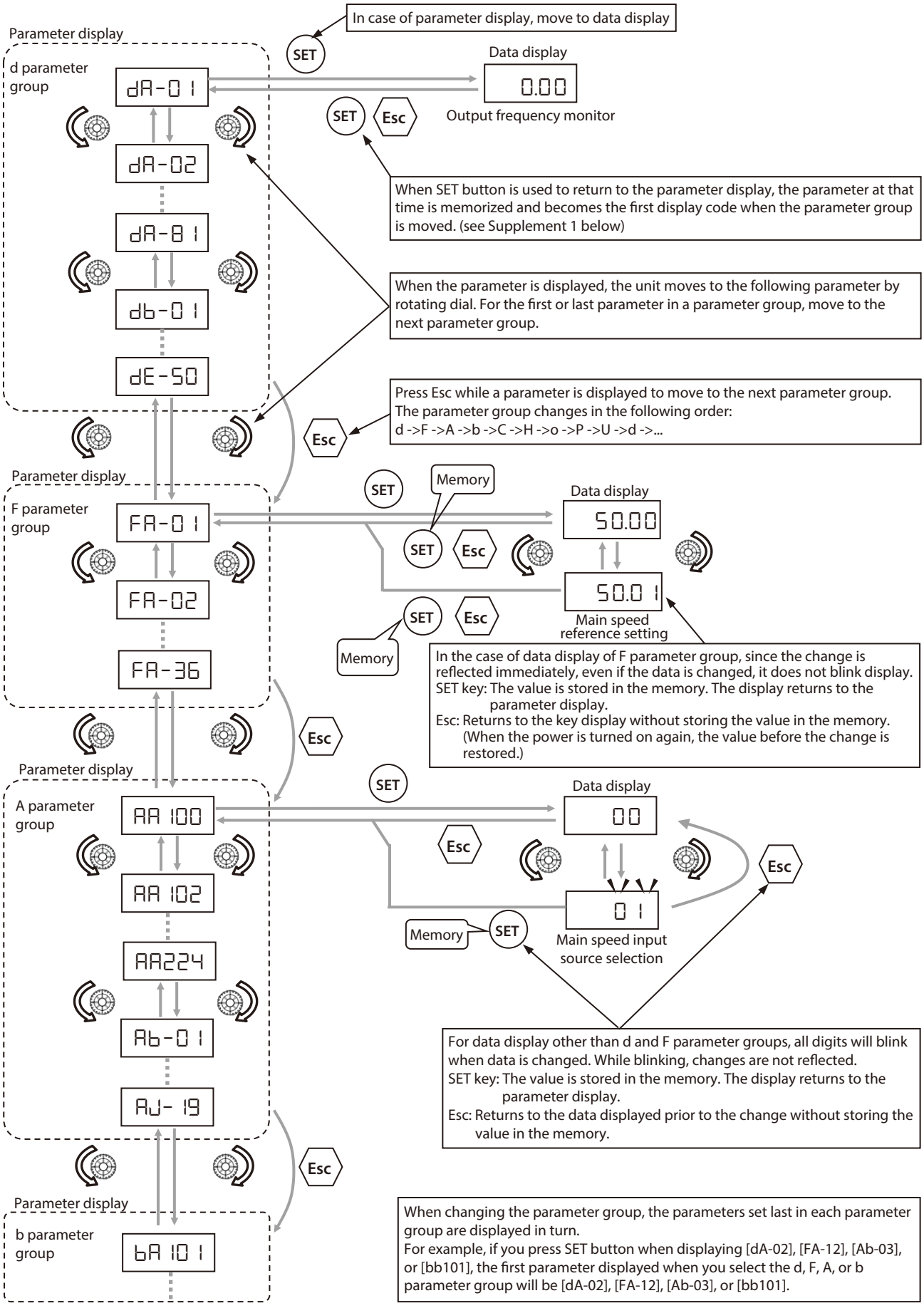
Operation Panel

Part names and descriptions for operation panel



Name	Description
(1) Power Indicator [PWR] (Green)	Lights up (green) while the inverter is supplying power.
(2) Current monitor lamp [A] (Green)	Lights (green) when the data of the display unit is current.
(3) Frequency monitor lamp [Hz] (Green)	Lights up (green) when the data in the display unit is frequency.
(4) Program lamp [PRG] (green)	Lit (green) when the display shows changeable data (set value). Flashes if the setting value is inconsistent.
(5) Alarm lamp [AL] (Red)	Lights up (red) when the inverter trips.
(6) Running lamp [RUN] (Green)	Lights up (green) when the inverter is running. (This lamp lights in OR of [With operation command] and [Inverter output in progress]. This lamp also lights during deceleration after operation command OFF or when an operation command is input at 0 Hz of the set frequency.)
(7) Minus lamp [-] (Red)	Lights up (red) when the display data is negative.
(8) Displays (5-digit LED)	Displays data (red) such as various parameters and frequency setting values.
(9) Run command lamp (Green)	Lit (green) when the operation command destination is "Operation panel". (RUN button on the control panel is enabled.) Even if the operation command destination is RUN key on the operation panel, this lamp blinks when RUN key is pressed while operation is disabled due to some function.
(10) RUN key	Run the inverter. However, it is effective when the operation command destination is "operation panel". Operation direction is set by "RUN key Operation direction selection [AA-12]".
(11) STOP/RESET key	Decelerates and stops the inverter. Use the "STOP key selection [AA-13]" to enable/disable the operation stopping function. Resets (recovers from trip state) when the inverter is tripping.
(12) Esc key	In case of parameter display, it moves to the next parameter group and displays the parameter set at the end of each group. Even after the power is turned off, the memory of the last set parameter is maintained. When displaying data, cancel setting and return to parameter display. Regardless of the screen, press and hold (about 3 seconds) to display the data (output frequency) of "output frequency monitor [dA-01]". When a remote operator (OS-44 ver.2.0 onwards) is connected, pressing and holding Esc key for 1 second enables the remote operator. Press and hold Esc key again to return to the remote operator.
(13) SET key	When displaying parameters, move to data display. When displaying the data, the setting is determined and stored, and the display returns to the parameter display. You can also memorize the last parameter that you pressed SET and view that parameter when the power is turned on. For each parameter group, the last parameter set is stored and becomes the first parameter displayed when Esc key is used to move the parameter group.
(14) Dial	Change the parameter or increase/decrease the set data. Rotate clockwise to increase or rotate counterclockwise to decrease. The degree of increase/decrease and carry of parameters and setting data with respect to the speed of turning dial can be set with "Dial sensitivity [UA-76]" and "Dial carry sensitivity [UA-77]".
(15) RJ45 Connector	Connector for optional remote operator connection (dedicated for RS-422). When a remote operator is connected, the keys on the main unit do not work. The data to be displayed on the (8) display unit at this time is set in the main unit display [UA-95] when the operator is connected. Caution: The remote operator should be connected or disconnected with the power supply disconnected.
(16) USB connector	This is a connector (USB 2.0 Micro-B connector) for connecting a personal computer. Used to connect to PC software.

How to display and change data using the operation panel



Standard and Common Specifications

Standard specifications

■ Single-phase 200V class

Model name				HF620S-				
				A20	A40	A75	1A5	2A2
Applicable motor capacity (4 poles) (kW)			LD	0.4	0.55	1.1	2.2	3.0
			ND	**0.2**	**0.4**	**0.75**	**1.5**	**2.2**
Output	Rated output current (A) Note:1		LD	2.0	3.5	6.0	9.8	12.2
			ND	**1.6**	**3.2**	**5.0**	**8.0**	**11.0**
	Overload current rating		LD	120% / 60s				
			ND	**150% / 60s**				
	Rated output voltage			Three-phase 200 to 240V (Output above the incoming voltage is not possible.)				
	Rated power (kVA)	200V	LD	0.7	1.2	2.0	3.4	4.2
			ND	**0.5**	**1.1**	**1.7**	**2.7**	**3.8**
		240V	LD	0.8	1.4	2.4	4.0	5.0
			ND	**0.6**	**1.3**	**2.0**	**3.3**	**4.5**
Input	Rated input current (A) Note:2		LD	3.6	7.3	13.8	20.2	24.0
			ND	**3.0**	**6.3**	**11.5**	**16.8**	**22.0**
	Rated input AC voltage Note:3			Single-phase 200 to 240V (-15%/+10%), 50/60Hz ± 5%				
	Power supply capacity (kVA) Note:4		LD	10.0	10.0	10.0	10.0	10.0
			ND	**10.0**	**10.0**	**10.0**	**10.0**	**10.0**
Carrier frequency variation Note:5			LD	2.0 to 10.0kHz				
			ND	**2.0 to 15.0kHz**				
Starting torque Note:6				200% / 0.5Hz				
Brake	Regenerative brake Note:7			Internal braking resistor operating circuit (connect the external braking resistor)				
	Minimum resistance value of connectable braking resistor (Ω)			100	100	50	50	35
Cooling method				Self-cooling (without Fan)			Forced air cooling (with Fan)	
Dimensions	H (height) (mm)			128	128	128	128	128
	W (width) (mm)			68	68	108	108	108
	D (depth) (mm) Note:8			109	122.5	170.5	170.5	170.5
Protective structure				IP20/UL open type				
Applox. weight (kg)				1.0	1.1	1.6	1.8	1.8

■ Three-phase 200V class

Model name				HF6202-							
				A20	A40	A75	1A5	2A2	3A7	5A5	7A5
Applicable motor capacity (4 poles) (kW)			LD	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11
			ND	**0.2**	**0.4**	**0.75**	**1.5**	**2.2**	**3.7**	**5.5**	**7.5**
Output	Rated output current (A) Note:1		LD	2.0	3.5	6.0	9.8	12.2	19.6	30.0	45.0
			ND	**1.6**	**3.2**	**5.0**	**8.0**	**11.0**	**17.5**	**25.0**	**33.5**
	Overload current rating		LD	120% / 60s							
			ND	**150% / 60s**							
	Rated output voltage			Three-phase 200 to 240V (Output above the incoming voltage is not possible.)							
	Rated power (kVA)	200V	LD	0.7	1.2	2.0	3.4	4.2	6.7	10.3	15.6
			ND	**0.5**	**1.1**	**1.7**	**2.7**	**3.8**	**6.0**	**8.6**	**11.6**
		240V	LD	0.8	1.4	2.4	4.0	5.0	8.1	12.4	18.7
			ND	**0.6**	**1.3**	**2.0**	**3.3**	**4.5**	**7.2**	**10.3**	**13.9**
Input	Rated input current (A) Note:2		LD	2.0	3.9	7.2	10.8	13.9	23.2	37.0	48.0
			ND	**1.6**	**3.3**	**6.0**	**9.0**	**12.7**	**20.5**	**30.8**	**39.6**
	Rated input AC voltage Note:3			Three-phase 200 to 240V (-15%/+10%), 50/60Hz ± 5%							
	Power supply capacity (kVA) Note:4		LD	10.0	10.0	10.0	10.0	10.0	20.0	30.0	50.0
			ND	**10.0**	**10.0**	**10.0**	**10.0**	**10.0**	**20.0**	**20.0**	**30.0**
Carrier frequency variation Note:5			LD	2.0 to 10.0kHz							
			ND	**2.0 to 15.0kHz**							
Starting torque Note:6				200% / 0.5Hz							
Brake	Regenerative brake Note:7			Internal braking resistor operating circuit (connect the external braking resistor)							
	Minimum resistance value of connectable braking resistor (Ω)			100	100	50	50	35	35	20	17
Cooling method				Self-cooling (without Fan)			Forced air cooling (with Fan)				
Dimensions	H (height) (mm)			128	128	128	128	128	128	260	260
	W (width) (mm)			68	68	68	108	108	140	140	140
	D (depth) (mm) Note:8			109	122.5	145.5	170.5	170.5	170.5	155	155
Protective structure				IP20/UL open type							
Applox. weight (kg)				1.0	1.1	1.2	1.6	1.8	2.0	3.5	3.5

Standard and Common Specifications

■Three-phase 400V class

Model name				HF6204-						
				A40	A75	1A5	2A2	3A7	5A5	7A5
Applicable motor capacity (4 poles) (kW)			LD	0.75	1.5	2.2	3.0	5.5	7.5	11
			ND	**0.4**	**0.75**	**1.5**	**2.2**	**3.7**	**5.5**	**7.5**
Output	Rated output current (A) Note:1		LD	2.1	4.1	5.5	7.1	11.9	17.5	24.0
			ND	**1.8**	**3.4**	**4.8**	**6.0**	**9.2**	**14.8**	**19.0**
	Overload current rating		LD	120% / 60s						
			ND	**150% / 60s**						
	Rated output voltage			Three-phase 380 to 480V (Output above the incoming voltage is not possible.)						
	Rated power (kVA)	380V	LD	1.3	2.6	3.6	4.6	7.8	11.5	15.7
			ND	**1.1**	**2.2**	**3.1**	**3.9**	**6.0**	**9.7**	**12.5**
		480V	LD	1.7	3.4	4.5	5.9	9.8	14.5	19.9
			ND	**1.4**	**2.8**	**3.9**	**4.9**	**7.6**	**12.3**	**15.7**
Input	Rated input current (A) Note:2		LD	2.1	4.3	5.9	8.1	13.3	20.0	24.0
			ND	**1.8**	**3.6**	**5.2**	**6.5**	**11.0**	**16.9**	**19.0**
	Rated input AC voltage Note:3			Three-phase 380 to 480V (-15%/+10%), 50/60Hz ± 5%						
	Power supply capacity (kVA) Note:4		LD	10.0	10.0	10.0	10.0	20.0	30.0	30.0
			ND	**10.0**	**10.0**	**10.0**	**10.0**	**20.0**	**20.0**	**30.0**
Carrier frequency variation Note:5			LD	2.0 to 10.0kHz						
			ND	**2.0 to 15.0kHz**						
Starting torque Note:6				200% / 0.5Hz						
Brake	Regenerative brake Note:7			Internal braking resistor operating circuit (connect the external braking resistor)						
	Minimum resistance value of connectable braking resistor (Ω)			180	180	180	100	100	70	70
Cooling method				Self-cooling (without FAN)	Forced air cooling (with FAN)					
Dimensions	H (height) (mm)			128	128	128	128	128	260	260
	W (width) (mm)			108	108	108	108	140	140	140
	D (depth) (mm) Note:8			143.5	170.5	170.5	170.5	170.5	155	155
Protective structure				IP20/UL open type						
Applox. weight (kg)				1.5	1.8	1.8	1.8	2.0	3.5	3.5

Note: 1. Load rating: ND = Normal duty rating (Overload current rating 150%/60s, initial setting)
LD = Light duty rating (Overload current rating 120%/60s)
Some models require current derating depending on the carrier frequency setting and ambient temperature.

2. The rated input current is the value at the rated output current. The value changes according to the impedance on the power supply side (wiring, breaker, input reactor option, etc.).
The input current on the specification label indicates the UL-certified current.

3. Compliance with the Low Voltage Directive (LVD) is as follows. -Pollution degree 2, -Overvoltage category 3

4. Power supply capacity is the value of the rated output current at 440V. The value changes according to the impedance on the power supply side (wiring, breaker, input reactor option, etc.).

5. The setting range of "Carrier Frequency setting [bb101]" is limited according to "Load type selection [Ub-03]".
It is recommended to set the carrier frequency setting equal or greater than the (maximum output frequency×10) Hz.

6. The value is specified for the Sumitomo standard motor controlled by the sensorless vector control at ND rating. Torque characteristics may vary depending on the control mode and the motor used.

7. In case of shortage for braking torque using internal brake circuit, connect the external brake unit (option).

8. Dimension D is without 3mm for dial projection. When the optional unit is connected, dimension D is increases.

Standard and Common Specifications

Common specifications

Item			Specifications	
Control method			PWM control (Switch between 3-phase modulation and 2-phase modulation)	
Output frequency range Note:1			0.01 to 590.00Hz	
Frequency accuracy			For the maximum frequency, digital ± 0.01%, analog ± 0.2% (25 ± 10°C)	
Frequency resolution			Digital: 0.01Hz, analog: maximum frequency/1000	
Control mode Note:2 (Voltage/frequency calculation)			IM	V/f control (Constant torque, Reduce torque, Free-V/f, Automatic torque boost) Sensorless vector control (With carrier frequency derating at low sepeed)
			SM/PMM	PM sensorless vector control Note:3
Acceleration/deceleration time			0.00 to 3600.00s (linear, S-curve, U-curve, inverted U-curve, EL-S-curve)	
Starting torque			200% / 0.5Hz (at IM sensorless vector control)	
Monitor function			Output frequency, Output current, Output torque Note:4, Trip history, Input/Output terminal status, Input power Note:5, Output power Note:5, etc.	
Starting function			Starting after DC braking, Active frequency matching, Reduced voltage start, Trip retry restart	
Stop function			DC braking after deceleration stop or free run stop, DC braking by input terminal (Braking force, time, and operating speed are adjustable.)	
Stall prevention function			Stall prevention, Overcurrent suppression, Overvoltage suppression	
Protection function Note:6			Overcurrent error, Motor overload error, Braking resistor overload error, Overvoltage error, Memory error, Undervoltage error, Current detector error, CPU error, External trip, USP error, Ground fault, Input overvoltage error, Temperature detector error, Temperature error, CPU communication error, Input phase loss, Main circuit error, Analog input level over error, Driver error, Output phase loss, Thermistor error, Brake error, Overload error at low speed, Controller overload error, Operator keypad disconnection error, RTC error, Option related errors, Functional safety related errors, Encoder disconnection, Positioning range error, Speed deviation error, Excessive speed error, Contactor error PID soft start error, Abnormal upper/lower detecting error	
Other functions			Free-V/f, Manual torque boost, Output voltage gain, AVR, Braking resistor circuit (DBTR), PID control, Motor constant selection, Auto-tuning, Stabilization control, Direction reversal protection, Position control, Torque control, Torque limit, Automatic carrier reduction, Energy saving operation, Brake control, Instantaneous power failure non-stop, Commercial power supply switching, Minimum frequency, Upper/lower frequency limit, Window comparator, Frequency jump, Acceleration/deceleration stop, Frequency calculation/addition, 2-stage acceleration/deceleration, External start/end, Multi-speed, Analog output adjustment, Stop selection, Input terminal response, Output signal delay, Soft-Lock, Operation direction limit, STOP/RESET key selection, Scaling function, Cooling-fan ON/OFF, Display restriction, Password function, Initial display selection.	
Input	Frequency reference	Keypad	The parameters for the command value set by dial, Esc key and SET key on the keypad	
		External signal Note:7	Analog input (Terminal [VRF]/[IRF]) (Switch between voltage and current input by parameter setting.)	0 to 10V voltage input (Input impedance: 10kΩ)
				4 to 20mA current input (Input impedance: 100Ω)
			Multi-speed terminal (input terminal function used.)	Maximum 16 speeds
			Pulse input (Input terminal [RST]/[PLA])	Maximum 32kHz x 2
		External port	RS485 serial communication (Modbus-RTU), USB (PC Software), Remote operator, Communication option	
	Forward/ Reverse Run/ Stop	Keypad	RUN and STOP/RESET key on the keypad (Forward/Reverse can be switched by parameter setting.)	
		External signal	"Forward [FR]"/"Reverse [RR]", 3-wire input (When input termnal functions are asigned)	
		External port	RS485 serial communication (Modbus-RTU), USB (PC Software), Remote operator, Communication option	
	Input terminal function		Input terminal function can be indivisually assiegned to input terminal [FR] to [PLA].	
	Analog input		2 terminals (Terminal [VRF]/[IRF]: 0 to 10V voltage input, 4 to 20mA current input) (Switch between voltage and current input by parameter setting.)	
	Backup power supply terminal		External +24V power supply can be input from [P24] terminal. (Installation of a reverse current prevention diode is mandatory.)	
	Safety function STO input terminal		2 terminals (Terminal [ST1]/[ST2])	
	Thermistor input terminal		1 terminal (PTC type thermistor can be connencted to input terminal [AUT])	
	Pulse input terminal		Input terminal [PLA] (A-phase), [RST] (B-phase), [ES] (Z-phase [PLZ]), or amy input terminals assigned input terminal functions [PLA]/[PLB]. (Terminals differ depending on parameter settings and functions used. For details, refer to the related pages of following functions: Frequency reference, Pulse counter, PID feedback, PID target value, Control with encoder, and Position control functions)	
Output	Output terminal function		Output terminal function can be indivisually assigned to 2 open collector output terminals (Output terminal [UPF]/[DRV]) and a relay output terminal [ML]. For details of types of output terminal function, refer to "9.16.1 Using External Output Signal Functions".	
	Functional safety EDM output		STO state monitor (Output terminal [UPF] is switched to [EDM] by slide switch)	
	Monitor output Note:8		2 terminals Terminal [AMI]: 0 to 10V analog voltage output / 4 to 20mA analog current output Terminal [AMV]: Pulse output (max. 32kHz)/10V output) / 0 to 10V analog voltage output	
EMC noise filter			Not built-in (optional external filter can be connected)	
PC external access			USB Micro-B	

Standard and Common Specifications

Item		Specifications
Operating environment	Ambient temperature	ND (Normal duty): -10 to 50°C / LD (Light duty): -10 to 40°C
	Storage Temperature Note:9	-20 to 65°C
	Humidity	20 to 90% RH (non-condensing)
	Vibration	10 to 57Hz: amplitude 0.075mm 57 to 150Hz: 9.8m/s^2 (1.0G)
	Installation place Note:10	Altitude: 1000m or less, indoors (free from corrosive gases, oil mist, and dust)
Components life span		The design life of the electrolytic capacitor on the board and the main circuit smoothing capacitor is 10 years.
		The design life of cooling fan is 10 years (models with cooling fan) with no dust.
		Non-volatile memory parts on control circuit board.
Conformity standards Note:11		CE: EN IEC 61800-3 (EMC-filter option required) EN 61800-5-1 UL: UL 61800-5-1, -Overvoltage Category 3, -Pollution Degree 2 Others: c-UL Functional safety: STO(Safe torque off) function / EN 61800-5-2: SIL3, EN ISO 13849-1: Cat.3 PLe EN 61508-1 to 7
Option board connector		One unit can be mounted
Other optional components		AC reactor, DC reactor, Noise filter, Radio noise filter(XY filter), Zero-phase reactor, Braking resistor, Brake unit, Remote operator (OS-44 ver.2.0 onwards), PC software, etc.

