HITACHI INVERTER

HITACHI
Inspire the Next

NJ600B SERIES

Multifunctional / Multiapplication
Universal Vector Frequency Inverter

進化

【Advanced Technology】

Universal Vector Frequency Inverter!

Widely used in fan, pump, air-condition, conveyor, wood making machine, plastic extruder, centrifugal machine and so on.

- High Starting Torque
- Easy Operation
- Smooth Performance

【Powerful】

High Starting Torque

- High starting torque of 150% or more at 0.5HZ.
- Smooth operation with easy adjustment.

【High Performance】

Programming Function

- Sequence operation is realized by downloading a program to an inverter.
- Significant cost can be saved by simplifying or eliminating external hardware.

【Saving】

Cost Effective

- Built-in EMC Filter up to 160kw
- Integrated brake circuit up to 30kw
- Saving installation space and total cost of the system

【Easy】

Ten Years of Lifespan
Easier Maintenance

- High quality components with warning functions which can be easily maintained or replaced when the inverter fails to work.

【Environmental】

- Internal PC board with varnish coating.
- Nickel-plated treatment of the circuit copper bus-bar.
- Meeting main environmental standards.

Powerful Inverter
NJ600B

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HITACHI INVERTER
NJ600B SERIES

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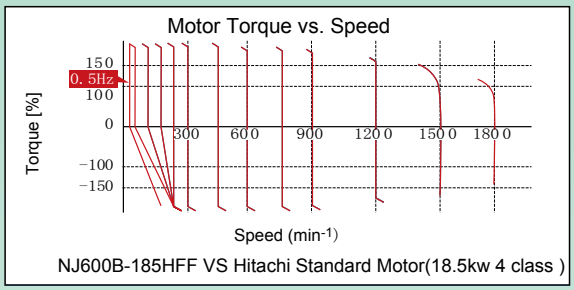
High performance, powerful

High Starting Torque, Powerful Drive and Easy Setting

Starting Torque of 150% or More at 0.5HZ

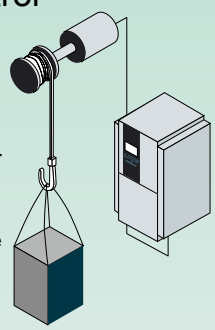
Hitachi specialized technology of Sensorless Vector Control and Auto Tuning contributes to a high starting torque of 150% or more at 0.5HZ.
* Much easier to set up the parameters
* Widely used in lifts, extruders and metal working machines, which need high torque to start at low speed



NJ600B-185HFF VS Hitachi Standard Motor(18.5kw 4 class)

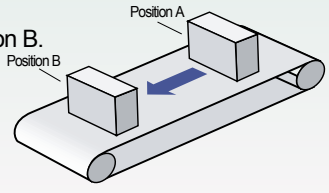
Hitachi Exclusive 0Hz Domain Sensorless Vector Control

The exclusive 0Hz domain sensorless vector control technology makes it possible to develop 120% torque at 0Hz speed reference, which is ideal for cranes that require high torque to start.
* Under the condition that the inverter is one frame size larger than the motor



Position Control Function

The NJ600B, with optional feedback board installed, together with an encoder-equipped motor can perform position control.For many applications, suitable performance can be achieved at a lower cost than servo system.Based on the four motion parameters (position command, speed command, acceleration time and deceleration time), the NJ600B will move an object from original position A to target position B. After the movement, the inverter keeps servo lock status.

