Sumitomo Drive Technologies

Sensorless Vector Inverter

INVERTER

HF-430NEO series

Sumitomo Heavy Industries, Ltd.

No.D3401E-1

Table of Contents

INVERTER HF-430NEO

Features

Inverter HF-430series is much easier to use!
High Performance Inverter HF-430NEO

Easy operation using the colored liquid crystal display!

- Intuitive, easy-to-use LCD operator is standard.
- Easily monitor, set, or review operational data and parameters.

5.5kW 200V class (HF4322-5A5)

15kW 200V class (HF4322-015)

Powerful operation for the Geared motor!

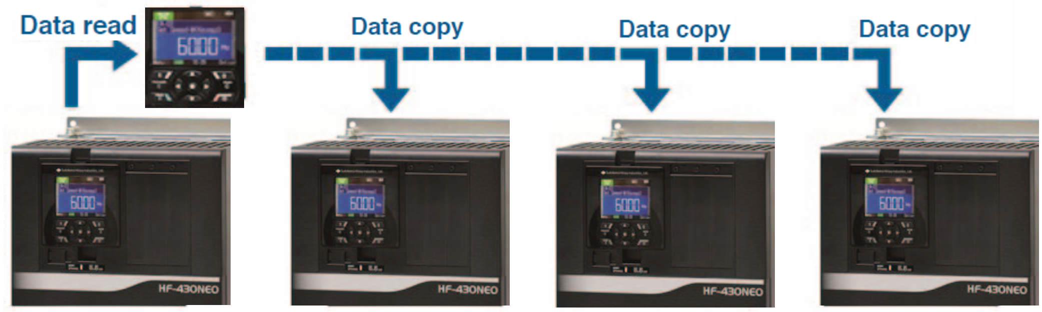
- The sensor-less vector control provides High starring torque and High performance. (Starting Torque 150% or more)

Cyclo® Gearmotor

Features

Easy data copy to multiple inverters!

- Operation panel is removable and memory is built in.
  Parameter data can be copied to multiple inverters, which allows users to replace inverter in a short working time.



Optional Cassette

- Optional cassettes are able to connect easily to HF-430NEO.
- Optional cassette is preparing a communication option and Analog Input/output.
  Analog Input/output：P1-AG
  Communication：PROFIBUS, PROFINET, CC-Link

Easy Maintenance

- Cooling fun and the capacitor for the main circuit is designed for 10 years life.
- When the life of component (cooling fan or capacitor) is near its end, an alarm can be generated based on self-diagnosis.
- If the battery (CR2023) is used, real time data is retained even when the power is turn off.

Power Range

Voltage class (Input/Rated Output)	Applicable Motor(kW)								
	5.5	7.5	11	15	22	30	37	45	55
3-phase 200V/3-phase 200V									
3-phase 400V/3-phase 400V									

Model No.

HF432 **2** **—** **5A5**

- HF432: HF430 NEO Series(HF432)
- 2: Power supply
  2：3-phase 200V
  4：3-phase 400V
- 5A5: Output power
  5A5：5.5kW 015：15kW 037：37kW
  7A5：7.5kW 022：22kW 045：45kW
  011：11kW 030：30kW 055：55kW

Operation

Operator Keypad

F1 Key
Displays functions such as navigation to the home screen and cancellation at the bottom left of the screen.

Power LED

RUN Key
The inverter runs when this key is enabled.

Arrow keys & SEL key (center)
Select data on the screen using arrow keys, and confirm by pressing the O key in the center.

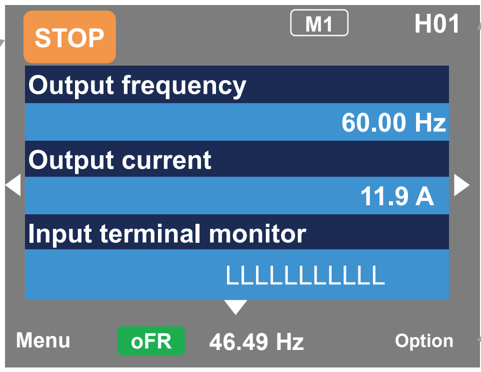
F2 Key
Displays functions such as data storage at the bottom right of the screen.

RUN LED

STOP/RESET Key
Performs deceleration stop and trip reset.

Colored Liquid Crystal Display

Visualization Icon
RUN, STOP and other is very obvious.
For this icon, error diagnosis is also easy.



Setting visualization Icon
Some of the setting is easy to understand.

Assist bar
Show function F1, F2
And RUN key to assist user operation.
Also clock information can be Shown in this area.

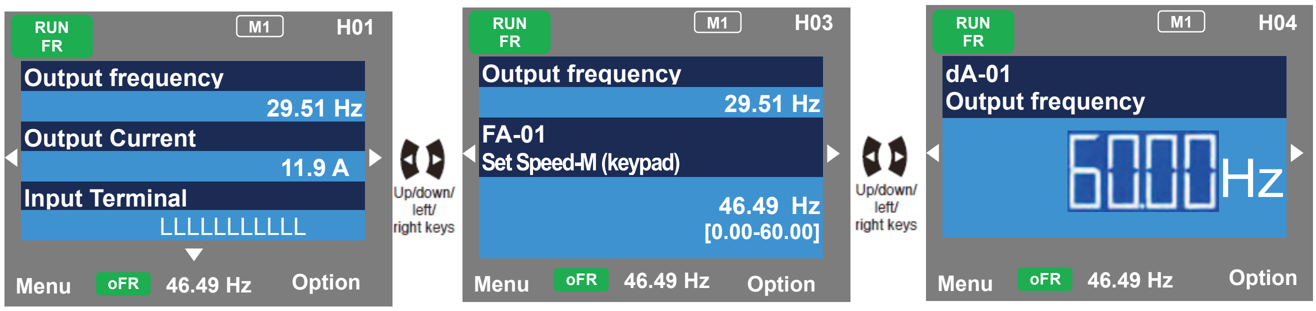
Background color can be selected.
Selectable from Blue/Green/Gray.
Easy visualization can be achieved in every cases!

< Icon Display >

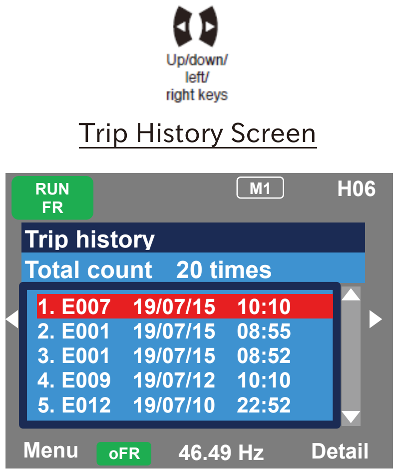
RUN FR	The motor is in forward running.	LIM	Output frequency is limited by such as overload.
RUN RR	The motor is in reverse running.	ALT	The inverter is in overload notice or Thermal notice.
TRIP	The inverter is in trip status	NRDY	The inverter cannot be operated in the RUN command.
STOP	Operation command is entered, but the Inverter is forced stop.	FAN	The inverter is in Fan life notice state.
STOP	The inverter is stopped. Because operation command is OFF.	C	The inverter is in capacitor life of the control board notice state.

Monitor Screen and Parameter Setting

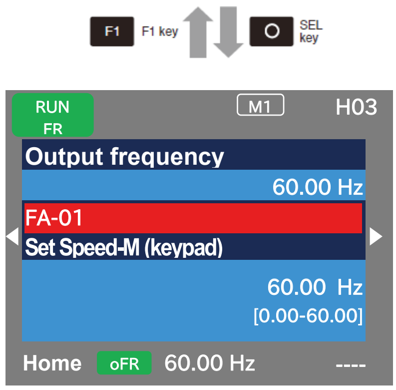
Monitor Screen　　Parameter Setting Screen　　Wide Monitor Screen



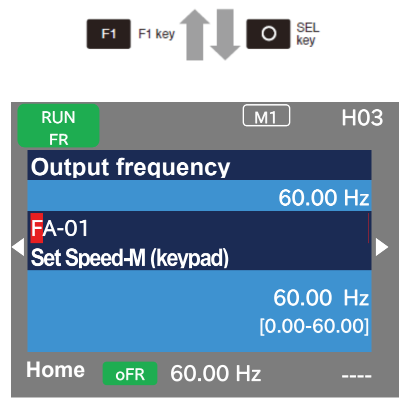
Trip History Screen

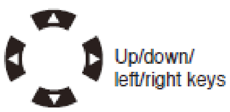


It is easy to access the parameters you want to set.
EX. FA-01＝60Hz → 30Hz

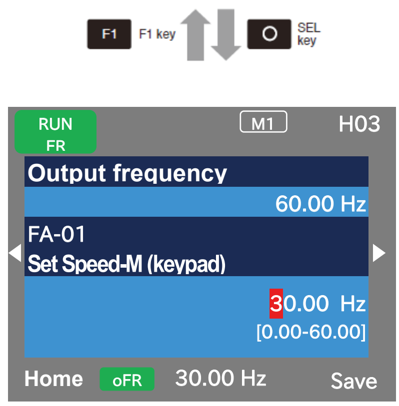


Either monitoring changes or parameter change is selected by the △▽ key.





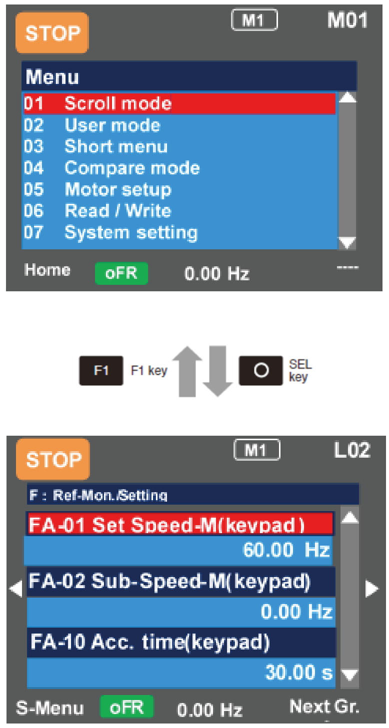
Select change parameter



Select the setting value with the arrow keys

Set FA-01＝30Hz

It is easy to set the parameters in Scroll mode.



Specifications

200V class Specifications

Model name			HF4322-								
			5A5	7A5	011	015	022	030	037	045	055
Applicable motor(4 poles)(kW)			5.5	7.5	11	15	22	30	37	45	55
Output	Rated output current (A)		24.0	32.0	46.0	64.0	95.0	121	145	182	220
Output	Overload current rating		150% 60s / 200% 3s								
Output	Rated output voltage		Three-phase(3 wire)200 to 240V (Corresponding to the incoming voltage)								
Output	Rated capacity (kVA)	200V	8.3	11.1	15.9	22.1	32.9	41.9	50.2	63.0	76.2
Output	Rated capacity (kVA)	240V	9.9	13.3	19.1	26.6	39.4	50.2	60.2	75.6	91.4
Input	Rated input AC voltage Note:1		Control power supply : Single-phase 200 to 240V , Permissible AC voltage 170 to 264 , 50Hz/60Hz(±5%)								
Input	Rated input AC voltage Note:1		Three-phase(3 wire) 200 to 240V , Permissible AC voltage 170 to 264 , 50Hz/60Hz(±5%)								
Input	Power supply capacity (kVA) Note:2		11.3	14.5	20.9	29.0	43.1	55.3	66.2	82.6	99.8
Carrier frequency variation Note:3			0.5～16.0kHz								
Starting torque Note:4			150%								
Regenerative brake			Internal BRD circuit (external discharge resistor value)					External regenerative braking unit			
Minimum resistance value(Ω)			16	10	10	7.5	5	-	-	-	-
Dimensions Note:5	H (height) (mm)		260	260	260	390	390	540	550	550	700
Dimensions Note:5	W (width) (mm)		210	210	210	245	245	300	390	390	480
Dimensions Note:5	D (Depth) (mm)		170	170	170	190	190	195	250	250	250
Protective structure			IP20 / UL open type								
Aprox. weight (kg)			6	6	6	10	10	22	33	33	47

400V class Specifications

Model name			HF4324-								
			5A5	7A5	011	015	022	030	037	045	055
Applicable motor(4 poles)(kW)			5.5	7.5	11	15	22	30	37	45	55
Output	Rated output current (A)		12.0	16.0	23.0	32.0	48.0	58.0	75.0	90.0	110
Output	Overload current rating		150% 60s / 200% 3s								
Output	Rated output voltage		Three-phase(3 wire)380～500V (Corresponding to the incoming voltage)								
Output	Rated capacity (kVA)	400V	9.7	13.1	15.9	22.2	33.3	40.2	52.0	62.1	76.2
Output	Rated capacity (kVA)	480V	9.9	13.3	19.1	26.6	39.9	48.2	62.3	74.8	91.4
Output	Rated capacity (kVA)	500V	10.4	13.9	19.9	27.7	41.6	50.2	65.0	77.9	95.3
Input	Rated input AC voltage Note:1		Control power supply : Single-phase 380 to 500V , Permissible AC voltage 323 to 550V , 50Hz/60Hz(±5%)								
Input	Rated input AC voltage Note:1		Three-phase(3 wire) 380 to 500V , Permissible AC voltage 323 to 550 , 50Hz/60Hz(±5%)								
Input	Power supply capacity (kVA) Note:2		13.4	17.2	22.7	29.0	43.5	55.3	68.0	82.6	101.6
Carrier frequency variation Note:3			0.5～16.0kHz								
Starting torque Note:4			150%								
Regenerative Brake			Internal BRD circuit (external discharge resistor value)							External regenerative braking unit	
Minimum resistance value (Ω)			70	35	35	24	20	15	15	10	10
Dimensions Note:5	H (height) (mm)		260	260	260	390	390	540	550	550	550
Dimensions Note:5	W (width) (mm)		210	210	210	245	245	300	390	390	390
Dimensions Note:5	D (Depth) (mm)		170	170	170	190	190	195	250	250	250
Protective structure			IP20 / UL open type								
Aprox. weight (kg)			6	6	6	8.5	8.5	22	31	31	31

＊ND rating is initial set parameter.(Overload current rating：150% 60sec)

Note: 1. Following are for Low Voltage Directive (LVD) compliant.
- Pollution degree 2
- Overvoltage category 3

2. The power supply capacity is the value of the rated output current at 220V. The value of the impedance at the supply side changes due to the wiring, breaker, input reactor, etc.
3. It is necessary to set the carrier frequency settings [bb101]/ [bb201] equal or greater than the (maximum output frequency x 10) Hz. For induction motor IM, set the carrier frequency to 2 kHz or more except V/f control. For synchronous motor (SM), permanent magnet motor (PMM) set the carrier frequency to 8 kHz or more.
4. The value is specified for the standard motor controlled by the sensor less vector control when ND rating.
Torque characteristics may vary by the control system and the use of the motor.
5. The key height of keypad are exclued from dimensions. When an option is connected, the depth is increased. Refer to the each optional instruction.

Specifications

Common specifications(1)

PWM system			Sine-wave PWM system	
Output frequency range [Note:1]			0.00～590.00Hz	
Frequency accuracy			For the highest frequency, digital±0.01%, analog±0.2% (25±10℃)	
Frequency resolution			Digital: 0.01Hz; Analog: Max. frequency/4000 (VRF terminal/IRF terminal:12bit/0～+10V or 0～+20mA, VF2 terminal 12bit/-10～+10V)	
Control system [Note:2]			IM	V/f control (constant torque/reduced torque/ free / automatic boost control) V/f with encoder(constant torque/reduced torque/ free / automatic boost control) Cascade type sensorless vector control, 0Hz sensorless vector control, Vector control with encoder
			SM/PMM	synchronous startup for smart sensorless vector control , IVMS start type sensor less vector control
Speed fluctuation [Note:3]			±0.5%(sensorless vector control)	
Acceleration/deceleration time			0.00～3600.00s (Linear, S-curve, U-curve, Inverted-U-curve, EL-S-curve)	
Display			Output frequency, Output current, Output torque, trip history, input/output terminal status, input/output terminal function input/output power, PN voltage, etc, the rest is described in the chapter 4.	
Start functions			DC braking after the start, matching frequency after the start, active frequency matching start, Low-voltage start, retry restart	
Stop functions			After free run stop, deceleration stop, DC braking or external DC braking operation (Braking force, time, adjustment of operation speed)	
Stall prevention function			Overload limit function, overcurrent supression, overvoltage suppresion function	
Protection functions [Note:4]			Overcurrent error, overload error, brake resistor overload, overvoltage error, memory error, undervoltage error, current detector error, CPU error, external trip error, USP error, ground error, supply overvoltage error, power loss error, temperature detector error, Cooling-fan rotation speed decrease, temperature error, phase input error, IGBT error, phase output error, thermistor error brake error, low-speed range overload error, inverter overload, RS485communication error, RTC error, the rest is described in the chapter 5.	
Other functions			V/f free setting (7 points), upper and lower speed limit, speed jump, curve acceleration and deceleration, manual torque boost energy-saven operation, analog output adjustment, minimun speed, carrier frequency adjustment, motor electronic thermal function(free is possible), inverter thermal function, external start-end(speed and rate), frequency input selection, trip retry, restart stop, various signal output, inilization setting, PID control, auto-decel at shut-off, brake control function, commercial switching function, auto-tuning (on/offline), etc. the rest is described in the chapter 4.	
Input	Frequency reference Panel	Panel	UP, DOWN keys according to the set parameter.	
		External signal [Note:5]	VRF/IRF terminal (for voltage input)	0～10Vdc set by the voltage input (Input impedance:10kΩ)
			VRF/IRF terminal (for current input)	0～20mA set by the current input (Input impedance:100Ω)
			VF2 terminal	-10～+10Vdc set by the voltage input (Input impedance:10kΩ)
			Multi-speed terminal	16multi-speed(With the use of the intelligent input terminal)
			Pulse train-input	Maximum 32kHz×2
		Communication port	RS485 serial communication (Protocol: Modbus-RTU)	
	RUN Stop Forward/Reverse	Keypad	By RUN/Stop key (With the set parameter, forward/reverse can be switched)	
		External signal	Forward (FR)/Reverse(RR)(When input terminal functions are allocated) 3-wire input allowed(When input terminal functions are allocated)	
		Communication Port	Set by RS485 communication (Maximum: 115.2kbps)	
	Input terminals		11 terminals (A or B terminal accept a pulse train)	
			FR(Forward rotation)/RR(Reverse rotation), DFL/DFM/DFH/DHH(Multi-speed 1～4), SF1～7(Multi-speed bit 1～7), ADD(Trigger for frequency addition), AUT(Command change), STA(3-wire start)/STP(3-wire stop)/ F/R(Forward/reverse by 3-wire), AHD(Analog command holding, UP(Remote control up)/DWN(Remote control down), UDC(Remote data clearance), F-OP(Forcible operation), SET(2nd-motor), RST(Reset), JOG(Jogging), DB(External DC braking), AD2(2-stage accel/decel), MBS(Free-run stop), ES(External trip) USP(Unattended start protection), CS(Commercial power supply switching), SFT(Software lock), BOK(Braking confirmation) OLR(Overload restriction selection), KHC(Accumulated input power clear), OKHC(Accumulated input), PID(PID1 disable), PIDC(PID1 integration reset), PID2(PID2 disable), PIDC2(PID2 integration reset), PID3(PID3 disable), PIDC3(PID3 integration reset), PID4(PID4 disable), PIDC4(PID4 integration reset), SVC1～4(PID1 multistage target value 1～4), PRO(PID gain change), PIO1(PID output change 1), PIO2(PID output change 2), SLEP(SLEEP trigger)/WAKE(WAKE trigger), TL(Enable torque limit), TRQ1/2(Torque limit 1/2), PPI(P/PI switching), CAS(Control gain switching), SON(Servo-ON), FOC(Forcing), ATR(Enable torque command input), TBS(Enable torque bias), ORT(Home search function), LAC(LAD cancellation), PCLR(Position deviation clearance), STAT(Enable 90° -shift phase) PUP(Position bias addition), PDN(Position bias subtraction), CP1～4(Multistage position 1～4), ORL(Zero-return limit function) ORG(Zero-return trigger function), FOT(Forward drive stop), ROT(Reverse drive stop), SPD(Speed/position change), PSET(Position data pre-set), PCC(Pulse counter clearance), HLD(accel/decel stop), REN(Motion enable signal), DISP(Display lock), PLA(Pulse train input A), PLB(Pulse train input B), EMF(Emergency-force drive activation), COK(Contactor check signal), DTR(Data trace start signal) PLZ(Pulse train input Z), TCH(Teach-in signal)	
	Backup supply terminal		P+/P-: DC24V input(Input allowable voltage: 24V±10%)	
	Functional safety STO input terminal		2 terminals (Simultaneous input)	
	Thermistor input terminal		1 terminal (PTC/NTC resistor allowed)	

Note: 1. Output frequency range will depend on the motor control method and the motor used. Consult the motor manufacturer for the maximum allowable frequency of the motor when operating beyond 60Hz.
2. In case of the control mode is changed and the motor constant is not set appropriately, the desired starting torque cannot be obtained and also exists the possibility of tripping.
3. Regarding the speed range regulation of motor, the variable range depends on the client system and the environment in which the motor is used.
4. If the IGBT error [E030] occurs by the protective function, it may have happened by the short-circuit protection, but also can occur if the IGBT is damaged. Depending on the operation status of the inverter, instead of the IGBT error, the overcurrent error [E001] may also occur.
5. At factory setting, the maximum output frequency for analogue input signal VRF/IRF is adjusted to 9.8V for voltage input and 19.6mA for current input. In order to adjust the specification use analogue start/end function.

Specifications

Common specifications(2)

Output	Output terminals	Transistor output terminal 5, 1a contact relay 1 point, 1c contact relay 1 point	
Output	Relay/Alarm relay (1a, 1c) function	DRV(While in run), UPF1〜5(Reached frequency signal), IRDY(Inverter ready), FRR(Forward rotation), RRR(Reverse rotation), FREF(panel frequency reference), REF(panel motion operation), SETM(2nd-motor selected), OPO(Option-Output), AL(Alarm signal), MJA(Major failure signal), OTQ(Over-torque), IP(Power loss), UV(Undervoltage), TRQ(Torque limited), IPS(Decel. Power loss), RNT(RUN time exceeded), ONT(ON time exceeded), THM(Motor electronic thermal warning), THC(Electronic thermal warning), WAC(Capacitor life warning), WAF(Cooling-fan life warning), FS(Operation signal), OHF(heat sink overheat warning), LOC/LOC2(Low-current indication signal), OL/OL2(Overload warning signal 1/2), BRK(Brake release)/BER(Brake error)/CON(Contactor control), ZS(0Hz detection signal) DSE(Maximum speed deviation), PDD(Maximum position deviation), POK(Positioning completed), PCMP(Pulse counter compare output) OD/OD2/OD3/OD4(Output deviation for PID control), FBV/FBV2/FBV3/FBV4(PID feedback comparison), NDc(Communication disconnection), VRFDc/IRFDc/VF2Dc(Analog VRF/IRF/VF2 disconnection), Ai4Dc/Ai5Dc/Ai6Dc(Option analog Ai4/Ai5/Ai6 disconnection) WCVRF/WCIRF/WCVF2(Window comparator VRF/IRF/VF2), WCAi4/WCAi5/WCAi6(Window comparator Ai4/Ai5/Ai6),LOG1〜7(logical operation result 1〜7),EMFC(Emergency force drive indicator),EMBP(Bypass mode indicator), WFT(Trace waiting signal), TRA(Trace running signal), LBK(Low battery of panel), OVS(Overvoltage power Supply), AC0-3(Alarm code bit-0 to 4), SSE(PID soft start error)	
Output	EDM output terminal	Functional safety diagnostic output	
Output	Output terminal monitor [Note:6]	The data of the monitor can be selected by the parameter of the output.	
EMC filter [Note:7]		EMC filter can be enable (The filter exchange method can alter depending on the model)	
PC external access		USB Micro-B	
Operating environment	Ambient temperature	ND	-10〜50℃
Operating environment	Ambient temperature	LD	-10〜45℃
Operating environment	Ambient temperature	VLD	-10〜40℃
Operating environment	Storage temperature [Note:8]	-20〜65°	
Operating environment	Level of humidity	20〜90%RH(No condensation allowed)	
Operating environment	Vibration tolerance [Note:9]	Model: up to HF4322-022 and up to HF4324-022	5.9m/s2 (0.6G), 10〜55Hz
Operating environment	Vibration tolerance [Note:9]	Model: more than HF4322-030 and more than HF4324-030	2.94m/s2 (0.3G), 10〜55Hz
Operating environment	Installation place [Note:10]	A maximum altitude of 1000m, without gases or dust.	
Components life span		The life span of the main circuit smoothing capacitors is 10 years.	
Components life span		The life span of the cooling-fan is 10 years.	
Conformity standars [Note:11]		UL, cUL, CE marking, RCM Functional safety (STO function/ IEC61800-5-2,IEC62061,IEC61508: SIL3/ EN ISO13849-1: Cat.4 PLe)	
Coating color		Black	
Optional slots		3 ports	
Optional boards	Input/ouput option	Analog input/output option (available soon)	
Optional boards	Communication option [Note:12]	CC-Link, PROFIBUS, PROFINET, Ethernet (Modbus-TCP)	
Optional boards	Feedback option	Line driver input (RS422)	
Optional boards	Functional safety option	Functional safety option(STO/SS1/SBC/SLS/SDI/SSM function / IEC61800-5-2,IEC62061,IEC61508: SIL3/ EN ISO13849-1: Cat.4 PLe)	
Other optional components		Braking resistor, AC reactor, DC reactor, Noise filter,Radio noise filter, Zero phase reactor,operator cable, regenerative braking unit, PC software	

Note: 6. The analogue voltage and analogue current monitor are estimated outputs of the analogue meter connection. Maximum output value might deviate slightly from 10V or 20mA by variation of the analogue output circuit. If you want to change the characteristics, adjust the Ao1 and Ao2 adjustment functions.
There are some monitor data that cannot be output.

7. In order to enable the EMC filter, connect to the neutral grounding supply. Otherwise, the leakage current may increase.
8. Storage temperature is the temperature during transport.
9. In accordance with the test methods of JIS C 60068-2-6:2010(IEC 60068-2-6:2007).
10. In case of utilization at an altitude of 1000m or more, take into account that the atmospheric pressure is reduced by 1% for every 100m up. Apply 1% derating from the rated current by increasing every 100m, and conduct an evaluation test.
When using above 2500m ambient, please contact Hitachi Inverter distributer.
11. Insulation distance is in accordance with the UL and CE standards.
12. Modbus is a registered trademark of Schneider Automation Inc.
PROFIBUS® and PROFINET® is registered trademark of PROFIBUS Nutzerorganisation e.V. (PNO).