Note: 1. The output frequency range depends on the control mode and the motor used. Consult the motor manufacturer for the maximum allowable frequency of the motor when operating beyond 60Hz.

2. In case that the control mode is changed and the motor constant settings are not appropriate, the desired starting torque cannot be obtained and also exists the possibility of tripping.

3. Contact your supplier when driving SM/PMM.

4. Output torque monitor is reference value. They are not suitable for calculation of efficiency values, etc. To obtain an accurate value, use an external device.

5. Input power monitor and output power monitor are reference values.
They are not suitable for calculation of efficiency values, etc. To obtain an accurate value, use an external device.

6. When "Driver error [E030]" occurs by the protective function, it may have happened by the short-circuit protection, but also can occur when the IGBT is damaged.
Depending on the operating conditions of the inverter, "Overcurrent error [E001]" may occur instead of [E030].

7. At factory setting, the maximum output frequency for analog input [VRF] is adjusted to 9.8V for voltage input and [IRF] is adjusted to 19.8mA for current input. To change the characteristics, refer to the analog start/end function.

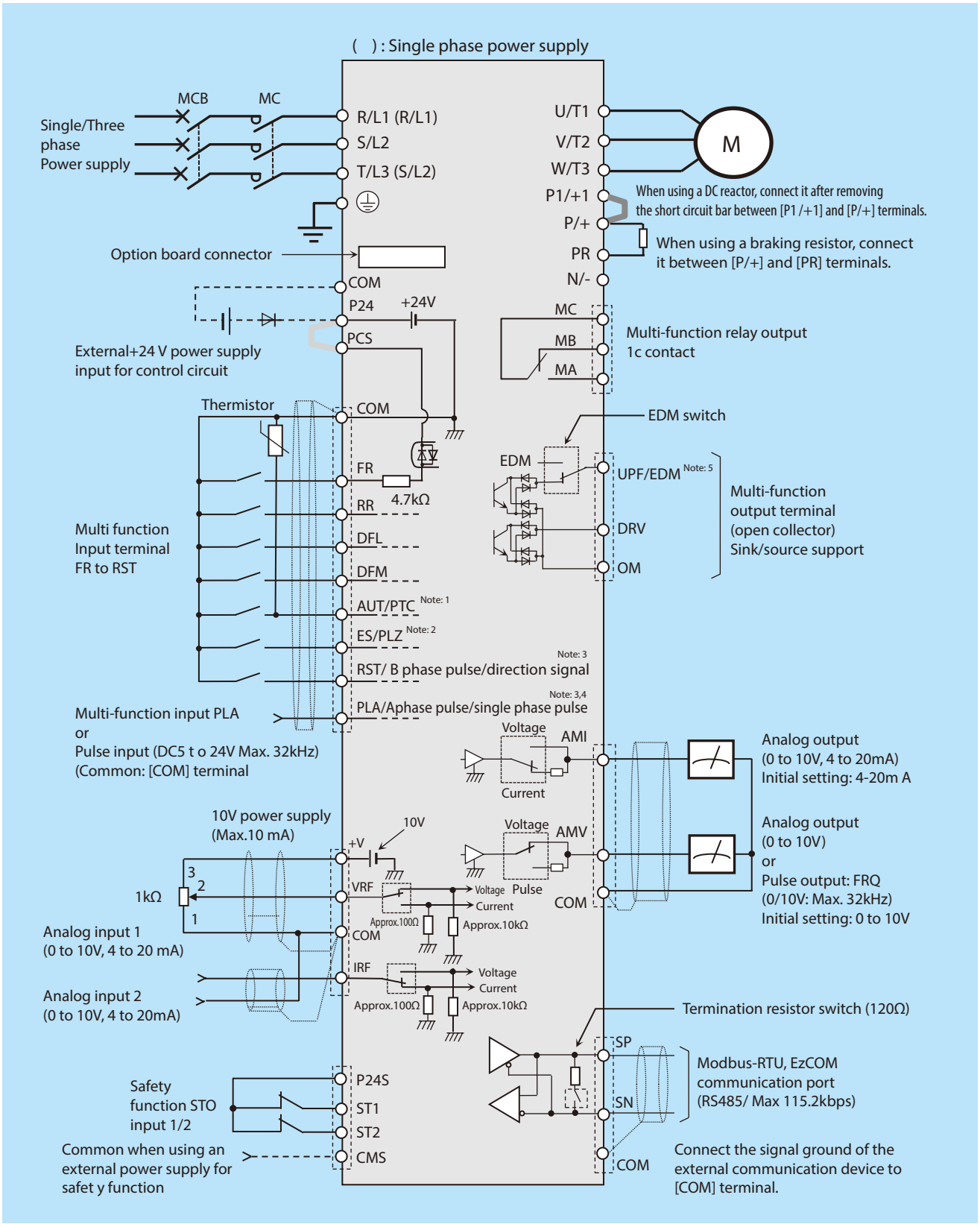
8. Analog monitor output is a reference output for analog meter or digital frequency meter connection.
The maximum output value may deviate slightly due to variations in the connected meters and analog output circuits. To change the characteristics, use [AMI]/[AMV] adjust function.

9. The storage temperature is the temperature during transportation.

10. In case of installing at an altitude of 1000m or more, the atmospheric pressure decreases by approximately 1% for every 100m altitude increase.
Apply 1% current derating from the rated current by increasing every 100m and conduct an evaluation test. When using at an altitude of 2500m, please contact your supplier.

11. Insulation distance conforms to UL and CE standards.

Standard Connection Diagram



Note: 1. When "Thermistor type selection [Cb-40]" is set to "PTC (01)", input terminal [AUT] becomes a terminal for connecting an external thermistor (PTC).

2. When using "Pulse input Z [PLZ]" input terminal, assign it to input terminal [ES].

3. When "Pulse input target function selection [CA-90]" is set to anything other than "Disable (00)", input terminal [RST] is automatically switched to the terminal for B-phase pulse input or direction signal, and input terminal [PLA] is automatically switched to the terminal for A-phase pulse input or single-phase pulse input.

4. The electrical specifications of input terminal [PLA] differ from those of other input terminals [FR] to [RST].

5. When the EDM switch on the board is turned ON, output terminal [UPF] switches to "STO state monitor [EDM]". When the switch is turned back to OFF, output terminal [UPF] becomes "Not use [no]".

Main terminals

Symbol	Name	Description
R/L1	Input terminal for main power supply	Connects to AC power supply. There is no [T/L3] terminal in the single-phase model. In this case, connect AC power supply to [R/L1] and [S/L2] terminals.
S/L2		
T/L3		
U/T1	Inverter output terminal	Connect a three-phase motor.
V/T2		
W/T3		
P1/+1	DC reactor connection terminal	Remove the short-circuit bar between [P/+] and [P1/+1] terminal and connect the optional DC reactor for power factor improvement.
P/+	Braking resistor connection terminal	When braking torque is required, connect the optional external braking resistor between [P/+] and [PR] terminal.
PR		
P/+	Regenerative braking unit connection terminal	When braking torque is required and the built-in braking circuit is insufficient, connect the optional regenerative braking unit between [P/+] and [N/-] terminal. Note: In this guide, the voltage between these terminals is referred to as the DC bus voltage.
N/-		
G ⏚	Inverter grounding terminal	Ground terminal. Ground to prevent electric shock and reduce noise. Connect according to the applicable local grounding standards. For models of 200V class 3.7kW or less and 400V class 3.7kW or less, connect the grounding bar on the bottom left of the inverter.

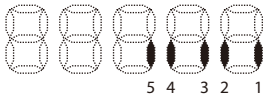
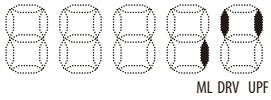
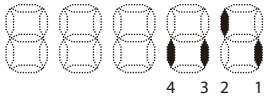
Control terminals

Item	Symbol	Name	Description	Electrical characteristics
Analog input/output				
Power supply	COM	Common for input signal	Common terminal for internal power supply, input terminal [FR] to [PLA], analog input/output and pulse input/output terminals.	-
	+V	Power supply for frequency reference	10V power supply. Used when inputting a frequency reference by analog voltage input with a potentiometer.	Max. allowable current: 10mA
Analog input	VRF	Analog input 1 (Voltage/Current)	[VRF] and [IRF] terminals are terminal for analog input. Both terminals can be switched between voltage input and current input by parameter setting. - Analog voltage input: 0 to 10V voltage input. - Analog current input: 4 to 20mA current inputs.	Analog voltage input: Input impedance: Approx. 10kΩ Allowable input voltage range: -0.3 to 12V Analog current input: Input impedance: Approx. 100Ω Allowable input current range: 0 to 24mA
	IRF	Analog input 2 (Voltage/Current)		
Thermist or input	AUT [PTC]	External thermistor input	When "Thermistor type selection [Cb-40]" is set to "PTC (01)", input terminal [AUT] becomes the terminal for connecting an external thermistor (PTC). An external thermistor is connected between this terminal and [COM] terminal to trip the inverter due to a temperature error. (Trip at approx. 3kΩ or more.) Regardless of the sink or source logic, the common is [COM] terminal.	PTC type
Digital input				
Power supply	COM	Common for input signal	Common terminal for internal power supply, input terminal [FR] to [PLA], analog input/output and pulse input/output terminals.	-
	P24	Power supply terminal for input signal	+24V internal power supply terminal for contact input. Common for source logic input. By supplying external +24V to this terminal, it is possible to operate only the control circuit and parameters can be read/written. When an external +24V power supply is connected, be sure to connect a reverse current prevention diode.	Max. allowable current: 10mA
	PCS	Sink/Source logic switching terminal for input signal	Sink logic: short-circuit to [P24] terminal Source logic: short-circuit to [COM] terminal When driving the contact input with an external power supply, remove the short-circuit wire.	-
Contact input	FR RR DFL DFM AUT	Multi-function input	Each terminal function can be selected by parameter setting for each terminal. Both sink and source logic are supported.	Voltage between each terminal and [COM] terminal ON voltage: min. 18V OFF voltage: Max. 3V Max. allowable voltage: 27V Load current: 5mA (at 24V) Internal resistance: 4.7kΩ
Contact input or Pulse input	ES	Multi-function input or Z-phase pulse input	Assign "Pulse input Z [PLZ]" to input terminal [ES] when inputting Z- phase pulses in order to use the home return function or orientation function.	Input pulse: min. 0.3Hz to Max. 32kHz [ES]/[RST] - [PLC] voltage: ON voltage: min. 18V OFF voltage: Max. 3V Max. allowable voltage: 27V Load current: 8mA (at 24V) Internal resistance: 3.0kΩ
	RST	Multi-function input or B-phase pulse input/Direction signal	When "Pulse input target function selection [CA-90]" is set to other than "Disable (00)", the input terminal [RST] is a terminal for B-phase pulse input or direction signal in single-phase pulse input. When [CA-90] is set to "Disable (00)", it becomes an intelligent input terminal.	

Terminal Functions

Item	Symbol	Name	Description	Electrical characteristics
Digital output				
Contact input or Pulse input	PLA	Multi-function input (Voltage input) or A-phase pulse input/Single-phase pulse input	When "Pulse input target function selection [CA-90]" is set to other than "Disable (00)", the input terminal [PLA] become 0/5 to 24V pulse input terminal. When [CA-90] is set to "Disable (00)", it becomes an intelligent input terminal. In this case, use the source logic or provide an external power supply between this terminal and the [COM] terminal. (Note that the internal circuit differs from the input terminals [FR] through [RST].)	Input pulse: min. 0.3Hz to Max. 32kHz [PLA] - [COM] voltage: ON voltage: min. 4V OFF voltage: Max. 1V Maximum allowable voltage: 27V Internal resistance: 11kΩ
Open collector Output	UPF DRV	Multi-function output	Each terminal function can be selected with the parameter setting of each terminal. Both sink and source logic are supported.	Open collector output Between each terminal and [OM] Max. allowable voltage: 27V Max. allowable current: 50mA Voltage drop when turned on: 4V or less
	OM	Common for Multi-function output	Common terminal for output terminal [UPF] and [DRV].	Max. allowable current: 100mA
Relay output	MC MA MB	Multi-function relay output	1c contact output. Output terminal function can be selected by parameter setting. (The factory default setting is alarm output.)	Max. contact capacity [MA] - [MC]: AC250V 2A (Resistance) 0.2A (Inductive load) DC30V 3A (Resistance) 0.6A (Inductive load) [MB] - [MC]: AC250V 1A (Resistance) 0.2A (Inductive load) DC30V 1A (Resistance) 0.2A (Inductive load) Min. contact capacity AC100V, 10mA, DC5V, 100mA
Monitor output				
Monitor output	AMI	Analog output (Voltage/Current)	Terminal [AMI] can be switched between analog voltage output and analog current output by parameter setting. - Analog voltage output Output any monitor as a 0 to 10V voltage signal. - Analog current output Output any monitor as a 4 to 20mA current signal.	Analog voltage output: Max. allowable current: 2mA Output voltage accuracy: ±10% (Ambient temp.: 25°C±10°C) Analog current output: Allowable load impedance: 250Ω or less Output voltage accuracy: ±20% (Ambient temp.: 25°C±10°C)
	AMV	Analog voltage output or Pulse output	Terminal [AMV] can be switched between analog voltage output and pulse output by parameter setting. - Analog voltage output Output any monitor as a 0 to 10V: voltage signal. - Pulse output Output any monitor as a 0/10V: pulse signal or PWM signal.	Analog voltage output: Max. allowable current: 2mA Output voltage accuracy: ±10% (Ambient temp.: 25°C±10°C) Pulse output: Max. allowable current: 2mA Max. output frequency: 32kHz
Communication				
Serial communication	SP SN	Modbus communication	RS485 ports for Modbus-RTU/ EzCOM. To connect the signal ground of the external control device, use [COM] terminal.	Max. baud rate: 115.2kbps Built-in termination resistor: 120Ω (Switched by dip switch) SP: RS485 differential (+) signal SN: RS485 differential (-) signal
Safety function				
Safety function	P24S	+24V output	+24V power supply dedicated for [ST1]/[ST2] input.	Max. output current: 100mA
	CMS	Common for +24V output	Common terminal for [P24S].	-
	ST1 ST2	STO input 1 STO input 2	Input terminal for STO signal.	Between [ST1]/[ST2] and [CMS] ON voltage: Min. 15V OFF voltage: Max. 5V Max. allowable voltage: 27V Load current: 5.8mA (at 27V) Internal resistance: 4.7kΩ
	UPF [EDM]	STO state monitor	When EDM switch is turned ON, output terminal [UPF] becomes "STO state monitor output [EDM]".	Open collector output Between [EDM] and [CM2] Max. allowable voltage: 27V Max. allowable current: 50mA Voltage drop when turned on: 4V or less

d Parameter (Monitor parameter)

Code	Name	Data range	
dA-01	Output frequency monitor	0.00 to 590.00 Hz	
dA-02	Output current monitor	0.00 to 655.35 A	
dA-03	Rotation direction monitor	o: Stop/ d: 0Hz output/ F: Forward/ r: Reverse	
dA-04	Frequency reference monitor (after calculation) (signed)	-590.00 to 590.00 Hz	
dA-06	Output frequency scale conversion monitor	0.00 to 59000.00	
dA-08	Detect speed monitor	-590.00 to 590.00 Hz	
dA-12	Output frequency monitor (signed)		
dA-14	Frequency upper limit monitor	0.00 to 590.00 Hz	
dA-15	Torque reference monitor (after calculation)	-1000.0 to 1000.0 %	
dA-16	Torque limit monitor	0.0 to 500.0 %	
dA-17	Output torque monitor	-1000.0 to 1000.0 %	
dA-18	Output voltage monitor (RMS)	0.0 to 800.0 V	
dA-20	Current position monitor	Absolute position control : -268435455 to 268435455 pls High resolution absolute position control : -1073741823 to 1073741823 pls	
dA-28	Pulse count monitor	0 to 2147483647	
dA-30	Input power monitor	0.00 to 655.35 kW	
dA-32	Accumulated input power monitor	0.0 to 1000000.0 kWh	
dA-34	Output power monitor	0.00 to 655.35 kW	
dA-36	Accumulated output power monitor	0.0 to 1000000.0 kWh	
dA-40	DC bus voltage monitor	DC0.0 to 1000.0 V	
dA-41	DBTR load factor monitor	0.00 to 100.00 % 0.00 to 100.00 % 0.00 to 100.00 %	
dA-42	Electronic thermal load factor monitor (Motor)		
dA-43	Electronic thermal load factor monitor (Inverter)		
dA-44	Safety STO terminal monitor		1: Terminal [ST1] (STO/ RUN enable) 2: Terminal [ST2] (STO/ RUN enable) 3: Terminal [EDM] (OFF/ ON) 4: [SFM1] signal (OFF/ ON) 5: [SFM2] signal (OFF/ ON)
dA-45	Safety STO monitor	00: No input/ 01: P-1A (-F20-)/ 02: P-2A (-F10-)/ 03: P-1b (-F02-)/ 04: P-2b (-F01-)/ 05: P-1C (-F22-) 06: P-2C (-F11-)/ 07: STO (--S--)	
dA-51	Input terminal monitor		(e.g.) FR, RR: ON
dA-54	Output terminal monitor		(e.g.) UPF, DRV: ON/ML: OFF
dA-60	Analog input/output status monitor		(e.g.) VRF : Analog current input IRF : Analog voltage input AMI : Analog current output AMV : Always voltage position
dA-61	Analog input [VRF] monitor	0.00 to 100.00 %	
dA-62	Analog input [IRF] monitor		
dA-70	Pulse input monitor	-100.00 to 100.00 %	
dA-81	Option mounting status	00: (0x00) None/ 02 to 06: Reserved/ 07: (0x07) CC-Link	
db-30 to db34	PID1 feedback value monitor 1 to 3	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	
db-36	PID2 feedback value monitor	-100.00 to 100.00 % Data range depends on PID2 scale adjustment (AH-04, 05, 06)	
db-42	PID1 set-point monitor (after calculation)	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	
db-44	PID1 feedback value monitor (after calculation)		
db-50	PID1 output monitor	-100.00 to 100.00 %	
db-51	PID1 deviation monitor	-200.00 to 200.00 %	
db-52 to db-54	PID1 deviation monitor 1 to 3		
db-55	PID2 output monitor	-100.00 to 100.00 %	
db-56	PID2 deviation monitor	-200.00 to 200.00 %	
db-61	Current PID P-Gain monitor	0.0 to 100.0	
db-62	Current PID I-Gain monitor	0.0 to 3600.0 s	
db-63	Current PID D-Gain monitor	0.00 to 100.00 s	
db-64	PID feedforward monitor	0.00 to 100.00 %	
dC-01	Inverter load type status	01: Light duty (LD)/ 02: Normal duty (ND)	
dC-02	Rated current monitor	0.0 to 6553.5 A	
dC-07	Main speed input source monitor	01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Multi-speed 0/ 09: Multi-speed 1/ 10: Multi-speed 2/ 11: Multi-speed 3 12: Multi-speed 4/ 13: Multi-speed 5/ 14: Multi-speed 6/ 15: Multi-speed 7/ 16: Multi-speed 8/ 17: Multi-speed 9 18: Multi-speed 10/ 19: Multi-speed 11/ 20: Multi-speed 12/ 21: Multi-speed 13/ 22: Multi-speed 14/ 23: Multi-speed 15 24: Jogging/ 25: RS485/ 26: Option/ 29: Pulse input/ 31: Reserved/ 32: PID function/ 34: AHD retention speed	
dC-08	Sub speed input source monitor	00: Disabled/ 01: Terminal [VRF] / 02: Terminal [IRF]/ 08: Sub speed (Parameter setting) 25: RS485/ 26: Option/ 29: Pulse input/ 31: Reserved/ 32: PID function	
dC-10	RUN command input source monitor	00: [FR]/[RR] terminal/ 01: 3-Wire/ 02: Keypad's RUN key/ 03: RS485/ 04: Option	
dC-15	Cooling fin temperature monitor	-20.0 to 200.0 °C	
dC-16	Life assessment monitor		1: WAC (Capacitor life warning) 2: WAF (Cooling-fan life warning) 3: WAP (Power module life warning) 4: WAIC (Inrush circuit life warning)