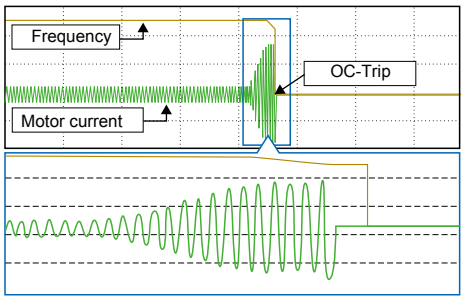


Trip Avoidance Function

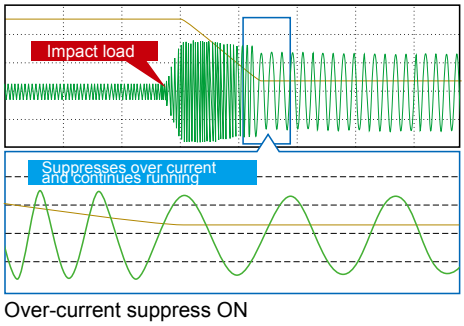
Over Current&Voltage Suppress Function

Higher internal calculation speed improves current control performance. Over-current and over-voltage suppress functions avoid inverter trip during acceleration and deceleration.
Even at sudden acceleration or with impact load, the inverter keeps operating with little trips. The over-voltage suppress function helps avoid trips during deceleration.

*Three times faster than other products



Over-current suppress OFF



Over-current suppress ON

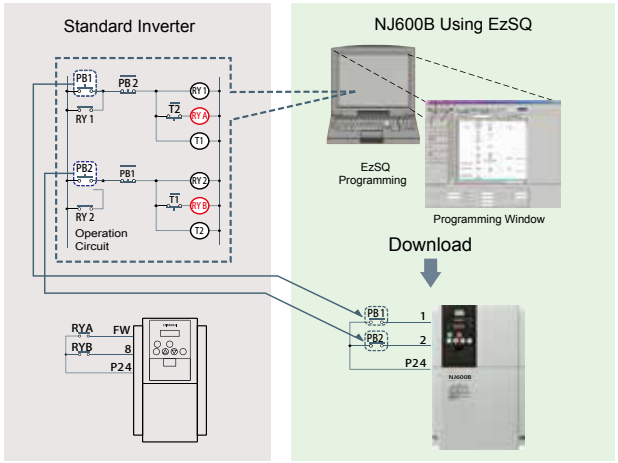
functions, more user friendly.

Programming【EzSQ: Easy Sequence】Function

Inverter Control by Built-in Programming Function

Sequence operation is realized by downloading to an inverter a program created with EzSQ (Easy Sequence). In loaded conditions, the crane or conveyor can also achieve automatic speed control. And significant cost will be saved by simplifying and eliminating external hardware.
The password protection is incorporated to prevent proprietary program data from loss or unauthorized modification.

Typical Example - Replacing External Relay Circuit



Item			Description
Language Spec	Language type		BASIC Like
	Supported Device		Windows(DOS/V)OS:Windows2000, WindowsXP)
	Memory area		1,024 steps or 6k byte (Smaller of these)Program is stored in internal of inverter.
	Programming environment		Editor(Windows), Display(Windows)
			Grammar check(Windows)
			Program download/upload, All clear
	Executable format		Interpreter 2.0ms/command (Sub routine supported. 8 nested)
I/O function	External input	External digital contact input	Contact signal/Open collector signal input (Internal DC24V power supply available)
			Program RUN command: FW terminal is reserved
			General-purpose input: Maximum of 8 point(X(00)-X(07))
		External analog input	XA(0) : 0-10V (O terminal)
			XA(1) : 4-20mA (OI terminal)
			XA(2) : 0-10V (O2 terminal)
	External output	General-purpose output terminal	Maximum of 8 point(Y(00)-Y(05))
		External analog output	YA(0) : Setup for FM terminal is possible.
			YA(1) : Setup for AM terminal is possible.
			YA(2) : Setup for AMI terminal is possible.
Reserved word	Command		Programmable flow control <Loop, Unconditional jump, conditional jump, Time control, Sub routine, Others>
			Operation command <+,-,,*, /, substitution, mod, abs>
			I/O control(Bit input, Word input, Bit output, Word output)
			Timer control <on delay, off delay>
			Inverter parameter setting
	Variable	User	U(00)-U(31)/32 point
		Timer	UL(00)-UL(07)/8 point
		Set frequency	SET-Freq
		Acceleration time	ACCEL
		Deceleration time	DECEL
		Monitor	Output frequency, Output current, Rotative direction, PID feedback, Converted frequency, Output torque, Output voltage, Power, Cumulative RUN time, Cumulative power-on time, trip
		General-purpose input contact	X(00)-X(07)/8 point
		General-purpose output contact	Y(00)-Y(05)/6 point(1 point is relay output)
		Internal user	UB(00)-UB(07)/8 point
		Internal timer contact	TD(0)-TD(7)/8 point
		Inverter input and output	In a remote operator display code.