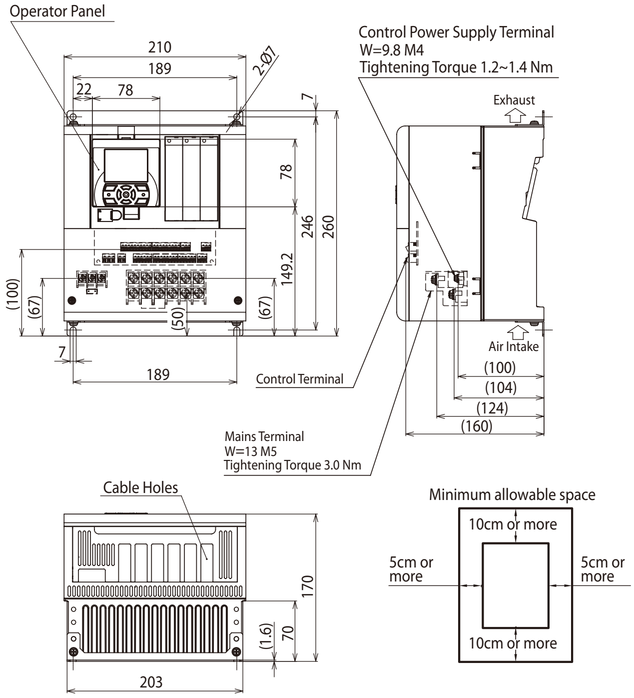
Protective Functions

Error Code

Error Code	Name	Explanation
E001	Overcurrent error	A large current flowing in the inverter results in a failure. To prevent this, the inverter turns OFF its output.
E005	Motor overload error	The built-in electronic thermal function monitors the output current of the inverter and when a motor overload is detected, the inverter turns OFF its output.
E006	Braking resistor overload error	When the use rate of inverter's braking resistor operation circuit (BRD) exceeds the use rate set beforehand in [bA-60], the inverter turns OFF its output.
E007	Overvoltage error	Too high P-N voltage results in a failure. To prevent this, the inverter turns OFF its output. When P-N voltage exceeds approx. 410Vdc (200V class) or approx. 820Vdc (400V class), the output is turned OFF.
E008	Memory error	If the built-in memory has problems, the inverter turns OFF its output. CPU error may be issued instead. The inverter recovers by re-turning ON the power; however, you need to check that there is no problem in parameters.
E009	Under voltage error	A decrease of the main power supply of inverter results in a circuit breakage. To prevent this, the inverter turns OFF its output. When P-N voltage falls below approx. 160Vdc (200V class) or approx. 320VDC (400V class), the output is turned OFF.
E010	Current detector error	If the built-in current detector has problems, the inverter turns OFF its output.
E011	CPU error	When a malfunction or problem occurs in the built-in CPU, the inverter turns OFF its output and then displays the error.
E012	External trip error	When the inverter accepted a signal commanded by an external device or equipment, the inverter turns OFF its output. (When external trip function is selected.)
E013	USP error	This error occurs if an operation command has been input to the inverter when the power supply is turned ON. Operation command detection is carried out for 1 second after the power supply is turned ON. (When USP function is selected.)
E014	Ground fault error	This is a function to protect the inverter by the detection of ground faults between the inverter output and the motor at power-on. The function doesn't work when there is a voltage induced in the motor due to idling or when the inverter trips.
E015	Incoming overvoltage error	This error occurs if high incoming voltage level is held for 100 seconds continuously while the inverter output is stopped when incoming overvoltage level [bb-61] is set to 01. It occurs when the P-N voltage exceeds the voltage level set in the incoming overvoltage level selection [bb-62] due to incoming voltage.
E016	Instantaneous power failure error	At the time of an instantaneous power failure, the inverter turns OFF its output. (15ms and over) If the power failure continues, the event is regarded as a normal power-off.
E019	Temperature detector error	This error occurs if there is a problem in the temperature detector circuit such as disconnection.
E020	Cooling fan rotation speed reduction error	If the temperature of inverter gets high due to deterioration of cooling ability resulted from decrease in fan rotation speed, the inverter turns OFF its output.
E021	Temperature error	When the temperature of inverter gets high, the inverter turns OFF its output.
E024	Input open-phase error	When [bb-65] input phase loss selection is set to 01, when a missing phase is detected in input line, the inverter turns OFF its output.
E030	IGBT error	At the time of an instantaneous overcurrent or the main element failure, the inverter turns OFF its output to protect the main element. Overcurrent error may be issued instead.
E034	Output open-phase error	When the output phase loss selection [bb-66] is set to 01, when a loose connection or disconnection of output line, disconnection inside the motor, etc. is detected, the inverter turns OFF its output. Detection of phase loss state is executed in the section between 5Hz to 100Hz.
E035	Thermistor error	If an abnormal temperature is observed during detection of resistor level change in an external thermistor, the inverter turns OFF its output. (When thermistor function is enabled.)
E036	Brake error	This is error occurs when the inverter cannot detect whether the brake check signal is ON or OFF during waiting time after the inverter has output a brake releasing signal. (When brake function is enabled.)
E038	Low-speed range overload error	This error occurs to protect the main element if the inverter has output at a low frequency of 0.2Hz or below. When such a low frequency is detected by the built-in electronic thermal function, the inverter turns OFF its output.
E039	Inverter overload error	The built-in electronic thermal function monitors the output current of the inverter and when inverter overload is detected, the inverter turns OFF its output.
E040	Operator keypad communication error	The inverter displays this error when timeout occurs because of a malfunction due to noises, loose connection or disconnection of circuit for communication with the operator keypad.
E041	RS485 communication error	The inverter displays this error only when timeout occurs because of a malfunction due to noises, loose connection or disconnection of circuit for RS485 communication (such as Modbus-RTU).
E042	RTC error	The error is generated if the data of RTC incorporated in the operator keypad is returned to the initial data.

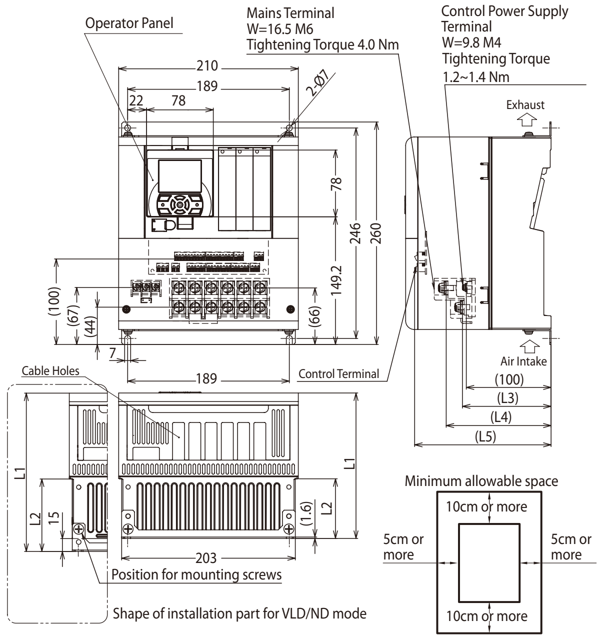
Outline Drawing

200V Class：HF4322-5A5(5.5kW), HF4322-7A5(7.5kW)
400V Class：HF4324-5A5(5.5kW), HF4324-7A5(7.5kW)



Weight：6kg

200V Class：HF4322-011(11kW)
400V Class：HF4324-011(11kW)



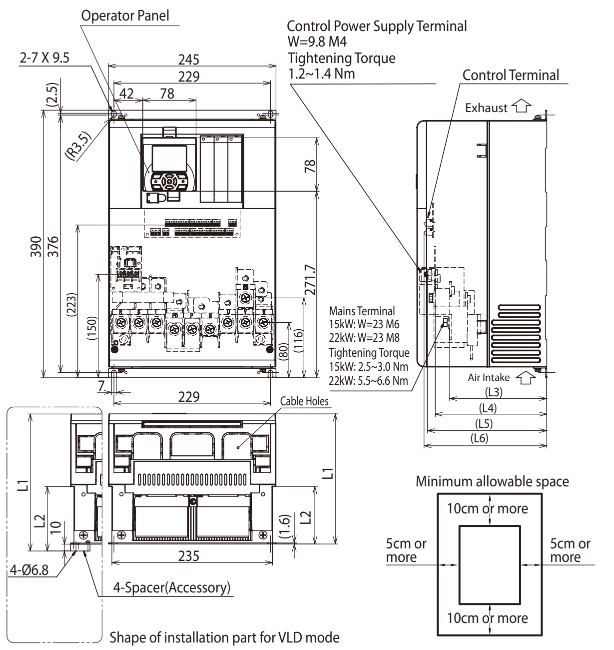
Dimension for each load mode

Voltage	Load Mode	L1	L2	L3	L4	L5
200V	VLD/LD	185	85	119	138	175
	ND	170	70	104	123	160
400V	VLD/LD/ND					

Unit: mm

Weight：6kg

200V Class：HF4322-015(15kW), HF4322-022(22kW)



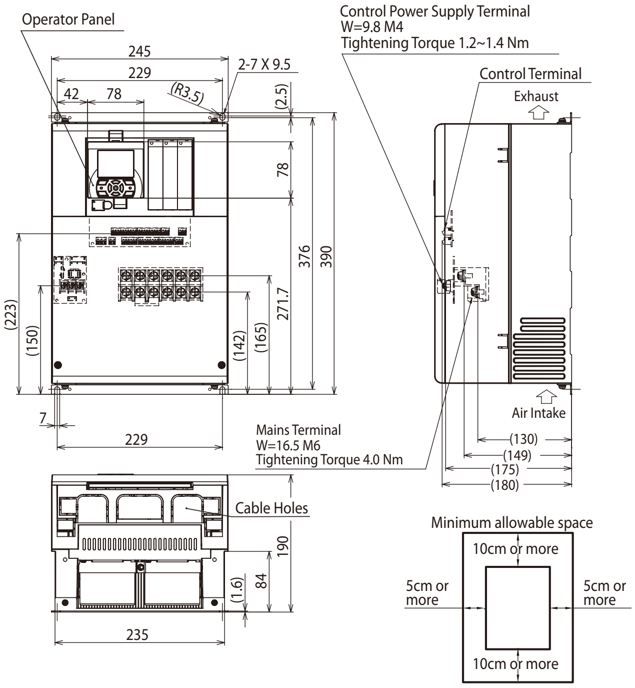
Dimension for each load mode

Capacity	Load Mode	L1	L2	L3	L4	L5	L6
22kW	VLD	200	94	152	173	185	190
	LD/ND	190	84	142	163	175	180
15kW	VLD/LD/ND						

Unit: mm

Weight：10kg

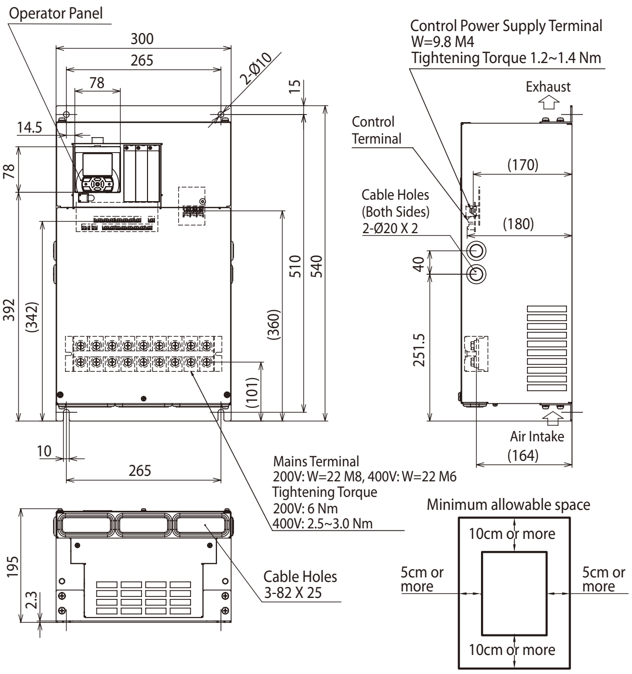
400V Class：HF4324-015(15kW), HF4324-022(22kW)



Weight：8.5kg

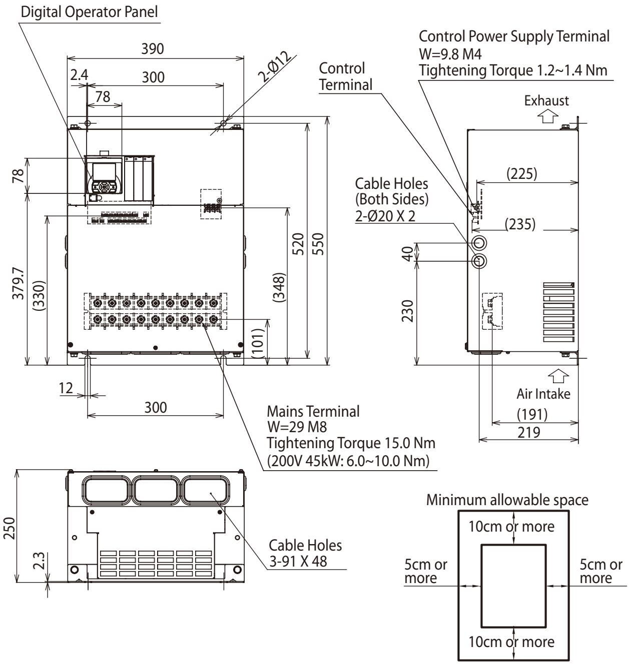
Outline Drawing

200V Class：HF4322-030(30kW)
400V Class：HF4324-030(30kW)



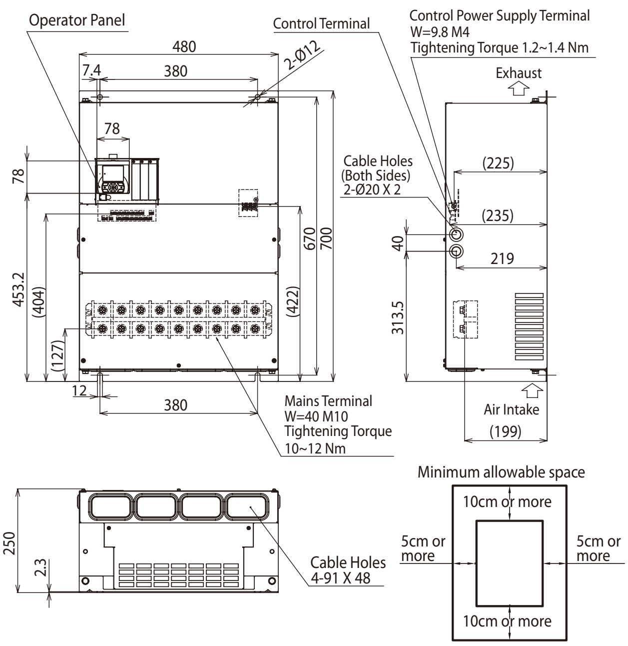
Weight：22kg

200V Class：HF4322-037(37kW), HF4322-045(45kW)
400V Class：HF4324-037(37kW), HF4324-045(45kW)
HF4324-055(55kW)



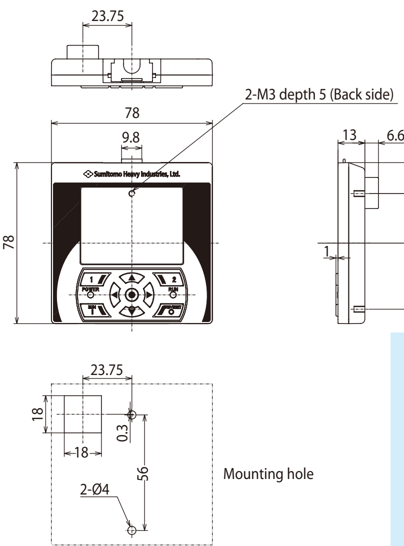
Weight：200V Class 33kg, 400V Class 31kg

200V Class：HF4322-055(55kW)



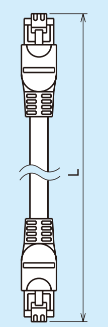
Weight：47kg

Operator Panel (OS-44)



Weight：0.1kg

●ICS-1, 3
(Cable for OS44)



Model	L(m)
ICS−1	1
ICS−3	3

Terminals

Main Circuit Terminals

Terminal Description

Symbol	Terminal Name	Description
R,S,T (L1,L2,L3)	Main power input terminals	Connect to the AC power supply.
U,V,W (T1,T2,T3)	Inverter output terminals	Connect a Three-phase motor. [Note]
P1,P (+)	DC reactor connection terminals	Remove the P1-P jumper from terminals, and connect the optional DC choke for power factor improvement.
P,PR (+)	External braking resistor connection terminals	Connect the optional external braking resistor. (HF4322-5A5 to 022 and HF4324-5A5 to 037)
P,N (+,-)	External braking unit connection terminals	Connect the optional external braking unit. (HF4322-030 to 055 and HF4324-045、055)
E(G) ⏚	Ground connection terminals	Connect the optional regenerative braking unit.
r1、t1	Control power supply input terminals	This serves as a ground terminal for the inverter chassis to ground. Connect 200V class and 400V class models to Type-D grounding and Type-C grounding, respectively.

Note: When operating with sensorless vector control, be sure to connect the motor.

Screw Diameter and Terminal width

Model	r1, t1 Terminal	Ground Terminal	Other Terminal	Terminal width (mm)	Terminal Arrangement
HF4322-5A5、7A5 / HF4324-5A5、7A5(5.5、7.5kW)	M4	M5	M5	13	Fig.1
HF4322-011(11kW)/ HF4324-011(11kW)	M4	M6	M6	16.5	
HF4322-015(15kW)	M4	M6	M6	23	Fig.2
HF4322-022(22kW)	M4	M6	M8	23	
HF4322-030(30kW)	M4	M6	M8	22	Fig.3
HF4322-037(37kW)/ HF4322-045(45kW)	M4	M8	M8	29	
HF4322-055(55kW)	M4	M8	M10	40	
HF4324-015(15kW)/ HF4324-022(22kW)	M4	M6	M6	16.5	Fig.4
HF4324-030(30kW)	M4	M6	M6	22	Fig.5
HF4324-037～HF4324-045(37～55kW)	M4	M8	M8	29	

Terminal Arrangement

Fig.1 200V class : HF4322-5A5～HF4322-011(5.5～11kW)
400V class : HF4324-5A5～HF4324-011(5.5～11kW)

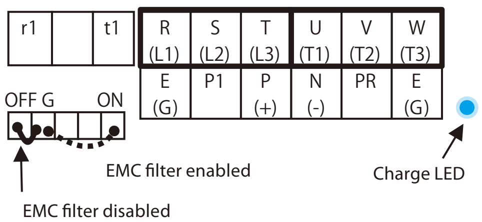


Fig.4 400V class:HF4324-015、HF4324-022(15、22kW)

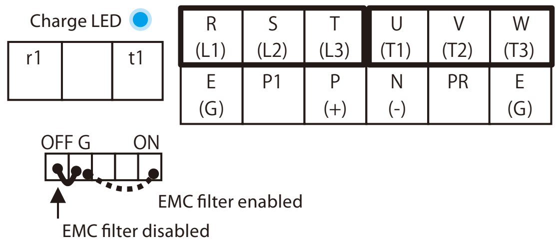


Fig.2 200V class:HF4322-015、HF4322-022(15、22kW)

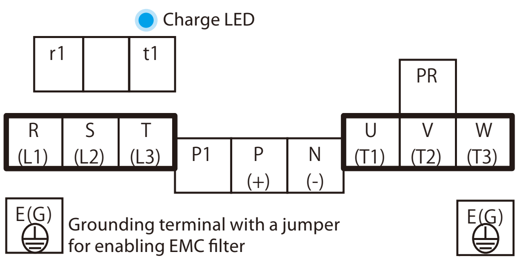


Fig.5 400V class:HF4324-030～HF4324-055(30～55kW)

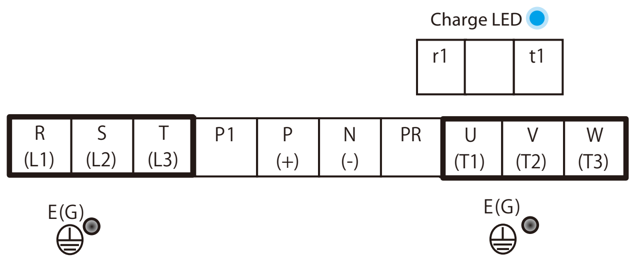
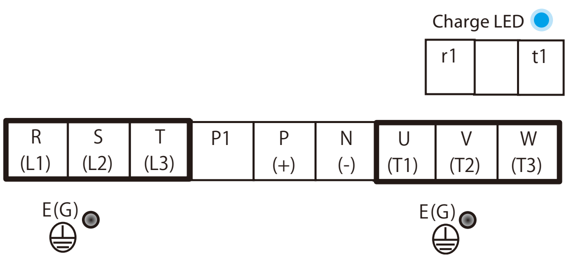
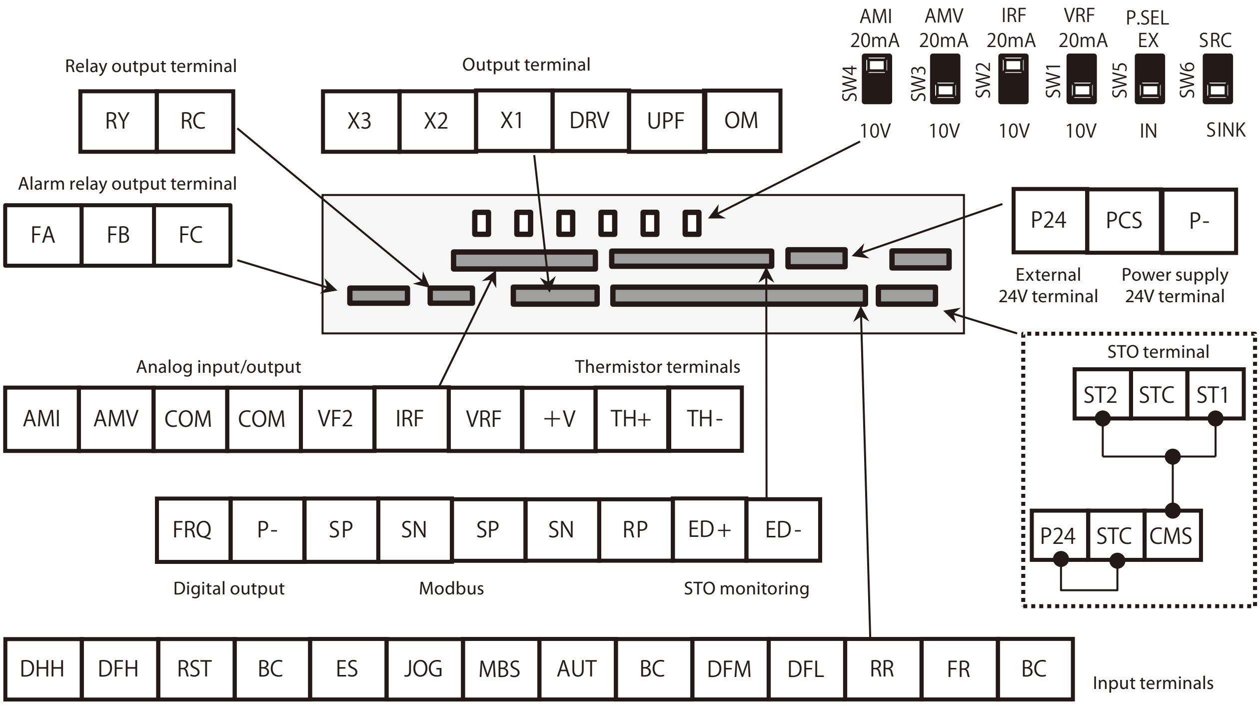


Fig.3 200V class:HF4322-030～HF4322-055(30～55kW)



Control Circuit Terminals

Terminal Arrangement



Configuration of Switches

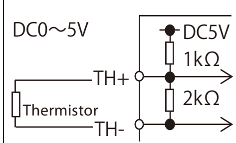
Indication	Name of Switch	Description
SW1	Analog input 1 selector	It changes the input specification of Analog input 1 (VRF terminal). 10V: Voltage input is available. 20mA: Current input is available.
SW2	Analog input 2 selector	It changes the input specification of Analog input 2 (IRF terminal). 10V: Voltage input is available. 20mA: Current input is available.
SW3	Analog output 1 selector	It changes the output specification of Analog output 1 (AMV terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
SW4	Analog output 2 selector	It changes the output specification of Analog output 2 (AMI terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
SW5	Change of the power supply Method to input terminals	It changes the power source for input terminals. IN: Internal power source. EX: External power source. (While setting EX, it requires an external power supply between input terminals and COM terminal)
SW6	Input terminal Sink/Source logic switching	It changes the sink or source logic for input terminal. This Is enabled when SW5 is in IN position. SINK: Switch to Sink logic. SRC: Switch to Source logic.

Terminal Description

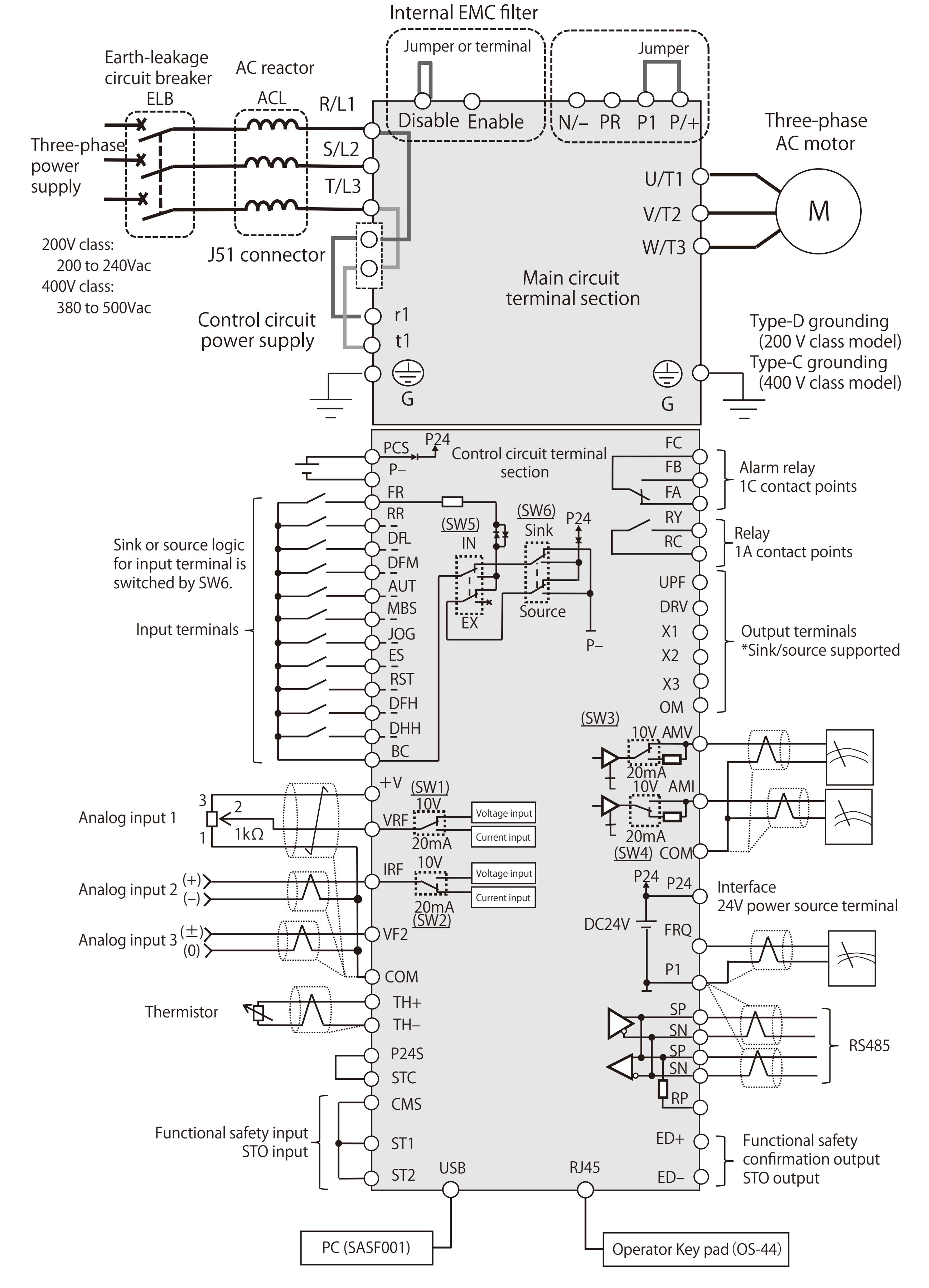
		Symbol	Terminal Name	Description	Electric characteristics
Analog Input/ output terminal	Power Supply	COM	COM for analog power supply	COM terminals for analog input terminals (VRF, IRF, VF2) and analog output terminals (AMV, AMI). Two COM terminals are available.	-
		+V	Speed setting power supply	DC10V power supply. Used for voltage input with analog input terminals (VRF, IRF, VF2) using a variable resister.	Max. allowable input current 20mA
	Analog Input	VRF	Analog input terminal 1 (voltage/current selector SW1)	Either VRF or IRF can be used by switching the selector switch to DC0 to 10V voltage input or 0- to 20mA current input. Used as speed input and feedback input.	For voltage input: ・Input impedance Approx.10kΩ ・Allowable input voltage DC-0.3V to 12V For current input: ・Input impedance Approx.100Ω ・Max. allowable input current 24mA
		IRF	Analog input terminal 2 (voltage/current selector SW2)		
		VF2	Analog input terminal 3	DC-10 to 10V voltage input is available. Used as speed input and feedback input.	Voltage input only: ・Input impedance Approx.10kΩ ・Allowable voltage input DC-12V to 12V
	Analog Output	AMV	Analog output terminal 1 (voltage/current selector SW3)	Either AMV or AMI can be used as an output for inverter monitoring data by switching the selector switch to DC0 to 10V voltage output or 0 to 20mA current output.	For voltage output: ・Max. allowable output current 2mA ・Output voltage accuracy ±10% (Ambient temperature:25±10 degrees C) For current input: ・Allowable load impedance 250Ω or less ・Output current accuracy ±20% (Ambient temperature:25±10 degrees C)
		AMI	Analog output terminal 2 (voltage/current selector SW4)		

Terminals

Terminal Description

	Symbol	Terminal Name	Description	Electric characteristics
Power Supply	PCS	24V output power source terminal	This terminal supplies DC24V power for contact signals.	Max. output 100mA
	P+	Terminal for external 24V input (24V)	Input external DC24V power supply to the inverter. 24V power supply input permit to change parameter settings and perform optional communication operations without control power supply.	Allowable input voltage DC24V±10% Max. allowable current 1A
	P-	Terminal for external 24V input (0V)		
Contact point	FR,RR DFL,DFM AUT,MBS JOG,ES RST	Input terminal	Terminal functions are selectable according to the parameter settings for each terminal. Switching SW6 to SRC or SINK allows you to select SINK or Source logic.	Voltage between each input and COM terminals • ON voltage Min.DC18V • OFF voltage Max.DC3V • Max. allowable voltage DC27V • Load current 5.6mA (at DC27V)
Contact point or Pulse input	DFH	Pulse input-A	This is a terminal for pulse input. A and B terminals can be used also as an input terminal. Terminal functions are selectable according to the parameter settings for each terminal. The maximum input pulse rate is 32kpps.	Voltage between an input and COM terminals • ON voltage Min.DC18V • OFF voltage Max.DC3V • Max. allowable voltage DC27V • Load current 5.6mA (at DC27V) • Max input pulse rate 32kpps
	DHH	Pulse input-B		
Common	BC	Input (common)	This is a common terminal for digital input terminals Three COM terminals are available.	-
Open collector	UPF,DRV X1,X2,X3	Output terminal	Terminal functions are selectable according to the parameter settings for each terminal. This is available for both SINK and Source logics.	Open collector output Between each terminal and CM2 • Voltage drop when turned on: 4 V or less • Max. allowable voltage 27V • Max. allowable current 50mA
	OM	Output (common)	This is a common terminal for output terminals.	-
Relay	RY RC	1a relay terminal	Relays for A contact output	Maximum contact capacity • AC250V, 2A(resistance) • AC250V, 1A(inductive load) (Minimum contact capacity) • DC1V, 1mA
	FA FB FC	1c relay terminal	Relays for C contact output	Maximum contact capacity FB/FC: • AC250V, 2A (resistance) • AC250V, 0.2A (inductive load) FA/FC: • AC250V, 1A (resistance) • AC250V, 0.2A(inductive load) Minimum contact capacity (common) • AC100V, 10mA • DC5V, 100mA
Monitor Output	FRQ	Digital monitor (voltage)	Digital monitor output is selectable from PWM output with 6.4ms cycle or pulse output with a variable duty cycle of approx. 50%.	Pulse train output DC0 to 10V Max. allowable output current 1.2mA Maximum frequency 3.60kHz
	P-	COM for digital monitor	This is a common terminal for digital monitor. This is also used as 0V reference potential for P24.	-
Thermistor	TH+	External thermistor input	Connect to an external thermistor to make the inverter trip if an abnormal temperature is detected. Connect the thermistor to TH+ and TH-. The impedance to detect temperature errors can be adjusted within the range 0Ω to 10,000Ω. [Recommended thermistor properties] Allowable rated power: 100 mW or more Impedance at temperature error: 3kΩ	DC0～5V 
	TH–	Common terminal for external thermistor input		
Serial communication	SP SN RP (P-)	MODBUS terminal (RS-485)	SP terminal: RS-485 differential(+) signal SN terminal: RS-485 differential(-) signal RP terminal: Connect to SP through a termination resistor CM1 terminal: Connect to the signal ground of external communication devices. There are two SP and two SN terminals, which are connected internally. The maximum baud rate is 115.2kbps.	Termination resistor (120Ω) integrated Enabled: RP-SN shorted Disabled: RP-SN opened

Connecting Diagram



Note:1. Common to each terminal varies.
2. DisconnectedJ51 when to supply r1, t1 separately. UV error is issued when main supply is off while in operation.