Code	Name	Data range
dC-20	Accumulated number of starts monitor	1 to 65535
dC-21	Accumulated number of power-on times monitor	
dC-22	Accumulated RUN time monitor	0 to 1000000 h
dC-24	Accumulated power-on time monitor	
dC-26	Accumulated cooling-fan run time monitor	
dC-30	Dual monitor	Monitor data selected by [UA-96], [UA-97]
dC-31	Unsteady detection value monitor	-100.00 to 100.00 %
dC-32	Unsteady detection upper level monitor	
dC-33	Unsteady detection lower level monitor	
dC-37	Icon 2 LIM detail monitor	00: Motor RUN not restricted/ 01: OC suppress/ 02: OL restriction/ 03: OV suppress/04: Torque limit 05: Frequency limit/ 06: Minimum frequency
dC-38	Icon 2 ALT detail monitor	00: No warning notice/ 01: OL notice/ 02: Motor thermal notice/ 03: Controller thermal notice 04: Motor overheating notice
dC-39	Icon 2 RETRY detail monitor	00: Not in retry status/ 01: Waiting for retry/ 02: Waiting for restart
dC-40	Icon 2 NRDY detail monitor	00: Ready/ 01: Trip occurrence/ 02: Power supply error/ 03: Resetting/ 04: STO/ 05: Standby 06: Data warning, etc./ 08: Free run/ 09: Forced stop
dC-45	IM/SM monitor	00: IM selected/01: SM selected
dC-47	Auto-tuning monitor	00: -- / 01: Auto-tuning completed/ 02: Auto-tuning failed
dC-49	Emergency-force drive mode monitor	00: Disabled/ 01: EMF Active/ 02: BYP Active
dC-50	Firmware Ver. monitor (I/O)	00.00 to 99.99 (MM.mm) MM: Major, mm: Minor
dC-53	Firmware Gr. monitor	00: Standard
dC-87	Firmware Ver. monitor (Core)	00.00 to 99.99 (MM.mm) MM: Major, mm: Minor
dE-01	Trip counter	0 to 65535 times
dE-11	Trip monitor 1 Factor	E001 to E122
	Trip monitor 1 Output frequency (signed)	-590.00 to 590.00 Hz
	Trip monitor 1 Output current	0.00 to 655.35 A
	Trip monitor 1 P-N DC voltage	0.0 to 1000.0 Vdc
	Trip monitor 1 Inverter status	0 to 8
	Trip monitor 1 LAD status	0 to 5
	Trip monitor 1 INV control mode	0 to 11
	Trip monitor 1 Limit status	0 to 6
	Trip monitor 1 Special status	
	Trip monitor 1 RUN time	0 to 1000000 h
	Trip monitor 1 Power-on time	1 to 1000000 h
	Trip monitor 1 Time Year/Month	YY/MM
	Trip monitor 1 Time Day/Day of week	DD/WW
	Trip monitor 1 Time Hour/Minute	HH/mm
dE-12 to dE-20	Trip monitor 2 to 10	Same as dE-11
dE-31	Retry monitor 1 Factor	r001 to r009
	Retry monitor 1 Output frequency (signed)	-590.00 to 590.00 Hz
	Retry monitor 1 Output current	0.00 to 655.35 A
	Retry monitor 1 P-N DC voltage	0.0 to 1000.0 Vdc
	Retry monitor 1 Inverter status	Same as dE-11
	Retry monitor 1 LAD status	
	Retry monitor 1 INV control mode	
	Retry monitor 1 Limit status	
	Retry monitor 1 Special status	
	Retry monitor 1 RUN time	0 to 1000000 h
	Retry monitor 1 Power-on time	1 to 1000000 h
	Retry monitor 1 Time Year/Month	YY/MM
	Retry monitor 1 Time Day/Day of week	DD/WW
	Retry monitor 1 Time Hour/Minute	HH/mm
dE-32 to dE-40	Retry monitor 2 to 10	Same as dE-31
dE-50	Warning monitor	Warning code

F Parameter (Reference monitor/setting)

Code	Name	Data range	Initial value
FA-01	Main speed reference setting (monitor)	0.00 to 590.00 Hz	10.00
FA-02	Sub speed reference setting (monitor)		0.00
FA-10	Acceleration time setting (monitor)	0.00 to 3600.00 s	10.00
FA-12	Deceleration time setting (monitor)		
FA-15	Torque reference setting (monitor)	-500.0 to 500.0 %	0.0
FA-16	Torque bias setting (monitor)		
FA-20	Position reference setting (monitor)	Absolute position control : -268435455 to 268435455 pls High resolution absolute position control : -1073741823 to 1073741823 pls	0
FA-30	PID1 set-point 1 setting (monitor)	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	0.00
FA-32	PID1 set-point 2 setting (monitor)		
FA-34	PID1 set-point 3 setting (monitor)		
FA-36	PID2 set-point setting (monitor)	-100.00 to 100.00 % Data range depends on PID2 scale adjustment (AJ-04, 05, 06)	0.00

A Parameter (Motor driving function)

Code	Name	Data range	Initial value
AA101	Main speed input source selection, 1st-motor	01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485 09: Option/ 12: Pulse input/ 14: Reserved/ 15: PID function	07
AA102	Sub speed input source selection, 1st-motor	00: Disabled/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting 08: RS485/ 09: Option/ 12: Pulse input/ 14: Reserved/ 15: PID function	0.00
AA104	Sub speed setting, 1st-motor	0.00 to 590.00 Hz	0.00
AA105	Speed reference calculation symbol selection, 1st-motor	00: Disable/ 01: Addiction [ADD]/ 02: Subtraction [SUB]/ 03: Multiplication [MUL]	00
AA106	Add frequency setting, 1st-motor	-590.00 to 590.00 Hz	0.00
AA111	RUN command input source selection, 1st-motor	00: [FR]/[RR] terminal/ 01: 3-wire/ 02: Keypad's RUN-key/ 03: RS485/ 04: Option	02
AA-12	RUN-key command rotation direction	00: Forward/ 01: Reverse	00
AA-13	STOP-key enable	00: Disable/ 01: Enable/ 02: Enable at only trip reset	01
AA114	RUN direction restriction selection, 1st-motor	00: No restriction/ 01: Only Forward/ 02: Only Reverse	00
AA115	STOP mode selection, 1st-motor	00: Deceleration stop/ 01: Free-run stop	00
AA121	Control mode selection, 1st-motor	00: V/f control (Constant torque) (IM)/ 01: V/f control (Reduce torque) (IM) 02: V/f control (Free-V/f) (IM)/ 03: V/f control (Automatic torque boost) (IM) 08: Sensorless vector control (IM)/ 11: Sensorless vector control (SM/PMM)	00
AA123	Vector control mode selection, 1st-motor	00: Speed/Torque control mode/ 02: Absolute position control 03: High resolution absolute position control	00
AA124	Speed compensation with encoder selection,1st-motor	00: Disable/ 01: Enable	00
Ab-01	Frequency conversion gain	0.01 to 100.00	1.00
Ab-03	Multi-speed operation selection	00: Binary (16-speeds)/ 01: Bit (8-speeds)	00
Ab110	Multi-speed 0 setting, 1st-motor	0.00 to Max. frequency Hz	10.00
Ab-11	Multi-speed 1 setting		20.00
Ab-12	Multi-speed 2 setting		30.00
Ab-13	Multi-speed 3 setting		40.00
Ab-14 to Ab-25	Multi-speed 4 to 15 setting		0.00
AC-01	Reserved	-	-
AC-02	Acceleration/Deceleration selection	00: Common setting/ 01: Multi-stage acceleration/deceleration	00
AC-03	Acceleration curve selection	00: Linear acceleration/ 01: S-curve acceleration/ 02: U-curve acceleration 03: Reverse U-curve acceleration/ 04: Elevator S-curve acceleration	01
AC-04	Reserved	-	-
AC-05	Acceleration curve constant setting	1 to 10	2
AC-06	Deceleration curve constant setting		
AC-08	EL-S-curve ratio at start of acceleration	0 to (100-[AC-09]) %	10
AC-09	EL-S-curve ratio at end of acceleration	0 to (100-[AC-08]) %	
AC-10	EL-S-curve ratio at start of deceleration	0 to (100-[AC-11]) %	
AC-11	EL-S-curve ratio at end of deceleration	0 to (100-[AC-10]) %	
AC115	Accel/Decel change trigger, 1st-motor	00: Switching by [AD2] terminal/ 01: Switching by setting 02: Switching only when rotation is reversed	00
AC116	Accel 1 to Accel 2 frequency transition point, 1st-motor	0.00 to 590.00 Hz	0.00
AC117	Decel 1 to Decel 2 frequency transition point, 1st-motor		
AC120	Acceleration time 1, 1st-motor	0.00 to 3600.00 s	10.00
AC122	Deceleration time 1, 1st-motor		
AC124	Acceleration time 2, 1st-motor		
AC126	Deceleration time 2, 1st-motor		
AC-30 to AC-86	Acceleration time for Multi-speed 1to 15 (AC-30, 34, 38, 42…86)	0.00 to 3600.00 s	0.00
AC-32 to AC-88	Deceleration time for Multi-speed 1to 15 (AC-32, 36, 40, 44…88)		
Ad-01	Torque reference input source selection	01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485 09: Option/ 12: Pulse input/ 15: PID function	01
Ad-02	Torque reference value setting	-500.0 to 500.0 (%)	0.0
Ad-03	Torque reference polarity selection	00: According to sign/01: Depending on the operation direction	01
Ad-04	Switching time of speed control to torque control	0 to 1000 ms	100
Ad-11	Torque bias input source selection	00: Disable/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting 08: RS485/ 09: Option/ 12: Pulse input/ 15: PID function	00
Ad-12	Torque bias value setting	-500.0 to 500.0 %	0.0
Ad-13	Torque bias polarity selection	00: According to sign/01: Depending on the operation direction	00
Ad-14	Enable terminal [TBS]	00: Disabled/01: Enabled	00
Ad-40	Speed limit input source selection at torque control	01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485 09: Option/ 12: Pulse input	07
Ad-41	Speed limit at torque control (at Forward rotation)	0.00 to Max. frequency Hz	0.00
Ad-42	Speed limit at torque control (at Reverse rotation)		
AE-04	Positioning completed range setting	0 to 10000 pls	50
AE-05	Positioning completed delay time setting	0.00 to 10.00 s	0.00
AE-10	Stop position selection of home search function	00: Parameter setting/ 01: Option	00
AE-11	Stop position of home search function	0 to 4095	0
AE-12	Speed reference of home search function	0.00 to 120.00 Hz	5.00
AE-13	Direction of home search function	00: Forward/ 01: Reverse	00
AE-14	DC braking control selection for simple positioning	00: Disable DB on simple positioning/ 01: Enable DB on simple positioning	00
AE-15	Creep speed setting	[Hb*30] to 10.00 Hz	5.00
AE-16	Position displacement at creep speed	0 to 16384 pls	2560
AE-17	Positioning restart range	0 to 10000 pls	0
AE-20 to AE-50	Position reference 1 to 15 (AE-20, 22, 24, 26…50)	Absolute position control: -268435455 to 268435455 pls High resolution absolute position control: -1073741823 to 1073741823 pls	0
AE-52	Position control range setting (forward)	Absolute position control: 0 to 268435455 pls High resolution absolute position control: 0 to 1073741823 pls	268435455
AE-54	Position control range setting (reverse)	Absolute position control: -268435455 to 0 pls High resolution absolute position control: -1073741823 to 0 pl)	-268435455
AE-56	Position control mode selection	00: Limited/ 01: Not limited	00

List of Parameters

Code	Name	Data range	Initial value
AE-60	Teach-in function target selection	00: X00/ 01: X01/ 02: X02/ 03: X03/ 04: X04/ 05: X05/ 06: X06/ 07: X07 08: X08/ 09: X09/ 10: X10/ 11: X11/ 12: X12/ 13: X13/ 14: X14/ 15: X15	00
AE-61	Save current position at power off	00: Disable/01: Enable	00
AE-62	Pre-set position data	Absolute position control:-268435455 to 268435455 pls High resolution absolute position control:-1073741823 to 1073741823 pls	0
AE-64	Deceleration stop distance calculation gain	50.00 to 200.00 %	100.00
AE-65	Deceleration stop distance calculation bias	0.00 to 655.35 %	0.00
AE-70	Homing function selection	00: Low speed homing/01: High speed homing 1/ 02: High speed homing 2	00
AE-71	Direction of homing function	00: Forward/ 01: Reverse	01
AE-72	Low-speed homing speed setting	0.00 to 10.00 Hz	5.00
AE-73	High-speed homing speed setting	0.00 to Max. frequency Hz	5.00
AE-74	ORG action selection	00: Without RUN command/01: With RUN command	01
AF101	DC braking selection, 1st-motor	00: Disable/ 01: Enable/ 02: Enable (by frequency reference)	00
AF103	DC braking frequency. 1st-motor	0.00 to 590.00 Hz	0.50
AF104	DC braking delay time, 1st-motor	0.00 to 5.00 s	0.00
AF105	DC braking force setting, 1st-motor	0 to 100 %	50
AF106	DC braking active time at stop, 1st-motor	0.00 to 60.00 s	0.50
AF107	DC braking operation method selection, 1st-motor	00: Edge/ 01: Level	01
AF108	DC braking force at tart, 1st-motor	0 to 100 %	0
AF109	DC braking active time at start, 1st-motor	0.00 to 60.00 s	0.00
AF120	Contactor control enable, 1st-motor	00: Disable/ 01: Enable (Primary side)/ 02: Enable (Secondary side)	00
AF121	Run delay time, 1st-motor	0.00 to 2.00 s	0.20
AF122	Contactor off delay time, 1st-motor		0.10
AF123	Contactor response check time, 1st-motor	0.00 to 5.00 s	0.10
AF130	Brake control enable, 1st-motor	00: Disable/ 01: Brake control enable (Common) 02: Brake control enable (Separate for FWD/REV)	00
AF131	Brake release wait time 1st-motor (Forward)	0.00 to 5.00 s	0.00
AF132	Brake wait time for accel.,1st-motor (Forward)		
AF133	Brake wait time for stopping, 1st-motor (Forward)		
AF134	Brake confirmation signal wait time, 1st-motor (Forward)		0.00
AF135	Brake release frequency setting, 1st-motor (Forward)	0.00 to 590.00 Hz	0.00
AF136	Brake release current setting, 1st-motor (Forward)	(0.00 to 2.00)×Inverter rated output current A	1.00×Rated output current
AF137	Braking frequency, 1st-motor (Forward)	0.00 to 590.00 Hz	0.00
AF138	Brake release wait time, 1st-motor (Reverse)		
AF139	Brake wait time for accel.,1st-motor (Reverse)	0.00 to 5.00 s	0.00
AF140	Brake wait time for stopping, 1st-motor (Reverse)		
AF141	Brake confirmation signal wait time, 1st-motor (Reverse)		
AF142	Brake release frequency setting, 1st-motor (Reverse)	0.00 to 590.00 Hz	0.00
AF143	Brake release current setting, 1st-motor (Reverse)	(0.00 to 2.00)×Inverter rated output current A	1.00×Rated output current
AF144	Braking frequency, 1st-motor (Reverse)	0.00 to 590.00 Hz	0.00
AG101	Jump frequency 1, 1st-motor		0.00
AG102	Jump frequency width 1, 1st-motor	0.00 to 10.00 Hz	0.50
AG103	Jump frequency 2, 1st-motor	0.00 to 590.00 Hz	0.00
AG104	Jump frequency width 2. 1st-motor	0.00 to 10.00 Hz	0.50
AG105	Jump frequency 3, 1st-motor	0.00 to 590.00 Hz	0.00
AG106	Jump frequency width 3. 1st-motor	0.00 to 10.00 Hz	0.50
AG110	Acceleration stop frequency setting, 1st-motor	0.00 to 590.00 Hz	0.00
AG111	Acceleration stop time setting, 1st-motor	0.0 to 60.0 s	0.0
AG112	Deceleration stop frequency setting, 1st-motor	0.00 to 590.00 Hz	0.00
AG113	Deceleration stop time setting, 1st-motor	0.0 to 60.0 s	0.0
AG-20	Jogging frequency	0.00 to 10.00 Hz	5.00
AG-21	Jogging stop mode selection	(Disable at RUN) 00: Free run at jogging stop/ 01: Deceleration stop at jogging stop 02: DC braking at jogging stop (Enable at RUN)/ 03: Free run at jogging stop 04: Deceleration stop at jogging stop/ 05: DC braking at jogging stop	01
AH-01	PID1 enable	00: Disable/ 01: Enable/ 02: Enable (with inverted output)	00
AH-02	PID1 deviation inversion	00: Disable/ 01: Enable	00
AH-03	PID1 unit selection	00: non/ 01: %/ 02: A/ 03: Hz/ 04: V/ 05: kW/ 06: W/ 07: h/ 08: s/ 09: kHz/ 10: Ω 11: mA/ 12: ms/ 13: P/ 14: kgm^2/ 15: pls/ 16: mH/ 17: Vdc/ 18: °C / 19: kWh/ 20: mF 21: mVs/rad/ 22: Nm/ 23: min^{-1}/ 24: m/s/ 25: m/min/ 26: m/h/ 27: ft/s/ 28: ft/min/ 29: ft/h 30: m/ 31: cm/ 32: °F/ 33: l/s/ 34: l/min/ 35: l/h/ 36: m^3/s/ 37: m^3/min/ 38: m^3/h / 39: kg/s 40: kg/min/ 41: kg/h/ 42: t/min/ 43: t/h / 44 gal/s/ 45: gal/min/ 46: gal/h / 47: ft^3/s/ 48: ft^3/min/ 49: ft^3/h/ 50: lb/s/ 51: lb/min/ 52: lb/h/ 53: mbar/ 54: bar/ 55: Pa/ 56: kPa/ 57: PSI/ 58: mm	01
AH-04	PID1 scale adjustment (0%)	-10000 to 10000	0
AH-05	PID1 scale adjustment (100%)		10000
AH-06	PID1 scale adjustment (decimal point position)	0 to 4	2
AH-07	PID1 set-point 1 input source selection	00: Not used/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting 08: RS485/ 09: Option/ 12: Pulse input	07
AH-10	PID1 set-point 1 setting	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	0.00
AH-12 to AH-40	PID1 multistage set-point 1 to 15 (AH-12, 14, 16, 18…40)		
AH-42	PID1 set-point 2 input source selection	Same as AH-07	00
AH-44	PID1 set-point 2 setting	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	0.00
AH-46	PID1 set-point 3 input source selection	Same as AH-07	00
AH-48	PID1 set-point 3 setting	-100.00 to 100.00 % Data range depends on PID1 scale adjustment (AH-04, 05, 06)	0.00
AH-50	PID1 set-point calculation symbol selection	01: Addition/ 02: Subtraction/ 03: Multiplication/ 04: Division 05: Minimum deviation/ 06: Maximum deviation	01
AH-51	PID1 feedback 1 input source selection	00: Not used/01: Terminal [VRF] 02: Terminal [IRF]/ 08: RS485 09: Option/ 12: Pulse input	02
AH-52	PID1 feedback 2 input source selection		00
AH-53	PID1 feedback 3 input source selection		00

Code	Name	Data range	Initial value
AH-54	PID1 feedback calculation symbol selection	01: Addition/ 02: Subtraction/ 03: Multiplication/ 04: Division/ 05: Square root of FB1 06: Square root of FB2/ 07: Square root of FB1-FB2/ 08: Average of the three inputs 09: Minimum of the three inputs/ 10: Maximum of the three inputs	01
AH-60	PID1 gain change method selection	00: Using gain-1 only/ 01: [PRO] terminal	00
AH-61	PID1 proportional gain 1	0.0 to 100.0	1.0
AH-62	PID1 integral time constant 1	0.0 to 3600.0 s	1.0
AH-63	PID1 derivative gain 1	0.00 to 100.00 s	0.00
AH-64	PID1 proportional gain 2	0.0 to 100.0	0.0
AH-65	PID1 integral time constant 2	0.0 to 3600.0 s	0.0
AH-66	PID1 derivative gain 2	0.00 to 100.00 s	0.00
AH-67	PID1 gain change time	0 to 10000 ms	100
AH-70	PID1 feed-forward input source selection	00: Not used/ 01: Terminal [VRF]/ 02: Terminal [IRF]	00
AH-71	PID1 output range	0.00 to 100.00 %	0.00
AH-72	PID1 over deviation level		3.00
AH-73	Turn-off level for the PID1 feedback compare signal		100.00
AH-74	Turn-on level for the PID1 feedback compare signal		0.00
AH-75	PID soft start function enable	00: Disable/ 01: Enable	00
AH-76	PID soft start target level	0.00 to 100.00 %	100.00
AH-78	Acceleration time setting for PID soft start function	0.00 to 3600.00 s	30.00
AH-80	PID soft start time	0.00 to 600.00 s	0.00
AH-81	PID soft start error detection enable	00: Disable/ 01: Enable (Error)/ 02: Enable (Warning)	00
AH-82	PID soft start error detection level	0.00 to 100.00 %	0.00
AH-85	PID sleep trigger selection	00: Disable/ 01: Low output/ 02: [SLEP] terminal	00
AH-86	PID sleep start level	0.00 to 590.00 Hz	0.00
AH-87	PID sleep active time	0.00 to 100.00 s	0.00
AH-88	Enable set-point boost before PID sleep	00: Disable/ 01: Enable	00
AH-89	Set-point boost time before PID sleep	0.00 to 100.00 s	0.00
AH-90	Set-point boost value before PID sleep	0.00 to 100.00 %	0.00
AH-91	Minimum RUN time before PID sleep	0.00 to 100.00 s	0.00
AH-92	Minimum active time of PID sleep		
AH-93	PID wake trigger selection	01: Deviation value/ 02: Low feedback/ 03: [WAKE] terminal	01
AH-94	PID wake start level	0.00 to 100.00 %	0.00
AH-95	PID wake start time	0.00 to 100.00 s	0.00
AH-96	PID wake start deviation value	0.00 to 100.00 %	0.00
AJ-01	PID2 enable	00: Disable/ 01: Enable/ 02: Enable (with inverted output)	00
AJ-02	PID2 deviation inversion	00: Disable/ 01: Enable	00
AJ-03	PID2 unit selection	00 to 58 (Same as AH-03)	01
AJ-04	PID2 scale adjustment (0%)	-10000 to 10000	0
AJ-05	PID2 scale adjustment (100%)		10000
AJ-06	PID2 scale adjustment (decimal point position)	0 to 4	2
AJ-07	PID2 set-point input source selection	00: Not used/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485 09: Option/ 12: Pulse input/ 15: PID1 output	07
AJ-10	PID2 set-point setting	-100.00 to 100.00 % (Data range depends on PID2 scale adjustment (AJ-04, 05, 06))	0.00
AJ-12	PID2 feedback input source selection	00: Not used/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 08: RS485/ 09: Option/ 12: Pulse input	02
AJ-13	PID2 proportional gain	0.0 to 100.0	1.0
AJ-14	PID2 integral time constant	0.0 to 3600.0 s	1.0
AJ-15	PID2 derivative gain	0.00 to 100.00 s	0.00
AJ-16	PID2 output range	0.00 to 100.00 %	0.00
AJ-17	PID2 over deviation level		3.00
AJ-18	Turn-off level for the PID2 feedback compare signal		100.00
AJ-19	Turn-on level for the PID2 feedback compare signal		0.00