* Windows® is a registered trademark of Microsoft Corporation.U.S.A and other countries.

EMC Filter&Brake Circuit Integrated as Standard

Built-in EMC Filter up to 160kW

Cost and space reduction compared with external EMC Filter.
Meets EN61800-3 2nd-Environment

Brake Circuit up to 30kW

Cost and Space reduction compared with external braking Controller.

The leakage current will be increased with the EMC filter on, so please use the proper sensitivity current for residual current circuit breaker.

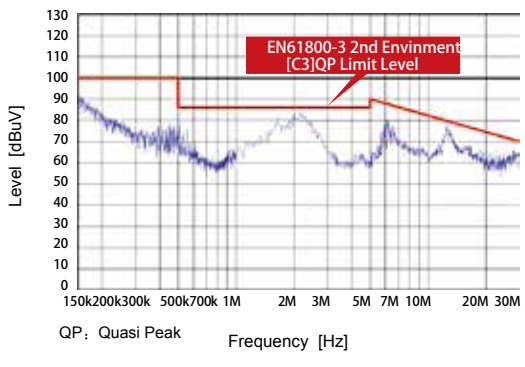
Leakage Current of EMC Filter(EMC Filter ON/OFF)

3 phase △ connection, value of 1 phase ground connection
Input power supplier(400v class: 480v/60Hz)

	400V class model (input power: 400VAC,50HZ)		
	7.5~15kW	18.5~75kW	90~160kW
Internal EMC Filter ON	Ca.95mA	Ca.56mA	-
Internal EMC Filter OFF	Ca.0.2mA	Ca.0.2mA	Ca.0.2mA

90~160kw EMC Filter. No swich between ON and OFF because of the low leakage current(o.2mA)

Example NJ600B-185HFF



Easy Maintenance

Easy-removable Construction for Maintenance

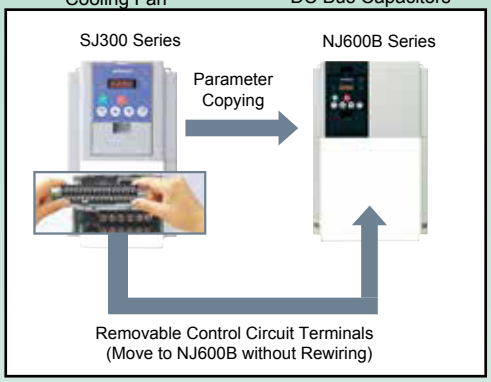
Endured parts like cooling fans and DC bus capacitors can be quickly replaced on site, which greatly reduces the maintenance time.

Like SJ300 series, the control circuit terminals can be taken off and replaced easily without wiring change.

The parameter of SJ300 can be read via WOP and then copied into NJ600B, which greatly saves the operating time.

Easy-removable Cooling Fan

Easy-removable DC Bus Capacitors



Durable Components with Warning Function

Components with Long Lifespan

NJ600B is composed of components with 10 years of lifespan. Besides, it features cooling fans with ON/OFF switch, which largely extends the inverters' lifespan.

* Under average annual temperature of 30 ℃.
* Under conditions of oil free, dust free, mist free and corrosive gases free.
* The lifetime is estimated but not guaranteed.

Lifetime Warning Function

NJ600B sends predictive warnings when the temperature of DC bus capacitor goes up or the cooling fans get aged. It monitors the motor's temperature and alarms to avoid an inverter trip caused by aged components.