List of Parameters

Monitors related to output

Code	Name	Data range
dA-01	Output frequency monitor	0.00~590.00 (Hz)
dA-02	Output current monitor	0.0~655.35 (A)
dA-03	Operation direction monitor	F (Normal rotation in process)/r (Reverse rotation in process) /d (0Hz output)/o (Stopped)
dA-04	Frequency command	-590.00~590.00 (Hz)
dA-06	Output frequency conversion monitor	0.00~59000.00 (Hz)
dA-08	Speed detection value monitor	-590.00~590.00 (Hz)
dA-12	Output frequency monitor (with sign)	
dA-14	Frequency upper limit monitor	0.00~590.00 (Hz)
dA-15	Torque command monitor (after calculation)	-1000.0~1000.0 (%)
dA-16	Torque limit monitor	0.0~500.0 (%)
dA-17	Output torque monitor	-1000.0~1000.0 (%)
dA-18	Output voltage monitor	0.0~800.0 (V)
dA-20	Current position monitor	When [AA121]≠10 or [AA123]≠03 -268435455~+268435455 (pls) When [AA121]=10 and [AA123]=03 -1073741823~+1073741823 (pls)
dA-26	Pulse string position deviation monitor	-2147483647~+2147483647 (pls)
dA-28	Pulse counter monitor	0~2147483647 (pls)
dA-30	Input power monitor	0.00~75.00 (kW)
dA-32	Integrated input power monitor	0.0~1000000.0 (kW)
dA-34	Output power monitor	0.00~75.00 (kW)
dA-36	Integrated output power monitor	0.0~1000000.0 (kW)
dA-38	Motor temperature monitor	-20.0~200.0 (° C)
dA-40	DC voltage monitor	0.0~1000.0 (V)
dA-41	Braking resistor circuit (DBTR) duty ratio monitor	0.00~100.00 (%)
dA-42	Electronic thermal duty ratio monitor (motor)	
dA-43	Electronic thermal duty ratio monitor (inverter)	

Monitors related to control circuit

Code	Name	Data range
dA-45	STO monitor	00 (no input)/ 01 (P-1A)/ 02 (P-2A)/ 03 (P-1b)/04 (P-2b)/05 (P-1C)/06 (P-2C)/ 07 (STO)
dA-50	Terminal block option mounted	00 (P1-TM: standard terminal block) 02 (P1-TM2: terminal block with round screws)/15 (not connected)
dA-51	Input terminal monitor	LLLLLLLLLLL~HHHHHHHHHHH [L:OFF/H:ON] [Left side] (terminal DHH) (terminal DFH) (terminal RST) - (terminal FR) [Right side]
dA-54	Output terminal monitor	LLLLLLL-HHHHHHH [L:OFF/H:ON] [Left side] (terminal FL) (terminal RL) (terminal X3) - (terminal UPF) [Right side]
dA-60	Analog I/O selection monitor	AAAAAAAA- VVVVVVVV [A: current/V: voltage] [Left side] (terminal Ao4 (Io4/Vo4)) (terminal Ao3 (Io3/Vo3)) (terminal Ai4 (Ii4/Vi4)) (terminal VF2 (Ii3/Vi3)) (terminal AMI) (terminal AMV) (terminal IRF) (terminal VRF) [Right side]
dA-61	Analog input [VRF] monitor	0.00~100.00 (%)
dA-62	Analog input [IRF] monitor	
dA-63	Analog input [VF2] monitor	-100.00~100.00 (%)
dA-64	Extended analog input [Ai4] monitor	0.00~100.00 (%)
dA-65	Extended analog input [Ai5] monitor	
dA-66	Extended analog input [Ai6] monitor	-100.00~100.00 (%)
dA-70	Pulse string input monitor (main body)	
dA-71	Pulse string input monitor (HF-FB)	

Option slot monitor

Code	Name	Data range
dA-81	Option slot 1 mounted	00: (none)/01: (P1-EN)/03: (P1-PN)/06: (P1-PB)/07: (P1-CCL)/18: (P1-AG) <hereafter only da-82 is indicated>33: (HF-FB)
dA-82	Option slot 2 mounted	
dA-83	Option slot 3 mounted	

Monitors related to PID function

Code	Name	Data range
db-30	PID1 feedback data 1 monitor	0.00~100.00 (%) (adjustable in [AH-04][AH-05][AH-06])
db-32	PID1 feedback data 2 monitor	
db-34	PID1 feedback data 3 monitor	
db-36	PID2 feedback data monitor	0.00~100.00 (%) (adjustable in [AJ-04][AJ-05][AJ-06])
db-38	PID3 feedback data monitor	0.00~100.00 (%) (adjustable in [AJ-24][AJ-25][AJ-26])
db-40	PID4 feedback data monitor	0.00~100.00 (%) (adjustable in [AJ-44][AJ-45][AJ-46])
db-42	PID1 target value monitor	0.00~100.00 (%) (adjustable in [AH-04][AH-05][AH-06])
db-44	PID1 feedback data monitor	
db-50	PID1 output monitor	-100.00~100.00 (%)
db-51	PID1 deviation monitor	
db-52	PID1 deviation 1 monitor	
db-53	PID1 deviation 2 monitor	
db-54	PID1 deviation 3 monitor	
db-55	PID2 output monitor	
db-56	PID2 deviation monitor	
db-57	PID3 output monitor	
db-58	PID3 deviation monitor	
db-59	PID4 output monitor	
db-60	PID4 deviation monitor	
db-61	PID current P gain monitor	0~100.00 (%)
db-62	PID current I gain monitor	0.0~3600.0 (s)
db-63	PID current D gain monitor	0.00~100.00 (s)
db-64	PID feed-forward monitor	0.00~100.00 (%)

Monitors for checking internal condition

Code	Name	Data range
dC-01	Monitor for checking selection of inverter duty spec	00 (very low duty) 01 (low duty) 02 (normal duty)
dC-02	Rated current monitor	0.0~6553.5 (A)
dC-07	Main speed command destination monitor	00 (disabled)/01 (VRF)/02 (IRF)/03 (VF2)/04 (Ai4)/05 (Ai5)/06 (Ai6) 07 (Multistage speed 0)/08 (auxiliary speed)/09 (Multistage speed 1) 10 (Multistage speed 2)/11 (Multistage speed 3)/12 (Multistage speed 4) 13 (Multistage speed 5)/14 (Multistage speed 6)/15 (Multistage speed 7) 16 (Multistage speed 8)/17 (Multistage speed 9)/18 (Multistage speed 10) 19 (Multistage speed 11)/20 (Multistage speed 12)/21 (Multistage speed 13) 22 (Multistage speed 14)/23 (Multistage speed 15)/24 (JOG)/25 (RS485) 26 (Option 1)/27 (Option 2)/28 (Option 3)/29 (Pulse array (main unit)) 30 (Pulse array (HF-FB))/31 (Reserved)/32 (PID) 33 (Reserved)/34 (AHD retention speed)
dC-08	Auxiliary speed command destination monitor	
dC-10	Operation command destination monitor	00 ([FR]/[RR] terminal)/01 (3 wire) 02 (RUN key on operator keypad)/03 (RS485 setting) 04 (Option 1)/05 (Option 2)/06 (Option 3)
dC-15	Cooling fin temperature monitor	-20.0~200.0 (° C)
dC-16	Life diagnostic monitor	LL - HH [L: normal/H: reduction of life] [Left side] (FAN life) (lives of the capacitors on the circuit board) [Right side]
dC-20	Total start-up count	1 - 65535 (Counts)
dC-21	Power-on count	
dC-22	Cumulative operating hours monitor during RUN	1~1000000 (hr)
dC-24	Cumulative power-on time	
dC-26	Cumulative operating time of cooling fan	
dC-37	Detailed monitor for icon 2LIM	00 (Condition other than below) 01 (Overcurrent suppression in process) 02 (Overload being limited) 03 (Overvoltage suppression in process) 04 (Torque being limited) 05 (Upper/lower limit and jump frequency setting being limited) 06 (Setting of minimum frequency being limited)
dC-38	Detailed monitor for icon 2ALT	00 (Condition other than below) 01 (Overload advance notice) 02 (Motor thermal advance notice) 03 (Controller thermal advance notice) 04 (Motor overheat advance notice)
dC-39	Detailed monitor for icon 2RETRY	00 (Condition other than below) 01 (Retry standby) 02 (Restart standby
dC-40	Detailed monitor for icon 2NRDY	00 (Preparation completed condition other than below IRDY=OFF) 01 (Trip occurred) 02 (Power supply abnormality) 03 (Resetting) 04 (STO)/05 (Standby) 06 (Data inconsistency Others (Including no FB, consistency of settings of A and B phases, etc.) 07 (Sequence abnormality) 08 (Free run) 09 (Forced stop)
dC-45	IM/SM (PMM) monitor	00 (Induction motor IM being selected) 01 (Synchronous motor SM (permanent magnet motor PMM) being selected)
dC-50	Firmware version monitor	0.000~99.255
dC-53	Firmware grade monitor	00 (Standard)
dE-50	Warning monitor	(Max. frequency) < (Upper limiter) [Hb105] < [bA102] [Hb205] < [bA202] (Max. frequency) < (Lower limiter) [Hb105] < [bA103] [Hb205] < [bA203] (Max. frequency) < (Main speed command) [Hb105] < [Ab110] [Hb205] < [Ab210] (Max. frequency) < (Auxiliary speed command) [Hb105] < [AA104] [Hb205] < [AA204]

Monitors and parameters for changing the current commands

Code	Name	Data range
FA-01	Main speed command monitor	0.00~590.00 (Hz)
FA-02	Auxiliary speed command monitor	-590.00 - 590.00 (Hz) (for monitoring)/0.00 - 590.00 (Hz) (for setting)
FA-10	Acceleration time monitor	0.00~3600.00 (s)
FA-12	Deceleration time monitor	
FA-15	Torque command monitor	-500.0~500.0 (%)
FA-16	Torque bias command monitor	
FA-20	Position command monitor	When [AA121]≠10 or [AA123]≠03 -268435455~+268435455 (pls) When [AA121]=10 and [AA123]=03 -1073741823~+1073741823 (pls)
FA-30	PID1 target value 1	0.00~100.00 (%) (adjustable in [AH-04] [AH-05] [AH-06])
FA-32	PID1 target value 2	
FA-34	PID1 target value 3	
FA-36	PID2 target value	0.00~100.00 (%) (adjustable in [AJ-04] [AJ-05] [AJ-06])
FA-38	PID3 target value	0.00~100.00 (%) (adjustable in [AJ-24] [AJ-25] [AJ-26])
FA-40	PID4 target value	0.00~100.00 (%) (adjustable in [AJ-44] [AJ-45] [AJ-46])

List of Parameters

Parameter mode (code A)

Code	Name	Data range	Initial value
AA101	First main speed command selection	01 (VRF terminal input)/02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit)/13 (Pulse string input: HF-FB)/14 (Reserved) 15 (PID calculation)/16 (Reserved)	07
AA102	First auxiliary speed command selection	00 (Disabled)/01 (VRF terminal input)/02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit)/13 (Pulse string input: HF-FB) 14 (Reserved)/15 (PID calculation)/16 (Reserved)	00
AA104	First auxiliary speed setting	0.00~590.00 (Hz)	0.00
AA105	First operator selection	00 (Disabled)/01 (Addition)/02 (Subtraction)/03 (Multiplication)	00
AA106	First additional frequency setting	-590.00~590.00 (Hz)	0.00
AA111	First operation command selection	00 ([FR]/[RR] terminal)/01 (3 wire)/02 (RUN key on operator keypad) 03 (RS485)/04 (Option 1)/05 (Option 2)/06 (Option 3)	02
AA-12	RUN key operation direction selection	00 (Normal rotation)/01 (Reverse rotation)	00
AA-13	STOP key selection	00 (Disabled)/01 (Enabled)/02 (Only reset is enabled)	01
AA114	First operation direction limit selection	00 (No limitation)/01 (Only normal rotation)/02 (Only reverse rotation)	00
AA115	First stop mode selection	00 (Deceleration stop)/01 (Free run stop)	00
AA121	First control mode	00 ([V/f] Fixed torque characteristics (IM)) 01 ([V/f] Reducing torque characteristics (IM)) 02 ([V/f] Free V/f (IM))/03 ([V/f] Auto torque boost (IM)) 04 ([V/f with sensor] Fixed torque characteristics (IM) 05 ([V/f with sensor] Reduced torque characteristics (IM) 06 ([V/f with sensor] Free V/f (IM)/07 ([V/f with sensor] Auto torque boost (IM) 08 (Sensorless vector control (IM))/09 (Zero-Hz range sensorless vector control (IM)) 10 (Vector control with sensor (IM)) 11 (Synchronous start type sensorless vector control (SM/PMM)) 12 (IVMS start type sensorless vector control (SM/PMM))	00
AA123	First vector control mode selection	00 (Speed/torque control mode)/01 (Pulse string position control mode) 02 (Absolute position control mode) 03 (High-resolution absolute position control mode)	00
AA201	Second main speed command selection	Same as AA101	07
AA202	Second auxiliary speed command selection	Same as AA102	00
AA204	Second auxiliary speed setting	Same as AA104	0.00
AA205	Second operator selection	Same as AA105	00
AA206	Second additional frequency setting	Same as AA106	0.00
AA211	Second operation command selection	Same as AA111	02
AA214	Second operation direction limit selection	Same as AA114	00
AA215	Second stop mode selection	Same as AA115	00
AA221	Second control mode	Same as AA121	00
AA223	Second vector control mode selection	Same as AA123	00

Code	Name	Data range	Initial value
Ab-01	Frequency conversion coefficient	0.01~100.00	1.00
Ab-03	Multistep speed selection	00 (16th speed: binary (DFL~DHH))/01 (8th speed: bit (SF1-SF7))	00
Ab110	0th speed of the 1st multi-step speed	0.00~590.00 (Hz)	10.00
Ab-11	1st speed of the multi-step speed		20.00
Ab-12	2nd speed of the multi-step speed		30.00
Ab-13	3rd speed of the multi-step speed		40.00
Ab-14	4th speed of the multi-step speed		0.00
Ab-15	5th speed of the multi-step speed		0.00
Ab-16	6th speed of the multi-step speed		0.00
Ab-17	7th speed of the multi-step speed		0.00
Ab-18	8th speed of the multi-step speed		0.00
Ab-19	9th speed of the multi-step speed		0.00
Ab-20	10th speed of the multi-step speed		0.00
Ab-21	11th speed of the multi-step speed		0.00
Ab-22	12th speed of the multi-step speed		0.00
Ab-23	13th speed of the multi-step speed		0.00
Ab-24	14th speed of the multi-step speed		0.00
Ab-25	15th speed of the multi-step speed		0.00
Ab210	0th speed of the 2nd multi-step speed	Same as Ab110	10.00
AC-01	Acceleration or deceleration time input type selection	00 (Parameter setting)/01 (Option 1)/02 (Option 2) 03 (Option 3)/04 (Reserved)	00
AC-02	Multi-stage acceleration or deceleration selection	00 (Common) 01 (Multi-stage acceleration/deceleration)	00
AC-03	Acceleration pattern selection	00 (Linear)/01 (S-shaped)/02 (U-shaped) 03 (Reverse U-shaped)/04 (Elevator S-shaped)	00
AC-04	Deceleration pattern selection		
AC-05	Acceleration curve constant (S-shaped, U-shaped, reverse U-shaped)	1~10	2
AC-06	Deceleration curve constant (S-shaped, U-shaped, reverse U-shaped)		
AC-08	Curvature 1 for EL-S-shaped acceleration	0~100	25
AC-09	Curvature 2 for EL-S-shaped acceleration		
AC-10	Curvature 1 for EL-S-shaped deceleration		
AC-11	Curvature 2 for EL-S-shaped deceleration		
AC115	First 2-stage acceleration or deceleration selection	00 ([AD2] terminal)/01 (Parameter setting)/02 (Normal/reverse rotation)	00

Code	Name	Data range	Initial value
AC116	First 2-stage acceleration frequency	0.00~590.00 (Hz)	0.00
AC117	First 2-stage deceleration frequency		
AC120	First acceleration time 1	0.00~3600.00 (s)	30.00
AC122	First deceleration time 1		
AC124	First acceleration time 2		
AC126	First deceleration time 2		
AC-30	Acceleration time for multi-speed 1st speed		0.00
AC-32	Deceleration time for multi-speed 1st speed		
AC-34	Acceleration time for multi-speed 2nd speed		
AC-36	Deceleration time for multi-speed 2nd speed		
AC-38	Acceleration time for multi-speed 3rd speed		
AC-40	Deceleration time for multi-speed 3rd speed		
AC-42	Acceleration time for multi-speed 4th speed		
AC-44	Deceleration time for multi-speed 4th speed		
AC-46	Acceleration time for multi-speed 5th speed		
AC-48	Deceleration time for multi-speed 5th speed		
AC-50	Acceleration time for multi-speed 6th speed		
AC-52	Deceleration time for multi-speed 6th speed		
AC-54	Acceleration time for multi-speed 7th speed		
AC-56	Deceleration time for multi-speed 7th speed		
AC-58	Acceleration time for multi-speed 8th speed		
AC-60	Deceleration time for multi-speed 8th speed		
AC-62	Acceleration time for multi-speed 9th speed		
AC-64	Deceleration time for multi-speed 9th speed		
AC-66	Acceleration time for multi-speed 10th speed		
AC-68	Deceleration time for multi-speed 10th speed		
AC-70	Acceleration time for multi-speed 11th speed		
AC-72	Deceleration time for multi-speed 11th speed		
AC-74	Acceleration time for multi-speed 12th speed		
AC-76	Deceleration time for multi-speed 12th speed		
AC-78	Acceleration time for multi-speed 13th speed		
AC-80	Deceleration time for multi-speed 13th speed		
AC-82	Acceleration time for multi-speed 14th speed		
AC-84	Deceleration time for multi-speed 14th speed		
AC-86	Acceleration time for multi-speed 15th speed		
AC-88	Deceleration time for multi-speed 15th speed		
AC215	Second 2-stage acceleration or deceleration selection	Same as AC115	00
AC216	Second 2-stage acceleration frequency	Same as AC116	0.00
AC217	Second 2-stage deceleration frequency	Same as AC117	
AC220	Second acceleration time 1	Same as AC120	30.00
AC222	Second deceleration time 1	Same as AC122	
AC224	Second acceleration time 2	Same as AC124	
AC226	Second deceleration time 2	Same as AC126	

Code	Name	Data range	Initial value
Ad-01	Torque command input selection	00 (Disabled)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting)/08 (RS 485) 09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/15 (PID calculation)	01
Ad-02	Torque command setting	-500.0~500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	0.0
Ad-03	Torque command polarity selection	00 (As per the sign) 01 (Follow the revolution direction)	00
Ad-04	Speed/torque control switch time	0~1000 (ms)	100
Ad-11	Torque bias input selection	00 (Disabled)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting)/08 (RS 485) 09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/15 (PID calculation)	00
Ad-12	Torque bias setting	-500.0~500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	0.0
Ad-13	Torque bias polarity selection	00 (As per the sign)/01 (Follow the revolution direction)	00
Ad-14	Torque bias enable terminal [TBS] selection	00 (Disabled)/01 (Enabled)	00
Ad-40	Torque control speed limit value input selection	01 (VRF terminal input)/02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485) 09 (Option 1)/10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit)/13 (Pulse string input: HF-FB)	07
Ad-41	Torque control frequency limit value (for normal rotation)	0.00~590.00 (Hz)	0.00
Ad-42	Torque control frequency limit value (for reverse rotation)		

List of Parameters

Code	Name	Data range	Initial value
AE-01	Electronic gear installation position selection	00 (Feedback side)/01 (Command side)	00
AE-02	Electronic gear ratio numerator	1~10000	1
AE-03	Electronic gear ratio denominator		
AE-04	Positioning completion range setting	0~1000 (ms)	5
AE-05	Positioning completion delay time setting	0.00~10.00 (s)	0.00
AE-06	Position control feed forward	0.00~655.35	0.00
AE-07	Position loop gain	0.00~100.00	0.50
AE-08	Position bias amount	-2048~2048	0
AE-10	Orientation stop position input destination selection	00 (Parameter setting)/01 (Option 1)/02 (Option 2)/03 (Option 3)	00
AE-11	Orientation stop position	0~4095	0
AE-12	Orientation speed setting	0.00~120.00	5.00
AE-13	Orientation direction setting	00 (Normal rotation)/01 (Reverse rotation)	00
AE-20	Position command 0	When [AA121]≠10 or [AA123]≠03 -268435455~+268435455 (pls) When [AA121]=10 and [AA123]=03 -1073741823~+1073741823 (pls)	0
AE-22	Position command 1		
AE-24	Position command 2		
AE-26	Position command 3		
AE-28	Position command 4		
AE-30	Position command 5		
AE-32	Position command 6		
AE-34	Position command 7		
AE-36	Position command 8		
AE-38	Position command 9		
AE-40	Position command 10		
AE-42	Position command 11		
AE-44	Position command 12		
AE-46	Position command 13		
AE-48	Position command 14		
AE-50	Position command 15		
AE-52	Position range designation (forward rotation side)	When [AA121]≠10 or [AA123]≠03 0~+268435455 (pls) When [AA121]=10 and [AA123]=03 0~+1073741823 (pls)	268435455
AE-54	Position range designation (reverse rotation side)	When [AA121]≠10 or [AA123]≠03 -268435455~0 (pls) When [AA121]=10 and [AA123]=03 -1073741823~0 (pls)	-268435455
AE-56	Positioning mode selection	00 (With limit)/01 (Without limit)	00
AE-60	Teaching selection	00 (X00)~15 (X15)	X00
AE-61	Memorization of current position at power-off	00 (Disabled)/01 (Enabled)	00
AE-62	Preset position data	When [AA121]≠10 or [AA123]≠03 0~+268435455 (pls) When [AA121]=10 and [AA123]=03 0~+1073741823 (pls)	0
AE-64	Gain for calculating the deceleration stop distance	50.00~200.00	100.00
AE-65	Bias for calculating the deceleration stop distance	0.00~655.35	0.00
AE-66	APR control speed limit	0.00~100.00	1.00
AE-67	APR start speed		0.20
AE-70	Zero return mode selection	00 (Low speed zero return)/01 (High speed zero return) 02 (High speed zero return 2)	00
AE-71	Zero return direction selection	00 (Normal rotation)/01 (Reverse rotation)	00
AE-72	Low speed zero return speed	0.00~10.00 (Hz)	0.00
AE-73	High speed zero return speed	0.00~590.00 (Hz)	0.00
AF101	First DC braking selection	00 (Disabled)/01 (Enabled)/02 (Frequency command)	00
AF102	First braking mode selection	00 (DC braking)/01 (Speed servo lock)/02 (Position servo lock)	00
AF103	First DC braking frequency setting	0.00~590.00 (Hz)	0.50
AF104	First DC braking delay time	0.00~5.00 (s)	0.00
AF105	First DC braking force at the time of the stop	0-100 (%) (with internal limitation)	0
AF106	First DC braking time at the time of the stop	0.00~60.00 (s)	0.00
AF107	First DC braking trigger selection	00 (Edge mode)/01 (Level mode)	01
AF108	First DC braking force at the start	0-100 (%) (with internal limitation)	0
AF109	First DC braking time at the start	0.00~60.00 (s)	0.00
AF120	First contactor control selection	00 (Disabled)/01 (Enabled: primary side)/02 (Enabled: secondary side)	00
AF121	First start waiting time	0.00~2.00 (s)	0.20
AF122	First contactor release delay time		0.10
AF123	First contactor check time	0.00~5.00 (s)	0.10
AF130	First brake control selection	00 (Disabled)/01 (Brake control 1 common inforward/reverse rotation) 02 (Brake control 1 forward/reverse set individually)/03 (Brake control 2)	00
AF131	First brake release establishment waiting time (forward rotation)	0.00~5.00 (s)	0.00
AF132	First acceleration waiting time (forward rotation)		
AF133	First stop waiting time (forward rotation)		
AF134	First brake confirmation waiting time (forward rotation)		
AF135	First brake release frequency (forward rotation)	0.00~590.00 (Hz)	0.00
AF136	First brake release current (forward rotation)	0.00 to 2.00) × Inverter rated current (A)	1.0× rated current
AF137	First brake apply frequency (forward rotation)	0.00~590.00 (Hz)	0.00
AF138	First brake release establishment waiting time (reverse rotation)	0.00~5.00 (s)	0.00
AF139	First acceleration waiting time (reverse rotation)		
AF140	First stop waiting time (reverse rotation)		
AF141	First brake confirmation waiting time (reverse rotation)		
AF142	First brake release frequency (reverse rotation)	0.00~590.00 (Hz)	0.00
AF143	First brake release current (reverse rotation)	(0.00 to 2.00) × Inverter rated current (A)	1.0× rated current
AF144	First brake apply frequency (reverse rotation)	0.00~590.00 (Hz)	0.00
AF150	First brake release delay time	0.00~2.00 (s)	0.20
AF151	First brake apply delay time		
AF152	First brake check time	0.00~5.00 (s)	0.10
AF153	First servo lock time at start	0.00~10.00 (s)	0.60
AF154	First servo lock time at stop		