• For the Parameters of 2nd-motor ([AA201] and so on), refer to the User's Guide.

b Parameter (Protection function)

Code	Name	Data range	Initial value
bA101	Upper frequency limit source selection, 1st-motor	00: Disable/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting 08: RS485/ 09: Option/ 12: Pulse input	00
bA102	Upper frequency limit 1st-motor	0.00 to Max. frequency, 1st motor (Hz)	0.00
bA103	Lower frequency limit 1st-motor	0.00 to Upper frequency limit, 1st motor (Hz)	
bA110	Torque limit selection 1st-motor	00: Disable/ 01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485/ 09: Option	07
bA111	Torque limiting parameters mode selection, 1st-motor	00: 4 quadrants/ 01: Switched by [TRQ1][TRQ2] terminals	00
bA112	Torque limit 1 (Forward drive), 1st-motor	0.0 to 500.0 %	200.0
bA113	Torque limit 2 (Reverse regenerative), 1st-motor		
bA114	Torque limit 3 (Reverse drive), 1st-motor		
bA115	Torque limit 4 (Forward regenerative), 1st-motor		
bA116	Torque limit LADSTOP selection, 1st-motor	00: Disable/ 01: Enable	00
bA120	Overcurrent suppression enable, 1st-motor	00: Disable/ 01: Enable/02: Enable (with voltage reduction)	00
bA121	Overcurrent suppression level, 1st-motor	(0.30 to 1.80)×Inverter rated output current	1.80×Rated output current
bA122	Overload restriction 1 mode selection, 1st-motor	00: Disable/ 01: Enable during accel. and constant speed/ 02: Constant speed only 03: Enable during accel. and constant speed (Accel. during regeneration)	01
bA123	Overload restriction 1 active level, 1st-motor	0.20 to 2.00)×Inverter rated output current	1.50×Rated output current
bA124	Overload restriction 1 action time, 1st-motor	0.10 to 3600.00 s	1.00
bA126	Overload restriction 2 mode selection, 1st-motor	Same as bA122	01
bA127	Overload restriction 2 active level, 1st-motor	(0.20 to 2.00)×Inverter rated output current	1.50×Rated output current
bA128	Overload restriction 2 action time, 1st-motor	0.10 to 3600.00 s	1.00
bA-30	Instantaneous power failure non-stop function mode selection	00: Disable/ 01: Deceleration stop 02: Deceleration stop at power failure (without resume) 03: Deceleration stop at power failure (with resume)	00

List of Parameters

Code	Name	Data range	Initial value
bA-31	Instantaneous power failure non-stop function start voltage level	200V class: DC0.0 to 400.0 V 400V class :DC0.0 to 800.0 V	220.0/440.0
bA-32	Instantaneous power failure non-stop function target voltage level		360.0/720.0
bA-34	Instantaneous power failure non-stop function deceleration time	0.01 to 3600.00 s	1.00
bA-36	Instantaneous power failure non-stop function start frequency decrement	0.00 to 10.00 Hz	0.00
bA-37	Instantaneous power failure non-stop function DC bus voltage control P gain	0.00 to 5.00	0.20
bA-38	Instantaneous power failure non-stop function DC bus voltage control I gain	0.00 to 150.00 s	1.00
bA140	Overvoltage suppression enable setting, 1st-motor	00: Disable/ 01: Constant DC bus voltage control (deceleration stop) 02: Enable acceleration (at deceleration) 03: Enable acceleration (at constant speed and deceleration)	00
bA141	Overvoltage suppression active level, 1st-motor	200V class: DC330.0 to 400.0 V/400V class: DC660.0 to 800.0 V	380.0/760.0
bA142	Overvoltage suppression active time, 1st-motor	0.00 to 3600.00 s	1.00
bA144	Constant DC bus voltage control P gain, 1st-motor	0.00 to 5.00	0.20
bA145	Constant DC bus voltage control I gain, 1st-motor	0.00 to 150.00 s	1.00
bA146	Overexcitation function selection, 1st-motor	00: Disable/ 01: Always enable/ 02: At deceleration only 03: Operation at setting level/ 04: Operation at setting level at deceleration stop	00
bA147	Overexcitation function output filter time constant 1st-motor	0.000 to 10.000 s	0.300
bA148	Overexcitation function voltage gain, 1st-motor	50 to 400 %	100
bA149	Overexcitation function level setting, 1st-motor	200V class: DC330.0 to 400.0 V/400V class: DC660.0 to 800.0 V	360.0/720.0
bA-60	Dynamic brake use ratio	0.0 to 10.0×([bA-63]/Min. resistance) 2 %	10.0
bA-61	Dynamic brake activation selection	00: Disable/ 01: Only while running/ 02: Enable during stop	00
bA-62	Dynamic brake activation level	200V class: DC330.0 to 400.0 V/400V class;DC660.0 to 800.0 V	360.0/720.0
bA-63	Dynamic brake resistor value	Min. resistance to 600.0 Ω	Min. resistance
bA-70	Cooling fan control method selection	00: Always ON/ 01: While inverter operates/ 02: Depends on temperature	01
bA-71	Clear accumulated cooling fan run time monitor	00: Disabled/ 01: Clear	00
bA-72	Ambient temperature	-10 to 50 °C	40
bb101	Carrier frequency setting, 1st-motor	ND: 2.0 to 15.0 kHz/LD: 2.0 to 10.0 kHz	2.0
bb102	Sprinkle carrier pattern selection, 1st-motor	00: Disable/ 01: Enable (Pattern-1)	00
bb103	Automatic carrier reduction selection, 1st-motor	00: Disable/ 01: Enable (Current)/ 02: Enable (Temperature)	01
bb-10	Automatic error reset selection	00: Disable/ 01: If RUN command is OFF/ 02: After set time	00
bb-11	Alarm signal selection at automatic error reset	00: Enable/ 01: Disable	00
bb-12	Automatic error reset wait time	0 to 600 s	2
bb-13	Automatic error reset number	0 to 10	3
bb-21	Number of retries after under voltage	0 (Trip) to 16/ 255 (Unlimited)	0
bb-22	Number of retries after overcurrent	0 to 5	0
bb-23	Number of retries after over voltage		
bb-24	Restart mode selection after instantaneous power failure/under-voltage error	00: Restart at 0 Hz/ 01: Restart with frequency matching 02: Restart with active frequency matching/ 03: Detect speed 04: Trip after deceleration stop with frequency matching	01
bb-25	Instantaneous power failure allowed time	0.3 to 25.0 s	1.0
bb-26	Retry wait time after instantaneous power failure under-voltage error	0.3 to 100.0 s	1.0
bb-27	Enable instantaneous power failure/under-voltage error while in stop status	00: Disable/ 01: Enable/ 02: Disable at stop and deceleration	00
bb-28	Restart mode selection after an overcurrent error	Same as bb-24	01
bb-29	Retry wait time after an overcurrent error	0.3 to 100.0 s	0.3
bb-30	Restart mode selection after an overvoltage error	Same as bb-24	01
bb-31	Retry wait time after an overvoltage error	0.3 to 100.0 s	0.3
bb-40	Restart mode after FRS release	00: Restart at 0 Hz/ 01: Restart with frequency matching 02: Restart with active frequency matching/ 03: Detect speed	00
bb-41	Restart mode after RS release		00
bb-42	Frequency matching minimum restart frequency	0.00 to 590.00 Hz	0.00
bb-43	Active frequency matching restart level	(0.00 to 2.00)×Inverter rated output current	1.00×Rated output current
bb-44	Restart constant (speed) of active frequency matching	0.10 to 30.00 s	0.50
bb-45	Active frequency matching restart constant (voltage)		1.20
bb-46	OC-suppress level at active frequency matching	(0.30 to 1.80)×Inverter rated output current	1.80×Rated output current
bb-47	Active frequency matching restart speed selection	00: Output frequency at shut down/ 01: Maximum frequency/ 02: Setting frequency	00
bb160	Overcurrent detection level, 1st-motor	(0.30 to 2.20)×Inverter rated output current	2.20×Rated output current
bb-61	Power supply overvoltage selection	00: Warning/ 01: Error	00
bb-62	Power supply overvoltage level setting	200V class: DC300.0 to 400.0 V/400V class: DC600.0 to 800.0 V	390.0/780.0
bb-64	Detect ground fault selection	00: Disable/ 01: Enable	00
bb-65	Input phase loss detection enable	00: Disable/ 01: Enable	00
bb-66	Output phase loss detection enable	00: Disable/ 01: Enable	00
bb-67	Output phase loss detection sensitivity	1 to 100 %	10
bb-70	Thermistor error level	0 to 10000 Ω	3000
bb-77	Input phase loss detection level	0 to 200	50
bb-80	Over-speed detection level	0.0 to 150.0 %	115.0
bb-81	Over-speed detection time	0.0 to 5.0 s	0.5
bb-82	Speed deviation error mode selection	00: Warning/ 01: Error	00
bb-83	Speed deviation error detection level	0.00 to 100.00 %	15.00
bb-84	Speed deviation error detection time	0.0 to 5.0 s	0.5
bC110	Electronic thermal level setting, 1st-motor	(0.00 to 3.00)×Inverter rated output current	1.00×Rated output current
bC111	Electronic thermal characteristic selection 1st-motor	00: Reduce torque (VT)/ 01: Constant torque (CT)/ 02: Free setting (FREE)	00

Code	Name	Data range	Initial value
bC112	Electronic thermal decrease function enable 1st-motor	00: Disable/ 01: Enable (Linear decrement)/ 02: Enable (Time constant decrement)	01
bC113	Electronic thermal decreasing time, 1st-motor	1 to 65535 s	600
bC114	Electronic thermal counter memory selection at Power-off	00: Disable/ 01: Enable	01
bC115	Electronic thermal accumulation gain, 1st-motor	1.0 to 200.0 %	100.0
bC120	Free electronic thermal frequency-1, 1st-motor	0.00 to [bC122] Hz	0.00
bC121	Free electronic thermal current-1, 1st-motor	(0.00 to 3.00)×Inverter rated output current	0.00
bC122	Free electronic thermal frequency-2, 1st-motor	[bC120] to [bC124] Hz	0.00
bC123	Free electronic thermal current-2, 1st-motor	(0.00 to 3.00)×Inverter rated output current	0.00
bC124	Free electronic thermal frequency-3, 1st-motor	[bC122] to 590.00 Hz	0.00
bC125	Free electronic thermal current-3, 1st-motor	(0.00 to 3.00)×Inverter rated output current	0.00
bd-01	STO input display selection	00: Warning (display)/ 01: Warning (without display)/ 02: Trip	01
bd-02	STO input change time (release)	0.00: Disable,/ 0.01 to 60.00 s	0.01
bd-03	Display selection during STO input change time	00: Warning (display)/ 01: Warning (without display)	01
bd-04	Action selection after STO input change time	00: Maintain current status/ 01: Disable/ 02: Trip	01
bd-05	STO input change time (shutoff)	0.00: Disable/ 0.01 to 60.00 s	0.01
bd-06	Warning release mode selection	00: Keep warning display/ 01: Release warning display	00
bd-07	Warning re-display time	1 to 30 (s)	30
bE-01	Unsteady detection enable	00: Disable/ 01: Enable (Frequency mode)/ 02: Enable (Time mode)	00
bE-02	Unsteady detection target	dA-**, db-**, dC-**, FA-**	dA-01
bE-03	Unsteady detection auto tuning selection	00: Disable/01: Enable	00
bE-04	Unsteady detection tuning tolerance	0.00 to 100.00 %	0.10
bE-05	Unsteady upper level detecting action	01: Warning/ 02: Trip/ 03: Trip after deceleration stop	01
bE-06	Unsteady upper level detecting time	0.00 to 600.00 s	0.00
bE-07	Unsteady lower level detecting action	01: Warning/ 02: Trip/ 03: Trip after deceleration stop	01
bE-08	Unsteady lower level detecting time	0.00 to 600.00 s	0.00
bE-10	Unsteady detection minimum frequency	0.00 to Max. frequency Hz	0.00
bE-12 to bE-16	Unsteady detection intermediate frequency 1 to 3 (bE-12, 14, 16)		
bE-18	Unsteady detection maximum frequency		
bE-21	Upper limit at minimum frequency	-100.00 to 100.00 %	0.00
bE-22 to bE-24	Upper limit at intermediate frequency 1 to 3		
bE-25	Upper limit at maximum frequency		
bE-26	Lower limit at minimum frequency		
bE-27 to bE-29	Lower limit at intermediate frequency 1 to 3		
bE-30	Lower limit at maximum frequency		
bE-31	Unsteady time detection operating time 1	0.00 to [bE-32] s	0.00
bE-32	Unsteady time detection operating time 2	[bE-31] to [bE-33] s	
bE-33	Unsteady time detection operating time 3	[bE-32] to [bE-34] s	
bE-34	Unsteady time detection operating time 4	[bE-33] to [bE-35] s	
bE-35	Unsteady time detection operating time 5	[bE-34] to [bE-36] s	
bE-36	Unsteady time detection operating time 6	[bE-35] to [bE-37] s	
bE-37	Unsteady time detection operating time 7	[bE-36] to [bE-38] s	
bE-38	Unsteady time detection operating time 8	[bE-37] to [bE-39] s	
bE-39	Unsteady time detection operating time 9	[bE-38] to [bE-40] s	
bE-40	Unsteady time detection operating time 10	[bE-39] to 600.00 s	
bE-41 to bE-50	Unsteady time detection upper level 1 to 10	-100.00 to 100.00 %	0.00
bE-51 to bE-60	Unsteady time detection lower level 1 to 10		

C Parameters (Input/Output, RS485)

Code	Name	Data range	Initial value
CA-01	Input terminal [FR] function	Refer to "List of Intelligent Input Terminal Functions"	001/FR
CA-02	Input terminal [RR] function		002/RR
CA-03	Input terminal [DFL] function		003/DFL
CA-04	Input terminal [DFM] function		004/DFM
CA-05	Input terminal [AUT] function		015/AUT
CA-06	Input terminal [ES] function		033/ES
CA-07	Input terminal [RST] function		028/RST
CA-08	Input terminal [PLA] function		103/PLA
CA-21	Input terminal [FR] active state	00: Normally Open (NO) 01: Normally Closed (NC)	00
CA-22	Input terminal [RR] active state		
CA-23	Input terminal [DFL] active state		
CA-24	Input terminal [DFM] active state		
CA-25	Input terminal [AUT] active state		
CA-26	Input terminal [ES] active state		
CA-27	Input terminal [RST] active state		
CA-28	Input terminal [PLA] active state		
CA-41	Input terminal [FR] response time	0 to 400ms	2
CA-42	Input terminal [RR] response time		
CA-43	Input terminal [DFL] response time		
CA-44	Input terminal [DFM] response time		
CA-45	Input terminal [AUT] response time		
CA-46	Input terminal [ES] response time		
CA-47	Input terminal [RST] response time		
CA-48	Input terminal [PLA] response time		
CA-55	Multistage input determination time	0 to 2000 ms	0
CA-60	UP/DWN overwrite target selection	00: Speed reference/01: PID1 Set-point 1	00

List of Parameters

Code	Name	Data range	Initial value
CA-61	UP/DWN data save enable	00: Not save/ 01: Save	00
CA-62	UP/DWN/UDC selection	00: 0Hz/ 01: Saved data	00
CA-64	Acceleration time setting for UP/DWN function	0.00 to 3600.00 s	10.00
CA-66	Deceleration time setting for UP/DWN function		
CA-70	Speed reference source selection when [F-OP] is active	01: Terminal [VRF]/ 02: Terminal [IRF]/ 07: Parameter setting/ 08: RS485/ 09: Option 12: Pulse input/ 14: Reserved/ 15: PID function	01
CA-71	RUN command source selection when [F-OP] is active	00: [FR]/[RR] terminal/ 01: 3-wire/ 02: Keypad's RUN-key/ 03: RS485/ 04: Option	00
CA-72	Reset mode selection	00: Always enabled (Trip release at turn-on)/ 01: Always enabled (Trip release at turn-off) 02: Only enabled in trip status (Trip release at turn-on) 03: Only enabled in trip status (Trip release at turn-off)	00
CA-73	[USP] active selection	00: Disabled/ 01: Enabled	00
CA-81	Encoder constant setting	1 to 65535 pls	512
CA-82	Encoder phase sequence selection	00: Phase-A Lead/ 01: Phase-B Lead	00
CA-83	Motor gear ratio numerator	1 to 10000	1
CA-84	Motor gear ratio denominator		1
CA-85	Encoder disconnection time	0.0 to 10.0 s	1.0
CA-86	Speed feedback filter	0 to 1000 ms	20
CA-90	Pulse input target function selection	00: Disable/ 01: Frequency reference/ 02: Speed feedback/ 03: Pulse count	01
CA-91	Pulse input mode selection	00: 90 degrees shift pulse input/ 01: Forward/Reverse pulse input and direction signal 03: Single phase pulse input	03
CA-92	Pulse input frequency scale	0.05 to 32.00 kHz	25.00
CA-93	Pulse input frequency filter time constant	0.01 to 2.00 s	0.10
CA-94	Pulse input frequency bias value	-100.0 to 100.0 %	0.0
CA-95	Pulse input upper frequency detection level	0.0 to 100.0 %	100.0
CA-96	Pulse input lower frequency detection level		1.0
CA-97	Pulse counter compare match output ON value	0 to 65535	0
CA-98	Pulse counter compare match output OFF value		
CA-99	Pulse counter compare match maximum value		65535
Cb-01	[VRF] Filter time constant	1 to 500 ms	500
Cb-03	[VRF] Start value	0.00 to 100.00 %	0.00
Cb-04	[VRF] End value		100.00
Cb-05	[VRF] Start rate	0.0 to [Cb-06] %	0.0
Cb-06	[VRF] End rate	[Cb-05] to 100.0 %	100.0
Cb-07	[VRF] Start value selection	00: Start value [Cb-03]/ 01: 0 %	01
Cb-08	[VRF] Input selection	01: Voltage/ 02: Current	01
Cb-11	[IRF] Filter time constant	1 to 500 ms	500
Cb-13	[IRF] Start value	0.00 to 100.00 %	0.00
Cb-14	[IRF] End value		100.00
Cb-15	[IRF] Start rate	0.0 to [Cb-16] %	20.0
Cb-16	[IRF] End rate	[Cb-15] to 100.0 %	100.0
Cb-17	[IRF] Start value selection	00: Start value [Cb-13]/ 01: 0%	01
Cb-18	[IRF] Input selection	01: Voltage/ 02: Current	02
Cb-30	[VRF] Voltage/Current bias adjustment	-100.00 to 100.00 %	0.00
Cb-31	[VRF] Voltage/Current gain adjustment	0.00 to 200.00 %	100.00
Cb-32	[IRF] Voltage/Current bias adjustment	-100.00 to 100.00 %	0.00
Cb-33	[IRF] Voltage/Current gain adjustment	0.00 to 200.00 %	100.00
Cb-40	Thermistor type selection	00: Disabled/ 01: PTC	00
Cb-41	Thermistor gain adjustment	0.0 to 1000.0	100.0
CC-01	Output terminal [UPF] function	Refer to "List of multi-function output terminal functions"	002 (UPF1)
CC-02	Output terminal [DRV] function		001 (DRV)
CC-07	Output terminal [ML] function		017(AL)
CC-11	Output terminal [UPF] active state	00: Normally Open (NO) 01: Normally Closed(NC)	00
CC-12	Output terminal [DRV] active state		
CC-17	Output terminal [ML] active state		
CC-20	Output terminal [UPF] on-delay time	0.00 to 100.00 s	0.00
CC-21	Output terminal [UPF] off-delay time		
CC-22	Output terminal [DRV] on-delay time		
CC-23	Output terminal [DRV] off-delay time		
CC-32	Output terminal [ML] on-delay time		
CC-33	Output terminal [ML] off-delay time		
CC-40	LOG1 operand-1 selection	Same as [CC-01] to [CC-07] (Except [LOG1] to [LOG3])	000
CC-41	LOG1 operand-2 selection		
CC-42	LOG1 logical calculation selection	00: AND/ 01: OR/ 02: XOR	00
CC-43	LOG2 operand-1 selection	Same as [CC-01] to [CC-07] (Except [LOG1] to [LOG3])	000
CC-44	LOG2 operand-2 selection		
CC-45	LOG2 logical calculation selection	00: AND/ 01: OR/ 02: XOR	00
CC-46	LOG3 operand-1 selection	Same as [CC-01] to [CC-07] (Except [LOG1] to [LOG3])	000
CC-47	LOG3 operand-2 selection		
CC-48	LOG3 logical calculation selection	00: AND/ 01: OR/02: XOR	00
Cd-01	[FRQ] Output wave form selection	00: PWM/ 01: Frequency	01
Cd-02	[FRQ] Output base frequency (at frequency output)	0 to 32000 Hz	1440
Cd-03	[FRQ] Output monitor selection	Monitor parameters	dA-01
Cd-04	[AMI] Output monitor selection		
Cd-05	[AMV] Output monitor selection	Monitor parameters	dA-01
Cd-06	Analog adjust gain basis selection	00: Bias value based full scale/ 01: Fixed full scale	00
Cd-10	Analog monitor adjustment mode enable	00: Disable/ 01: Enable	00
Cd-11	[FRQ] Output filter time constant	1 to 500 (ms)	10
Cd-12	[FRQ] Data type selection	00: Absolute value/ 01: Signed value	00
Cd-13	[FRQ] Bias adjustment	-100.0 to 100.0 %	0.0
Cd-14	[FRQ] Gain adjustment	-1000.0 to 1000.0 %	100.0
Cd-15	Adjustment mode [FRQ] output level	-100.0 to 100.0 %	100.0
Cd-16	Pulse input/output scale conversion gain	0.01 to 100.00	1.00

Code	Name	Data range	Initial value
Cd-21	[AMI] Output filter time constant	1 to 500 ms	100
Cd-22	[AMI] Data type selection	00: Absolute value/ 01: Signed value	00
Cd-23	[AMI] Bias adjustment (Voltage/Current)	-100.0 to 100.0 %	20.0
Cd-24	[AMI] Gain adjustment (Voltage/Current)	-1000.0 to 1000.0 %	80.0
Cd-25	Adjustment mode [AMI] output level	-100.0 to 100.0 %	100.0
Cd-26	[AMI] Output type selection	01: Voltage/ 02: Current	02
Cd-31	[AMV] Output filter time constant	1 to 500 ms	100
Cd-32	[AMV] Data type selection	00: Absolute value/ 01: Signed value	00
Cd-33	[AMV] Bias adjustment (Voltage)	-100.0 to 100.0 %	0.0
Cd-34	[AMV] Gain adjustment (Voltage)	-1000.0 to 1000.0 %	100.0
Cd-35	Adjustment mode [AMV] output level	-100.0 to 100.0 %	100.0
Cd-36	[AMV] Output type selection	00: Voltage/ 01: Current	01
CE101	Low current signal output mode selection, 1st motor	00: During accel./decel. and constant speed/ 01: During constant speed only	01
CE102	Low current detection level 1, 1st motor	(0.00 to 2.00)×Inverter rated output current	1.00×Rated output current
CE103	Low current detection level 2, 1st motor		
CE105	Overload signal output mode selection, 1st motor	00: During accel./decel. and constant speed/ 01: During constant speed only	00
CE106	Overload warning level 1, 1st motor	(0.00 to 2.00)×Inverter rated output current	1.15×Rated output current
CE107	Overload warning level 2, 1st motor		
CE-10	Arrival frequency 1 value setting during acceleration	0.00 to 590.00 Hz	0.00
CE-11	Arrival frequency 1 value setting during deceleration		
CE-12	Arrival frequency 2 value setting during acceleration		
CE-13	Arrival frequency 2 value setting during deceleration		
CE120	Over-torque level (Forward drive),1st motor	0.0 to 500.0 %	100.0
CE121	Over-torque level (Reverse regenerative), 1st motor		
CE122	Over-torque level (Reverse drive), 1st motor		
CE123	Over-torque level (Forward regenerative), 1st motor		
CE124	Over/Under torque output signal mode, 1st-motor	00: During accel./decel. and constant speed/ 01: During constant speed only	01
CE125	Over/Under torque selection, 1st-motor	00: Over torque/ 01: Under torque	00
CE-30	Electronic thermal warning level (Motor)	0.00 to 100.00 %	85.00
CE-31	Electronic thermal warning level (Inverter)		
CE-33	Zero speed detection level	0.00 to 100.00 Hz	0.00
CE-34	Cooling fin overheat warning level	0 to 200 ms	100
CE-36	Accum. RUN time (RNT) /Accum. Power-on time (ONT) setting	0 to100000 h	0
CE-40	[VRF] Window comparator higher limit	0 to 100 % Min. : ([CE-41]+[CE-42])×2	100
CE-41	[VRF] Window comparator lower limit	0 to 100 % Max. : ([CE-40]-[CE-42])×2	0
CE-42	[VRF] Window comparator hysteresis width	0 to 10 % Max. : ([CE-40]-[CE-41])/2	0
CE-43	[IRF] Window comparator higher limit	0 to 100 % Min. : ([CE-44]+[CE-45])×2	100
CE-44	[IRF] Window comparator lower limit	0 to 100 (%) Max. : ([CE-43]-[CE-45])×2	0
CE-45	[IRF] Window comparator hysteresis width	0 to 10 (%) Max. : ([CE-43]-[CE-44])/2	0
CE-50	[VRF] Operation set level at disconnection or compare event	0 to 100 %	0
CE-51	[VRF] Operation set level implement timing	00: Disable/ 01: Enable (at WCVRF active)/ 02: Enable (at WCIRF de-active)	00
CE-52	[IRF] Operation set level at disconnection or compare event	0 to 100 %	0
CE-53	[IRF] Operation set level implement timing	00: Disable/ 01: Enable (at WCVRF active)/ 02: Enable (at WCIRF de-active)	00
CE-60	Output frequency related filter for terminal function	0 to 2000 ms	20
CE-61	Output current related filter for terminal function		300
CE-62	Output torque related filter for terminal function		100
CF-01	RS485 communication baudrate selection	03: 2400bps/ 04: 4800bps/ 05: 9600bps/ 06: 19.2kbps/ 07:38.4kbps 08: 57.6kbps/ 09: 76.8kbps/ 10: 115.2kbps	05
CF-02	RS485 communication node address	1 to 247	1
CF-03	RS485 communication parity selection	00: no parity/ 01: Even parity/ 02: Odd parity	00
CF-04	RS485 communication stop bit selection	01: 1-bit/ 02: 2-bit	01
CF-05	RS485 communication error selection	00: Error/ 01: Trip after deceleration stop/ 02: Ignore/ 03: Free run stop 04: Deceleration stop	02
CF-06	RS485 communication timeout setting	0.00 to 100.00 s	2.00
CF-07	RS485 communication wait time setting	0 to 1000 m	5
CF-08	RS485 communication mode selection	01: Modbus-RTU/ 02: Communication between inverters (EzCOM) 03: Communication between inverters (EzCOM Administrator)	01
CF-11	Register data AV<=>% conversion function	00: A, V/01: %	00
CF-12	RS485 endianness selection	00: Big endian/ 01: Little endian/ 02: Special endian	00
CF-20	EzCOM start node No.	1 to 8	1
CF-21	EzCOM end node No.		
CF-22	EzCOM start method selection	00: [ECOM] terminal/ 01: Usually communication	00
CF-23	EzCOM data size	1 to 5	5
CF-24	EzCOM destination address 1	1 to 247	1
CF-25	EzCOM destination register 1	0000h to FFFFh	0000h
CF-26	EzCOM source register 1		
CF-27	EzCOM destination address 2	1 to 247	2
CF-28	EzCOM destination register 2	0000h to FFFFh	0000h
CF-29	EzCOM source register 2		
CF-30	EzCOM destination address 3	1 to 247	3
CF-31	EzCOM destination register 3	0000h to FFFFh	0000h
CF-32	EzCOM source register 3		
CF-33	EzCOM destination address 4	1 to 247	4
CF-34	EzCOM destination register 4	0000h to FFFFh	0000h
CF-35	EzCOM source register 4		
CF-36	EzCOM destination address 5	1 to 247	5
CF-37	EzCOM destination register 5	0000h to FFFFh	0000h
CF-38	EzCOM source register 5		
CF-50	USB communication node address	1 to 247	1
CF-61	Output current monitor filter	0 to 1000 ms	300
CF-62	Output torque monitor filter		100
CF-63	Output voltage monitor filter		100

Code	Name	Data range	Initial value
CF-64	Input/Output power filter	0 to 1000 ms	400
CG-01	Register mapping function selection	00: Disable/ 01: Enable	00
CG-11 to CG-20	External register 1 to 10	0000h to FFFFh	0000h
CG-31 to CG-40	External register format 1 to 10	00: Unsigned word/ 01: Signed word	00
CG-51 to CG-60	External register scaling 1 to 10	0.001 to 65.535	1.000
CG-71 to CG-80	Internal register 1 to 10	0000h to FFFFh	0000h
CH-01 to CH-06	Sync input terminal function selection 1 to 6	Refer to "List of Multi-function Input Terminal Functions"	00
CH-11 to CH-16	Sync output terminal function selection 1 to 6	Refer to "List of Muti-function Output Terminal Functions"	00
CH-21 to CH-26	Sync terminal logic selection 1 to 6	00: Normally Open (NO) 01: Normally Closed (NC)	00
CH-30 to CH-40	Sync terminal on-delay time 1 to 6 (CH-30, 32, 34, 36, 38, 40)	0.00 to 100.00 s	0.00
CH-31 to CH-41	Sync terminal off-delay time 1 to 6 (CH-31, 33, 35, 37, 39, 41)		

H Parameters (Motor control)

Code	Name	Data range	Initial value
HA-01	Auto-tuning selection	00: Disabled/ 01: No-rotation/ 02: Rotation	00
HA-02	Auto-tuning RUN command source selection	00: Keypad's RUN-key/ 01: Setting by [AA111]/[AA211]	00
HA110	Stabilization constant, 1st-motor	0 to 1000 %	100
HA112	Stabilization ramp function end ratio, 1st-motor	0 to 100 %	30
HA113	Stabilization ramp function start ratio, 1st-motor		10
HA115	Speed response, 1st-motor	0 to 1000 %	100
HA120	ASR gain switching mode selection, 1st-motor	00: [CAS] terminal/ 01: Parameter setting	00
HA121	ASR gain switching time setting, 1st-motor	0 to 10000 ms	100
HA122	ASR gain mapping intermediate speed 1, 1st-motor	0.00 to 590.00 Hz	0.00
HA123	ASR gain mapping intermediate speed 2, 1st-motor		
HA124	ASR gain mapping maximum speed, 1st-motor		
HA125	ASR gain mapping P-gain 1, 1st-motor	0.0 to 1000.0 %	100.0
HA126	ASR gain mapping I-gain 1, 1st-motor		
HA127	ASR gain mapping P control P-gain 1, 1st-motor		
HA128	ASR gain mapping P-gain 2, 1st-motor		
HA129	ASR gain mapping I-gain 2, 1st-motor		
HA130	ASR gain mapping P control P-gain 2, 1st-motor		
HA131	ASR gain mapping P-gain 3, 1st-motor		
HA132	ASR gain mapping I-gain 3, 1st-motor		
HA133	ASR gain mapping P-gain 4, 1st-motor		
HA134	ASR gain mapping I-gain 4, 1st-motor		
Hb101	Async. Motor type selection ,1st-motor	00: Reserved/ 01: Sumitomo AF motor/ 02: Sumitomo d2G4 motor 03: SumitomoIE3 motor	03
Hb102	Async. Motor capacity setting, 1st-motor	0.01 to 11.00 kW	Same as Inverter capacity
Hb103	Async. Motor number of poles setting, 1st-motor	2/4/6/8/10/12/14/16/18/20/22/24/26/28/30/32/34/36/38/40/42/44 46/48 P	4
Hb104	Async. Motor base frequency setting, 1st-motor	30.00 to [Hb105] Hz	60.00
Hb105	Async. Motor maximum frequency setting, 1st-motor	[Hb104] to 590.00 Hz	60.00
Hb106	Async. Motor rated voltage, 1st-motor	1 to 1000 V	200/400
Hb108	Async. Motor rated current, 1st-motor	0.01 to 10000.00 A	Depends on Hb101 to Hb104
Hb110	Async. Motor constant R1, 1st-motor	0.000001 to 1000.000000 Ω	
Hb112	Async. Motor constant R2, 1st-motor		
Hb114	Async. Motor constant L, 1st-motor	0.000001 to 1000.000000 mH	
Hb116	Async. Motor constant I0, 1st-motor	0.01 to 10000.00 A	
Hb118	Async. Motor constant J, 1st-motor	0.00001 to 10000.00000 kgm^2	
Hb130	Minimum frequency adjustment, 1st-motor	0.01 to 10.00 Hz	0.50
Hb131	Reduced voltage start time setting, 1st-motor	0 to 2000 ms	12
Hb140	Manual torque boost operation mode selection 1st-motor	00: Disabled/ 01: Always enable/ 02: Enable at Forward rotation 03: Enable at Reverse rotation	01
Hb141	Manual torque boost value, 1st-motor	0.0 to 20.0 %	1.0
Hb142	Manual torque boost peak speed, 1st-motor	0.0 to 50.0 %	0.8
Hb145	Eco drive enable, 1st-motor	00: Disable/ 01: Enable	00
Hb146	Eco drive response adjustment, 1st-motor	0 to 100 %	50
Hb150	Free-V/f frequency 1 setting, 1st-motor	0.00 to [Hb152] Hz	0.00
Hb151	Free-V/f voltage 1 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb152	Free-V/f frequency 2 setting, 1st-motor	[Hb150] to [Hb154] Hz	0.00
Hb153	Free-V/f voltage 2 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb154	Free-V/f frequency 3 setting, 1st-motor	[Hb152] to [Hb156] Hz	0.00
Hb155	Free-V/f voltage 3 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb156	Free-V/f frequency 4 setting, 1st-motor	[Hb154] to [Hb158] Hz	0.00
Hb157	Free-V/f voltage 4 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb158	Free-V/f frequency 5 setting, 1st-motor	[Hb156] to [Hb160] Hz	0.00
Hb159	Free-V/f voltage 5 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb160	Free-V/f frequency 6 setting, 1st-motor	[Hb158] to [Hb162] Hz	0.00
Hb161	Free-V/f voltage 6 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb162	Free-V/f frequency 7 setting, 1st-motor	[Hb160] to [Hb164] Hz	0.00
Hb163	Free-V/f voltage 7 setting, 1st-motor	0.0 to 1000.0 V	0.0
Hb170	Slip compensation P-gain with encoder, 1st-motor	0 to 1000 %	100
Hb171	Slip compensation I-gain with encoder, 1st-motor		
Hb180	Output voltage gain, 1st-motor	0 to 255 %	

Code	Name	Data range	Initial value
HC101	Automatic torque boost voltage compensation gain, 1st-motor	0 to 255 %	100
HC102	Automatic torque boost slip compensation gain, 1st-motor		
HC111	Boost value at start, 1st-motor (IM-SLV)	0 to 50 %	0
HC114	Direction reversal protection, 1st-motor	00: Disabled/ 01: Enabled	01
HC115	Torque conversion method selection, 1st-motor	00: Torque/ 01: Current	01
HC120	Torque current reference filter time constant, 1st-motor	0 to 100 ms	2
HC121	Speed feedforward compensation gain, 1st-motor	0 to 1000 %	0
HC137	Flux settling level, 1st-motor	0.0 to 100.0 %	80.0
HC141	Modulation threshold 1, 1st-motor	0 to 133 %	115
HC142	Modulation threshold 2, 1st-motor		
Hd102	Sync. Motor capacity setting, 1st-motor	0.01 to 11.00 kW	Same as Inverter capacity
Hd103	Sync. Motor number of poles setting, 1st-motor	Same as Hb103	Depends on Hd102
Hd104	Sync. Motor base frequency setting, 1st-motor	30.00 to [Hd105] Hz	
Hd105	Sync. Motor maximum frequency setting, 1st-motor	[Hd104] to 590.00 Hz	
Hd106	Sync. Motor rated voltage, 1st-motor	1 to 1000 V	
Hd108	Sync. Motor rated current, 1st-motor	0.01 to 10000.00 A	
Hd110	Sync. Motor constant R, 1st-motor	0.000001 to 1000.000000 Ω	
Hd112	Sync. Motor constant Ld, 1st-motor	0.000001 to 1000.000000 mH	
Hd114	Sync. Motor constant Lq, 1st-motor		
Hd116	Sync. Motor constant Ke, 1st-motor	0.1 to 100000.0 (mVs/rad)	
Hd118	Sync. Motor constant J, 1st-motor	0.00001 to 10000.00000 kgm^2	
Hd130	Sync. Motor minimum frequency adjustment, 1st-motor	0 to 50 %	8
Hd131	Sync. Motor No-Load current, 1st-motor	0 to 100 %	10
Hd132	Sync. Motor starting method, 1st-motor	00: IMPE Disable/ 01: IMPE Enable	00
Hd133	Sync. Motor IMPE 0V wait number, 1st-motor	0 to 255	10
Hd134	Sync. Motor IMPE detect wait number, 1st-motor		10
Hd135	Sync. Motor IMPE detect number, 1st-motor		30
Hd136	Sync. Motor IMPE voltage gain, 1st-motor	0 to 200 %	100
Hd137	Sync. Motor IMPE Mg-pole position offset, 1st-motor	0 to 359 deg	0

O Parameters (Option)

Code	Name	Data range	Initial value
oA-10	Operation selection at an option error	00: Error/ 01: Ignore error (keep running)	00
oA-11	Communication Watch Dog Timer	0.00 to 100.00	1.00
oA-12	Action selection at a communication error	00: Error/ 01: Trip after deceleration stop/ 02: Ignore/ 03: Free run stop 04: Deceleration stop	01
oA-13	RUN command selection at start up	00: Disable/ 01: Enable	00
oJ-01 to oJ-10	Writing register 1 to 10, Gr. A	0000h to FFFFh	0000h
oJ-11 to oJ-20	Reading register 1 to 10, Gr. A		

P Parameters (Special function)

Code	Name	Data range	Initial value
PA-01	Enable Emergency-force drive mode	00: Disable/ 01: Enable	00
PA-02	Emergency-force drive frequency reference	0.00 to 590.00 Hz	0.00
PA-03	Emergency-force drive direction command	00: Forward rotation/ 01: Reverse rotation	00
PA-04	Commercial power supply bypass function selection	00: Disable/ 01: Enable	00
PA-05	Commercial power supply bypass function delay time	0.0 to 1000.0 s	5.0
PA-20	Simulation mode enable	00: Disable/ 01: Enable	00
PA-21	Error code selection for alarm test	0 to 255 (Error code)	0
PA-22	Optional output selection for the output current monitor	00: Disable/ 01: Parameter [PA-23]/ 02: Setting by Terminal [VRF] 03: Setting by Terminal [IRF]	01
PA-23	Optional output value setting for the output current monitor	(0.00 to 3.00)×Inverter output current A	0.00
PA-24	Optional output selection for the DC bus voltage monitor	00: Disable/ 01: Parameter [PA-25]/ 02: Setting by Terminal [VRF]/ 03: Setting by Terminal [IRF]	01
PA-25	Optional output value setting for the DC bus voltage monitor	200V class: DC0.0 to 450.0 V/400V class: DC0.0 to 900.0 V	270.0 540.0
PA-26	Optional output selection for the output voltage monitor	00: Disable/01: Parameter [PA-27]/ 02: Setting by Terminal [VRF] 03: Setting by Terminal [IRF]	01
PA-27	Optional output value setting for the output voltage monitor	200V class: 0.0 to 300.0 V/400V class: 0.0 to 600.0 V	0.0
PA-28	Optional output selection for the output torque monitor	00: Disable/ 01: Parameter [PA-29]/ 02: Setting by Terminal [VRF] 03: Setting by Terminal [IRF]	01
PA-29	Optional output value setting for the output torque monitor	-500.0 to 500.0 %	0.0
PA-30	Optional frequency matching start enable setting	00: Disable/ 01: Parameter [PA-31]/ 02: Setting by Terminal [VRF] 03: Setting by Terminal [IRF]	01
PA-31	Optional frequency matching start setting value	0.00 to 590.00 Hz	0.00

List of Parameters

U Parameters (Initial setting, Panel setting)