Code	Name	Data range	Initial value
AF201	Second DC braking selection	Same as AF101	00
AF202	Second braking mode selection	Same as AF102	00
AF203	Second DC braking frequency setting	Same as AF103	0.50
AF204	Second DC braking delay time	Same as AF104	0.00
AF205	Second DC braking force at the time of the stop	Same as AF105	0
AF206	Second DC braking time at the time of the stop	Same as AF106	0.00
AF207	Second DC braking trigger selection	Same as AF107	01
AF208	Second DC braking force at the start	Same as AF108	0
AF209	Second DC braking time at the start	Same as AF109	0.00
AF220	Second contactor control selection	Same as AF120	00
AF221	Second start waiting time	Same as AF121	0.20
AF222	Second contactor release delay time	Same as AF122	0.10
AF223	Second contactor check time	Same as AF123	0.10
AF230	Second brake control selection	Same as AF130	00
AF231	Second brake release establishment waiting time (forward rotation)	Same as AF131	0.00
AF232	Second acceleration waiting time (forward rotation)	Same as AF132	0.00
AF233	Second stop waiting time (forward rotation)	Same as AF133	0.00
AF234	Second brake confirmation waiting time (forward rotation)	Same as AF134	0.00
AF235	Second brake release frequency (forward rotation)	Same as AF135	0.00
AF236	Second brake release current (forward rotation)	Same as AF136	1.0× rated current
AF237	Second brake apply frequency (forward rotation)	Same as AF137	0.00
AF238	Second brake release establishment waiting time (forward rotation)	Same as AF138	0.00
AF239	Second acceleration waiting time (forward rotation)	Same as AF139	0.00
AF240	Second stop waiting time (forward rotation)	Same as AF140	0.00
AF241	Second brake confirmation waiting time (reverse rotation)	Same as AF141	0.00
AF242	Second brake release frequency (reverse rotation)	Same as AF142	0.00
AF243	Second brake release current (reverse rotation)	Same as AF143	1.0× rated current
AF244	Second brake apply frequency (reverse rotation)	Same as AF144	0.00
AF250	Second brake release delay time	Same as AF150	0.20
AF251	Second brake apply delay time	Same as AF151	0.20
AF252	Second brake check time	Same as AF152	0.10
AF253	Second servo lock time at start	Same as AF153	0.60
AF254	Second servo lock time at stop	Same as AF154	0.60
AG101	First jump frequency 1	0.00~590.00 (Hz)	0.00
AG102	First jump frequency width 1	0.00~10.00 (Hz)	0.50
AG103	First jump frequency 2	0.00~590.00 (Hz)	0.00
AG104	First jump frequency width 2	0.00~10.00 (Hz)	0.50
AG105	First jump frequency 3	0.00~590.00 (Hz)	0.00
AG106	First jump frequency width 3	0.00~10.00 (Hz)	0.50
AG110	First acceleration stop frequency	0.00~590.00 (Hz)	0.00
AG111	First acceleration stop time	0.0~60.0 (s)	0.0
AG112	First deceleration stop frequency	0.00~590.00 (Hz)	0.00
AG113	First deceleration stop time	0.0~60.0 (s)	0.0
AG-20	Jogging frequency	0.00~10.00 (Hz)	5.00
AG-21	Selecting the jogging stop	00 (Disabled during MBS operation at stop) 01 (Disabled during deceleration stop operation) 02 (Disabled during DB operation at stop) 03 (Enabled during MBS operation at stop) 04 (Enabled during deceleration stop operation) 05 (Enabled during DB operation at stop)	01
AG201	Second jump frequency 1	Same as AG101	0.00
AG202	Second jump frequency width 1	Same as AG102	0.00
AG203	Second jump frequency 2	Same as AG103	0.00
AG204	Second jump frequency width 2	Same as AG104	0.00
AG205	Second jump frequency 3	Same as AG105	0.00
AG206	Second jump frequency width 3	Same as AG106	0.00
AG210	Second acceleration stop frequency	Same as AG110	0.00
AG211	Second acceleration stop time	Same as AG111	0.0
AG212	Second deceleration stop frequency	Same as AG112	0.00
AG213	Second deceleration stop time	Same as AG113	0.0
AH-01	PID1 selection	00 (Disabled) 01 (Enabled Without reverse output) 02 (Enabled With reverse output)	00
AH-02	PID1 deviation negative	00 (Disabled)/01 (Enabled)	00
AH-03	PID1 unit selection	Unit options	01
AH-04	PID1 scale adjustment (0%)	-10000~10000	0
AH-05	PID1 scale adjustment (100%)		10000
AH-06	PID1 scale adjustment (decimal point)	0~4	2
AH-07	PID1 target value 1 input destination selection	00 (None)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input) 05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3) 12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)	07
AH-10	PID1 target value 1 set value	-100.00~100.00 Data range differs depending on [AH-04] - [AH-06].	0.00

List of Parameters

Code	Name	Data range	Initial value
AH-12	PID1 multistage target value 1	-100.00~100.00 Data range differs depending on [AH-04] - [AH-06].	0.00
AH-14	PID1 multistage target value 2		
AH-16	PID1 multistage target value 3		
AH-18	PID1 multistage target value 4		
AH-20	PID1 multistage target value 5		
AH-22	PID1 multistage target value 6		
AH-24	PID1 multistage target value 7		
AH-26	PID1 multistage target value 8		
AH-28	PID1 multistage target value 9		
AH-30	PID1 multistage target value 10		
AH-32	PID1 multistage target value 11		
AH-34	PID1 multistage target value 12		
AH-36	PID1 multistage target value 13		
AH-38	PID1 multistage target value 14		
AH-40	PID1 multistage target value 15		
AH-42	PID1 target value 2 input destination selection	Same as AH-07	00
AH-44	PID1 target value 2 set value	-100.00~100.00 (%) Data range differs depending on [AH-04] - [AH-06].	0.00
AH-46	PID1 target value 3 input destination selection	Same as AH-07	00
AH-48	PID1 target value 3 set value	-100.00~100.00 (%) Data range differs depending on [AH-04] - [AH-06].	0.00
AH-50	PID1 target value 1 operator selection	01 (Addition)/02 (Subtraction)/03 (Multiplication)/04 (Division)	01
AH-51	PID1 feedback Data 1 Input destination selection	00 (None)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)	01
AH-52	PID1 feedback Data 2 Input destination selection		00
AH-53	PID1 feedback Data 3 Input destination selection		00
AH-54	PID1 feedback Data operator selection	01 (Addition)/02 (Subtraction)/03 (Multiplication)/04 (Division)	01
AH-60	PID1 gain switch method selection	00 (Only gain 1)/01 ([PRO] terminal switch)	00
AH-61	PID1 proportional gain 1	0.0~100.0	1.0
AH-62	PID1 integral gain 1	0.0~3600.0 (s)	1.0
AH-63	PID1 differential gain 1	0.00~100.00 (s)	0.00
AH-64	PID1 proportional gain 2	0.0~100.0	0.0
AH-65	PID1 integral gain 2	0.00~3600.0 (s)	0.0
AH-66	PID1 differential gain 2	0.00~100.00 (s)	0.00
AH-67	PID1 gain switch time	0~10000 (ms)	100
AH-70	PID feed-forward selection	00 (Disabled)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)	00
AH-71	PID1 changeable range	0.00~100.00 (%)	0.00
AH-72	PID1 deviation excessive level		3.00
AH-73	PID1 feedback comparison signal OFF level		100.00
AH-74	PID1 feedback comparison signal ON level		0.00
AH-75	PID soft-start function selection	00 (Disabled)/01 (Enabled)	00
AH-76	PID soft-start target level	0.00~100.00 (%)	100.00
AH-78	Acceleration time for PID soft-start	0.00~3600.00 (s)	30.00
AH-80	PID soft-start time	0.00~100.00 (s)	0.00
AH-81	PID start abnormal judgment implement selection	00 (Disabled)/01 (Enabled: error output)/02 (Enabled: warning)	00
AH-82	PID start abnormality judgment level	0.00~100.00 (%)	0.00
AH-85	PID sleep condition selection	00 (Disabled)/01 (Low output)/02 ([SLEP] terminal)	00
AH-86	PID sleep start level	0.00~590.00 (Hz)	0.00
AH-87	PID sleep operation time	0.00~100.00 (s)	0.00
AH-88	Boost selection prior to PID sleep	00 (Disabled)/01 (Enabled)	00
AH-89	Boost time prior to PID sleep	0.00~100.00 (s)	0.00
AH-90	Boost amount prior to PID sleep	0.00~100.00 (%)	0.00
AH-91	Minimum operation time prior to PID sleep	0.00~100.00 (s)	0.00
AH-92	PID sleep status minimum retaining time		
AH-93	PID wake condition selection	01 (Deviation amount)/02 (Low feedback)/03 ([WAKE] terminal)	01
AH-94	PID wake start level	0.00~100.00 (%)	0.00
AH-95	PID wake operation time	0.00~100.00 (s)	0.00
AH-96	PID wake start deviation amount	0.00~100.00 (%)	0.00

Code	Name	Data range	Initial value
AJ-01 to 10	PID2 selection	Same as AH-01 to AH-10	-
AJ-12	PID2 feedback data input destination selection	Same as AH-52	02
AJ-13	PID2 proportional gain	0.0~100.0	1.0
AJ-14	PID2 integral gain	0.0~3600.0 (s)	1.0
AJ-15	PID2 differential gain	0.00~100.00 (s)	0.00
AJ-16	PID2 changeable range	0.00~100.00 (%)	0.00
AJ-17	PID2 deviation excessive level		3.00
AJ-18	PID2 feedback comparison signal OFF level		100.00
AJ-19	PID2 feedback comparison signal ON level		0.00
AJ-20 to 30	PID3 selection	Same as AH-01 to AH-10	-
AJ-32	PID3 feedback data input destination selection	Same as AH-52	02
AJ-33 to 39	PID3	Same as AJ-13 to AJ-19	-
AJ-41 to 50	PID4 selection	Same as AH-01 to AH-10	-
AJ-52	PID4 feedback data input destination selection	Same as AH-52	02
AJ-53 to 59	PID4	Same as AJ-13 to AJ-19	-

Parameter mode (code B)

Code	Name	Data range	Initial value
bA101	First frequency upper limit selection	00 (Disabling)/01(VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting)/08 (RS485)/09 (Option 1) 10 (Option 2)/11 (Option 3)/12 (Pulse string input (main body)) 13 (Pulse string input HF-FB)	00
bA102	First frequency upper limiter	0.00~590.00 (Hz)	0.00
bA103	First frequency lower limiter		
bA110	First torque limit selection	00 (Disable)/01 (VRF terminal input)/02 (IRF terminal input) 03 (VF2 terminal input)/04 (Ai4 terminal input)/05 (Ai5 terminal input) 06 (Ai6 terminal input)/07 (Parameter setting)/08 (RS 485)/09 (Option 1) 10 (Option 2)/11 (Option 3)	07
bA111	First torque limit parameter mode selection	00 (Four quadrant specific)/01 ([TRQ] terminal switch)	00
bA112	First torque limit 1 (Four quadrant normal powered)	0.0~500.0 (%) (Limited at a torque equivalent to 200% of inverter ND rating)	200.0
bA113	First torque limit 2 (Four quadrant reverse rotation regeneration)		
bA114	First torque limit 3 (Four quadrant reverse powered)		
bA115	First torque limit 4 (Four quadrant normal rotation regeneration)		
bA116	First torque LAD stop selection	00 (Disabled) 01 (Enabled)	00
bA120	First overcurrent suppression selection		
bA121	First overcurrent suppression level	(0.00 to 2.50) × Inverter rated current (A)	Note: 1.
bA122	First stall prevention 1 selection	00 (Disabled) 01 (Accelerate at constant speed) 02 (Only constant speed) 03 (Accelerate at constant speed/Increase speed at regeneration)	01
bA123	First stall prevention level 1	(0.20 to 2.50) × Inverter rated current (A)	Note: 2.
bA124	First stall prevention 1 operation time	0.10~3600.00 (s)	1.00
bA126	First stall prevention 2 selection	00 (Disabled) 01 (Accelerate at constant speed) 02 (Only constant speed) 03 (Accelerate at constant speed/Increase speed at regeneration)	01
bA127	First stall prevention level 2	(0.20 to 2.50) × Inverter rated current (A)	Note: 2.
bA128	First stall prevention 2 operation time	0.10~3600.00 (s)	1.00
bA-30	Instantaneous power failure non-stop selection	00 (Disabled)/01 (Enabled: deceleration stop) 02 (Enabled: no recovery)/03 (Enabled: with recovery)	00
bA-31	Instantaneous power failure non-stop function starting voltage	(200V class) 0.0 - 410.0 (V) (400V class) 0.0 - 820.0 (V)	220.0 440.0
bA-32	Instantaneous power failure non-stop target level	(200V class) 0.0 - 410.0 (V) (400V class) 0.0 - 820.0 (V)	360.0 720.0
bA-34	Instantaneous power failure non-stop deceleration time	0.01~3600.00 (s)	1.00
bA-36	Instantaneous power failure non-stop deceleration starting range	0.00~10.00 (Hz)	0.00
bA-37	Instantaneous power failure non-stop constant DC voltage control P gain	0.00~5.00	0.20
bA-38	Instantaneous power failure non-stop constant DC voltage control I gain	0.00~150.00 (s)	1.00
bA140	First overvoltage suppression function	00 (Disabled) 01 (DC voltage constant deceleration) 02 (Acceleration only at deceleration) 03 (Acceleration at constant speed/deceleration)	00
bA141	First overvoltage suppression level setting	(200V class) 330.0 - 400.0 (V) (400V class) 660.0 - 800.0 (V)	380.0 760.0
bA142	First overvoltage suppression operating time	0.00~3600.00 (s)	1.00
bA144	First DC voltage control P gain	0.00~5.00	0.20
bA145	First DC voltage control I gain	0.00~150.00 (s)	1.00
bA146	First over-excitation function selection	00 (Disabled)/01 (Regular operation) 02 (Operation only at deceleration) 03 (Level mode)/04 (Level mode only at deceleration)	00
bA147	First over-excitation filter time constant	0.00~1.00(s)	0.30
bA148	First over-excitation voltage gain	50~400 (%)	100
bA149	First over-excitation suppression level setting	(200V class) 330.0 - 400.0 (V) (400V class) 660.0 - 800.0 (V)	360.0 720.0
bA-60	Braking resistor operation circuit (DBTR) use rate	0.0 - 10.0×([bA-63]/minimum resistance) ^{2} (%) Note: 3.	10.0
bA-61	Braking resistor circuit (DBTR) selection	00 (Disabled)/01 (Enabled: disabled at stop) 02 (Enabled: enabled at stop)	00
bA-62	Braking resistor circuit (DBTR) ON level	(200V class) 330.0 - 400.0 (V) (400V class) 660.0 - 800.0 (V)	360.0 720.0
bA-63	Braking resistor circuit (DBTR) resistance	Minimum resistance - 600 (Ω)	Note: 3.
bA-70	Selection of the cooling fan operation	00 (Always ON) 01 (ON during operation) 02 (Temperature dependent)	00
bA-71	Clear cumulative operating time of cooling fan	00 (Disabled)/01 (Clear)	00

Note: 1. 2.00 × Inverter rated current (A)
2. 1.70 × Inverter rated current (A)
3. The minimum resistance varies depending on inverter models.

List of Parameters

Code	Name	Data range	Initial value
bA201	Second frequency upper limit selection	Same as bA101	00
bA202	Second frequency upper limiter	Same as bA102	0.00
bA203	Second frequency lower limiter	Same as bA103	0.00
bA210	Second torque limit selection	Same as bA110	07
bA211	Second torque limit parameter mode selection	Same as bA111	00
bA212	Second torque limit 1 (Four quadrant normal powering)	Same as bA112	200.0
bA213	Second torque limit 2 (Four quadrant reverse rotation regeneration)	Same as bA113	
bA214	Second torque limit 3 (Four quadrant reverse powering)	Same as bA114	
bA215	Second torque limit 4 (Four quadrant normal rotation regeneration)	Same as bA115	
bA216	Second torque LAD stop selection	Same as bA116	00
bA220	Second overcurrent suppression selection	Same as bA120	00
bA221	Second overcurrent suppression level	Same as bA121	Note: 1.
bA222	Second stall prevention 1 selection	Same as bA122	01
bA223	Second stall prevention level 1	Same as bA123	Note: 2.
bA224	Second stall prevention 1 operation time	Same as bA124	1.00
bA226	Second stall prevention 2 selection	Same as bA126	00
bA227	Second stall prevention level 2	Same as bA127	Note: 2.
bA228	Second stall prevention 2 operation time	Same as bA128	1.00
bA240	Second overvoltage suppression function	Same as bA140	00
bA241	Second overvoltage suppression level setting	Same as bA141	380.0/760.0
bA242	Second overvoltage suppression operating time	Same as bA142	1.00
bA244	Second DC voltage control P gain	Same as bA144	0.20
bA245	Second DC voltage control I gain	Same as bA145	1.00
bA246	Second over-excitation function selection	Same as bA146	02
bA247	Second over-excitation filter time constant	Same as bA147	0.30
bA248	Second over-excitation voltage gain	Same as bA148	100
bA249	Second over-excitation suppression level setting	Same as bA149	360.0/720.0
bb101	First carrier frequency	[Ub-03]=02: Normal duty:0.5~16.0 (kHz) [Ub-03]=01: Low duty:0.5~12.0 (kHz) [Ub-03]=00: Very low duty:0.5~10.0 (kHz)	2.0
bb102	First sprinkle carrier pattern selection	00 (Disabled)/01 (Pattern 1 enabled) 02 (Pattern 2 enabled)/03 (Pattern 3 enabled)	00
bb103	First automatic carrier frequency reduction selection	00 (Disabled)/01 (Enabled: current)/02 (Enabled: temperature)	00
bb-10	Auto-reset selection	00 (Disabled)/01 (Enabled with operation command OFF) 02 (Enable after the setting time)	00
bb-11	Auto-reset alarm selection	00 (Output)/01 (Not output)	00
bb-12	Auto-reset waiting time	0~600 (s)	2
bb-13	Auto-reset count	0~10	3
bb-20	Instantaneous power failure retry count	0~16/255	0
bb-21	Undervoltage retry count		
bb-22	Overcurrent retry count	0~5	0
bb-23	Overvoltage retry count		
bb-24	Selection of instantaneous power failure/undervoltage retry	00 (0Hz)/01 (Frequency matching)/02 (Frequency entrainment) 03 (Detection speed)/ 04 (Trip after frequency matching deceleration stop)	01
bb-25	Allowable instantaneous power failure time	0.3~25.0 (s)	1.0
bb-26	Retry wait time after instantaneous power failure/undervoltage	0.3~100.0 (s)	0.3
bb-27	Instantaneous power failure/undervoltage tripping selection during stop	00 (Disabled)/01 (Enabled at stop) 02 (Disabled at stop and deceleration stop)	00
bb-28	Overcurrent trip/retry selection	00 (0Hz)/01 (Frequency matching)/02 (Frequency entrainment) 03 (Detection speed) 04 (Trip after frequency matching deceleration stop)	01
bb-29	Retry wait time after overcurrent	0.3~100.0 (s)	0.3
bb-30	Overvotage tripping retry selection	00 (0Hz)/01 (Frequency matching)/02 (Frequency entrainment) 03 (Detection speed) 04 (Trip after frequency matching deceleration stop)	01
bb-31	Overvoltage retry standby time	0.3~100.0 (s)	0.3
bb-40	Restart mode after free-run (MBS) stop	00 (0Hz)/01 (Frequency matching)/02 (Frequency entrainment) 03 (Detection speed)	00
bb-41	Restart mode after reset (RST)		
bb-42	Frequency matching lower limit setting	0.00~590.00 (Hz)	0.00
bb-43	Level of frequency pull-in restart	(0.20 to 2.50) × Inverter rated current (A)	Note: 3.
bb-44	Constant (frequency) of frequency pull-in restart	0.10~30.00 (s)	0.50
bb-45	Constant (voltage) of frequency pull-in restart		
bb-46	Overcurrent suppression level of frequency pull-in restart	(0.00 to 2.50) × Inverter rated current (A)	Note: 3.
bb-47	Start frequency selection of frequency pull-in restart	00 (Cutoff frequency)/01 (Maximum frequency)/ 02 (Setting frequency)	00
bb-50	Frequency matching filter gain	0~1000 (%)	50
bb160	First overcurrent detection level	Depend on the inverter model	-
bb-61	Excessive voltage of accepted power	00 (Warning)/01 (Error)	00
bb-62	Incoming overvoltage level selection	(200V class) 300.0 - 410.0 (V) (400V class) 600.0 - 820.0 (V)	390.0 780.0
bb-64	Ground fault detection selection	00 (Disabled)/01 (Enabled)	01
bb-65	Input phase loss selection		00
bb-66	Output phase loss selection	00 (Disabled)/01 (Enabled)	00
bb-67	Output phase loss detection sensitivity	1~100 (%)	10

Note: 1. 2.00 × Inverter rated current (A)
2. 1.70 × Inverter rated current (A)
3. 1.00 × Inverter rated current (A)

Code	Name	Data range	Initial value
bb-70	Thermistor error level	0~10000 (Ω)	3000
bb-80	Over-speed error detection level setting	0.0~150.0 (%)	135.0
bb-81	Over-speed error detection time	0.0~5.0 (s)	0.5
bb-82	Operation for speed deviation error	00 (Warning)/01 (Error)	00
bb-83	Speed deviation error detection level setting	0.0~100.0 (%)	15.0
bb-84	Speed deviation error detection time	0.0~5.0 (s)	0.5
bb-85	Behavior when the position deviation is abnormal	00 (Warning)/01 (Error)	00
bb-86	Abnormal position deviation detection level	0.0~65535 (×100pls)	4096
bb-87	Abnormal position deviation time	0.0~5.0 (s)	0.5
bb201	Second carrier frequency	Same as bb101	2.0
bb202	Second sprinkle carrier pattern selection	Same as bb102	00
bb203	Second automatic carrier frequency reduction selection	Same as bb103	00
bb260	Second overcurrent detection level	Same as bb160	-
bC110	First electronic thermal level	(0.00 - 3.00)× Inverter rated current	1.0× rated current
bC111	First electronic thermal characteristics selection	00 (Reduction characteristics) 01 (Constant torque characteristics)/02 (Arbitrary setting)	00
bC112	First electronic thermal subtraction function selection	00 (Disabled)/01 (Enabled)	01
bC113	First electronic thermal subtraction time	1~1000 (s)	600
bC-14	Electronic thermal counter memory at power-off	00 (Disabled)/01 (Enabled)	01
bC120	First free electronic thermal frequency 1	0.00~[bC122] (Hz)	0.00
bC121	First free electronic thermal current 1	(0.00~3.00)× Inverter rated current	0.00
bC122	First free electronic thermal frequency 2	[bC120]~[bC124] (Hz)	0.00
bC123	First free electronic thermal current 2	(0.00~3.00)× Inverter rated current	0.00
bC124	First free electronic thermal frequency 3	[bC122]~590.00 (Hz)	0.00
bC125	First free electronic thermal current 3	(0.00~3.00)× Inverter rated current	0.00
bC210	Second electronic thermal level	Same as bC110	1.0× rated current
bC211	Second electronic thermal characteristics selection	Same as bC111	00
bC212	Second electronic thermal subtraction function selection	Same as bC112	01
bC213	Second electronic thermal subtraction time	Same as bC113	600
bC220	Second free electronic thermal frequency 1	Same as bC120	0.00
bC221	Second free electronic thermal current 1	Same as bC121	0.00
bC222	Second free electronic thermal frequency 2	Same as bC122	0.00
bC223	Second free electronic thermal current 2	Same as bC123	0.00
bC224	Second free electronic thermal frequency 3	Same as bC124	0.00
bC225	Second free electronic thermal current 3	Same as bC125	0.00
bd-01	STO input indication selection	00 (With indication)/01 (Without indication)/02 (Trip)	00
bd-02	STO allowable input switch time	0.00~60.00 (s)	1.00
bd-03	STO indication selection within allowable input time	00 (With indication)/01 (Without indication)	00
bd-04	STOoperation selection after allowable input time	00 (Retain only the condition)/01 (Disabled)/02 (Trip)	00

Parameter mode (code C)

Code	Name	Data range	Initial value
CA-01	Input terminal function [FR] selection	See <List of input terminal functions>	001
CA-02	Input terminal function [RR] selection		002
CA-03	Input terminal function [DFL] selection		003
CA-04	Input terminal function [DFM] selection		004
CA-05	Input terminal function [AUT] selection		015
CA-06	Input terminal function [MBS] selection		032
CA-07	Input terminal function [JOG] selection		029
CA-08	Input terminal function [ES] selection		033
CA-09	Input terminal function [RST] selection		028
CA-10	Input terminal function [DFH] selection		005
CA-11	Input terminal function [DHH] selection		006
CA-21	Selection of Input terminal [FR] a/b (NO/NC)	00 (Normally open)/01 (Normally closed)	00
CA-22	Selection of Input terminal [RR] a/b (NO/NC)		
CA-23	Selection of Input terminal [DFL] a/b (NO/NC)		
CA-24	Selection of Input terminal [DFH] a/b (NO/NC)		
CA-25	Selection of Input terminal [AUT] a/b (NO/NC)		
CA-26	Selection of Input terminal [MBS] a/b (NO/NC)		
CA-27	Selection of Input terminal [JOG] a/b (NO/NC)		
CA-28	Selection of Input terminal [ES] a/b (NO/NC)		
CA-29	Selection of Input terminal [RST] a/b (NO/NC)		
CA-30	Selection of Input terminal [DFH] a/b (NO/NC)		
CA-31	Selection of Input terminal [DHH] a/b (NO/NC)		
CA-41	Input terminal [FR] response time	0~400 (ms)	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 [MBS] response time		
CA-47	Input terminal [JOG] response time		
CA-48	Input terminal [ES] response time		
CA-49	Input terminal [RST] response time		2
CA-50	Input terminal [DFH] response time		
CA-51	Input terminal [DHH] response time		
CA-55	Multi-step input determination time	0~200 (ms)	0
CA-60	UP/DWN target selection	00 (Frequency command)/01 (PID1)	00
CA-61	UP/DWN memory selection	00 (Not save)/01 (Save)	00