Code	Name	Data range	Initial value
UA-01	Password for display	0000h to FFFFh	0000h
UA-02	Password for soft lock		
UA-10	Display restriction selection	00: Full display/ 01:Function-specific display/ 02: User setting display 03: Data compare display/ 04: Monitor only	00
UA-12	Accumulated input power monitor clear	00: Disable/ 01: Clear	00
UA-13	Display gain for the accumulated input power monitor	1 to 1000	1
UA-14	Accumulated output power monitor clear	00: Disable/ 01: Clear	00
UA-15	Display gain for the accumulated output power monitor	1 to 1000	1
UA-16	Soft-Lock selection	00: [SFT] terminal/ 01: Always enable	00
UA-17	Soft-Lock target selection	00: All data/ 01: All data, except frequency related parameters	00
UA-18	Data R/W selection	00: Enabled/ 01: Disabled, R/W by remote operator	00
UA-19	Low battery warning enable	00: Disable/ 01: Warning/02: Error	00
UA-20	Action selection at keypad disconnection	00: Error/ 01: Trip after deceleration stop/ 02: Ignore/ 03: Free run stop/ 04: Deceleration stop	02
UA-21	2nd-motor parameter display selection	00: Hidden/ 01: Display	00
UA-22	Option parameter display selection	00: Hidden/ 01: Display	00
UA-30	User-parameter auto setting function enable	00: Disable/ 01: Enable	00
UA-31 to UA-62	User-parameter selection 1 to 32	no / dA-01 to (Except [UA-31] to [UA-62])	no
UA-76	Dial sensitivity	1 to 24	1
UA-77	dial carry sensitivity	1 to 100	20
UA-90	Reserved	0 to 60	0
UA-91	Waiting time for turning off the display	0 to 60 min.	dA-01
UA-92	Initial display selection	no / dA-01 to (Except [UA-31] to [UA-62])	00
UA-93	Enable auto-return to the Initial display	00: Disable/01: Enable	00
UA-94	Enable frequency changes through monitor display	00: Disable/01: Enable	00
UA-95	Display while external operator connected	dA-**, db-**, dC-**, FA-**	dA-01
UA-96	Dual monitor target 1 selection	dA-**, db-**, dC-**, FA-** (except [dC-30])	dA-01
UA-97	Dual monitor target 2 selection		dA-02
Ub-01	Initialize mode selection	00: Disable/ 01: Error history clear/ 02: Data initialize/ 03: Error history clear and data initialize 05: All data except terminal configuration/ 06: All data except communication configuration 07: All data except terminal and communication configuration/ 10: User parameters 11: All data except user parameters	00
Ub-02	Initialize data selection	00: Mode 0 (JP/USA)/ 01: Mode 1 (EU)/ 03: Mode 3 (CN)	00
Ub-03	Load type selection	01: Light duty (LD)/ 02: Normal duty(ND)	02
Ub-05	Enable initialization	00: Disable/ 01: Execute initialization	00
Ub-06	Restart communication	00: Disable/ 01: Execute communication restart	00
Uc-01	Debug mode selection	-	00
Ud-01	Trace function enable	00: Disable/ 01: Enable	00
Ud-02	Trace start	00: Stop/ 01: Start	00
Ud-03	Number of trace data setting	0 to 8	1
Ud-04	Number of trace signals setting		
Ud-10 to Ud-17	Trace data selection 0 to 7	Monitor parameters	dA-01
Ud-20	Trace signal 0 input/output selection	00: Input [Ud-21]/01: Output [Ud-22]	00
Ud-21	Trace signal 0 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-22	Trace signal 0 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-23	Trace signal 1 input/output selection	00: Input [Ud-24]/01: Output [Ud-25]	00
Ud-24	Trace signal 1 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-25	Trace signal 1 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-26	Trace signal 2 input/output selection	00: Input [Ud-27]/01: Output [Ud-28]	00
Ud-27	Trace signal 2 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-28	Trace signal 2 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-29	Trace signal 3 input/output selection	00: Input [Ud-30]/01: Output [Ud-31]	00
Ud-30	Trace signal 3 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-31	Trace signal 3 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-32	Trace signal 4 input/output selection	00: Input [Ud-33]/01: Output [Ud-34]	00
Ud-33	Trace signal 4 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-34	Trace signal 4 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-35	Trace signal 5 input/output selection	00: Input [Ud-36]/01: Output [Ud-37]	00
Ud-36	Trace signal 5 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-37	Trace signal 5 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-38	Trace signal 6 input/output selection	00: Input [Ud-39]/01: Output [Ud-40]	00
Ud-39	Trace signal 6 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-40	Trace signal 6 output terminal selection	Same as [CC-01] to [CC-07]	001
Ud-41	Trace signal 7 input/output selection	00: Input [Ud-42]/01: Output [Ud-43]	00
Ud-42	Trace signal 7 input terminal selection	Same as [CA-01] to [CA-08]	001
Ud-43	Trace signal 7 output terminal selection	Same as [CC-01] to [CC-07]	001
UD-50	Trace trigger 1 selection	00: Trip/ 01: Trace data 0/ 02 to 08: Trace data 1 to 7/ 09 to 16: Trace signal 0 to 7	00
Ud-51	Trigger 1 activation selection at trace data trigger	00: Action at rising above the trigger level/ 01: Action at falling below the trigger level	00
Ud-52	Trigger 1 level setting at trace data trigger	0 to 100 %	0
Ud-53	Trigger 1 activation selection at trace signal trigger	00: Action by signal ON/ 01: Action by signal OFF	00
Ud-54	Trace trigger 2 selection	Same as Ud-50	00
Ud-55	Trigger 2 activation selection at trace data trigger	00: Action at rising above the trigger level/ 01: Action at falling below the trigger level	00
Ud-56	Trigger 2 level setting at trace data trigger	0 to 100 %	0
Ud-57	Trigger 2 activation selection at trace signal trigger	00: Action by signal ON/ 01: Action by signal OFF	00
Ud-58	Trigger condition selection	00: At trace trigger 1 activation/01: At trace trigger 2 activation 02: Trigger-1 OR Trigger-2 activation /03: Trigger-1 AND Trigger-2 activation	00
Ud-59	Trigger point setting	0 to 100 %	0
Ud-60	Sampling time setting	02:0.5ms/ 03:1ms/ 04:2ms/ 05:5ms/ 06:10ms/ 07:50ms/ 08:100ms/ 09:500ms/ 10:1000ms	03

List of multi-function input terminal function

Function code	Symbol	Name
000	no	Not use
001	FR	Forward rotation
002	RR	Reverse rotation
003	DFL	Multi speed selection 1
004	DFM	Multi speed selection 2
005	DFH	Multi speed selection 3
006	DHH	Multi speed selection 4
007	SF1	Multi speed Bit-1
008	SF2	Multi speed Bit-2
009	SF3	Multi speed Bit-3
010	SF4	Multi speed Bit-4
011	SF5	Multi speed Bit-5
012	SF6	Multi speed Bit-6
013	SF7	Multi speed Bit-7
014	ADD	Trigger for frequency addition
015	AUT	Main/Sub speed reference change
016	STA	3-wire start
017	STP	3-wire stop
018	F/R	3-wire forward/reverse
019	AHD	Analog command holding
020	UP	Remote control Speed-Up function
021	DWN	Remote control Speed-Down function
022	UDC	Remote control Speed data clearing
023	F-OP	Force operation
024	SET	2nd-motor control
028	RST	Reset
029	JOG	Jogging
030	DB	External DC braking
031	AD2	2-stage Acceleration/Deceleration
032	MBS	Free run stop
033	ES	External fault
034	USP	Unattended start protection
035	CS	Commercial power supply change
036	SFT	Soft-Lock
037	BOK	Answer back from Brake
038	OLR	Overload restriction selection
039	KHC	Accumulated input power clearance
040	OKHC	Accumulated output power clearance
041	PID	Disable PID1
042	PIDC	PID1 integration reset
043	PID2	Disable PID2
044	PIDC2	PID2 integration reset

Function code	Symbol	Name
051	SVC1	Multi set-point selection 1
052	SVC2	Multi set-point selection 2
053	SVC3	Multi set-point selection 3
054	SVC4	Multi set-point selection 4
055	PRO	PID gain change
056	PIO1	PID output switching 1
058	SLEP	SLEEP condition activation
059	WAKE	WAKE condition activation
060	TL	Torque limit enable
061	TRQ1	Torque limit selection bit 1
062	TRQ2	Torque limit selection bit 2
063	PPI	P/PI control mode selection
064	CAS	Control gain change
067	ATR	Permission of torque control
068	TBS	Torque Bias enable
069	ORT	Home search function
071	LAC	Acceleration/Deceleration cancellation
072	PCLR	Clearance of position deviation
076	CP1	Multistage position settings selection 1
077	CP2	Multistage position settings selection 2
078	CP3	Multistage position settings selection 3
079	CP4	Multistage position settings selection 4
080	ORL	Limit signal of Homing function
081	ORG	Start signal of Homing function
082	FOT	Forward Over Travel
083	ROT	Reserve Over Travel
084	SPD	Speed/Position switching
085	PSET	Position data presetting
086 to 093	-	Reserved
097	PCC	Pulse counter clearing
098	ECOM	EzCOM activation
099	-	Reserved
100	HLD	Acceleration/Deceleration disable
101	REN	RUN enable
102	DISP	Display lock
103	PLA	Pulse input A
104	PLB	Pulse input B
105	EMF	Emergency-Force Drive activation
107	COK	Contactor check signal
108	DTR	Data trace start
109	PLZ	Pulse input Z
110	TCH	Teach-in signal

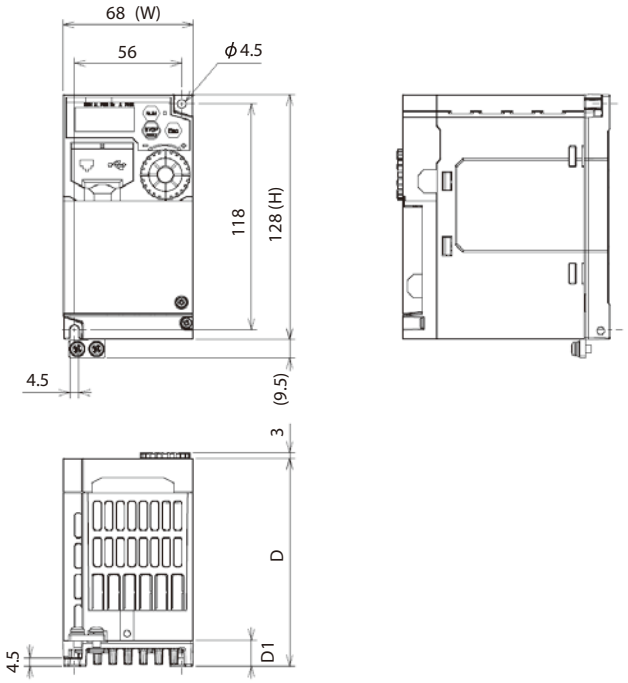
List of multi-function output terminal function

Function code	Symbol	Name
000	no	Not use
001	DRV	Running
002	UPF1	Constant-frequency reached
003	UPF2	Set frequency overreached
004	UPF3	Set frequency reached
005	UPF4	Set frequency overreached 2
006	UPF5	Set frequency reached 2
007	IRDY	Inverter ready
008	FRR	Forward rotation
009	RRR	Reverse rotation
010	FREF	Frequency reference=Keypad is selected
011	REF	Run command=Keypad is selected
012	SETM	2nd control is selected
016	OPO	Option output
017	AL	Alarm
018	MJA	Major failure
019	OTQ	Over-torque
021	UV	Undervoltage
022	TRQ	Torque limited
023	IPS	IP nonstop function is active
024	RNT	Accumulated operation time over
025	ONT	Accumulated power-on time over
026	THM	Electronic thermal alarm (Motor)
027	THC	Electronic thermal alarm (Inverter)
029	WAC	Capacitor life warning
030	WAF	Cooling-fan life warning
031	FS	RUN command active
032	OHF	Heat sink overheat warning
033	LOC	Low-current indication
034	LOC2	Low-current indication 2
035	OL	Overload warning notice
036	OL2	Overload warning notice 2
037	BRK	Brake release
038	BER	Brake error

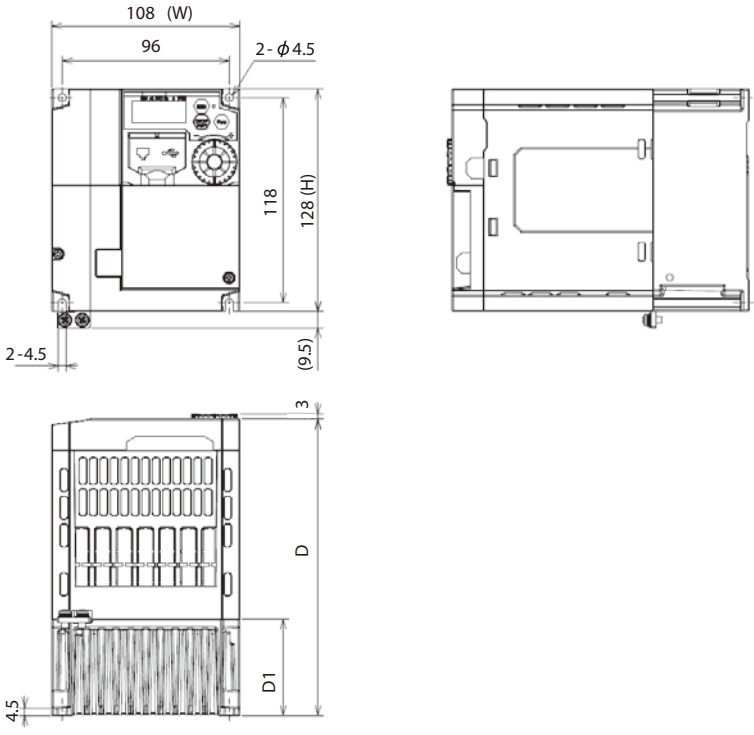
Function code	Symbol	Name
039	CON	Contactor control
040	ZS	Zero speed detection
041	DSE	Speed over deviation
043	POK	Positioning completed
044	PCMP	Pulse count compare match output
045	OD	Over deviation for PID control
046	FBV	PID feedback comparison
047	OD2	Over deviation for PID2 control
048	FBV2	PID2 feedback comparison
049	NDc	Communication line disconnection
050	VRFDc	Analog VRF disconnection detection
051	IRFDc	Analog IRF disconnection detection
056	WCVRF	Window comparator VRF
057	WCIRF	Window comparator IRF
062	LOG1	Logical operation result 1
063	LOG2	Logical operation result 2
064	LOG3	Logical operation result 3
069 to 071	-	Reserved
076	EMFC	Emergency-Force Drive indicator
077	EMBP	Bypass mode indicator
078	WFT	Trace function waiting for trigger
079	TRA	Trace function data logging
080	LBK	Low-battery of keypad
081	OVS	Over-Voltage power supply
082	ABU	Abnormal exceeded Upper limit
083	ABL	Abnormal fall below Lower limit
088	FSC	STO input discrepancy
093	SSE	PID soft start error
094	SFM1	ST1 feedback monitor
095	SFM2	ST2 feedback monitor
096	EDM	STO state monitor
097	WAP	Power module life warning
098	WAIC	Inrush circuit life warning

Outline Drawing

Power supply	Model	W (mm)	H (mm)	D (mm)	D1 (mm)	Approx. weight (kg)
1-phase 200V	HF620S-A20	68	128	109	13.5	1.0
	HF620S-A40			122.5	27	1.1
3-phase 200V	HF6202-A20			109	13.5	1.0
	HF6202-A40			122.5	27	1.1
	HF6202-A75			145.5	50	1.2

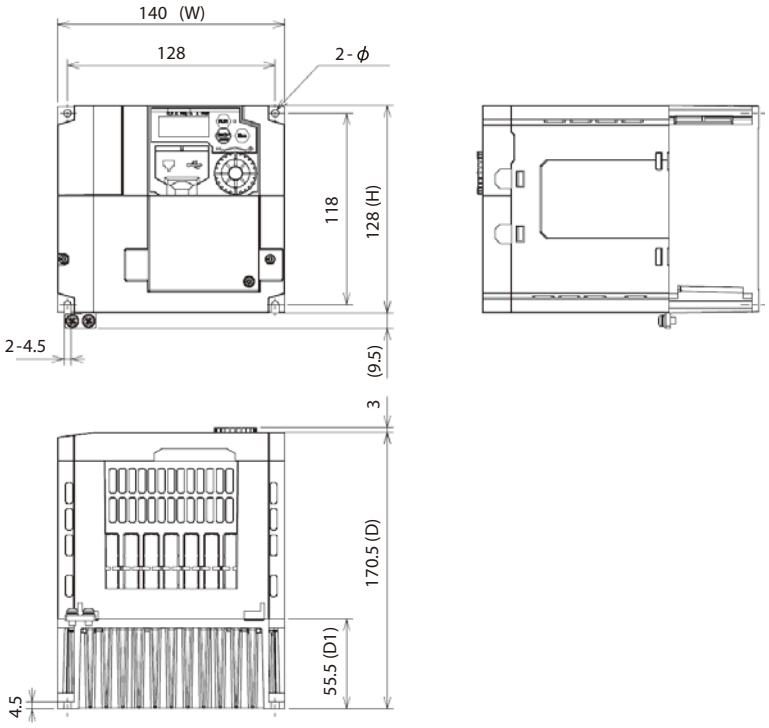


Power supply	Model	W (mm)	H (mm)	D (mm)	D1 (mm)	Approx. weight (kg)
1-phase 200V	HF620S-A75	108	128	170.5	55.5	1.6
	HF620S-1A5					1.8
	HF620S-2A2					
3-phase 200V	HF6202-1A5					1.6
	HF6202-2A2					1.8
3-phase 400V	HF6204-A40			143.5	28.5	1.5
	HF6204-A75			170.5	55.5	1.8
	HF6204-1A5					
	HF6204-2A2					

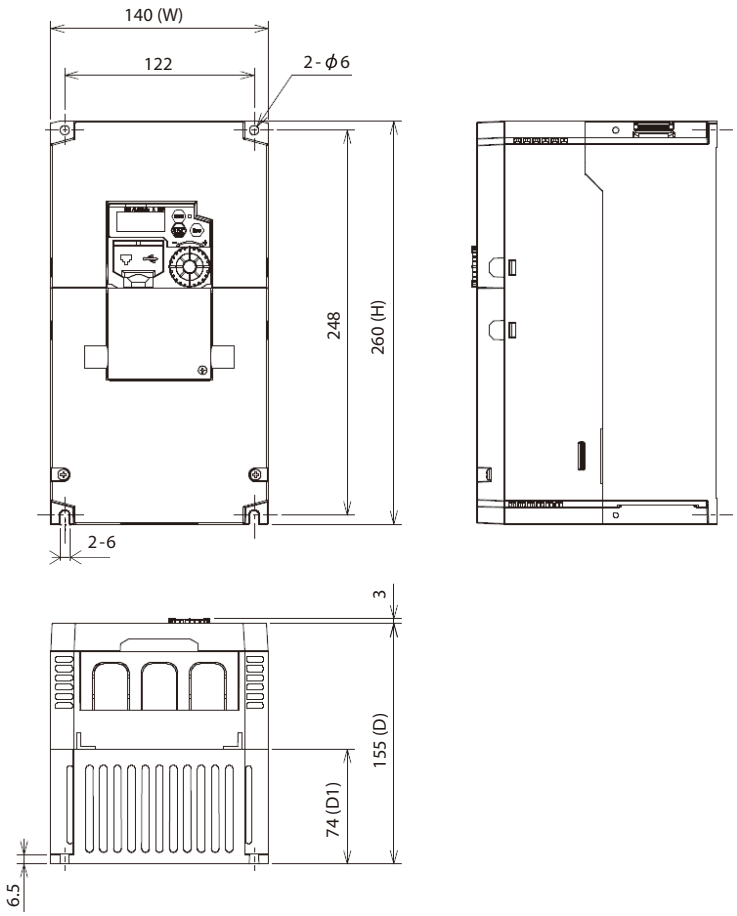


Outline Drawing

Power supply	Model	W (mm)	H (mm)	D (mm)	D1 (mm)	Approx. weight (kg)
3-phase 200V	HF6202-3A7	140	128	170.5	55.5	2.0
3-phase 400V	HF6204-3A7					

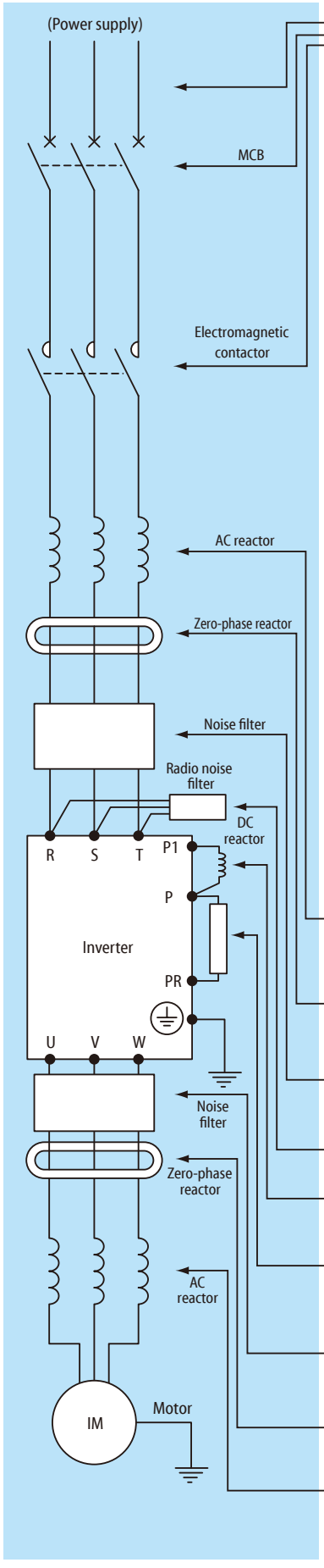


Power supply	Model	W (mm)	H (mm)	D (mm)	D1 (mm)	Approx. weight (kg)
3-phase 200V	HF6202-5A5	140	260	155	74	3.5
	HF6202-7A5					
3-phase 400V	HF6204-5A5					
	HF6204-7A5					



Accessories and Options

Standard Accessories



Rated input voltage	Applicable motor (kW)	Inverter model	Circuit breaker (made by Mitsubishi Electric)		Electromagnetic contactor (made by Fuji Electric)	Cable size (mm^2) Length 20m
			Rated current (A)	Type	Type	
1-phase 200V class	0.2	HF620S-A20	5	NF-32SV	SC-03	2
	0.4	HF620S-A40	10	NF-32SV	SC-03	2
	0.75	HF620S-A75	20	NF-32SV	SC-4-0	2
	1.5	HF620S-1A5	30	NF-32SV	SC-N2	2
	2.2	HF620S-2A2	40	NF-63SV	SC-N2	2
3-phase 200V class	0.2	HF6202-A20	5	NF-32SV	SC-03	2
	0.4	HF6202-A40	5	NF-32SV	SC-03	2
	0.75	HF6202-A75	10	NF-32SV	SC-03	2
	1.5	HF6202-1A5	15	NF-32SV	SC-4-0	2
	2.2	HF6202-2A2	20	NF-32SV	SC-N1	2
	3.7	HF6202-3A7	30	NF-32SV	SC-N2	3.5
	5.5	HF6202-5A5	50	NF-63SV	SC-N2S	5.5
	7.5	HF6202-7A5	60	NF-125SV	SC-N3	8
3-phase 400V class	0.2, 0.4	HF6204-A40	5	NF-32SV	SC-03	2
	0.75	HF6204-A75	5	NF-32SV	SC-03	2
	1.5	HF6204-1A5	10	NF-32SV	SC-03	2
	2.2	HF6204-2A2	15	NF-32SV	SC-4-0	2
	3.7	HF6204-3A7	20	NF-32SV	SC-N1	2
	5.5	HF6204-5A5	30	NF-32SV	SC-N2	3.5
	7.5	HF6204-7A5	30	NF-32SV	SC-N2	5.5

Note: 1. The shown accessories are for use with SUMITOMO 3-phase, 4-pole motors.
2. Select the circuit breaker based on required capacity.
3. Use thicker cables when wiring distance exceeds 20 m.
4. The alarm output cable should be 0.75mm^2.
5. Corresponds to UL standard, refer to the page 28.

When using an earth leakage breaker (ELB), select the breaker's trip current from the table below based on the total wire distance (R) by summing the distance from the breaker to the inverter and the inverter to the motor.

ℓ	Trip current (mA)
100m or less	30
300m or less	100

Note: 1. When CV wiring is used in metal conduit, the leakage current is approximately 30mA/km.
2. Leakage current will increase eightfold with IV type cable due to higher dielectric constant. In this case, use ELB with the next higher trip rating.