List of Parameters

Code	Name	Data range	Initial value
CA-62	UP/DWN UDC mode selection	00 (0Hz)/01 (saved data)	00
CA-64	Acceleration time for UP/DWN functions	0.00~3600.00 (s)	30.00
CA-66	Deceleration time for UP/DWN functions		
CA-70	[F-OP] frequency command	01 (VRF terminal input)/02 (IRF terminal input)/03 (VF2 terminal input) 04 (Ai4 terminal input)/05 (Ai5 terminal input)/06 (Ai6 terminal input) 07 (Parameter setting)/08 (RS 485)/09 (Option 1)/10 (Option 2) 11 (Option 3)/12 (Pulse string input: main unit) 13 (Pulse string input: HF-FB)/14 (Program function) 15 (PID calculation)/16 (Reserved)	01
CA-71	[F-OP] Operation command	00 ([FR]/[RR] terminal)/01 (3 wire)/02 (RUN key on operator keypad) 03 (RS485)/04 (Option 1)/05 (Option 2)/06 (Option 3)	00
CA-72	Reset selection	00 (On to Release Trip)/01 (Off to Release Trip)/02 (On to Release at Trip) 03 (Of to Release at Trip)	00
CA-81	Encoder constant set-up	32~65535 (pls)	1024
CA-82	Encoder phase sequence selection	00 (Phase-A is leading)/01 (Phase-B is leading)	00
CA-83	Motor gear ratio's numerator	1~10000	1
CA-84	Motor gear ratio's denominator		
CA-90	Pulse string input (main body) detection target selection	00 (Pulse count)/01 (Frequency command)/02 (Speed feedback) 03 (Pulse count)	00
CA-91	Pulse string input (main body) mode selection	00 (90° phase difference) 01 (forward/reverse rotation command and rotation direction) 02 (forward/reverse rotation pulse string)	00
CA-92	Pulse string frequency (main body) scale	0.05~32.00 (kHz)	25.00
CA-93	Pulse string frequency (main body) filter time constant	0.01~2.00 (s)	0.10
CA-94	Pulse string frequency (main body) bias size	-100.0~100.0 (%)	0.0
CA-95	Pulse string frequency (main body) upper detection limit	0.0~100.0 (%)	100.0
CA-96	Pulse string frequency (main body) lower detection limit		0.0
CA-97	Pulse count compare-match output ON level	0~65535	0
CA-98	Pulse count compare-match output OFF level		0
CA-99	Maximum value for pulse count compare-match output		65535
Cb-01	[VRF] terminal input filter time constant	1~500 (ms)	500
Cb-03	[VRF] terminal frequency setting start amount	0.00~100.00 (%)	0.00
Cb-04	[VRF] terminal frequency setting end amount		100.00
Cb-05	[VRF] terminal analog input start ratio	0.0~ [Cb-06] (%)	0.0
Cb-06	[VRF] terminal analog input end ratio	[Cb-05]~100.0 (%)	100.0
Cb-07	[VRF] terminal start selection	00 (Start amount)/01 (0%)	01
Cb-11	[IRF] terminal input filter time constant	1~500 (ms)	500
Cb-13	[IRF] terminal frequency setting start amount	0.00~100.00 (%)	0.00
Cb-14	[IRF] terminal frequency setting end amount		100.00
Cb-15	[IRF] terminal analog input start ratio	0.0~ [Cb-16] (%)	20.0
Cb-16	[IRF] terminal analog input end ratio	[Cb-15]~100.0 (%)	100.0
Cb-17	[IRF] terminal start selection	00 (Start amount)/01 (0%)	01
Cb-21	[VF2] terminal input filter time constant	1~500 (ms)	500
Cb-22	[VF2] terminal selection	00 (Single)/01 (Added to VRF/IRF: with reversibility) 02 (Added to VRF/IRF: without reversibility)	00
Cb-23	[VF2] terminal frequency setting start amount	-100.00~100.00 (%)	-100.00
Cb-24	[VF2] terminal frequency setting end amount		100.00
Cb-25	[VF2] terminal analog input start ratio	-100 .0~[Cb-26]	-100.0
Cb-26	[VF2] terminal analog input end ratio	[Cb-25]~100.0	100.0
Cb-30	[VRF] voltage/current bias adjustment	-100.00~100.00	0.00
Cb-31	[VRF] voltage/current adjustment gain	0~200.00	100.00
Cb-32	[IRF] voltage/current bias adjustment	-100.00~100.00	0.00
Cb-33	[IRF] voltage/current adjustment gain	0~200.00	100.00
Cb-34	[VF2] voltage bias adjustment	-100.00~100.00	0.00
Cb-35	[VF2] voltage adjustment gain	0~200.00	100.00
Cb-40	Thermistor selection	00 (Disabled)/01 (PTC resistance value enabled) 02 (NTC resistance value enabled)	00
Cb-41	Thermistor [TH+/TH-] adjustment	0.0~1000.0	100.0
CC-01	Selection of output terminal function [UPF]	See <List of output terminal functions>	002
CC-02	Selection of output terminal function [DRV]		001
CC-03	Selection of output terminal function [X1]		003
CC-04	Selection of output terminal function [X2]		007
CC-05	Selection of output terminal function [X3]		035
CC-06	Selection of output terminal function [RL]		000
CC-07	Selection of output terminal function [FL]		017
CC-11	Selection of output terminal [UPF] a/b (NO/NC)	00 (Normally open)/01 (Normally closed)	00
CC-12	Selection of output terminal [DRV] a/b (NO/NC)		
CC-13	Selection of output terminal [X1] a/b (NO/NC)		
CC-14	Selection of output terminal [X2] a/b (NO/NC)		
CC-15	Selection of output terminal [X3] a/b (NO/NC)		
CC-16	Selection of output terminal [RL] a/b (NO/NC)		
CC-17	Selection of output terminal [FL] a/b (NO/NC)		01
CC-20	Output terminal [UPF] on-delay time	0.00~100.00 (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-24	Output terminal [X1] on-delay time		
CC-25	Output terminal [X1] off-delay time		
CC-26	Output terminal [X2] on-delay time		

List of Parameters

Code	Name	Data range	Initial value
CC-27	Output terminal [X2] off-delay time	0.00~100.00 (s)	0.00
CC-28	Output terminal [X3] on-delay time		
CC-29	Output terminal [X3] off-delay time		
CC-30	Output terminal [RL] on-delay time		
CC-31	Output terminal [RL] off-delay time		
CC-32	Output terminal [FL] on-delay time		
CC-33	Output terminal [FL] off-delay time		
CC-40	Logical calculation output signal LOG1 selection 1	See <List of output terminal functions>	000
CC-41	Logical calculation output signal LOG1 selection 2		
CC-42	Logical calculation output signal LOG1 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-43	Logical calculation output signal LOG2 selection 1	See <List of output terminal functions>	000
CC-44	Logical calculation output signal LOG2 selection 2		
CC-45	Logical calculation output signal LOG2 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-46	Logical calculation output signal LOG3 selection 1	See <List of output terminal functions>	000
CC-47	Logical calculation output signal LOG3 selection 2		
CC-48	Logical calculation output signal LOG3 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-49	Logical calculation output signal LOG4 selection 1	See <List of output terminal functions>	000
CC-50	Logical calculation output signal LOG4 selection 2		
CC-51	Logical calculation output signal LOG4 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-52	Logical calculation output signal LOG5 selection 1	See <List of output terminal functions>	000
CC-53	Logical calculation output signal LOG5 selection 2		
CC-54	Logical calculation output signal LOG5 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-55	Logical calculation output signal LOG6 selection 1	See <List of output terminal functions>	000
CC-56	Logical calculation output signal LOG6 selection 2		
CC-57	Logical calculation output signal LOG6 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
CC-58	Logical calculation output signal LOG7 selection 1	See <List of output terminal functions>	000
CC-59	Logical calculation output signal LOG7 selection 2		
CC-60	Logical calculation output signal LOG7 operator selection	00 (AND)/01 (OR)/02 (XOR)	00
Cd-01	[FRQ] terminal output form selection	00 (PWM)/01 (frequency)	00
Cd-02	[FRQ] terminal standard frequency (for PWM output)	0~3600 (kHz)	2880
Cd-03	[FRQ] terminal output selection	See the List of output monitor functions	[dA-01]
Cd-04	[AMV] terminal output selection		
Cd-05	[AMI] terminal output selection		
Cd-10	Analog monitor adjustment mode selection	00 (Disabled)/01 (Enabled)	00
Cd-11	[FRQ] output filter time constant	1~500 (ms)	100
Cd-12	[FRQ] output data type selection	00 (absolute value)/01 (with sign)	00
Cd-13	[FRQ] bias adjustment	-100.0~100.0 (%)	0.0
Cd-14	[FRQ] gain adjustment	-1000.0~1000.0 (%)	100.0
Cd-15	[FRQ] output level in the adjustment mode	-100.0~100.0 (%)	
Cd-21	[AMV] output filter time constant	1~500 (ms)	100
Cd-22	[AMV] output data type selection	00 (absolute value)/01 (with sign)	00
Cd-23	[AMV] bias adjustment	-100.0~100.0 (%)	0.0
Cd-24	[AMV] gain adjustment	-1000.0~1000.0 (%)	100.0
Cd-25	[AMV] output level in the adjustment mode	-100.0~100.0 (%)	
Cd-31	[AMI] output filter time constant	1~500 (ms)	100
Cd-32	[AMI] output data type selection	00 (absolute value)/01 (with sign)	00
Cd-33	[AMI] bias adjustment	-100.0~100.0 (%)	20.0
Cd-34	[AMI] gain adjustment	-1000.0~1000.0 (%)	80.0
Cd-35	[AMI] output level in the adjustment mode	-100.0~100.0 (%)	100.0
CE101	First low current signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01
CE102	First low current detection level 1	(0.00 to 2.00) × Inverter rated current	1.0× rated current
CE103	First low current detection level 2		
CE105	First overload prewarning signal output mode selection	00 (During acceleration/deceleration, at constant speed) 01 (Only at constant speed)	01
CE106	First overload prewarning level 1	(0.00 to 2.00) × Inverter rated current	1.0× rated current
CE107	First overload prewarning level 2		
CE-10	Acceleration reaching frequency 1	0.00~590.00 (Hz)	0.00
CE-11	Deceleration reaching frequency 1		
CE-12	Acceleration reaching frequency 2		
CE-13	Deceleration reaching frequency 2		
CE120	First over torque level (normal powered)	0.0~500.0 (%)	100.0
CE121	First over torque level (reverse regenerative)		
CE122	First over torque level (reverse powered)		
CE123	First over torque level (normal regenerative)		
CE-30	Electronic thermal warning level (motor)	0.00~100.00 (%)	85.00
CE-31	Electronic thermal warning level (inverter)		
CE-33	0-Hz detection value level		0.50
CE-34	Cooling fin heating prewarning level	0~200 (° C)	120
CE-36	RUN time/power-on time level	0~100000 (hr)	0
CE-40	Window comparator [VRF] upper limit level	0~100 (%)	100
CE-41	Window comparator [VRF] lower limit level		0
CE-42	Window comparator [VRF] hysteresis range	0~10 (%)	0
CE-43	Window comparator [IRF] upper limit level	0~100 (%)	100
CE-44	Window comparator [IRF] lower limit level		0
CE-45	Window comparator [IRF] hysteresis range	0~10 (%)	0
CE-46	Window comparator [VF2] lower limit level	-100~100 (%)	100
CE-47	Window comparator [VF2] lower limit level		-100
CE-48	Window comparator [VF2] hysteresis range	0~10 (%)	0

List of Parameters

Code	Name	Data range	Initial value
CE-50	[VRF] operation level at disconnection	0~100 (%)	0
CE-51	[VRF] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
CE-52	[IRF] operation level at disconnection	0~100(%)	0
CE-53	[IRF] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
CE-54	[VF2] operation level at disconnection	-100~100(%)	0
CE-55	[VF2] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
CE201	Second low current signal output mode selection	Same as CE101	01
CE202	Second low current detection level 1	Same as CE102	1.0× rated current
CE203	Second low current detection level 2	Same as CE103	
CE205	Second overload prewarning signal output mode selection	Same as CE105	01
CE206	Second overload prewarning level 1	Same as CE106	1.0× rated current
CE207	Second overload prewarning level 2	Same as CE107	
CE220	Second over torque level (normal powered)	Same as CE120	100.0
CE221	Second over torque level (reverse regenerative)	Same as CE121	
CE222	Second over torque level (reverse powered)	Same as CE122	
CE223	Second over torque level (normal regenerative)	Same as CE123	
CF-01	Communication transmission speed selection (baudrate selection)	03 (2400bps)/04 (4800bps) 05 (9600bps)/06 (19.2kbps) 07 (38.4kbps)/08 (57.6kbps) 09 (76.8kbps)/10 (115.2kbps)	04
CF-02	Communication station number selection	1~247	1
CF-03	Communication parity selection	00 (Without parity) 01 (Even number parity) 02 (Odd number parity)	00
CF-04	Communication stop bit selection	01 (1bit)/02 (2bit)	01
CF-05	Communication error selection	00 (Error) 01 (Trip after deceleration stop) 02 (Ignore) 03 (Free run) 04 (Deceleration stop)	02
CF-06	Communication timeout time	0.00~100.00 (s)	0.00
CF-07	Communication waiting time	0~1000 (ms)	2
CF-08	Communication method selection	01 (Modbus-RTU) 02 (EzCOM) 03 (EzCOM management)	01
CF-11	Resister dataA,V⇔% conversion function	00 (A, V)/01 (%)	00
CF-20	EzCOM start INV station number	01~08	01
CF-21	EzCOM stop INV station number		
CF-22	EzCOM start selection	00 (ECOM) terminal) 01 (Modbus spec)	00
CF-23	Numer of EzCOM data sets	01~05	05
CF-24	EzCOM transmission destination station number 1	1~247	1
CF-25	EzCOM transmission destination register 1	0000~FFFF	0000
CF-26	EzCOM transmission source register 1		
CF-27	EzCOM transmission destination station number 2	1~247	2
CF-28	EzCOM transmission destination register 2	0000~FFFF	0000
CF-29	EzCOM transmission source register 2		
CF-30	EzCOM transmission destination station number 3	1~247	3
CF-31	EzCOM transmission destination register 3	0000~FFFF	0000
CF-32	EzCOM transmission source register 3		
CF-33	EzCOM transmission destination station number 4	1~247	4
CF-34	EzCOM transmission destination register 4	0000~FFFF	0000
CF-35	EzCOM transmission source register 4		
CF-36	EzCOM transmission destination station number 5	1~247	5
CF-37	EzCOM transmission destination register 5	0000~FFFF	0000
CF-38	EzCOM transmission source register 5		
CF-50	USB station number selection	1~247	1

Parameter mode (code H)

Code	Name	Data range	Initial value
HA-01	Auto-tuning selection	00 (Disabled)/01 (Non-rotation)/02 (Rotation)/03 (IVMS)	00
HA-02	Operation command for auto-tuning	00 (RUN key on the operator keypad)/01 ([AA111]/[AA211])	00
HA-03	Online tuning selection	00 (Disabled)/01 (Enabled)	00
HA110	First stability constant	0~1000 (%)	100
HA112	First stabilization ramp function end ratio	0~100 (%)	30
HA113	First stabilization ramp function start ratio		10
HA115	First speed response	0~1000 (%)	32
HA120	First gain switch selection	00 ([CAS] terminal)/01 (setting switch)	00
HA121	First gain switch time	0~10000 (ms)	100
HA122	First gain switch intermediate frequency 1	0.00~590.00 (Hz)	0.00
HA123	First gain switch intermediate frequency 2		
HA124	First gain mapping maximum frequency		
HA125	First gain mapping P gain 1	0.0~1000.0 (%)	100.0
HA126	First gain mapping I gain 1		
HA127	First gain mapping P control P gain 1		
HA128	First gain mapping P gain 2		
HA129	First gain mapping I gain 2		
HA130	First gain mapping P control P gain 2		
HA131	First gain mapping P gain 3		
HA132	First gain mapping I gain 3		
HA133	First gain mapping P gain 4		
HA134	First gain mapping I gain 4		
HA210	Second stability constant	Same as HA110	100
HA212	Second stabilization ramp function end ratio	0~100 (%)	30
HA213	Second stabilization ramp function start ratio		10
HA215	Second speed response	0~1000 (%)	32
HA220	Second gain switch selection	00 ([CAS] terminal)/01 (setting switch)	00
HA221	Second gain switch time	0~10000 (ms)	100
HA222	Second gain switch intermediate frequency 1	0.00~590.00 (Hz)	00
HA223	Second gain switch intermediate frequency 2		100
HA224	Second gain mapping maximum frequency		0.00
HA225	Second gain mapping P gain 1	0.0~1000.0 (%)	100.0
HA226	Second gain mapping I gain 1		
HA227	Second gain mapping P control P gain 1		
HA228 to HA234	Second gain mapping	Same as HA128 to HA134	100.0
Hb101	Motor setting, 1st-motor	00:IE1 motor/01:AF motor/02:d2G4 motor/03:IE3 motor	03
Hb102	First IM motor capacity selection	0.01~75.00 (kW)	Note:
Hb103	Selection of number of first IM motor poles	2 to 48 (poles)	4
Hb104	First IM base frequency	10.00~590.00 (Hz)	60.00
Hb105	First IM maximum frequency		
Hb106	First IM motor's rated voltage	1~1000 (V)	200 V class : 200 400 V class : 400
Hb108	First IM motor's rated current	0.01~10000.00 (A)	Note:
Hb110	First IM motor constant R1	0.000001~1000.000000 (Ω)	
Hb112	First IM motor constant R2		
Hb114	First motor constant L	0.000001~1000.000000 (mH)	
Hb116	First IM motor constant Io	0.01~10000.00 (A)	
Hb118	First IM motor constant J	0.00001~10000.00000 (kgm^2)	
Hb130	First minimum frequency	0.10~10.00 (Hz)	0.50
Hb131	First reduced voltage start time	0~2000 (ms)	36
Hb140	First manual torque boost operation mode selection	00 (Disabled)/01 (Always enabled) 02 (Enabled only for forward revolution) 03 (Enabled only for reverse revolution)	01
Hb141	First amount of manual torque boost	0.0~20.0 (%)	1.0
Hb142	First manual torque boost break point	0.0~50.0 (%)	0.8
Hb145	First energy-saving operation selection	00 (Disabled)/01 (Enabled)	00
Hb146	First energy-saving response/accuracy adjustment	0.0~100.0(%)	50.0
Hb150	First free V/f frequency 1	0.00~[Hb152] (Hz)	0.00
Hb151	First free V/f voltage 1	0.0~1000.0 (V)	0.0
Hb152	First free V/f frequency 2	[Hb150]~[Hb154] (Hz)	0.00
Hb153	First free V/f voltage 2	0.0~1000.0 (V)	0.0
Hb154	First free V/f frequency 3	[Hb152]~[Hb156] (Hz)	0.00
Hb155	First free V/f voltage 3	0.0~1000.0 (V)	0.0
Hb156	First free V/f frequency 4	[Hb154]~[Hb158] (Hz)	0.00
Hb157	First free V/f voltage 4	0.0~1000.0 (V)	0.0
Hb158	First free V/f frequency 5	[Hb156]~[Hb160] (Hz)	0.00
Hb159	First free V/f voltage 5	0.0~1000.0 (V)	0.0
Hb160	First free V/f frequency 6	[Hb158]~[Hb162] (Hz)	0.00
Hb161	First free V/f voltage 6	0.0~1000.0 (V)	0.0
Hb162	First free V/f frequency 7	[Hb160]~[Hb104] (Hz)	0.00
Hb163	First free V/f voltage 7	0.0~1000.0 (V)	0.0
Hb170	First slip compensation P gain with sensor(V/f with sensor)	0~1000 (%)	100
Hb171	First slip compensation I gain with sensor(V/f with sensor)		
Hb180	First output voltage gain	0~255 (%)	100

Note: Varies depending on inverter models and settings of duty rating.

List of Parameters

Code	Name	Data range	Initial value
Hb201	Second Motor setting	Same as Hb101	03
Hb202	Second IM motor capacity selection	Same as Hb102	Note:
Hb203	Selection of number of second IM motor poles	Same as Hb103	4
Hb204	Second IM base frequency	Same as Hb104	60.00
Hb205	Second IM maximum frequency	Same as Hb105	
Hb206	Second IM motor's rated voltage	Same as Hb106	200 V class : 200 400 V class : 400
Hb208	Second IM motor's rated current	Same as Hb108	Note:
Hb210	Second IM motor constant R1	Same as Hb110	
Hb212	Second IM motor constant R2	Same as Hb112	
Hb214	Second IM motor constant L	Same as Hb114	
Hb216	Second IM motor constant Io	Same as Hb116	
Hb218	Second IM motor constant J	Same as Hb118	
Hb230	Second minimum frequency	Same as Hb130	0.50
Hb231	Second reduced voltage start time	Same as Hb131	36
Hb240	Second manual torque boost operation mode selection	Same as Hb140	01
Hb241	Second amount of manual torque boost	Same as Hb141	0.0
Hb242	Second manual torque boost break point	Same as Hb142	
Hb245	Second energy-saving operation selection	Same as Hb145	00
Hb246	Second energy-saving response/accuracy adjustment	Same as Hb146	50.0
Hb250	Second free V/f frequency 1	Same as Hb150	0
Hb251	Second free V/f voltage 1	Same as Hb151	0.0
Hb252	Second free V/f frequency 2	Same as Hb152	0.00
Hb253	Second free V/f voltage 2	Same as Hb153	0.0
Hb254	Second free V/f frequency 3	Same as Hb154	0.00
Hb255	Second free V/f voltage 3	Same as Hb155	0.0
Hb256	Second free V/f frequency 4	Same as Hb156	0.00
Hb257	Second free V/f voltage 4	Same as Hb157	0.0
Hb258	Second free V/f frequency 5	Same as Hb158	0.00
Hb259	Second free V/f voltage 5	Same as Hb159	0.0
Hb260	Second free V/f frequency 6	Same as Hb160	0.00
Hb261	Second free V/f voltage 6	Same as Hb161	0.0
Hb262	Second free V/f frequency 7	Same as Hb162	0.00
Hb263	Second free V/f voltage 7	Same as Hb163	0.0
Hb270	Second slip compensation I gain with sensor (V/f with sensor)	Same as Hb170	100
Hb271	Second slip compensation I gain with sensor (V/f with sensor)	Same as Hb171	
Hb280	Second output voltage gain	Same as Hb180	

Code	Name	Data range	Initial value
HC101	First automatic torque boost voltage compensation gain	0~255 (%)	100
HC102	First automatic torque boost slip compensation gain		
HC110	First zero-speed range limiter (IM-0Hz)	0~100 (%)	
HC111	First amount of boost at the start (IM-SLV)	0~50 (%)	0
HC112	First amount of boost at the start (IM-oHz)		10
HC113	First selection of secondary-resistance correction that is conducted or not.	00 (Disabled)/01 (Enabled)	00
HC114	First selection of reversal prevention		
HC115	First selection for the torque transformation	00 (Torque)01 (Current)	01
HC120	First time constant for torque current command filter	0~100 (ms)	2
HC121	First speed feed forward gain	0~1000	0
HC137	First flux setting level	0.0~100.0 (%)	80.0
HC140	First forcing level	0~1000 (%)	100
HC141	First modulation threshold level 1	0~133 (%)	133
HC142	First modulation threshold level 2		
HC201	Second automatic torque boost voltage compensation gain	Same as HC101	100
HC202	Second automatic torque boost slip compensation gain	Same as HC102	
HC210	Second zero-speed range limiter (IM-0Hz)	Same as HC110	80
HC211	Second amount of boost at the start (IM-SLV)	Same as HC111	0
HC212	Second amount of boost at the start (IM-oHz)	Same as HC112	10
HC213	Second selection of whether a secondary-resistance correction is to be conducted.	Same as HC113	00
HC214	Second selection of reversal prevention	Same as HC114	
HC215	Second selection for the torque transformation	Same as HC115	01
HC220	Second time constant for torque current command filter	Same as HC120	2
HC221	Second speed feed forward gain	Same as HC121	0
HC237	Second flux setting level	Same as HC137	80.0
HC240	Second forcing level	Same as HC140	100
HC241	Second modulation threshold level 1	Same as HC141	133
HC242	Second modulation threshold level 2	Same as HC142	
Hd102	First SM (PMM) motor capacity selection	0.01~75.00 (kW)	Note:
Hd103	First selection of number of SM (PMM) motor poles	2 to 48 (poles)	
Hd104	First SM (PMM) base frequency	10.00~590.00 (Hz)	
Hd105	First SM (PMM) maximum frequency		
Hd106	First SM (PMM) motor's rated voltage	1~1000 (V)	
Hd108	First SM (PMM) motor's rated current	0.01~10000.00 (A)	
Hd110	First SM (PMM) motor's constant R	0.000001~1000.000000 (Ω)	
Hd112	First SM (PMM) motor's constant Ld	0.000001~1000.000000 (mH)	
Hd114	First SM (PMM) motor's constant Lq		

Note: Varies depending on inverter models and settings of duty rating.

List of Parameters

Code	Name	Data range	Initial value
Hd116	First SM (PMM) motor's constant Ke	0.1~100000.0 (mVs/rad)	Note: 1.
Hd118	First SM (PMM) motor's constant J	0.00001~10000.00000 (kgm2)	
Hd130	First SM (PMM) minimum frequency	0~50 (%)	8
Hd131	First SM (PMM) no-load current	0~100 (%)	10
Hd132	First SM (PMM) start method selection	00 (Position estimation disabled) 01 (Position estimation enabled)	00
Hd133	First SM (PMM) initial position estimation zero-V stand-by times	0~255	10
Hd134	First SM (PMM) initial position estimation detection stand-by times		
Hd135	First SM (PMM) initial position estimation detection times		30
Hd136	First SM (PMM) initial position estimation voltage gain	0~200 (%)	100
Hd137	First initial position estimation magnetic-pole position offset	0~359 (deg)	0
Hd-41	IVMS carrier frequency Note: 2.	0.5~16.0 (kHz)	2.0
Hd-42	Filter gain of IVMS detection current Note: 2.	0~1000	100
Hd-43	Open-phase voltage detection gain selection Note: 2.	00 (Gain 0)/01 (Gain 1)/02 (Gain 2)/03 (Gain 3)	00
Hd-44	Selection of open-phase switch threshold correction Note: 2.	00 (Disabled)/01 (Enabled)	01
Hd-45	Speed control P gain Note: 2.	0~1000	100
Hd-46	Speed control I gain Note: 2.	0~10000	100
Hd-47	Waiting time for open-phase switching Note: 2.	0~1000	15
Hd-48	Restriction on the rotation-direction determination Note: 2.	00 (Disabled)/01 (Enabled)	01
Hd-49	Adjustment of the timing for detecting the open-phase voltage Note: 2.	0~1000	10
Hd-50	Minimum pulse-width adjustment Note: 2.		100
Hd-51	Current limit of IVMS threshold Note: 2.	0~255	100
Hd-52	IVMS threshold gain Note: 2.		
Hd-58	IVMS carrier-frequency switching start/finish point Note: 2.	0~50 (%)	5
Hd202	Second SM (PMM) motor capacity selection	Same as Hd102	Note: 1.
Hd203	Second selection of number of SM (PMM) motor poles	Same as Hd103	
Hd204	Second SM (PMM) base frequency	Same as Hd104	
Hd205	Second SM (PMM) maximum frequency	Same as Hd105	
Hd206	Second SM (PMM) motor's rated voltage	Same as Hd106	
Hd208	Second SM (PMM) motor's rated current	Same as Hd108	
Hd210	Second SM (PMM) motor's constant R	Same as Hd110	
Hd212	Second SM (PMM) motor's constant Ld	Same as Hd112	
Hd214	Second SM (PMM) motor's constant Lq	Same as Hd114	
Hd216	Second SM (PMM) motor's constant Ke	Same as Hd116	
Hd218	Second SM (PMM) motor's constant J	Same as Hd118	
Hd230	Second SM (PMM) minimum frequency	Same as Hd130	8
Hd231	Second SM (PMM) no-load current	Same as Hd131	10
Hd232	Second SM (PMM) start method selection	Same as Hd132	00
Hd233	Second SM (PMM) initial position estimation zero-V stand-by times	Same as Hd133	10
Hd234	Second SM (PMM) initial position estimation detection stand-by times	Same as Hd134	
Hd235	Second SM (PMM) initial position estimation detection times	Same as Hd135	30
Hd236	Second SM (PMM) initial position estimation voltage gain	Same as Hd136	100
Hd237	Second initial position estimation magnetic-pole position offset	Same as Hd137	0

Note: 1. Varies depending on inverter models and settings of duty rating.
2. Hd-41 to Hd-58 are reserved parameters.

Parameter mode (code o)

Code	Name	Data range	Initial value
oA-10	Operation selection when option error occurs (slot 1)	00 (Error)/01 (Continue operation)	00
oA-11	Communication monitoring timer setting (slot1)	0.00~100.00 (s)	1.00
oA-12	Operation setting at the time of communication error (slot1)	00 (Error)/01 (Trip after deceleration stop)/02 (Ignore) 03 (Free run)/04 (Deceleration stop)	01
oA-13	Selection of operation command behavior at start (slot 1)	00 (Operation command disabled)/01 (Operation command enabled)	00
oA-20	Operation selection when option error occurs (slot 2)	00 (Error)/01 (Continue operation)	00
oA-21	Communication monitoring timer setting (slot 2)	0.00~100.00 (s)	1.00
oA-22	Operation setting at the time of communication error (slot 2)	00 (Error)/01 (Trip after deceleration stop)/02 (Ignore)/03 (Free run) 04 (Deceleration stop)	01
oA-23	Selection of operation command behavior at start (slot 2)	00 (Operation command disabled)/01 (Operation command enabled)	00
oA-30	Operation selection when option error occurs (slot 3)	00 (Error)/01 (Continue operation)	00
oA-31	Communication monitoring timer setting (slot 3)	0.00~100.00 (s)	1.00
oA-32	Operation setting at the time of communication error (slot 3)	00 (Error)/01 (Trip after deceleration stop)/02 (Ignore)/03 (Free run) 04 (Deceleration stop)	01
oA-33	Selection of operation command behavior at start (slot 3)	00 (Operation command disabled)/01 (Operation command enabled)	00
ob-01	Encoder constant set-up (option)	32~65535 (pls)	1024
ob-02	Encoder phase sequence selection (option)	00 (Phase-A is leading)/01 (Phase-B is leading)	00
ob-03	Motor gear ratio's numerator (option)	1~10000	1
ob-04	Motor gear ratio's denominator (option)		
ob-10	Pulse string input SA/SB (option) detection target selection	00 (Command)/01 (Pulse string position command)	00
ob-11	Pulse string input (option) mode selection	00 (90° phase difference) 01 (forward/reverse rotation command and rotation direction) 02 (forward/reverse rotation pulse string)	01
ob-12	Pulse string input (option) scale	0.05~200.0 (kHz)	25.00
ob-13	Pulse string input (option) filter time constant	0.01~2.00 (s)	0.10
ob-14	Pulse string input (option) bias size	-100.0~100.0 (%)	0.0
ob-15	Pulse string input (option) upper detection limit	0.0~100.0 (%)	100.0
ob-16	Pulse string input (option) lower detection limit		0.0

List of Parameters

Code	Name	Data range	Initial value
oE-01	[Ai4] terminal input filter time constant	1~500 (ms)	16
oE-03	[Ai4] terminal start amount	0.00~100.00 (%)	0.00
oE-04	[Ai4] terminal end amount		100.00
oE-05	[Ai4] terminal start ratio	0.0~ [oE-06] (%)	0.0
oE-06	[Ai4] terminal end ratio	[oE-05]~100.0 (%)	100.0
oE-07	[Ai4] terminal start selection	00 (Start amount [oE-03])/01 (0%)	01
oE-11	[Ai5] terminal input filter time constant	1~500 (ms)	16
oE-13	[Ai5] terminal start amount	0.00~100.00 (%)	0.00
oE-14	[Ai5] terminal end amount		100.00
oE-15	[Ai5] terminal start ratio	0.0~ [oE-16] (%)	0.0
oE-16	[Ai5] terminal end ratio	[oE-15]~100.0 (%)	100.0
oE-17	[Ai5] terminal start selection	00 (Start amount [oE-13])/01 (0%)	01
oE-21	[Ai6] terminal input filter time constant	1~500 (ms)	16
oE-23	[Ai6] terminal start amount	-100.00~100.00 (%)	-100.00
oE-24	[Ai6] terminal end amount		100.00
oE-25	[Ai6] terminal start ratio	-100.0~ [oE-26] (%)	-100.0
oE-26	[Ai6] terminal end ratio	[oE-25]~100.0 (%)	100.0
oE-28	[Ai4] voltage/current bias adjustment	-100.00~100.00 (%)	0.00
oE-29	[Ai4] voltage adjustment gain	0.00~200.00 (%)	100.00
oE-30	[Ai5] voltage/current bias adjustment	-100.00~100.00 (%)	0.00
oE-31	[Ai5] voltage adjustment gain	0.00~200.00 (%)	100.00
oE-32	[Ai6] voltage bias adjustment	-100.00~100.00 (%)	0.00
oE-33	[Ai6] voltage adjustment gain	0.00~200.00 (%)	100.00
oE-35	Window comparator [Ai4] upper limit level	0~100 (%)	100
oE-36	Window comparator [Ai4] lower limit level		0
oE-37	Window comparator [Ai4] hysteresis range	0~10 (%)	0
oE-38	Window comparator [Ai5] upper limit level	0~100 (%)	100
oE-39	Window comparator [Ai5] lower limit level		0
oE-40	Window comparator [Ai5] hysteresis range	0~10 (%)	0
oE-41	Window comparator [Ai6] upper limit level	-100~100 (%)	100
oE-42	Window comparator [Ai6] lower limit level		-100
oE-43	Window comparator [Ai6] hysteresis range	0~10 (%)	0
oE-44	[Ai4] operation level at disconnection	-100~100 (%)	0
oE-45	[Ai4] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
oE-46	[Ai5] operation level at disconnection	0~100 (%)	0
oE-47	[Ai5] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
oE-48	[Ai6] operation level at disconnection	0~100 (%)	0
oE-49	[Ai6] operation level selection at disconnection	00 (Disabled) 01 (Enabled: out of range) 02 (Enabled: within the range)	00
oE-50	[Ao3] terminal output selection	See the List of output monitor functions	dA-01
oE-51	[Ao4] terminal output selection		
oE-52	[Ao5] terminal output selection		
oE-56	[Ao3] output filter time constant	1~500 (ms)	100
oE-57	[Ao3] output data type selection	00 (absolute value) 01 (with sign)	00
oE-58	[Ao3] bias adjustment (voltage/current)	-100.0~100.0 (%)	0.0
oE-59	[Ao3] gain adjustment (voltage/current)	-1000.0~1000.0 (%)	100.0
oE-60	[Ao3] output level in the adjustment mode	-100.0~100.0 (%)	
oE-61	[Ao4] output filter time constant	1~500 (ms)	100
oE-62	[Ao4] output data type selection	00 (absolute value) 01 (with sign)	00
oE-63	[Ao4] bias adjustment (voltage/current)	-100.0~100.0 (%)	0.0
oE-64	[Ao4] gain adjustment (voltage/current)	-1000.0~1000.0 (%)	100.0
oE-65	[Ao4] output level in the adjustment mode	-100.0~100.0 (%)	
oE-66	[Ao5] output filter time constant	1~500(ms)	100
oE-67	[Ao5] output data type selection	00 (absolute value) 01 (with sign)	00
oE-68	[Ao5] bias adjustment (voltage)	-100.0~100.0 (%)	0.0
oE-69	[Ao5] gain adjustment (voltage)	-1000.0~1000.0 (%)	100.0
oE-70	[Ao5] output level in the adjustment mode	-100.0~100.0 (%)	

Code	Name	Data range	Initial value
oH-01	IP address selection (P1-EN)	00 (Gr.1)/01 (Gr.2)	00
oH-02	Transmission speed (port 1) (P1-EN)	00 (Auto negotiation)/01 (100M: full duplex)/02 (100M: half duplex) 03 (10M: full duplex)/04 (10M: half duplex)	
oH-03	Transmission speed (port 2) (P1-EN)		
oH-04	Ethernet communication timeout (P1-EN)	1~65535 (×10ms)	3000
oH-05	Modbus TCP port number (IPv4)	502, 1024~65535	502
oH-06	Modbus TCP port number (IPv6)		
oH-20	Profibus Nobe address	0~125	0
oH-21	Profibus Clear Mode selection	00 (Clear)/01 (Value retained the last time)	00
oH-22	Profibus Map selection	00 (PPO)/01 (Comvertional)/02 (FlexibleMode)	
oH-23	Selection of setting from the Profibus master	00 (Allowed)/01 (Not allowed)	
oH-24	Selection of setpoint telegram/Actual value telegram Gr	00 (Gr.A)/01 (Gr.B)/02 (Gr.C)	
oH-30	IP address selection (P1-PN)	00 (Gr.1)/01 (Gr.2)	
oH-31	Transmission speed (port 1) (P1-PN)	00 (Auto negotiation)/01 (100M: full duplex)/02 (100M: half duplex) 03 (10M: full duplex)/04 (10M: half duplex)	
oH-32	Transmission speed (port 2) (P1-PN)		
oH-33	Ethernet communication timeout (P1-PN)	1~65535 (×10ms)	3000
oH-34	Selection of setpoint telegram/Actual value telegram Gr	00 (Gr.A)/01 (Gr.B)/02 (Gr.C)	502
oJ-01 to 10	Gr.A flexible command registration writing register 1 to 10	0000~FFFF	0000
oJ-11 to 20	Gr.A flexible command registration reading register 1 to 10		
oJ-21 to 30	Gr.B flexible command registration writing register 1 to 10		
oJ-31 to 40	Gr.B flexible command registration reading register 1 to 10		
oJ-41 to 50	Gr.C flexible command registration writing register 1		
oJ-51 to 60	Gr.C flexible command registration reading register 1		
oL-01	Gr.1 IPv4 IP address (1)	0~255	192
oL-02	Gr.1 IPv4 IP address (2)		168
oL-03	Gr.1 IPv4 IP address (3)		0
oL-04	Gr.1 IPv4 IP address (4)		2
oL-05	Gr.1 IPv4 subnet mask (1)		255
oL-06	Gr.1 IPv4 subnet mask (2)		255
oL-07	Gr.1 IPv4 subnet mask (3)		255
oL-08	Gr.1 IPv4 subnet mask (4)		0
oL-09	Gr.1 IPv4 default gateway (1)		192
oL-10	Gr.1 IPv4 default gateway (2)		168
oL-11	Gr.1 IPv4 default gateway (3)		0
oL-12	Gr.1 IPv4 default gateway (4)		1
oL-20 to 27	Gr.1 IPv6 IP address (1) to (8)	0000~FFFF	0000
oL-28	Gr.1 IPv6 subnet prefix	0~127	64
oL-29 to 36	Gr.1 IPv6 default gateway (1) to (8)	0000~FFFF	0000
oL-40 to 51	Gr.2 IPv4	Same as oL-01 to oL-12	-
oL-60 to 67	Gr.1 IPv6 IP address (1) to (8)	0000~FFFF	0000
oL-68	Gr.2 IPv6 subnet prefix	0~127	64
oL-69 to 76	Gr.2 IPv6 default gateway (1) to (8)	0000~FFFF	0000

Parameter mode (code P)

Code	Name	Data range	Initial value
PA-01	Forced operation mode selection	00 (Disabled)/01 (Enabled)	00
PA-02	Forced operation frequency setting	0.00~590.00 (Hz)	0.00
PA-03	Forced operation rotation direction command	00 (Normal rotation)/01 (Reverse rotation)	00
PA-04	Commercial power supply bypass function selection	00 (Disabled)/01 (Enabled)	00
PA-05	Bypass function delay time	0.0~1000.0 (s)	5.0
PA-20	Simulation mode selection	00 (Disabled)/01 (Enabled)	00
PA-21	Selection of error code for alarm test	000~255	000
PA-22	Output current monitor optional output selection	00 (Disabled)/01 (Enabled: parameter setting [PA-23]) 02 (Enabled: set from [VRF])/03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2])/05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5])/07 (Enabled: set from [Ai6])	01
PA-23	Output current monitor optional setting value	0.0 to 3.0 × Inverter rated current (A)	0.0
PA-24	P-N voltage monitor optional output selection	00 (Disabled)/01 (Enabled: parameter setting [PA-25]) 02 (Enabled: set from [VRF])/03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2])/05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5])/07 (Enabled: set from [Ai6])	01
PA-25	P-N voltage monitor optional setting value	200V class: 0.0 to 450.0 (Vdc) 400V class: 0.0 to 900.0 (Vdc)	270.0 540.0
PA-26	Output voltage monitor optional output selection	00 (Disabled)/01 (Enabled: parameter setting [PA-27]) 02 (Enabled: set from [VRF])/03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2])/05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5])/07 (Enabled: set from [Ai6])	01
PA-27	Output voltage monitor optional setting value	200V class: 0.0-300.0 (V) 400V class: 0.0-600.0 (V)	0.0
PA-28	Output torque monitor optional output selection	00 (Disabled)/01 (Enabled: parameter setting [PA-29]) 02 (Enabled: set from [VRF])/03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2])/05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5])/07 (Enabled: set from [Ai6])	01
PA-29	Output torque monitor optional setting value	-500.0~+500.0 (%)	0.0
PA-30	Frequency adjustment optional output selection	00 (Disabled)/01 (Enabled: parameter setting [PA-31]) 02 (Enabled: set from [VRF])/03 (Enabled: set from [IRF]) 04 (Enabled: set from [VF2])/05 (Enabled: set from [Ai4]) 06 (Enabled: set from [Ai5])/07 (Enabled: set from [Ai6])	01
PA-31	Frequency matching optional setting value	0.0~590.00 (Hz)	0.00

List of Parameters

Parameter mode (code U)

Code	Name	Data range	Initial value
UA-01	Password input for display selection	0000~FFFF	0000
UA-02	Soft-lock password input		
UA-10	Display selection	00 (Full display)/01 (By function)/02 (User setting) 03 (Compare display)/04 (Only monitor display)	00
UA-12	Clearing of integrated input power	00 (Disabled)/01 (Clear)	00
UA-13	Integrated input power display gain	1~1000	1
UA-14	Clearing of integrated output power	00 (Disabled)/01 (Clear)	00
UA-15	Integrated output power display gain	1~1000	1
UA-16	Soft-lock selection	00 ([SFT] terminal)/01 (Always enabled)	00
UA-17	Soft-lock target selection	00 (All data cannot be changed) 01 (Data other than set frequency cannot be changed)	00
UA-18	Data R/W selection	00 (R/W enabled)/01 (R/W disabled)	00
UA-19	Battery level warning selection	00 (Disabled)/01 (Warning)/02 (Error)	00
UA-20	Operation at disconnection of operator keypad	00 (Error)/01 (Error after deceleration stop)/02 (Ignore) 03 (Free run)/04 (Deceleration stop)	02
UA-21	Selection of second setting parameter display	00 (Not display) 01 (Display)	00
UA-22	Selection of option parameter display		
UA-30	Selection of user parameter automatic setting	00 (Disabled)/01 (Enabled)	00
UA-31 to 62	User parameter 1 to 62 selection	no/***** (select a parameter)	no
Ub-01	Selection of factory default initialization	00 (Disabled)/01 (Trip history)/02 (Parameter initialization) 03 (Trip history + parameters)/04 (Reserved)/05 (Other than terminal function) 06 (Other than communication function) 07 (Other than terminal&communication functions)/08 (Reserved)	00
Ub-02	Selection of initial values	00 (Mode 0)/01 (Mode 1)/02 (Mode 2)/03 (Mode 3)	00
Ub-03	Duty type selection	00 (VLD)/01 (LD)/02 (ND)	02
Ub-05	Initialization start selection	00 (Disabled)/01 (Start initialization)	00

Code	Name	Data range	Initial value
Ud-01	Trace function selection	00 (Disabled)/01 (Enabled)	00
Ud-02	Trace start	00 (Stop)/01 (Start)	00
Ud-03	Selection of the number of trace data sets	0~8	1
Ud-04	Selection of the number of trace signals		
Ud-10 to17	Selection of trace data 0 to 7	<List of output monitor functions>.	dA-01
Ud-20	Trace signal 0 I/O selection	00 (Input: [Ud-21])/01 (Output: [Ud-22])	00
Ud-21	Trace signal 0 input terminal selection	<List of input terminal functions>	001
Ud-22	Trace signal 0 output terminal selection		
Ud-23	Trace signal 1 I/O selection	00 (Input: [Ud-24])/01 (Output: [Ud-25])	00
Ud-24	Trace signal 1 input terminal selection	<List of input terminal functions>	001
Ud-25	Trace signal 1 output terminal selection		
Ud-26	Trace signal 2 I/O selection	00 (Input: [Ud-27]/01 (Output: [Ud-28])	00
Ud-27	Trace signal 2 input terminal selection	<List of input terminal functions>	001
Ud-28	Trace signal 2 output terminal selection		
Ud-29	Trace signal 3 I/O selection	00 (Input: [Ud-30])/01 (Output: [Ud-31])	00
Ud-30	Trace signal 3 input terminal selection	<List of input terminal functions>	001
Ud-31	Trace signal 3 output terminal selection		
Ud-32	Trace signal 4 I/O selection	00 (Input: [Ud-33])/01 (Output: [Ud-34])	00
Ud-33	Trace signal 4 input terminal selection	<List of input terminal functions>	001
Ud-34	Trace signal 4 output terminal selection		
Ud-35	Trace signal 5 I/O selection	00 (Input: [Ud-36])/01 (Output: [Ud-37])	00
Ud-36	Trace signal 5 input terminal selection	<List of input terminal functions>	001
Ud-37	Trace signal 5 output terminal selection		
Ud-38	Trace signal 6 I/O selection	00 (Input: [Ud-39])/01 (Output: [Ud-40])	00
Ud-39	Trace signal 6 input terminal selection	<List of input terminal functions>	001
Ud-40	Trace signal 6 output terminal selection		
Ud-41	Trace signal 7 I/O selection	00 (Input: [Ud-42])/01 (Output: [Ud-43])	00
Ud-42	Trace signal 7 input terminal selection	<List of input terminal functions>	001
Ud-43	Trace signal 7 output terminal selection		
Ud-50	Selection of trace trigger 1	00 (Trip)/01 (Trace data 0)/02 (Trace data 1)/03 (Trace data 2)/04 (Trace data 3) 05 (Trade data 4)/06 (Trace data 5)/07 (Trace data 6)/08 (Trace data 7) 09 (Trace signal 0)/10 (Trace signal 1)/11 (Trace signal 2)/12 (Trace signal 3) 13 (Trace signal 4)/14 (Trace signal 5)/15 (Trace signal 6)/16 (Trace signal 7)	00
Ud-51	Selection of trigger 1 operation at trace data trigger	00 (Operate when it is above the trigger level) 01 (Operate when it is below the trigger level)	00
Ud-52	Trigger 1 level at trace data trigger	0~100 (%)	0
Ud-53	Selection of trigger 1 operation at trace signal trigger	00 (Operate when the signal is ON) 01 (Operate when the signal is OFF)	00
Ud-54	Selection of trace trigger 2	Same as Ud-50	00
Ud-55	Selection of trigger 2 operation at trace data trigger	00 (Rising edge) 01 (Falling edge)	00
Ud-56	Trigger 2 level at trace data trigger	0~100 (%)	0
Ud-57	Selection of trigger 2 operation at trace signal trigger	00 (Operate when the signal is ON) 01 (Operate when the signal is OFF)	00
Ud-58	Trigger condition selection	00 (When trigger 1 is satisfied)/01 (When trigger 2 is satisfied) 02 (When trigger 1 or 2 is satisfied)/03 (When trigger 1 and 2 are satisfied)	00
Ud-59	Trigger point setting	0~100 (%)	0
Ud-60	Sampling time setting	01 (0.2ms)/02 (0.5ms)/03 (1ms)/04 (2ms)/05 (5ms)/06 (10ms)/07 (50ms) 08 (100ms)/09 (500ms)/10 (1000ms)	03

〈List of output monitor functions〉

Monitor No.	Function
dA-01	Output frequency monitor
dA-02	Output current monitor
dA-04	Frequency command after calculation
dA-08	Speed detection value monitor
dA-12	Output frequency monitor (with sign)
dA-14	Frequency upper limit monitor
dA-15	Torque command monitor after calculation
dA-16	Torque limit monitor
dA-17	Output torque monitor
dA-18	Output voltage monitor
dA-30	Input power monitor
dA-34	Output power monitor
dA-38	Motor temperature monitor
dA-40	DC voltage monitor
dA-41	DBTR load factor monitor
dA-42	Electronic thermal duty ratio monitor MTR
dA-43	Electronic thermal duty ratio monitor CTL
dA-61	Analog input [VRF] monitor
dA-62	Analog input [IRF] monitor
dA-63	Analog input [VF2] monitor
dA-64	Analog input [Ai4] monitor
dA-65	Analog input [Ai5] monitor
dA-66	Analog input [Ai6] monitor
dA-70	Pulse string input monitor main body
dA-71	Pulse string input monitor option
db-30	PID1 feedback data 1 monitor
db-32	PID1 feedback data 2 monitor
db-34	PID1 feedback data 3 monitor
db-36	PID2 feedback data monitor
db-38	PID3 feedback data monitor
db-40	PID4 feedback data monitor
db-42	PID1 target value monitor after calculation
db-44	PID1 feedback data
db-50	PID1 output monitor
db-51	PID1 deviation monitor
db-52	PID1 deviation 1 monitor
db-53	PID1 deviation 2 monitor
db-54	PID1 deviation 3 monitor
db-55	PID2 output monitor
db-56	PID2 deviation monitor
db-57	PID3 output monitor
db-58	PID3 deviation monitor
db-59	PID4 output monitor
db-60	PID4 deviation monitor
db-64	PID feed-forward monitor
dC-15	Cooling fin temperature monitor
FA-01	Main speed command
FA-02	Auxiliary speed command
FA-15	Torque command monitor
FA-16	Torque bias monitor
FA-30	PID1 target value 1
FA-32	PID1 target value 2
FA-34	PID1 target value 3
FA-36	PID2 target value
FA-38	PID3 target value
FA-40	PID4 target value

〈List of input terminal functions〉

Function No.	Abbreviation	Function name
000	no	Without allocation
001	FR	Normal rotation
002	RR	Reverse rotation
003	DFL	Multistage speed 1
004	DFM	Multistage speed 2
005	DFH	Multistage speed 3
006	DHH	Multistage speed 4
007 to 013	SF1 to 7	Multistage speed bit 1 to 7
014	ADD	Addition of frequency
015	AUT	Switching of command
016	STA	3-wire starting up
017	STP	3-wire stopping
018	FS	3-wire normal and reverse
019	AHD	Retention of analog command
020	UP	Acceleration through remote operation
021	DWN	Deceleration through remote operation
022	UDC	Clearing of remote operation data
023	F-OP	Forced switching of command
024	SET	Second control
028	RST	Reset
029	JOG	Jogging
030	DB	Braking with external direct current
031	AD2	2-step acceleration/deceleration
032	MBS	Free-run stop
033	ES	External abnormality
034	USP	Prevention of power restoration restarting
035	CS	Commercial switch
036	SFT	Soft-lock
037	BOK	Brake check
038	OLR	Switching of stall prevention
039	KHC	Clearing of integrated input power
040	OKHC	Clearing of integrated output power
041	PID	PID1 disabled
042	PIDC	Resetting of PID1 integration
043	PID2	PID2 disabled
044	PIDC2	Resetting of PID2 integration
045	PID3	PID3 disabled
046	PIDC3	Resetting of PID3 integration
047	PID4	PID4 disabled
048	PIDC4	Resetting of PID4 integration
051	SVC1	PID1 multistage target value 1
052	SVC2	PID1 multistage target value 2
053	SVC3	PID1 multistage target value 3
054	SVC4	PID1 multistage target value 4
055	PRO	Switching of PID gain
056	PIO	Switching of PID output
058	SLEP	Satisfaction of SLEEP condition
059	WAKE	Satisfaction of WAKE condition
060	TL	Validation of torque limit
061	TRQ1	Torque limit switchover 1
062	TRQ2	Torque limit switchover 2
063	PPI	PPI control switch
064	CAS	Control gain switch
066	FOC	Auxiliary excitation
067	ATR	Validation of torque control
068	TBS	Validation of torque bias
069	ORT	Orientation
071	LAC	Cancellation of LAD
072	PCLR	Clearing of positional deviation
073	STAT	Permission to inputting of Pulse string position command
074	PUP	Addition of positional bias
075	PDN	Subtraction of positional bias
076	CP1	Positional command selection 1
077	CP2	Positional command selection 2
078	CP3	Positional command selection 3
079	CP4	Positional command selection 4
080	ORL	Origin limit signal
081	ORG	Return-to-origin start up signal
082	FOT	Stopping of normal rotation driving
083	ROT	Stopping of reverse rotation driving
084	SPD	Switching of speed position
085	PSET	Presetting of positional data
097	PCC	Clearing of pulse counter
098	ECOM	Starting up of EzCOM
100	HLD	Stopping of acceleration/deceleration
101	REN	Operation permission signal
102	DISP	Fixation of display
103	PLA	Pulse string input A
104	PLB	Pulse string input B
105	EMF	Emergency forced operation
107	COK	Contactor check signal
108	DTR	Data trace starting signal
109	PLZ	Pulse string input Z
110	TCH	Teaching signal

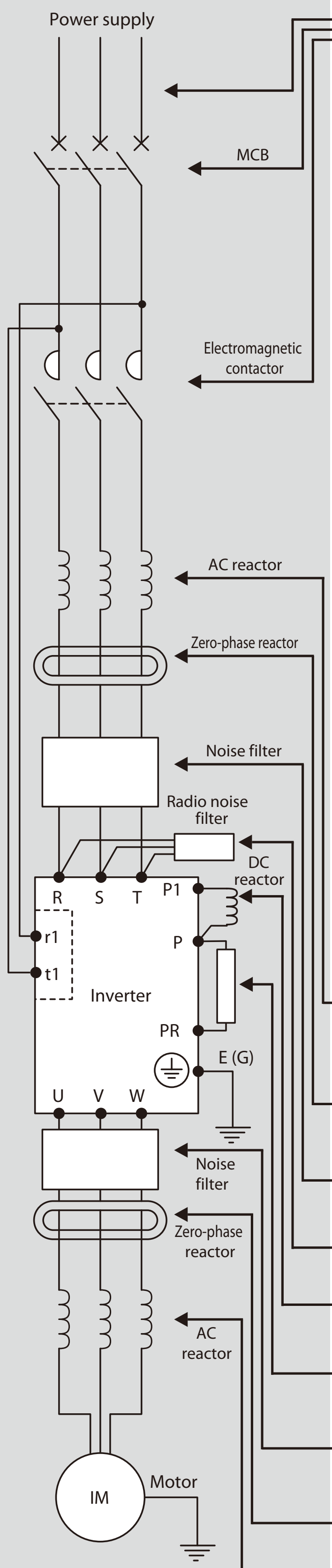
List of Parameters

〈List of output terminal functions〉

Function No.	Abbreviation	Function name
000	no	Without allocation
001	DRV	During operation
002	UPF1	When the constant speed is attained
003	UPF2	Equal to or above the set frequency
004	UPF3	Set frequency only
005	UPF4	Equal to or above the set frequency 2
006	UPF5	Set frequency only 2
007	IRDY	Operation ready completion
008	FRR	During normal rotation operation
009	RRR	During reverse rotation operation
010	FREF	Frequency command panel
011	REF	Operation command panel
012	SETM	Second control under selection
016	OPO	Optional output
017	AL	Alarm signal
018	MJA	Severe failure signal
019	OTQ	Excessive torque
020	IP	During instantaneous power failure
021	UV	Under insufficient voltage
022	TRQ	During torque limitation
023	IPS	During power failure deceleration
024	RNT	RUN time elapsed
025	ONT	Power ON time elapsed
026	THM	Electronic thermal warning
027	THC	Electronic thermal warning
029	WAC	Capacitor life advance notice
030	WAF	Fan life advance notice
031	FS	Operation command signal
032	OHF	Cooling fin heating advance notice
033	LOC	Low current signal
034	LOC2	Low current signal 2
035	OL	Overload advance notice
036	OL2	Overload advance notice 2
037	BRK	Brake release
038	BER	Brake abnormality
039	CON	Contactor control

Function No.	Abbreviation	Function name
040	ZS	0 Hz detection signal
041	DSE	Excessive speed deviation
042	PDD	Excessive positional deviation
043	POK	Positioning completed
044	PCMP	Pulse count compare-match output
045	OD	PID excessive deviation
046	FBV	PID feedback comparison
047	OD2	PID2 excessive deviation
048	FBV2	PID2 feedback comparison
049	NDc	Communication disconnection
050	VRFDc	Analog disconnection VRF
051	IRFDc	Analog disconnection IRF
052	VF2Dc	Analog disconnection VF2
053	Ai4Dc	Analog disconnection Ai4
054	Ai5Dc	Analog disconnection Ai5
055	Ai6Dc	Analog disconnection Ai6
056	WCVRF	Window comparator VRF
057	WCIRF	Window comparator IRF
058	WCVF2	Window comparator VF2
059	WCAi4	Window comparator Ai4
060	WCAi5	Window comparator Ai5
061	WCAi6	Window comparator Ai6
062 to 068	LOG1 to 7	Result of logical operation 1 to 7
076	EMFC	Forced operation in process signal
077	EMBP	During-bypass-mode signal
078	WFT	Trace trigger stand-by signal
079	TRA	During-tracing signal
080	LBK	Operation panel battery insufficient
081	OVS	Excessive voltage of accepted power
084 to 087	AC0 to 3	Alarm code bit 0 to 3
089	OD3	PID3 excessive deviation
090	FBV3	PID3 feedback comparison
091	OD4	PID4 excessive deviation
092	FBV4	PID4 feedback comparison
093	SSE	PID soft start abnormality

Accessories and Options



Standard Accessories

Rated input voltage	Applicable motor rating	Applicable inverter model	Circuit breaker and earth leakage breaker (Made by Mitsubishi Electric)		Electromagnetic contactor [MC] (Made by Fuji Electric)	Cable size (mm²) Note: 1	
			No reactor		Input side No reactor	Input side No reactor	Inverter output side
200 V class	5.5	HF4322-5A5	NF63-SV, NV63-SV	50A	SC-N1	8 (5.5)	5.5 (5.5)
	7.5	HF4322-7A5	NF125-SV, NV125-SV	60A	SC-N2	14 (8)	8 (8)
	11	HF4322-011	NF125-SV, NV125-SV	75A	SC-N2S	22 (14)	14 (14)
	15	HF4322-015	NF125-SV, NV125-SV	100A	SC-N3	38 (14)	22 (14)
	22	HF4322-022	NF250-SV, NV250-SV	175A	SC-N5	60 (22)	38 (22)
	30	HF4322-030	NF250-SV, NV250-SV	200A	SC-N7	38*2 (38)	60 (30)
	37	HF4322-037	NF400-CW, NV400-CW	250A	SC-N8	50*2 (50)	38*2 (38)
	45	HF4322-045	NF400-CW, NV400-CW	300A	SC-N10	60*2 (60)	38*2 (50)
	55	HF4322-055	NF400-CW, NV400-CW	350A	SC-N11	80*2 (38*2)	60*2 (60)
400 V class	5.5	HF4324-5A5	NF32-SV, NV32-SV	20A	SC-5-1	5.5 (2)	3.5 (3.5)
	7.5	HF4324-7A5	NF32-SV, NV32-SV	30A	SC-5-1	5.5 (2)	3.5 (3.5)
	11	HF4324-011	NF63-SV, NV63-SV	40A	SC-N1	8 (3.5)	5.5 (3.5)
	15	HF4324-015	NF125-SV, NV125-SV	50A	SC-N2	14 (5.5)	8 (5.5)
	22	HF4324-022	NF125-SV, NV125-SV	75A	SC-N2S	30 (5.5)	14 (8)
	30	HF4324-030	NF125-SV, NV125-SV	100A	SC-N3	38 (14)	22 (14)
	37	HF4324-037	NF250-SV, NV250-SV	125A	SC-N4	60 (22)	38 (14)
	45	HF4324-045	NF250-SV, NV250-SV	150A	SC-N5	30*2 (30)	38 (22)
	55	HF4324-055	NF250-SV, NV250-SV	200A	SC-N7	38*2 (38)	60 (38)

Notes: 1. The size of cable is 600V HIV cable for ND rating. 600V crosslinked-polyethylene-insulated cable is shown in parentheses. *2 shows parallel connection.
2. The above types may change depending on the operating environment.
3. Use thicker cables when wiring distance exceeds 20 m.
4. The shown accessories are for use with SUMITOMO 3-phase, 4-pole motors.