Input AC reactor for harmonic suppression/power smoothing/powerfactor improvement	This is useful in suppressing harmonics induced on the power supply lines, or when the main power voltage imbalance exceeds 3%, (and power source capacity is more than 500kVA), or to smooth out line fluctuations. It also improves the power factor.
Radio noise filter Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise.
Input noise filter	This filter reduces the conducted noise in the power supply wiring between the inverter and the power distribution system. Connect it to the inverter primary (input side).
Input radio noise filter (XY filter)	This capacitive filter reduces radiated noise from the main power wires in the inverter input side.
DC reactor	The inductor or choke filter suppresses harmonics generated by the inverter.
Regenerative braking resistor	The regenerative braking resistor is useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capacity.
Output noise filter	This filter reduces radiated noise emitted on the inverter output cable that may interfere with radio or television reception and test equipment and sensor operation.
Radio noise filter Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise.
Output AC reactor	Install it on the output side to reduce leakage current contributed by higher harmonics. Contact our company for details.

Caution in Selecting Peripheral Equipment

Wiring and connection		1. Be sure to connect the power supply to RST (input terminals) and the motor to U, V, W (output terminals). 2. Be sure to connect the grounding terminal. (⏚ mark) Inverters generate high frequency, increasing leakage current. Be sure to ground the inverter and motor.
Wiring between inverter and motor	Electromagnetic contactor	When using an electromagnetic contactor between the inverter and motor, do not turn the contactor ON or OFF during inverter operation.
	Thermal relay	Install a thermal relay that matches the motor in the following cases: *Install a thermal relay for each motor when operating more than one motor with one inverter. *Set the current of the thermal relay at the rated motor current x 1.1. When the wiring length is long the thermal relay may be activated too quickly. Install an AC reactor or current sensor on the output side. *When motors are to be operated with the rated current exceeding the adjustable level of the built-in electronic thermal relay.
Earth leakage breaker		Install an earth leakage breaker on the input side for protection of the inverter wiring and operators. Conventional earth leakage breakers may malfunction because of high harmonics from the inverter; therefore use an earth leakage breaker that is applicable to the inverter. The leakage current differs according to the cable length. Refer to p.14.
Wiring distance		The wiring distance between the inverter and operation panel should be less than 20m. If it exceeds 20m, use a current/voltage converter, etc. Use shielded cable for wiring. When the wiring distance between the motor and inverter is long, the leakage current from high harmonics may cause the protective function of the inverter and peripheral equipment to be activated. The situation will be improved by an AC reactor installed on the output side of the inverter. Select appropriate cable to prevent voltage drop. (Large voltage drop lowers the torque.)
Phase-advanced capacitor		Do not use a phase-advanced capacitor. When a power factor improving capacitor is connected between the inverter and motor, the capacitor may be heated or broken by the higher harmonics in the inverter output.

Compliance to UL standards

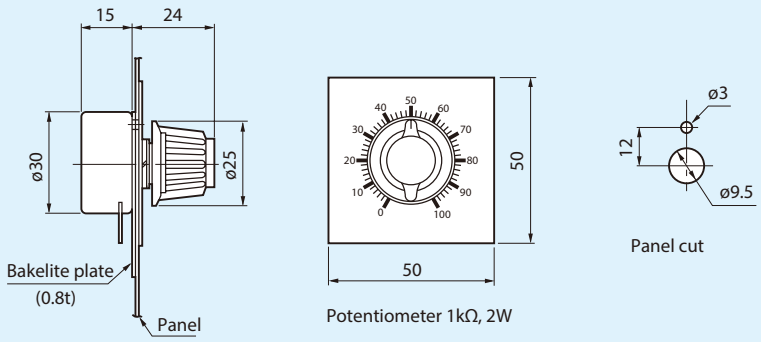
Power supply	Applicable motor (kW)	Model	Wire Range (AWG/mm^2)	Screw size	Required Torque (Nm)	Non-Semiconductor Fuse			Semiconductor Fuse
						Type	Voltage	Current	Manufacture Cooper Bussmann LLC
Single phase 200V	0.2	HF620S-A20	AWG16 (1.3mm^2)	M3.5	1.0	Class J Class CC Class G Class T	600V	6 A	FWH-15A14F
	0.4	HF620S-A40	AWG16 (1.3mm^2)	M3.5	1.0			10 A	FWH-15A14F
	0.75	HF620S-A75	AWG12 (3.3mm^2)	M4	1.4			20 A	FWH-60B
	1.5	HF620S-1A5	AWG10 (5.3mm^2)	M4	1.4			30 A	FWH-60B
	2.2	HF620S-2A2	AWG10 (5.3mm^2)	M4	1.4			30 A	FWH-60B
Three phase 200V	0.2	HF6202-A20	AWG16 (1.3mm^2)	M3.5	1.0	Class J Class CC Class G Class T	600V	6 A	FWH-15A14F
	0.4	HF6202-A40	AWG16 (1.3mm^2)	M3.5	1.0			10 A	FWH-15A14F
	0.75	HF6202-A75	AWG16 (1.3mm^2)	M3.5	1.0			15 A	FWH-25A14F
	1.5	HF6202-1A5	AWG14 (2.1mm^2)	M4	1.4			15 A	FWH-25A14F
	2.2	HF6202-2A2	AWG12 (3.3mm^2)	M4	1.4			20 A	FWH-60B
	3.7	HF6202-3A7	AWG10 (5.3mm^2)	M4	1.4			30 A	FWH-60B
	5.5	HF6202-5A5	AWG6 (13mm^2)	M5	3.0			60 A	FWH-150B
	7.5	HF6202-7A5	AWG6 (13mm^2)	M5	3.0			60 A	FWH-150B
Three phase 400V	0.2, 0.4	HF6204-A40	AWG16 (1.3mm^2)	M4	1.4	Class J Class CC Class G Class T	600V	6 A	FWH-15A14F
	0.75	HF6204-A75	AWG16 (1.3mm^2)	M4	1.4			10 A	FWH-25A14F
	1.5	HF6204-1A5	AWG16 (1.3mm^2)	M4	1.4			10 A	FWH-25A14F
	2.2	HF6204-2A2	AWG14 (2.1mm^2)	M4	1.4			10 A	FWH-25A14F
	3.7	HF6204-3A7	AWG12 (3.3mm^2)	M4	1.4			15 A	FWH-25A14F
	5.5	HF6204-5A5	AWG10 (5.3mm^2)	M5	3.0			30 A	FWH-60B
	7.5	HF6204-7A5	AWG10 (5.3mm^2)	M5	3.0			30 A	FWH-60B

Note: Connect to the UL type non-semiconductor fuse or semiconductor fuse to the input side for power supply.

External Options

Frequency Reference Setting Unit

Model No. VR07

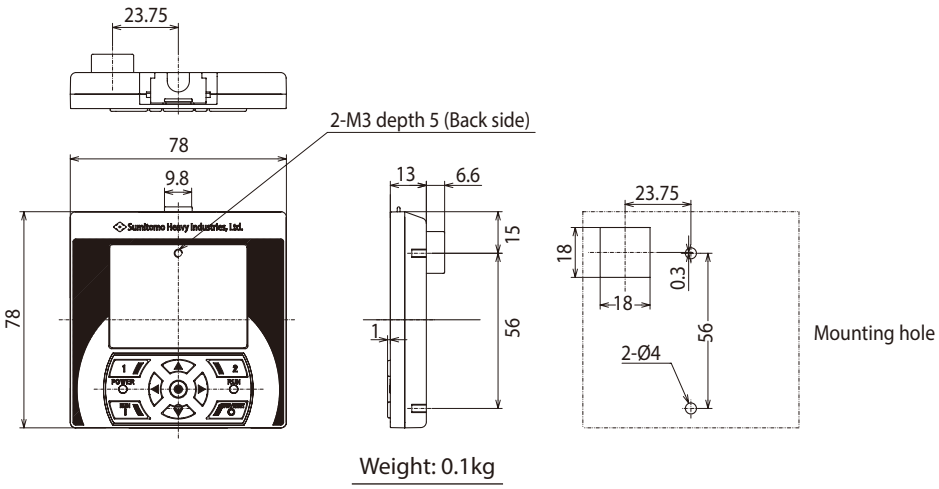


Weight: 0.1kg

Unit : mm

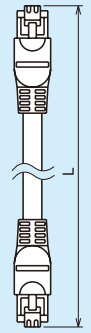
Remote Operator OS-44 (ver.2.0 onwards)

Model No. CT066AW



Weight: 0.1kg

●ICS-1, 3
(Cable for OS44)

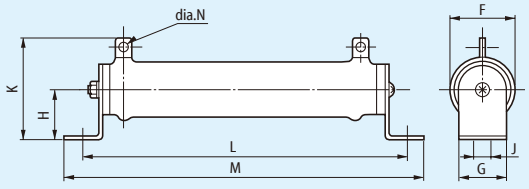


Model	L(m)
ICS−1	1
ICS−3	3

Regenerative Braking Resistor

Rated power (W)	Dimensions (mm)								Weight (g)
	F	G	H	J	K	L	M	N	
200	28	26	22	6	53	287	306	4	340
300	44	40	40	10	78	309	335	5	840
400	44	40	40	10	78	385	411	5	1000
750	57	40	40	10	84	355	381	5	1360

100% braking torque: 10 s 10% ED



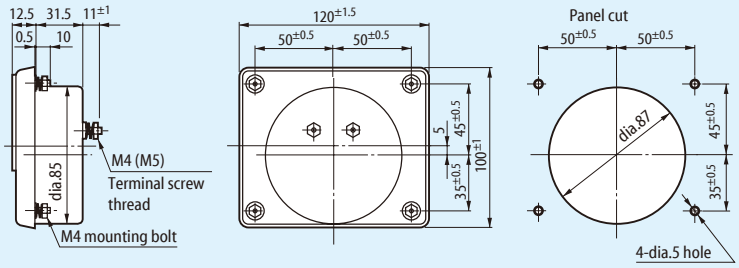
Voltage (V)	Capacity (kW)	Braking resistor				Thermal relay set value (A)
		Model No.	Rated power	Resistance	Qty	
200V	0.2	Y135AA201	200W	400Ω	1	0.83
	0.4	Y135AA200	200W	200Ω	1	0.83
	0.75	Y135AA205	300W	200Ω	1	1.25
	1.5	Y135AA204	300W	80Ω	1	1.25
	2.2	Y135AA208	400W	70Ω	1	1.7
	3.7	Y135AA203	300W	20Ω	2-pc. series	2.1
	5.5	X435AC069	750W	10Ω	2-pc. series	5.3
	7.5	X435AC069	750W	10Ω	2-pc. series	5.3
400V	0.4	Y135AA202	200W	750Ω	1	0.42
	0.75	Y135AA207	300W	750Ω	1	0.63
	1.5	Y135AA206	300W	400Ω	1	0.63
	2.2	Y135AA209	400W	250Ω	1	0.83
	3.7	Y135AA204	300W	80Ω	2-pc. series	1.1
	5.5	Y135AA209	400W	250Ω	3-pc. series	2.0
	7.5	Y135AA209	400W	250Ω	3-pc. series	2.0

Type of thermal relay: TR-0NH

% Speed Meter: DCF-12N

Unit : mm

0-100% 50 divisions

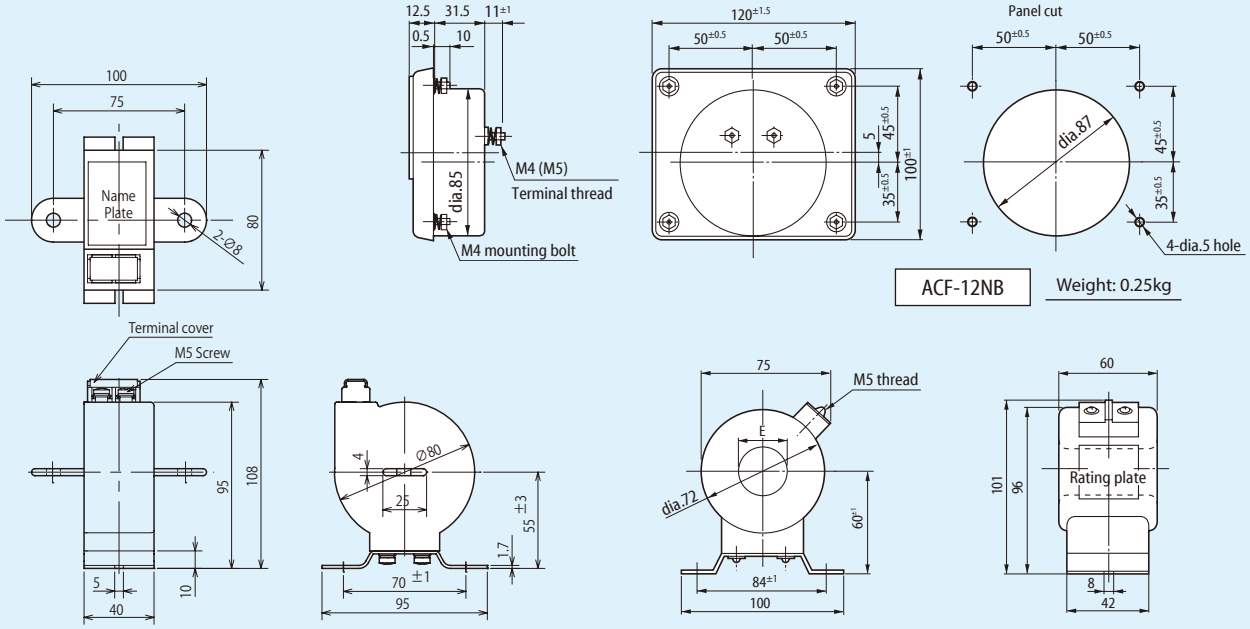


Model No.	
X525AA048	10V F.S.

Weight: 0.15kg

AC Ammeter: ACF-12NB

The current transformer (CT) directly detects the current of the secondary side of the inverter.



ACF-12NB Weight: 0.25kg

COMA-15A Weight: 0.8kg

COM-15-26 E=Ø26 Weight: 0.9kg

Table of combination of AC ammeter (ACF-12NB) and current transformer (CT)

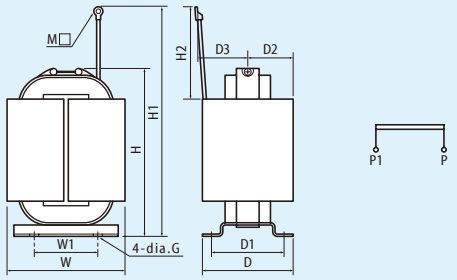
Motor capacity (kW)	200V class					400V class				
	Model No.	Meter		CT Type	Number of primary through holes	Model No.	Meter		CT Type	Number of primary through holes
		Rated current [A]	Max. scale [A]				Rated current [A]	Max. scale [A]		
0.2	CT002AW	3	3	COMA-15A 5/5A	-	CT001AW	2	2	COMA-15A 5/5A	-
0.4	CT003AW	5	5	COMA-15A 5/5A	-	CT002AW	3	3	COMA-15A 5/5A	-
0.75	CT004AW	5	10	COMA-15A 10/5A	-	CT003AW	5	5	COMA-15A 5/5A	-
1.5	CT005AW	5	15	COMA-15A 15/5A	-	CT004AW	5	10	COMA-15A 10/5A	-
2.2	CT006AW	5	20	COMA-15A 20/5A	-	CT004AW	5	10	COMA-15A 10/5A	-
3.7	CT007AW	5	30	COMA-15A 30/5A	-	CT005AW	5	15	COMA-15A 15/5A	-
5.5	X525AA042	5	50	COM-15-26 50/5A	3	CT006AW	5	20	COMA-15A 20/5A	-
7.5	X525AA042	5	50	COM-15-26 50/5A	3	CT007AW	5	30	COMA-15A 30/5A	-

Construction of current transformer (CT) COMA-15A type: Totally molded current transformer with primary winding
COM-15-26 type: Totally molded current transformer, throughhole type

Install the current transformer (CT) on the output side of the inverter.

DC Reactor for Power Factor Improvement and Harmonics Suppression

The DC reactor is available for improvement of the power factor of the inverter, ensuring power line impedance, and control of higher harmonics.



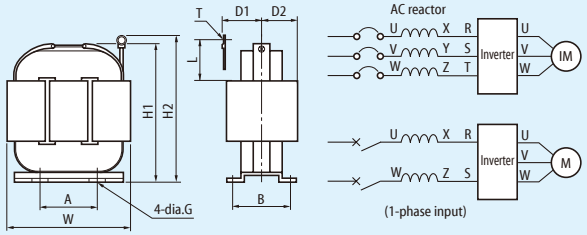
Unit : mm

	Applicable capacity (kW)	Specification		Model No. Y220DA	W	W1	D	D1	D2	D3	H	H1	H2	G	Connection Terminal	Weight (kg)	Insulation
		Current (A)	L (mH)														
200V Series	0.2	1.0	29.7	032	52	35	40	32	20	22	65	-	300	dia.4	M4	0.3	B
	0.4	2.0	14.8	033	52	35	40	32	20	22	75	-	300	dia.4	M4	0.4	B
	0.75	3.75	9.72	034	52	35	50	42	25	27	85	-	300	dia.4	M4	0.6	B
	1.5	7.5	4.83	035	74	50	45	37	-	-	120	145	-	dia.5	M5	1.0	B
	2.2	11.0	3.41	036	74	50	45	37	-	-	120	145	-	dia.5	M5	1.1	B
	3.7	18.5	2.13	037	90	60	62	52	-	-	140	170	-	dia.5	M5	2.0	B
	5.5	28.0	1.47	038	90	60	62	52	-	-	140	170	-	dia.5	M5	2.4	B
	7.5	38.0	1.11	039	100	80	95	80	-	-	140	170	-	5.5×7	M5	3.5	B
400V Series	0.4	1.0	59.3	003	52	35	40	32	20	22	75	-	300	dia.4	M4	0.4	B
	0.75	1.88	38.9	004	52	35	50	42	25	27	85	-	300	dia.4	M4	0.6	B
	1.5	3.75	19.3	005	59	40	60	47	30	35	100	-	300	dia.4	M4	0.9	B
	2.2	5.5	13.7	006	74	50	45	37	-	-	120	140	-	dia.5	M5	1.1	B
	3.7	9.25	8.52	007	74	50	70	62	-	-	120	145	-	dia.5	M5	1.8	B
	5.5	14.0	5.87	008	90	60	62	52	-	-	140	165	-	dia.5	M5	1.5	B
	7.5	19.0	4.46	009	100	80	95	80	-	-	140	165	-	5.5×7	M5	3.5	B

AC Reactor for Power Factor Improvement and Harmonics Suppression

The AC reactor is available for improvement of the power factor of the inverter, ensuring proper power line impedance, and control of higher harmonics.

Note: The AC reactor is for 3-phase input.



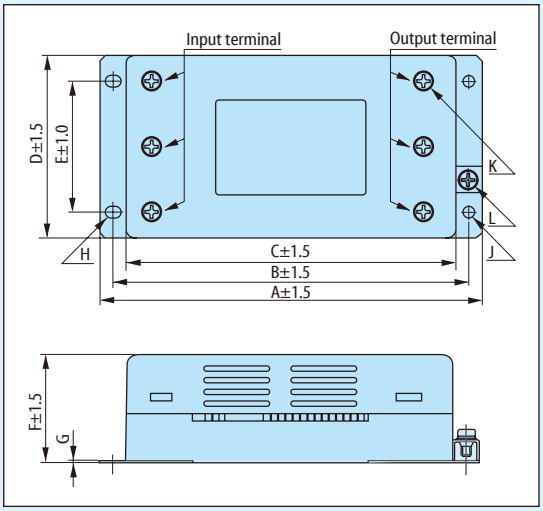
Unit : mm

	Applicable capacity (kW)		Specification		Model No. Y220DA	W	Dl	D2	H1	H2	A	B	G	L	T	Weight (kg)	Insulation
	3-Phase	1-Phase	Current (A)	L (mH)													
200V Series	0.2, 0.4	0.2	2.1	5.8	053	87	26	23	95	-	50	38	4	310	M4	1.0	B
	0.75	0.4	4.0	3.1	054	87	26	23	95	-	50	38	4	310	M4	1.1	B
	1.5	0.75	8.0	1.6	055	90	33	30	100	120	55	48	4	-	M4	1.6	B
	2.2	-	11	1.2	056	113	35	30	116	140	55	43	4	-	M4	2.1	B
	3.7	1.5/2.2	17	0.7	057	113	35	30	116	140	55	43	4	-	M5	2.4	B
	5.5	-	24	0.5	058	146	35	35	147	180	80	50	5	-	M5	3.9	F
	7.5	-	33	0.4	059	150	35	35	150	185	80	50	5	-	M6	4.4	F
400V Series	0.4	-	1.2	22	080	87	26	23	95	-	50	38	4	310	M4	1.0	B
	0.75		2.1	12	081	90	26	23	96	-	50	38	4	310	M4	1.1	B
	1.5		4.0	6.5	082	90	33	30	100	-	55	48	4	310	M4	1.7	B
	2.2		5.5	4.6	083	113	33	30	115	-	55	43	4	310	M4	2.5	B
	3.7		9.0	2.9	084	113	35	30	115	140	55	43	4	-	M4	2.8	B
	5.5		13	2.0	085	153	35	35	145	175	80	50	5	-	M4	4.2	B
	7.5		17	1.5	086	162	37	35	145	175	80	50	5	-	M5	4.4	B

Noise Filter

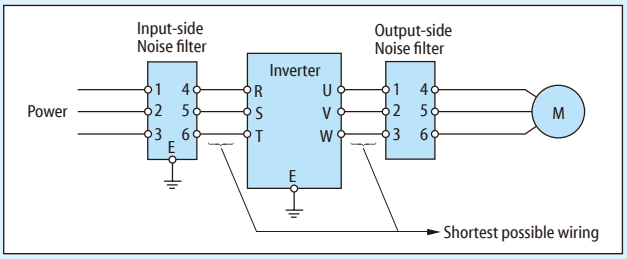
Voltage Class	Applicable Motor (kW)	Input side			Output side		
		Model No.	Type	Weight (kg)	Model No.	Type	Weight (kg)
3-phase 200V	0.2, 0.4	X480AC289	NF3010A-VZ	0.5	X480AC163	CC3005C-P	1
	0.75, 1.5				X480AC164	CC3010C-P	
	2.2	X480AC290	NF3020A-VZ		X480AC165	CC3015C-P	
	3.7				X480AC166	CC3020C-P	1.5
	5.5	X480AC291	NF3030A-VZ	0.7	X480AC167	CC3030C-P	
	7.5	X480AC292	NF3040A-VZ	1.3	X480AC168	CC3045C-P	2.5
3-phase 400V	0.2 to 1.5	X480AC296	NF3010C-VZ	0.5	X480AC163	CC3005C-P	1
	2.2, 3.7				X480AC164	CC3010C-P	
	5.5	X480AC297	NF3020C-VZ		X480AC165	CC3015C-P	
	7.5				X480AC166	CC3020C-P	1.5
1-Phase 200V	0.2, 0.4	X480AC289	NF3010A-VZ	0.5	X480AC163	CC3005C-P	1
	0.75				X480AC164	CC3010C-P	
	1.5	X480AC290	NF3020A-VZ		X480AC165	CC3015C-P	
	2.2	X480AC291	NF3030A-VZ	0.7	X480AC166	CC3020C-P	1.5

Input-side Noise Filter

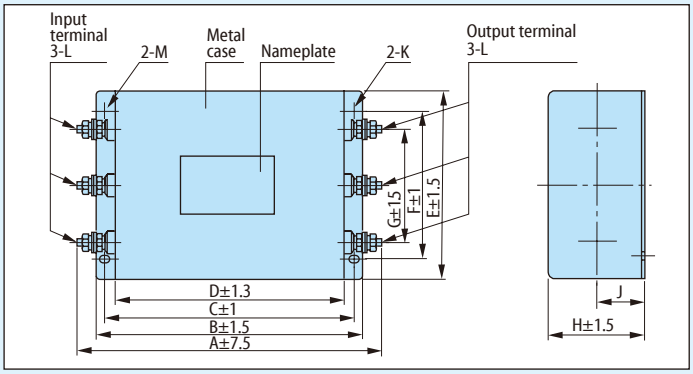


Input side	Dimensions (Unit: mm)										
Model No.	A	B	C	D	E	F	G	H	J	K	L
X480AC289	128	118	108	63	43	42	1.0	4.5 X 6	Ø4.5	M4	M4
X480AC290											
X480AC291	145	135	125	70	50						
X480AC292	179	167	155	90	70	54	1.6			M5	
X480AC296	128	118	108	63	43	42	1.0			M4	
X480AC297											

1. Connect the input-side filter between the power supply and inverter input terminal, and the output-side filter between the inverter output terminal and motor. Make the connection cable as short as possible.
2. Use grounding cable as thick as possible. Correctly ground the equipment.
3. The input and output cables of the filter should be sufficiently separated.
4. Do not connect the input-side filter to the inverter output (motor) side.