When using an earth leakage breaker (ELB), select the breaker's trip current from the table below based on the total wire distance (ℓ) 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
600m or less	200

Notes: 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.

Name	Function
Input side AC reactor	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.
Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magenetic choke filter helps reduce radiated noise.
Input side 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).
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 side 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.
Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magenetic choke filter helps reduce radiated noise.
Output side AC reactor	Install the reactor on the output side to reduce leakage current contributed by high harmonics. Contact our company for details.

Note: Ground the noise filter according to the operation manual.
Incorrect grounding will lessen the effectiveness.

Braking Unit and Braking Resistor

■ Selection table for braking unit and braking resistor

Selection table

Voltage	Model of inverter	Motor rating (kW)	Braking torque 100%									
			Operation rate : 4%ED Braking time : 7s. or less					Operation rate : 10%ED Braking time : 15s. or less				
			Braking unit		Braking resistor Note: 2		Thermal Setting (A)	Braking unit		Braking resistor Note: 2		Thermal Setting (A)
			Type	Min. Ω	Model No.	Qty.		Type	Min. Ω	Model No.	Qty.	
200V Class	HF4322-5A5	5.5	Note: 1	-	Y135AA208(70Ω 400W) Note: 3	2P	3.0	Note: 1	-	X435AC069(10Ω 750W)	2S	5.5
	HF4322-7A5	7.5		-	X435AC069(10Ω 750W)	2S	5.5		-	X435AC069(10Ω 750W)	2S	5.5
	HF4322-011	11		-	X435AC069(10Ω 750W) Note: 4	2S	5.5		-	X435AC094(7Ω 750W) Note: 4	3S	6.7
	HF4322-015	15		-	X435AC064(2.5Ω 750W)	3S	11.0		-	X435AC064(2.5Ω 750W)	4S	11.0
	HF4324-022	18.5		-	X435AC064(2.5Ω 750W)	3S	11.0		-	X435AC054(1.5Ω 750W)	5S	14.1
	HF4322-022	22		-	X435AC054(1.6Ω 750W)	4S	13.7		-	X435AC065(1.1Ω 750W)	6S	16.5
	HF4322-030	30	BRD-E3-30K	4 Ω	X435AC065(1.1Ω 750W)	4S	16.5	BRD-E3-30K	4 Ω	X435AC066(0.6Ω 750W)	8S	21.4
	HF4322-037	37	BRD-E3-55K	2 Ω	X435AC065(1.1Ω 750W)	4S	16.5	BRD-E3-55K	2 Ω	X435AC054(1.6Ω 750W)	5S×2P	27.4
	HF4322-045	45		2 Ω	X435AC054(1.6Ω 750W)	3S×2P	27.4		2 Ω	X435AC065(1.1Ω 750W)	6S×2P	33.0
	HF4322-055	55		2 Ω	X435AC054(1.6Ω 750W)	3S×2P	27.4		2 Ω	X435AC066(0.6Ω 750W)	8S×2P	44.7
400V Class	HF4324-5A5	5.5	Note: 1	-	Y135AA205(200Ω 300W)	2P	1.5	Note: 1	-	Y135AA209(250Ω 400W)	3P	2.7
	HF4324-7A5	7.5		-	Y135AA153(30Ω 400W)	2S	2.3		-	Y435AC058(250Ω 750W)	2S	3.5
	HF4324-011	11		-	Y435AC058(30Ω 750W) Note: 5	2S	3.2		-	Y435AC103(20Ω 750W)	3S	3.9
	HF4324-015	15		-	Y435AC069(10Ω 750W)	3S	5.5		-	Y435AC069(10Ω 750W)	4S	5.5
	HF4324-022	18.5		-	Y435AC069(10Ω 750W)	3S	5.5		-	Y435AC063(4.5Ω 750W)	6S	8.2
	HF4324-022	22		-	Y435AC090(6Ω 750W)	4S	7.1		-	Y435AC063(4.5Ω 750W)	6S	8.2
	HF4324-030	30		-	Y435AC063(4.5Ω 750W)	4S	8.2		-	Y435AC064(2.5Ω 750W)	8S	11.0
	HF4324-037	37		-	Y435AC063(4.5Ω 750W) Note: 3	4S	8.2		-	Y435AC054(1.6Ω 750W)	10S	13.7
	HF4324-045	45	BRD-EZ3-30K	10 Ω	Y435AC064(2.5Ω 750W)	5S	11.0	BRD-EZ3-30K	10 Ω	Y435AC065(1.1Ω 750W)	12S	16.5
	HF4324-055	55		10 Ω	Y435AC094(7Ω 750W)	3S×2P	13.1		10 Ω	Y435AC064(2.5Ω 750W)	8S×2P	21.9

Note:
1. A braking unit is unnecessary because a braking circuit is built in the inverter. Use an external thermal relay for protection of the resistor from heating. When the thermal relay is activated, turn off the input power of the inverter. Set the usage rate with inverter parameters for protection from overloading.
2. P in the column of the number of resistors means parallel connection and S means series connection.
3. Braking torgue Approx. 70%.
4. Braking torgue Approx. 80%.
5. Braking torgue Approx. 90%.

Wire size (Terminal P/PR/N)

Model of inverter	Wire
HF4322-5A5	3.5mm² or more
HF4322-7A5	5.5mm² or more
HF4322-011	8mm² or more
HF4322-015	14mm² or more
HF4322-022	22mm² or more
HF4324-5A5	2mm² or more
HF4324-7A5	
HF4324-011	2mm² or more
HF4324-015	5.5mm² or more
HF4324-022	8mm² or more
HF4324-030 HF4324-037	14mm² or more

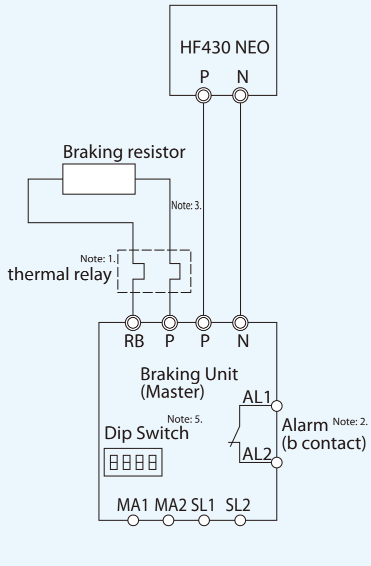
Model of braking unit	Resistor	Wire	SL1,SL2, MA1,MA2	Ground
BRD-E3-30K	8 Ω or more	8mm² or more	0.75mm² or more	5.5mm² or more
	5 to 7.9 Ω	14mm² or more		
	4 to 4.9 Ω	22mm² or more		
BRD-E3-55K	4 Ω or more	22mm² or more		
	3 to 3.9 Ω	38mm² or more		
	2 to 2.9 Ω	60mm² or more		
BRD-EZ3-30K	17 Ω or more	8mm² or more		
	13 to 16.9 Ω	14mm² or more		
	10 to 12.9 Ω	22mm² or more		

Note:
1. The maximum temperature of the braking resistor is approx. 150°C. Use heat-resistant wire. When installing the resistor pay close attention to the location with regards to clearance from heat sensitive elements.
2. The maximum wire length shall be 5 m. Twist the wire.
3. Improper connection of P, N, and PR will lead to failure of the inverter and braking unit. Make sure that the same terminal codes are connected.
4. The braking resistor may become hot during operation. Do not touch it directly with bare hands.

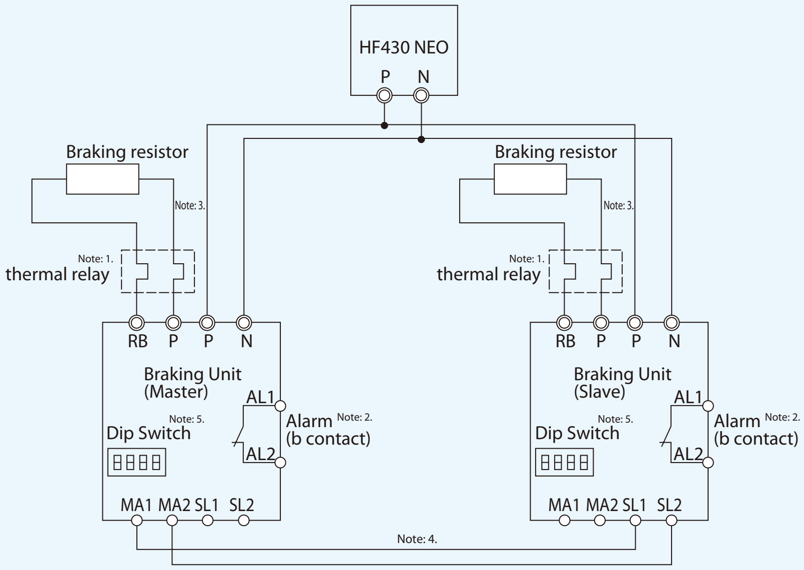
Braking Unit and Braking Resistor

■ Connection Drawing for Braking Unit and Braking Resister

① One Braking Unit



② Two Braking Units

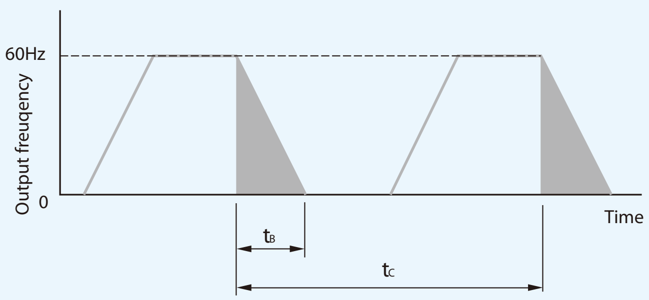


Note:
1. Connect a thermal relay to braking resistor and when operating, please cut the power supply of the inverter off.
2. Connect an alarm output(AL1 and AL2) for overheating prevention of the braking unit and cut the power supply of the inverter off.
3. Use a twisted cable for the wiring of the braking resistor within the 5m.
4. Use a twisted cable for wiring of MA1, MA2 And SL1,SL2.
5. Operation voltage level of the braking unit is setting by DIP switch. (The master and slave of the braking units)

Setting for DIP Switch					Function Setting	Romarks
1	2	3	4	1 2 3 4 ON OFF	Master Note: 6. Operation Voltage : 363V(725V)	Factory setting
OFF	OFF	ON	×			
1	2	3	4	1 2 3 4 ON OFF	Master Note: 6. Operation Voltage : 345V(689V)	
ON	OFF	ON	×			
1	2	3	4	1 2 3 4 ON OFF	Master Note: 6. Operation Voltage : 326V(653V)	
ON	ON	ON	×			
1	2	3	4	1 2 3 4 ON OFF	Slave	Operation voltage depends on setting of muster unit.
×	×	OFF	×			

Note: 6. Values shown here are too 400V class drives.

Operating rate %ED



$$\text{Operating rate \%ED} = \frac{t_B}{t_C} \times 100$$

t_B=Braking time (s)

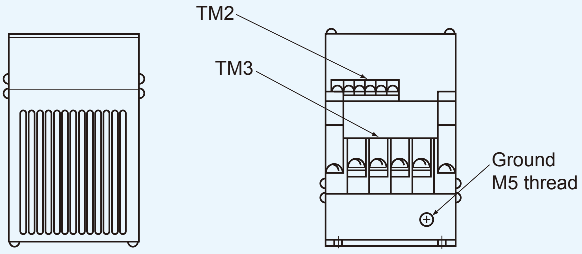
t_C=Cycle time (s)

Outline Drawing of Braking Unit

■ Braking Unit

Unit: mm

BRD-EZ3-30K

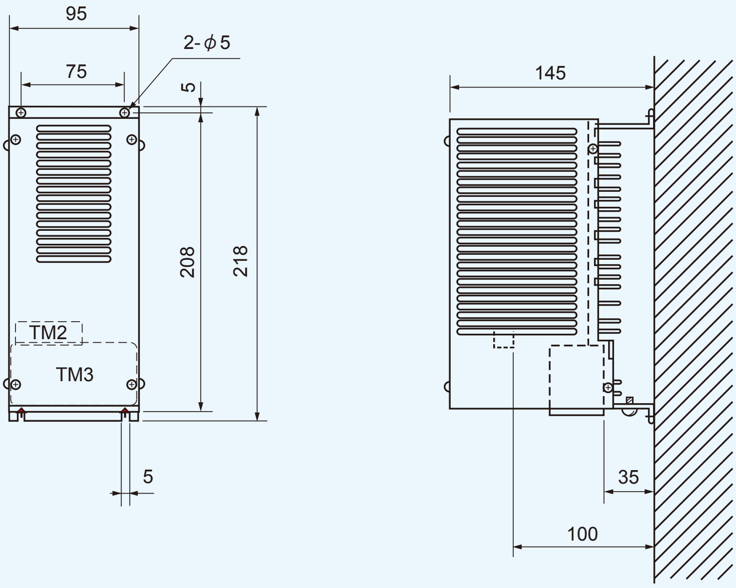


TM2 terminal width 6, M3 thread

SL1	SL2	MA1	MA2	AL1	AL2

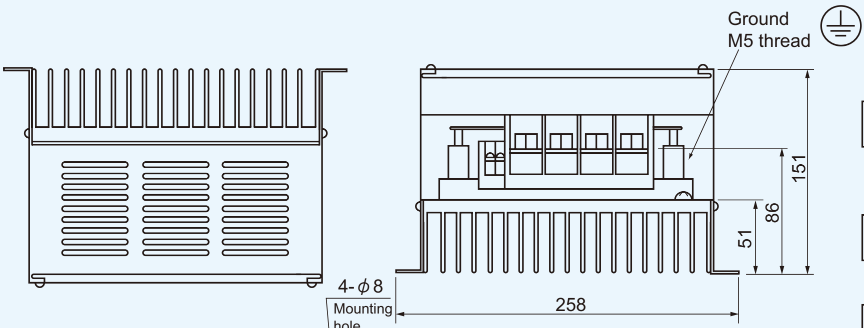
TM3 terminal width 13, M5 thread

N	RB	P	P



Weight:2kg

BRD-E3-30K



TM1 terminal width 6.4, M3 thread

SL1	SL2	MA1	MA2	2		1

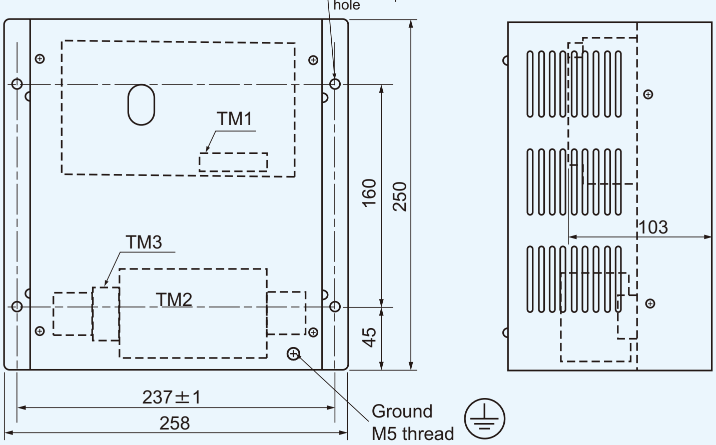
Note: Do not use terminal No.1 and 2.

TM2 terminal width 23, M8 thread

N	RB	P	P

TM3 terminal width 5.9, M3 thread

AL2	AL1

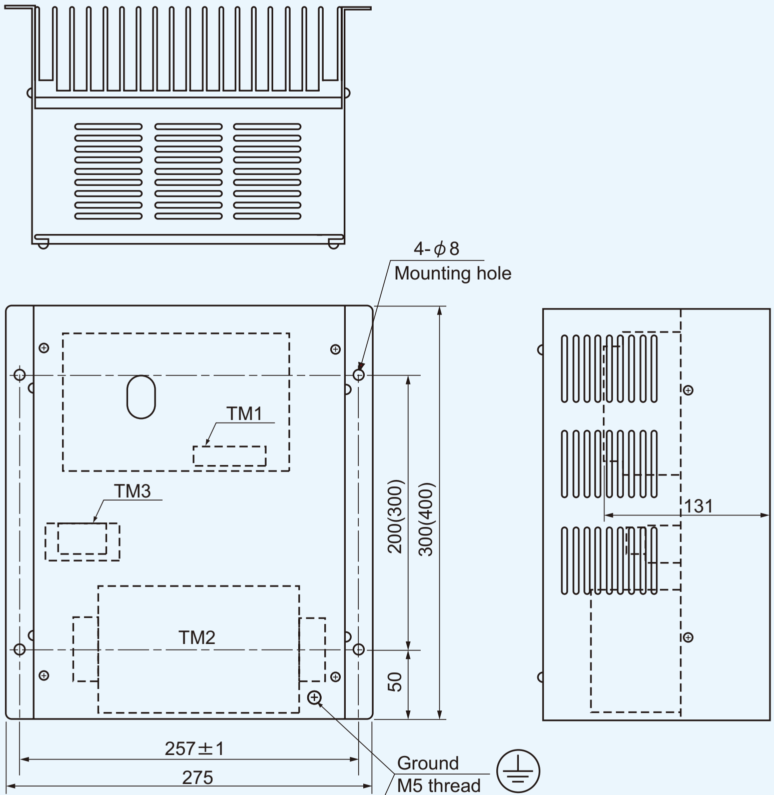


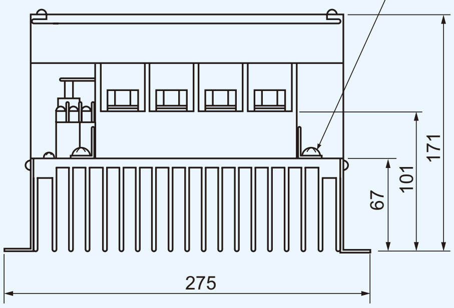
Weight:6kg

Outline Drawing of Braking Unit and Braking Resistor

BRD-E3-55K

Unit: mm





TM1 terminal width 6.4, M3 thread

SL1	SL2	MA1	MA2	2		1

Note: Do not use terminal No.1 and 2.

TM2 terminal width 33, M10 thread

N	RB	P	P

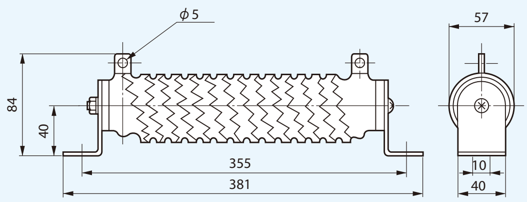
TM3 terminal width 7.5, M3 thread

AL2	AL1

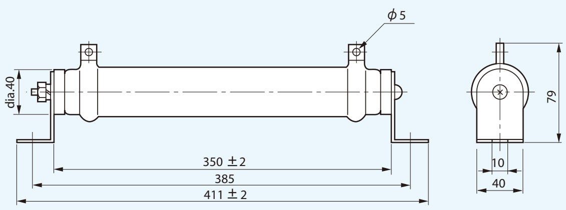
Weight:6kg

■ Braking Resisitor

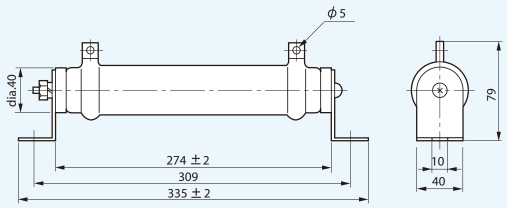
750W



400W



300W



Note: When mounting the braking resistor, keep at least a 50mm clearance around the resistor.

Peripheral Equipment

[Installation]

Unit: mm

When the inverter installation conditions are as follows, install an AC reactor on the primary side:

(1) The capacity of the power transformer exceeds 500 kV.

(2) The capacity of the power transformer exceeds 30 times the inverter capacity. AC current with a large peak value flows through the primary side of the inverter. This peak current increases in proportion to the capacity of the power transformer, leading to failure of the converter section in some cases. For prevention of such failure, an AC reactor must be installed. Especially in the case of a 400 V class power supply, care must be exercised because operation with a large capacity transformer is common.

(3) Sudden change in supply voltage is expected.
(Example) When the phase advancing capacitor is changed over (charge/release) on the high voltage side.

(4) Large-capacity thyristor Leonard equipment or other phase control equipment is installed on the same power supply system as the inverter.

(5) The unbalance in the supply voltage is large

(6) A phase advancing capacitor is installed in the same power supply system as the inverter.

(7) Power factor improvement is necessary. Power factor can be improved by using AC or DC reactors on the inverter input side.

(8) Harmonic suppression is necessary.

AC Reactor (Input side)

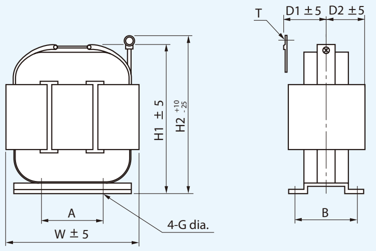


Fig. 1

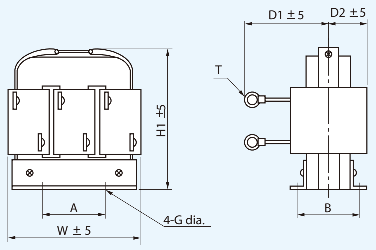


Fig. 2

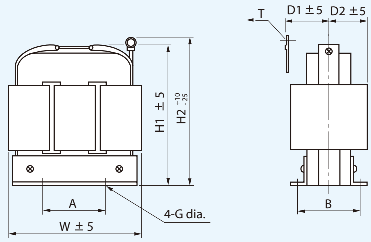


Fig. 3

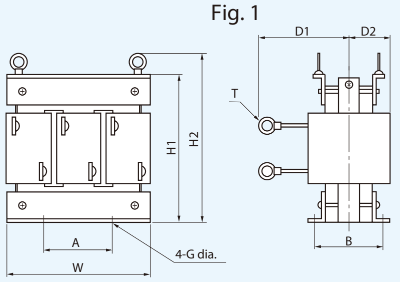


Fig. 4

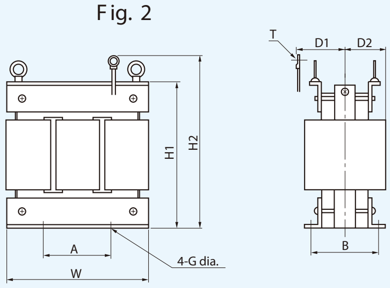


Fig. 5

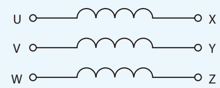


Fig. 6 Connection

Series	Applicable rating (kW)	Specifications		Model No. Y220CA	W	D1	D2	H1	H2	A	B	G	T	Weight (kg)	Insulation class	Figure
		Current (A)	L (mH)													
200V series	5.5	24	0.5	058	146	35	35	147	180	80	50	5	M5	3.9	F	1
	7.5	33	0.4	059	150	35	35	150	185	80	50	5	M6	4.4	F	
	11	47	0.3	060	150	40	35	150	185	80	55	5	M6	5.4	F	
	15	63	0.2	061	175	40	40	170	215	80	65	6	M6	7.2	F	
	22	92	0.15	063	185	45	40	172	220	80	65	6	M8	8.6	F	
	30	130	0.1	064	190	55	48	173	230	80	80	6	M10	10.5	F	
	37	155	0.08	065	211	130	50	200	-	90	85	7	M10	13.0	F	2
	45	190	0.07	066	220	140	60	200	225	90	100	7	M10	16.0	F	4
	55	220	0.06	067	220	147	60	200	225	90	100	7	M12	19.0	F	

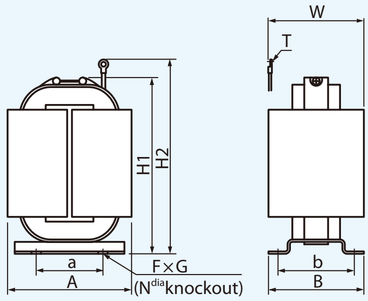
Series	Applicable rating (kW)	Specifications		Model No. Y220CA	W	D1	D2	H1	H2	A	B	G	T	Weight (kg)	Insulation class	Figure
		Current (A)	L (mH)													
400V series	5.5	13	2.0	085	153	35	35	145	175	80	50	5	M4	4.2	B	1
	7.5	17	1.5	086	162	37	35	145	175	80	50	5	M5	4.4	B	
	11	25	1.0	087	150	40	35	149	180	80	55	5	M5	5.5	F	
	15	33	0.7	088	173	42	42	169	210	80	65	6	M6	6.3	F	
	22	48	0.5	090	175	56	48	172	215	80	80	6	M6	9.0	F	
	30	66	0.4	091	183	56	50	174	215	80	80	6	M6	11.0	F	
	37	80	0.3	092	183	65	55	173	220	80	95	6	M8	12.0	F	
	45	100	0.25	093	220	56	50	205	250	90	85	7	M8	14.0	F	3
	55	120	0.21	094	220	78	60	203	260	90	100	7	M10	17.0	F	5

Peripheral Equipment

■ DC Reactor

Unit: mm

- Remove the shorting bar from the reactor connection terminal of the inverter, and connect the DC reactor before use.
- Determine the place of installation so that the wiring distance from the inverter will be as short as possible.
- As with any harmonic suppression techniques, using the DC reactor in combination with AC reactor will improve overall noise suppression.
- When installing in a location with substantial vibration, use vibration absorbing mounts or a stabilizer to dampen vibration to the reactor.