Output-side Noise Filter

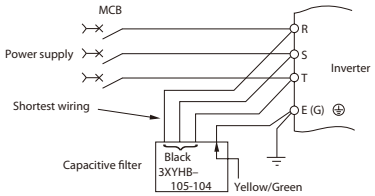


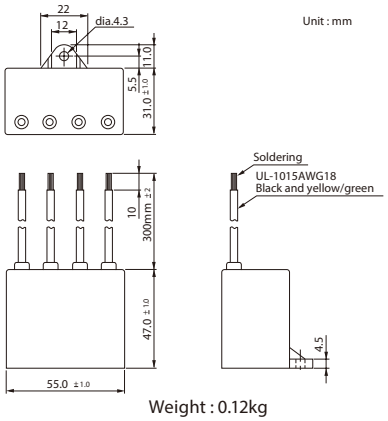
Output side	Dimensions (Unit: mm)											
Model No.	A	B	C	D	E	F	G	H	J	K	L	M
X480AC163	147	140	125	110	95	70	50	50	25	Ø4.5	M4	R2.25 length 6
X480AC164												
X480AC165												
X480AC166	167	160	145	130	110	80	60	70	35	Ø5.5	M5	R2.75 length 7
X480AC167	215	200	185	170	120	90	70	70	35	Ø5.5	M5	R2.75 length 7
X480AC168	255	230	215	200	140	110	80	80	40	Ø6.5	M6	R3.25 length 8

Capacitive filter (XY filter) Type: X480AC185

Model No. X480AC185, Type: 3XYHB-105-104
Applicable to all models for HF-430NEO: rated voltage 500VAC

[Method of connection]
(1) Connect it directly to the inverter input (power supply) terminal. Make the connection line as short as possible.
(2) Ensure correct grounding. (Grounding resistance: 100 Ω or less)
(3) Do not use on the inverter output (motor) side.





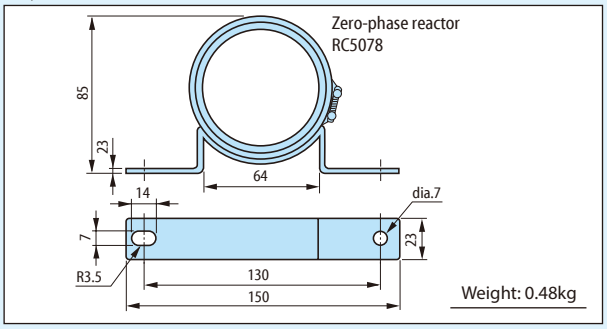
Weight : 0.12kg

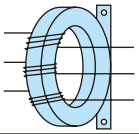
Zero-phase Reactor (Inductive Filter)

Unit : mm

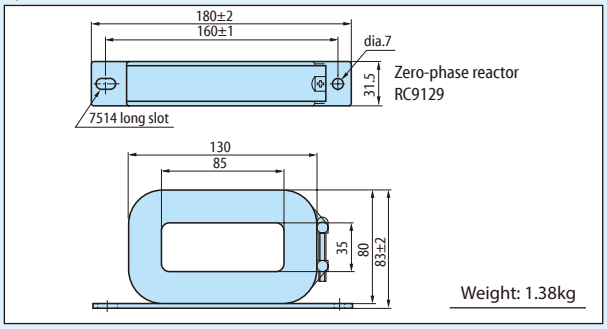
Common to 200 V and 400 V classes, as well as input and output sides

· 3.7 kW or less
Model No. X480AC188
Type RC5078



Winding turns	More than 3 times (4T)
Qty used	1 pc
Winding	

· 5.5 kW or more
Model No. X480AC192
Type RC9129



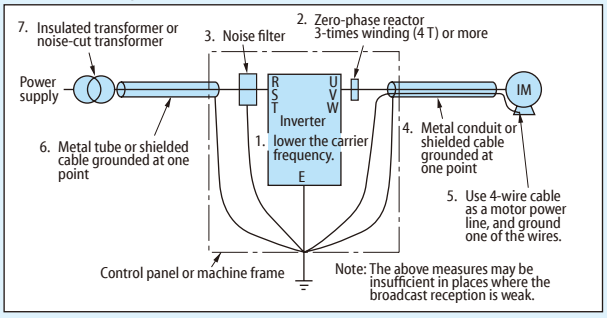
Method of connection

1. It can be used on both input (power supply) side and output (motor) side of the inverter.
2. Wind the cables of the three phases respectively on the input or output side more than three times (4 turns) in the same direction. If cables are too thick to wind more than three times (4 turns), arrange two or more zero-phase reactors to reduce the number of winding turns.
3. Make the gap between the cable and the inside of the core as small as possible.

When AM Radio Picks Up Noise

1. When noise level is high

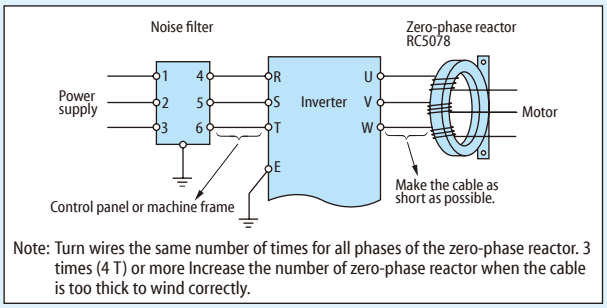
Take possible measures among the following in the order of 1 to 7. Each measure will improve noise reduction.



■ Corrective measures

1. Lower the carrier frequency as much as possible. Up to approx. 10 kHz when low-noise operation is necessary.
2. Install a zero-phase reactor on the output side of the inverter. (Type: RC9129)
3. Install a Noise filter on the input side of the inverter.
4. Connect the inverter and motor with a metal conduit or shielded cable.
5. Use 4-wire cable as a motor power line, and ground one of the wires.
6. Connect the inverter and power with a metal conduit or shielded cable.
7. Install a drive isolation or noise reduction transtormer for the power supply. The transformer capacity differs according to the inverter capacity and voltage.

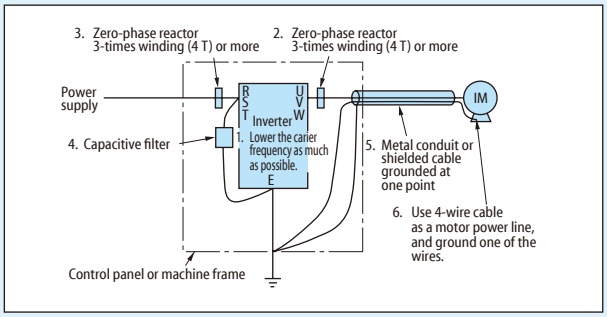
■ Connection of the zero-phase reactor and the Noise filter



Note: Turn wires the same number of times for all phases of the zero-phase reactor. 3 times (4 T) or more Increase the number of zero-phase reactor when the cable is too thick to wind correctly.

2. When noise level is low

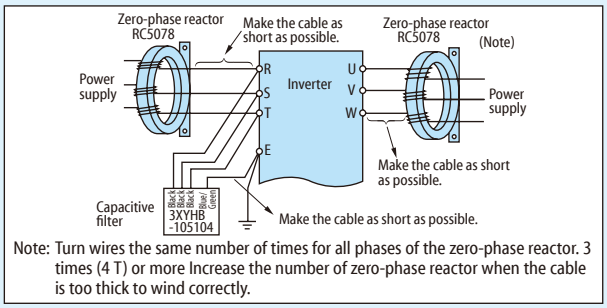
Take possible measures among the following in the order of 1 to 6. Each measure will improve noise reduction.



■ Corrective measures

1. Lower the carrier trequency as much as possible. Up to approx. 10 kHz when low-noise operaton is necessary.
2. Install a zero-phase reactor on the output side of the inverter. (Type: RC5078, RC9129)
3. Install a zero-phase reactor on the input side the inverter. (Type: RC5078, RC9129)
4. Install a capacitive filter on the input side of the inverter. (Type: 3XYHB-105104)
5. Connect the inverter and motor with a metal conduit or shielded cable.
6. Use 4-wire cable as a motor power line, and ground one of the wires.

■ Connection of the zero-phase reactor and the capacitive filter

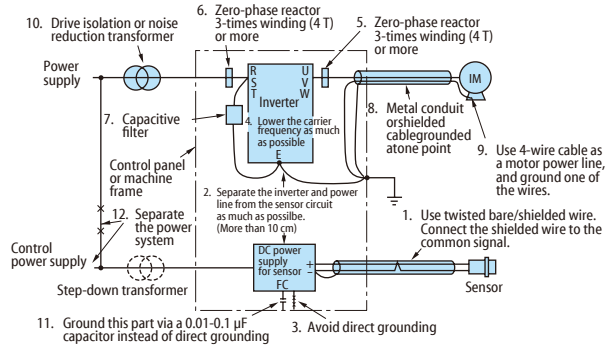


Note: Turn wires the same number of times for all phases of the zero-phase reactor. 3 times (4 T) or more Increase the number of zero-phase reactor when the cable is too thick to wind correctly.

External Options/Motor Operating Characteristics

Measures to Take When Proximity Switch/photoelectric Switch, etc. Malfunction

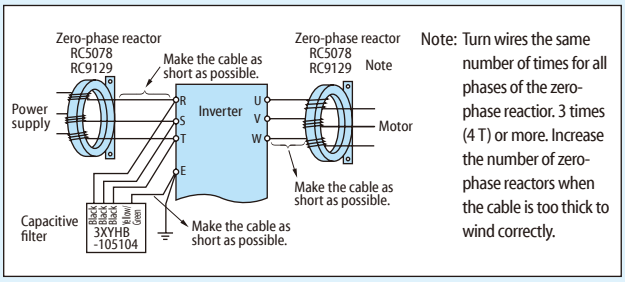
Take possible measures among the following in the order of 1 to 12. Each measure will improve noise reduction.



Corrective measures

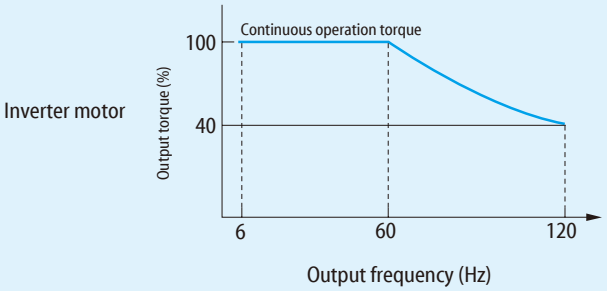
1. Use twisted pair/shielded wire as a sensor signal line, and connect the shielded wire to common.
2. Separate the inverter and power line from the sensor circuit as much as possible. (More than 10 cm desirable)
3. Remove the grounding wire when the power supply for the sensor is grounded.
4. Lower the carrier frequency as much as possible. Up to approx. 10 kHz when low-noise operation is necessary.
5. Install a zero-phase reactor on the output side of the inverter. (Type: RC5078, RC9129)
6. Install an LC filter on the input side of the inverter. (Type: FS)
7. Install a capacitive filter on the input side of the inverter. (Type: 3XYHB-105104)
8. Use a metal conduit or shielded cable for power supply wiring.
9. Use 4-wire cable as a motor power line, and ground one of the wires.
10. Install a drive isolation or noise reduction transformer for the inverter power supply.
11. Ground the power supply for the sensor via a 0.01-0.1 →(630V 0.1μF)
12. Separate the inverter power supply from the sensor power supply system.

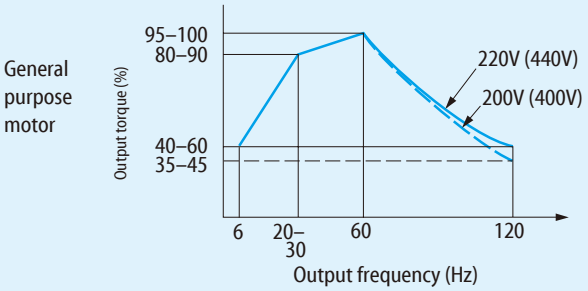
Connection of the reactors and the capacitive filter



Note: Turn wires the same number of times for all phases of the zero-phase reactior. 3 times (4 T) or more. Increase the number of zero-phase reactors when the cable is too thick to wind correctly.

Motor Operating Characteristics





When SUMITOMO motor is operated according to the inverter HF-620 using V/f control, torque characteristics above is possible.
Please contact us for motor operating characteristics using sensorless vector control for HF-620.

Motor Temperature Rise

When a general-purpose motor is used in variable-speed operation with an inverter, the temperature rise of the motor will be slightly greater than in cases where commercial power is used. The causes are shown below:

Influence of output waveform	Unlike commercial power, the output waveform of an inverter is not a perfect sine wave, and contains higher harmonics. Therefore, the motor loss increases and the temperature is slightly higher.
Reduction in the motor cooling effect during slow-speed operation	Motors are cooled by the fan on the motor itself. When the motor speed is reduced by an inverter, the cooling effect will decrease.

Therefore, lower the load torque or use an inverter motor to control temperature rise when the frequency is below the frequency of commercial power.

Notes to Inverter Users

Precautions for Application of Inverter

- Power supply
  1. When the inverter is connected directly to a large-capacity power supply (especially in a 400 V line), excessively large peak will flow in, breaking the inverter unit. In such a case, install an AC reactor (option) on the input side of the inverter unit.
  2. Install an AC reactor in the following cases as well.
     1) There is a possibility of surge voltage generated in the power supply system: When surge energy flows into the inverter, OV tripping may result.
     2) When a large-capacity thyristor Leonard or other phase control units are installed
  3. When the inverter is operated by a private power generator, secure a sufficiently large generation capacity for the inverter kVA in consideration of the influence of higher harmonic current on the generator.
- Installation
  1. Do not install the inverter in places with poor environmental conditions subjected to dust, oil mist, corrosive gas, or inflammable gas.
  2. In places where there is suspended matter in the air, install the inverter inside a "closed-type" panel to prevent entry of suspended matter. Determine the cooling method and dimensions of the panel so that the ambient temperature around the inverter will be lower than the allowable temperature.
  3. Vertically install the inverter on a wall. Do not install it on wood or other inflammable products.
- Handling
  1. Do not connect the output terminal UVW of the inverter to the power supply; otherwise the inverter will be broken. Carefully check the wiring for correct arrangement before turning on the power.
  2. It takes some time for the internal capacitors to discharge completely after the power is turned off. Check that the charge lamp on the printed circuit board is OFF before inspection.
- Operation
  1. Do not start and stop the inverter frequently by means of an electromagnetic contactor (MC) installed on the input side of the inverter; otherwise failure of the inverter will result.
  2. When more than one motor is operated by one inverter, select the inverter capacity so that 1.1 times the total rated current of the motors will not exceed the rated output current of the inverter.
  3. When an error occurs, the protective function is activated and the inverter trips and stops operation. In that case, motors will not stop immediately. When emergency stop is desired, use mechanical brakes as well.
  4. The acceleration time of the motor is subject to the inertial moment of the motor and load, motor torque, and load torque.
     1) When the acceleration time setting is too short, the stall prevention function is activated, and the setting time is elongated automatically. For stable acceleration and deceleration, set longer time so that the stall prevention function will not be activated.
     2) When the deceleration time is too short, the stall prevention function is activated or OV tripping will result. Set longer deceleration time or install a braking unit/braking resistor.

When Operating 400 V Class 3-Phase Induction Motor

When the inverter is used to drive the 3-phase induction motor (general-purpose motor), a high carrier frequency type inverter (e.g. IGBT) requiring high input voltage (more than 400 V) is necessary. When the wiring distance is long, the withstand voltage of the motor must be taken into consideration. Contact us in such cases.

Life of Major Parts

The electrolytic capacitor, cooling fan, and other parts used for inverters are consumables. Their life substantially depends on the operating condition of inverters. When replacement of the cooling fan is necessary, contact our dealer or service center.

Notes to Inverter Users

The inverter described in this brochure is used for variable-speed operation of 3-phase induction motors for general industry use.

⚠ CAUTION

▼This product is designed and manufactured for use in industrial applications.
When this product is applied to the following applications that have a significant impact on the human, and public functions (nuclear power, aerospace, public transportation, medical instrument and related applications), contact our agency at each time.

▼Our products are manufactured under stringent quality control. However, install a safety device on the equipment side in order to prevent serious accidents or loss when our products are applied to equipment that may cause serious accidents or loss due to failure or malfunction.

▼Do not use the inverter for any load other than 3-phase induction motors.

▼When an explosion-proof motor is selected, pay attention to the installation environment, because the inverter is not an explosion-proof type.

▼Carefully read the "Operation Manual" before use for correct operation.
Read the manual carefully aiso for long-term storage.

▼Electrical work is necessary for installation of the inverter. Leave the electric work to specialists.

The cautions to special motor application

<Pole change motor>
When controlling a pole-change motor with the inverter, select the inverter with current rating higher than the maximum current of the motor.
After stopping the motor, please change poles of the motor.
When poles of the motor is changed during the motor running, the alram of overvoltage or overcurrent occurs.

<Motor with the brake>
The power supply for the brake must be certainly connected to the primary side of an inverter.
The inverter must be "OFF" when the brake is "ON" (the motor is stopped).

<Single-phase motor>
The inverter is not suitable to operate a single phase motor.
If the inverter is used with a single phase motor, there's a possibility of capacitor damage, phase-splitting, or even fire hazard.

Warranty

Warranty period	The warranty shall be 18 months from date of shipment or 12 months after initial operation, whichever is shorter.
Warranty condition	In the event that any problem or damage to the product arises during the "Warranty Period" from defects in the product whenever the product is properly installed and combined with the buyer´s equipment or machines maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agreed upon in writing between the seller and buyer or its customers. the seller will provide, at its sole discretion, appropriate repair or replacement of the product without charge at a designated facility, except as stipulated in the "Warranty Exclusions" as described below. However, if the product is installed or integrated into the buyer´s equipment or machines, the seller shall not reimburse the following cost: removal or re-installation of the product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the buyer or its customers.
Warranty exclusion	Notwithstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the product that is caused by: 1. Installation, connection, combination or integration of the product in or to the other equipment or machine that rendered by any person or entity other than the seller. 2. Insufficient maintenance or improper operation by the buyer or its customers, such that the product is not maintained in accordance with the maintenance manual provided or designated by the seller. 3. Improper use or operation of the product by the buyer or its customers that is not informed to the seller, including, without limitation, the buyer´s or its customer´s operation of the product not in conformity with the specifications. 4. Any problem or damage on any equipment or machine to which the product is installed, connected or combined or any specifications particular to the buyer or its customers. 5. Any changes, modifications, improvements or alterations to the product or those functions that are rendered on the product by any person or entity other than the seller. 6. Any parts in the product that are supplied or designated by the buyer or its customers. 7. Earthquake, fire, flood, salt air, gas, lightning, acts of God or any other reasons beyond the control of the seller. 8. Normal wear and tear, or deterioration of the product´s parts, such as the cooling fan. 9. Any other problems with or damage to the product that are not attributable to the seller.

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