	Applicable rating (kW)	Specifications		Model No. Y220DA	Dimension (mm)									N	T	Weight (kg)
		Current (A)	L (mH)		A	a	B	b	H_1	H_2	W	F	G			
200V series	5.5	28.0	1.47	038	90	60	62	52	140	170	75	-	-	dia.5	M5	2.4
	7.5	38.0	1.11	039	100	80	95	80	140	170	95	5.5	7	-	M5	3.5
	11	55.0	0.79	040	100	80	95	80	140	175	100	5.5	7	-	M6	4.1
	15	75.0	0.59	041	125	105	105	80	142	175	120	5.5	7	-	M6	5.3
	22	110.0	0.40	043	140	120	110	90	150	205	135	6.5	9	-	M8	7.5
	30	150.0	0.30	044	150	120	120	100	150	215	145	6.5	9	-	M8	9.4
	37	190.0	0.25	045	160	130	135	115	170	240	170	6.5	9	-	M10	12.3
	45	230.0	0.20	046	170	130	135	115	173	255	170	6.5	9	-	M10	13.3
	55	280.0	0.17	047	180	150	145	120	190	270	170	-	-	dia.8	M12	15.9

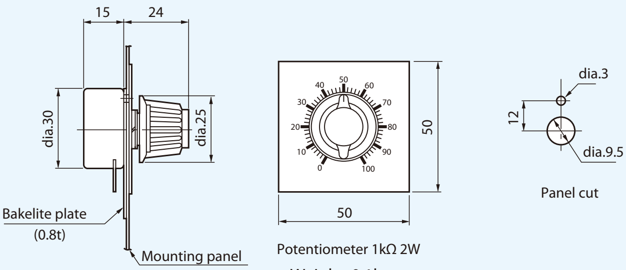
	Applicable rating (kW)	Specifications		Model No. Y220CA	Dimension (mm)									N	T	Weight (kg)
		Current (A)	L (mH)		A	a	B	b	H_1	H_2	W	F	G			
400V series	5.5	14.0	5.87	008	90	60	62	52	140	165	75	-	-	dia.5	M5	1.5
	7.5	19.0	4.46	009	100	80	95	80	140	165	95	5.5	7	-	M5	3.5
	11	27.5	3.13	010	100	80	95	80	140	165	100	5.5	7	-	M5	3.9
	15	37.5	2.35	011	125	105	105	80	142	175	120	5.5	7	-	M6	5.3
	22	55.0	1.60	013	140	120	110	90	150	185	135	6.5	9	-	M6	7.3
	30	75.0	1.22	014	150	120	120	100	150	205	145	6.5	9	-	M8	9.2
	37	92.5	0.99	015	160	130	135	115	170	225	170	6.5	9	-	M8	12.0
	45	113.0	0.81	016	170	130	135	115	170	230	170	6.5	9	-	M8	13.0
	55	138.0	0.66	017	180	150	145	120	170	255	170	-	-	dia.8	M8	15.3

Peripheral Equipment

Unit : mm

■ Frequency setting unit : VR-07 [1kΩ ,2W]

Model No. VR07

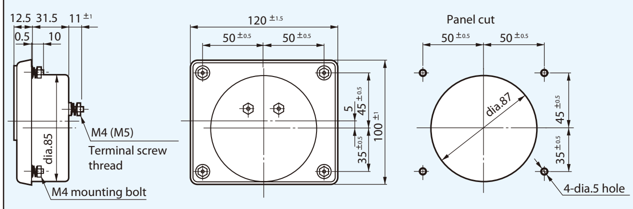


Weight: 0.1kg

Unit : mm

■ % Speed meter: DCF-12N [10V F.S.]

0 -100% ; 50divisions (X525AA048)

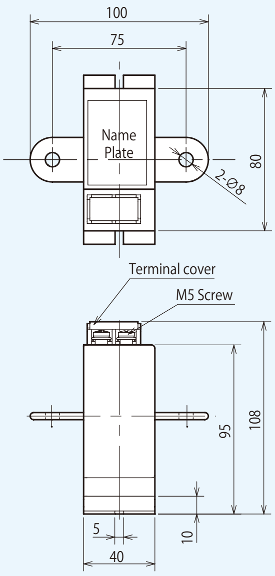


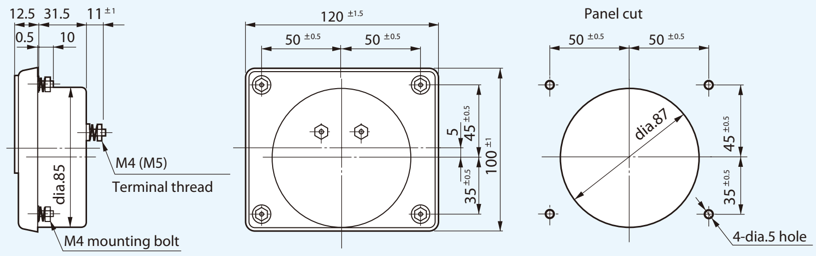
Weight: 0.15kg

Unit : mm

■ AC Ammeter: ACF-12NB

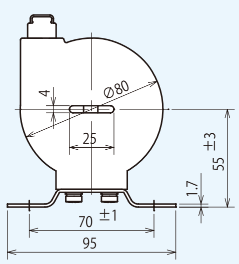
The current transformer (CT) directly detects the current of the secondary side of the inverter.





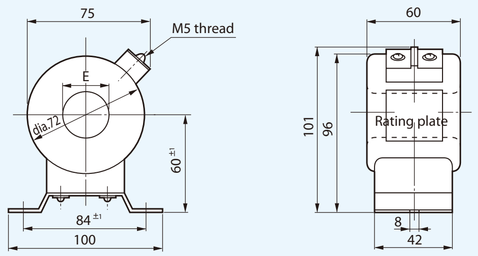
ACF-12NB

Weight: 0.25kg



COMA-15A

Weight: 0.8kg



Type	E
COM-15-26	26
COM-15-30	30

Weight: 0.9kg

The current transformer (CT) detects directly the current of the inverter.
The measurement error of the current increase in low frequency.

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

Motor capacity (kW)	200V class					400V class				
	Model No.	Meter: Rated current [A]	Meter: Max. scale [A]	CT: Type	Number of primary through holes	Model No.	Meter: Rated current [A]	Meter: Max. scale [A]	CT: Type	Number of primary through holes
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	-
11	X525AA043	5	75	COM-15-26 75/5A	2	X525AA042	5	50	COM-15-26 50/5A	3
15	X525AA116	5	100	COM-15-30 100/5A	2	X525AA042	5	50	COM-15-26 50/5A	3
22	X525AA044	5	150	COM-15-26 150/5A	1	X525AA043	5	75	COM-15-26 75/5A	2
30	X525AA045	5	200	COM-15-30 200/5A	1	X525AA116	5	100	COM-15-30 100/5A	2
37	X525AA046	5	250	COM-15-30 250/5A	1	X525AA044	5	150	COM-15-26 150/5A	1
45	X525AA047	5	300	COM-15-30 300/5A	1	X525AA044	5	150	COM-15-26 150/5A	1
55	X525AA121	5	400	COM-15-30 400/5A	1	X525AA045	5	200	COM-15-30 200/5A	1

Construction of current transformer (CT) COMA-15A type: Totally molded current transformer with primary winding
COM-15-26 type: Totally molded current transformer, throughholes type
COM-15-30 type: Totally molded current transformer, throughholes type
Install the current transformer (CT) on the output side of the inverter.

■ Noise filter

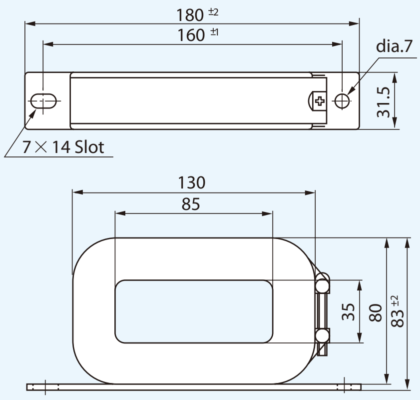
Install input/output side filters in order to lower the noise level from the inverter and protect peripheral equipment from the adverse effects of noise. The standard input-side filters are the noise filter, zero-phase reactor,and capacitive (XY) filter, while the standard output-side filter is the zero-phase reactor.

- Noise filter : Substantially attenuates noise from the inverter.
- Zero-phase reactor : Lowers the level of noise transmitted from the power supply side or output side
- Capacitive filter : Lowers the level of noise in the AM radio frequency band.

1. Zero-phase reactor

Model No.X480AC192, Type: RC9129

Unit : mm



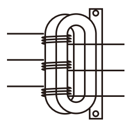
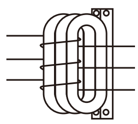
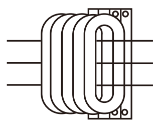
Weight: 1.38kg

[Method of connection]

(1) It can be used on both inverter input (power supply) side and output (motor) side.

(2) Wind the three wires of respective phases on the input or output side more than three times (4 turns) in the same direction. When winding wires more than three times (4 turns) is impossible because the wire is too thick, install two or more zerophase reactors side by side to reduce the number of turns.

(3) Make the gap between the cable and core as small as possible.

Wire size Note:	14 mm² or less	14–30mm²	22mm² –
Winding turns	3 times (4T)	Once (2T)	Through (1T)
Qty	1 pc	2 pcs	4 pcs
Winding method			

Note: The size of wire differs according to the kind of wire (flexblty).

2. Noise filter

Contact our agency for the output side noise filter, and filters (installed on the output side) that conform to various standards (VCCI, FCC, and VDE).

List of noise filters

Applicable motor (kW)	Model No.	200V input side Type	Weight (kg)	Fig.
5.5	X480AC291	NF3030A-VZ	0.7	Fig.1
7.5	X480AC292	NF3040A-VZ	1.3	
11	X480AC293	NF3080A-RQ2	3.6	Fig.2
15				
22	X480AC294	NF3150A-RQ2	9	
30, 37	X480AC295	NF3200A-RQ2	16	Fig.3
45, 55	X480AC311	NF3250A-RQ2		

Note: Ground the noise filter with its own ground connection

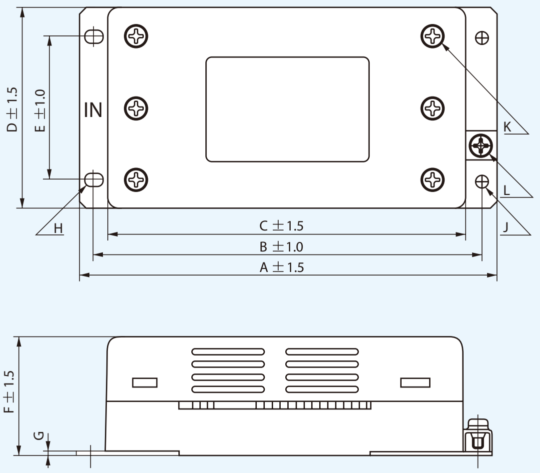
Applicable motor (kW)	Model No.	400V input side Type	Weight (kg)	Fig.
5.5	X480AC297	NF3020C-VZ	0.5	Fig.1
7.5				
11	X480AC298	NF3030C-VZ	0.7	
15	X480AC299	NF3040C-VZ	1.3	
22	X480AC300	NF3080C-RQ2	3.6	Fig.2
30				
37	X480AC301	NF3100C-RQ2	4.6	
45, 55	X480AC303	NF3150C-RQ2	9	

Peripheral Equipment

Dimensional Drawing of Noise Filter

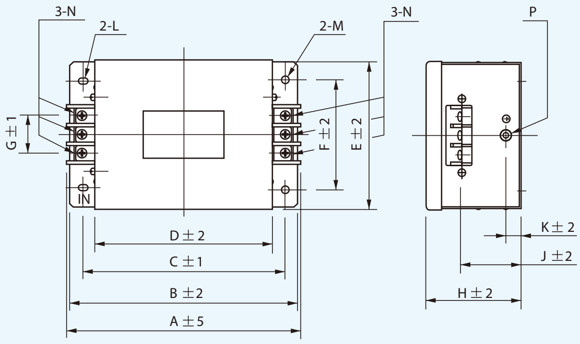
Unit: mm

Fig.1



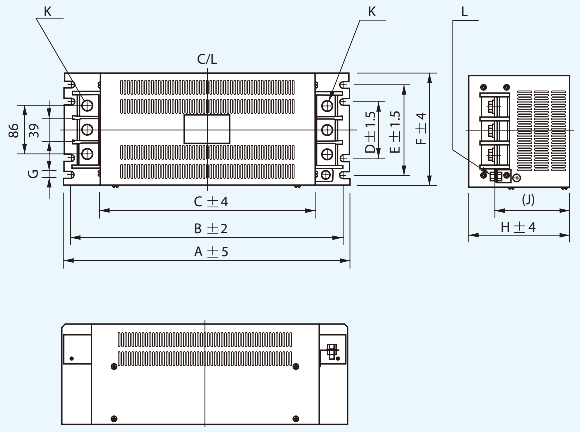
Model No.	Type	A	B	C	D	E	F	G	H	J	K	L
X480AC291	NF3030A–VZ	145	135	125	70	50	42	1.0	4.5×6	dia. 4.5	M4	M4
X480AC292	NF3040A–VZ	179	167	155	90	70	54	1.6			M5	
X480AC296	NF3010C–VZ	128	118	108	63	43	42	1.0			M4	
X480AC297	NF3020C–VZ											
X480AC298	NF3030C–VZ	145	135	125	70	50						
X480AC299	NF3040C–VZ	179	167	155	90	54	54	1.6			M5	

Fig.2



Model No.	Type	A	B	C	D	E	F	G	H	J	K	L	M	N	P
X480AC293	NF3080A–RQ2	217	200	185	170	120	90	44	115	85	20	5.5×7	dia.5.5	M6	M4
X480AC294	NF3150A–RQ2	314	300	280	260	200	170	57	130	90	35	6.5×8	dia.6.5	M8	M6
X480AC300	NF3080C–RQ2	217	200	185	170	120	90	44	115	85	20	5.5×7	dia.5.5	M6	M4
X480AC301	NF3100C–RQ2	254	230	215	200	150	120	57	115	80	30	6.5×8	dia.6.5	M8	M6
X480AC302	NF3150C–RQ2	314	300	280	260	200	170	57	130	90	35	6.5×8	dia.6.5	M8	M6

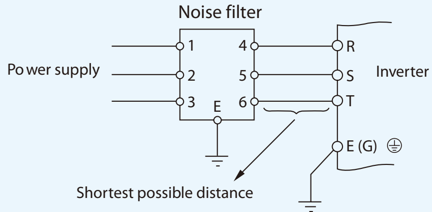
Fig.3



Model No.	Type	A	B	C	D	E	F	G	H	J	K	L
X480AC295	NF3200A–RQ2	450	430	338	100	190	230	7	180	(133)	M10	M8
X480AC311	NF3250A–RQ2											

(Connection method)

(1) Install the noise filter between the power supply and inverter input terminal. Make the connection wire between the inverter and the noise filter as short as possible.
(2) Use thick short grounding wire as much as possible. Connect the grounding wire correctly.
(3) Separate the input/output lines of the noise filter.
(4) The noise filter cannot be used on the inverter output (motor) side.

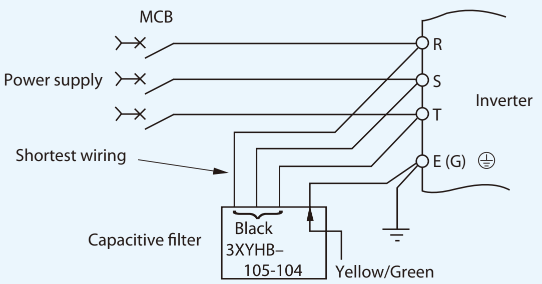


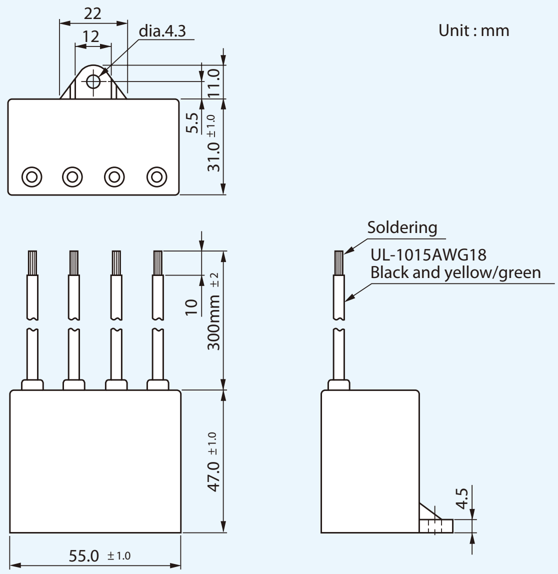
Peripheral Equipment

3. Capacitive Filter (XY Filter)

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.

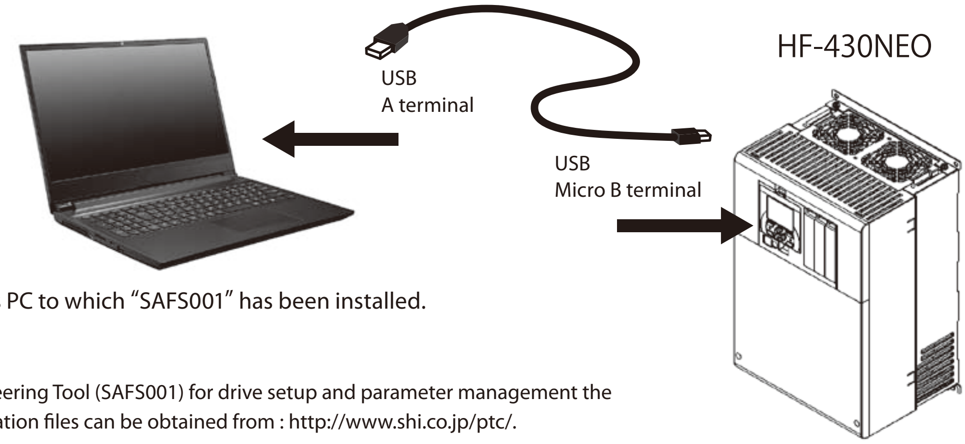




Weight:0.12kg

■ PC Software (SAFS001 Ver.2)

USB cable: Model No. V906AA009 (Option)

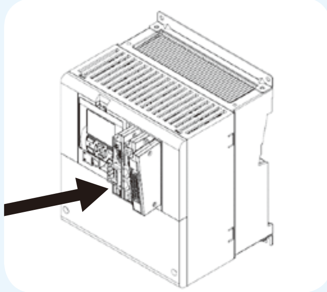


A Windows PC to which "SAFS001" has been installed.

Note: Engineering Tool (SAFS001) for drive setup and parameter management the installation files can be obtained from : http://www.shi.co.jp/ptc/.

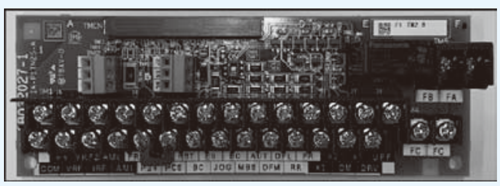
■ Optional Cassettes

Name	Model No.	Type	Remarks
Ethernet	V906AA002	P1-EN	Communication for Open network
PROFIBUS	V906AA003	P1-PB	
PROFINET	V906AA004	P1-PN	
CC-Link	V906AA007	P1-CCL	
Encoder Feedback	V906AA005	HF-FB	For the motor with encoder
Analog Input/Output	V906AA006	P1-AG	Analog Input/Output Extension



■ Screw Type Terminal Board (Option)

・The control terminal board can change from the standard board to the screw type terminal board.
Model No. V906AA008
Type：HF-TM2

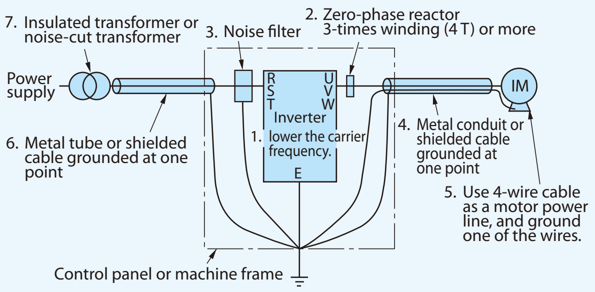


Peripheral Equipment

■ 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.

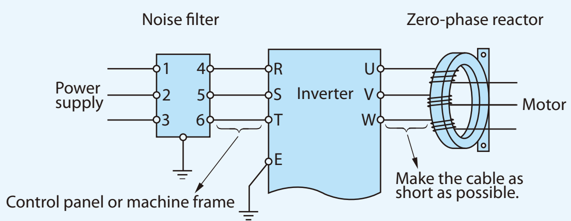


Note: The above measures may be insufficient in places where the broadcast reception is weak.

■ 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 an 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.

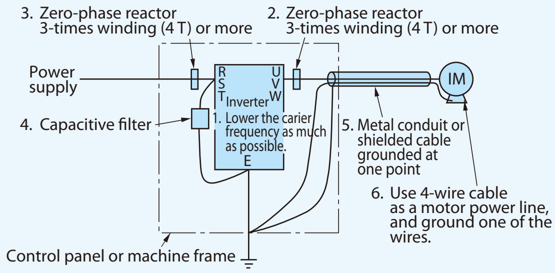
■ Connection of a zero-phase reactor and a noise filter



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

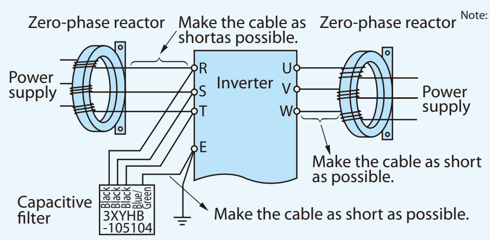
Take possible measures among the following in the order of 1 to 6. Each measure will improve noise reduction.



■ 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: RC9129)
3. Install a zero-phase reactor on the input side the inverter. (Type: 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 zero-phase reactors and a 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.

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.

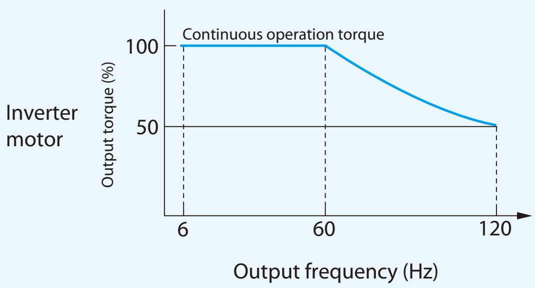
- Operation

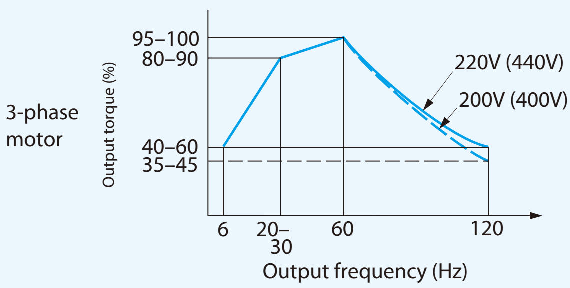
1. Do not start and stop the inverter frequently by means of an electromagnetic contactor (MC) installed on the input side of the inverter; otherwise failure of the inverter will result.
2. When more than one motor is operated by one inverter, select the inverter capacity so that 1.1 times the total 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 Motor

When the inverter is used to drive a 3-phase 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 micro surge voltage of the motor must be taken into consideration. Contact us in such cases.

■ Motor Operating Characteristics





Notes to Inverter Users

■ 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	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.

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 moter is selected, pay attention to the installation environment, because the inverter is not of 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>
Since the pole change motor differs from ampere rating, the maximum current of the motor is checked and an inverter is selected.
Please be sure to perform the change of the number of poles, after stooping the motor.
If it carries out, over voltage or over current protection will operate, and the motor will serve as a free run.

<Motor with the brake>
The power supply for the brake is certainly connected to the primary side of an inverter.
Please shut down an inverter output at the time of the brake operation (at the time of the motor stop).
In the kind of brake, the sound of lining may come out in a low-speed.

<Single-phase motor>
The single-phase motor does not fit an inverter drive.
There is a possibility of current flowing and destroying a capacitor and the thing of phase-splitting starting and rebounding starting is internal centrifugally.
In order that the power switch may not operate, there is a possibility of damaging a starting coil by fire.

Warranty

1. Warranty Policy on Inverter

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 the 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 cost of: 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	Not withstanding 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 customers' 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 bearings; 9. Any other troubles, problems or damage to the Product that are not attributable to the Seller.
Others	The Seller will not be responsibility for the installation and removal of the inverter. Any inverter transportation cost shall be born by both Seller and Buyer.

2. Warranty Policy on Repaired and Returned Products

Warranty period	The warranty shall be 6 months from date of repair and shipment.
Warranty condition	Warranty on repaired Product will apply only on the replacement parts used in the repair done or authorized by the Seller. All other aspects conform to the Warranty Conditions described in item 1.
Warranty exclusion	Please refer to Warranty Exclusions described in item 1.
Others	Please refer to Others decribed in item 1.

memo

Worldwide Locations

U.S.A
Sumitomo Machinery Corporation of America (SMA)
4200 Holland Blvd. Chesapeake, VA 23323, U.S.A.
TEL (1)757-485-3355 FAX (1)757-485-7490

Canada
SM Cyclo of Canada, Ltd. (SMC)
1453 Cornwall Road, Oakville, Canada ON L6J 7T5
TEL (1)905-469-1050 FAX (1)905-469-1055

Mexico
SM Cyclo de Mexico, S.A. de C.V. (SMME)
Av. Desarrollo 541, Col. Finsa, Guadalupe,
Nuevo León, México, CP67132
TEL (52)81-8144-5130 FAX (52)81-8144-5130

Brazil
Sumitomo Industrias Pesadas do Brasil Ltda. (SHIB)
Rodovia do Acucar (SP-075) Km 26
Itu, Sao Paulo, Brasil
TEL (55)11-4886-1000 FAX (55)11-4886-1000

Chile
SM-Cyclo de Chile Ltda. (SMCH)
Camino Lo Echevers 550, Bodegas 5 y 6,
Quilicura, Región Metropolitana, Chile
TEL (56)2-892-7000 FAX (56)2-892-7001

Argentina
SM-Cyclo de Argentina S.A. (SMAR)
Ing Delpini 2230, B1615KGB Grand Bourg,
Malvinas Argentinas, Buenos Aires, Argentina
TEL (54)3327-45-4095 FAX (54)3327-45-4099

Guatemala
SM Cyclo de Guatemala Ensambladora, Ltda. (SMGT)
Parque Industrial Unisur, 0 Calle B 19-50 Zona 3,
Bodega D-1 Delta Bárcenas en Villa Nueva, Guatemala
TEL (502)6648-0500 FAX (502)6631-9171

Colombia
SM Cyclo Colombia, S.A.S. (SMCO)
Parque Industrial Celta, Km 7.0 Autopista Medellín,
Costado Occidental, Funza, Cundinamarca, Colombia
TEL (57)1-300-0673

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SM Cyclo de Perú, S.A.C (SMPE)
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Santiago de Surco, Perú
TEL (51)1-713-0342 FAX (51)1-715-0223

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Cyclostraße 92, 85229 Markt Indersdorf, Germany
TEL (49)8136-66-0 FAX (49)8136-5771

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Sumitomo (SHI) Cyclo Drive Germany GmbH (SCG)
SCG Branch Austria Office
Gruentalerstraße 30A, 4020 Linz, Austria
TEL (43)732-330958 FAX (43)732-331978

Belgium
Hansen Industrial Transmissions NV (HIT)
Leonardo da Vincilaan 1, Edegem, Belgium
TEL (32)34-50-12-11 FAX (32)34-50-12-20

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8 Avenue Christian Doppler, 77700 Serris, France
TEL (33)164171717 FAX (33)164171718

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SM-Cyclo Italy Srl (SMIT)
Via dell' Artigianato 23, 20010 Cornaredo (MI), Italy
TEL (39)293-481101 FAX (39)293-481103

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SM-Cyclo Iberia, S.L.U. (SMIB)
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TEL (44)1482-790340 FAX (44)1482-790321

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SM Cyclo Turkey Güç Aktarım Sis. Tic. Ltd. Sti. (SMTR)
Barbaros Mh. Çiğdem Sk. Ağaoğlu, Office Mrk. No:1 Kat:4 D.18
Ataşehir, İstanbul, Turkey
TEL (90)216-250-6069 FAX (90)216-250-5556

India
Sumi-Cyclo Drive India Private Limited (SDI)
Gat No. 186, Raisoni Industrial Park, Alandi Markal Road,
Fulgaon-Pune, Maharashtra, India
TEL (91)96-0774-5353

China
Sumitomo (SHI) Cyclo Drive Shanghai, Ltd. (SCS)
11F, SMEG Plaza, No. 1386 Hongqiao Road,
Changning District, Shanghai, China 200336
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Specifications, dimensions, and other items are subject to change without prior notice.

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