Easy Operation

User Selection of Displayed Parameters

Data Comparison Function

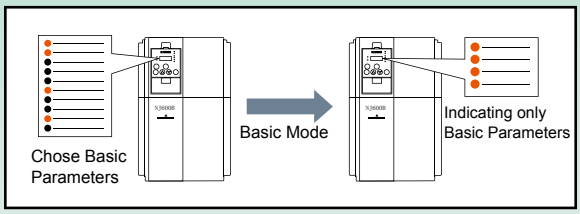
- Allows display of parameters changed from default.

User Selection Function

- Display of up to 12 user defined parameters U001 to U012.

Basic Mode (Default)

- Basic display mode for commonly used parameters.



※ Please refer to page 13 for available parameters for basic mode.

Other Functions

* The direct input of function code selection is possible rather than scrolling through the list.
* Holding down the function key for 3 seconds, users can change the display to output frequency monitor (d001) mode from any menu location.

Network Compatibility

Improving Network Scalability

NJ600B is incorporated with Standard RS-485 Modbus-RTU port. It can connect to open network such as DeviceNet, LonWorks, PROFIBUS-DP and CANopen.

* DeviceNet is the registered trademark of Open DeviceNet Vender Association, Inc
* LonWorks is the registered trademark of Echelon Corporation
* PROFIBUS-DP is the registered trademark of PROFIBUS Nutzer

Sink& Source Logic

Input and output terminals
corresponds to sink& source logic.

Wide Input Power to Voltage Range

Input voltage 380v~480v class as standard.

Environmental Friendliness

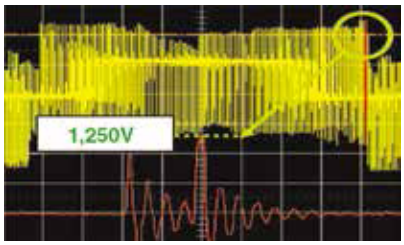
Micro Surge Voltage Suppress Function

Hitachi exclusive PWM control method limits motor terminal voltage to twice less than the inverter DC bus voltage.

When the DC bus voltage is lower than 625v, motor terminal voltage may not exceed Hitachi motor Max. insulation voltage(1,250v).

*During regeneration, the motor terminal voltage may exceed the maximum insulation voltage(1,250v)

Motor Terminal Voltage



E=625V, Cable=100m

Improvement of the Environment

Varnish coating of internal PC board & nickel-plating of main circuit copper bus bar are standard, which can much more easier adapt to the terrible environment.

Other Functions

Instantaneous Power Failure
Disregard Function
The NJ600B ignores instantaneous power failure when power fluctuation happens frequently, as long as DC bus voltage remains higher than under-voltage trip level.

Emergency Stop
Shuts down the inverter through hardware circuit, bypassing the CPU, to achieve a reliable emergency stop function.

Intelligent Input Terminal and Output Terminal ON/OFF Delay Function
Helps simplify external circuits.

Active Frequency Matching Function
Motor frequency matches restart function operates effectively even without motor residual voltage.

Controlled Deceleration and Stop on Power Loss

Analog Input Disconnection
Detection Function
The NJ600B outputs a disconnection signal when frequency command through analog input is lost.

Acceleration/Deceleration Curve Functions
The curve shape (five kinds, such as S-curve, etc.) can be chosen according to the application requirements.

Analog Command Holding Function (AHD)
Output frequency can be changed with UP/DOWN Function, or with an analog signal as reference value. The set frequency at power shutdown can be saved, too.

Pulse Train Input Function
Pulse train input for Frequency reference or PID feed back signal, with SJ-FB (speed feed back card option).

Integrated Input Electric Power monitor
Input electric power (kW) and Integrated input electric power for monitoring energy saving.

Automatic Carrier Frequency
Adjustment Function
The NJ600B detects motor current and automatically reduces carrier frequency according to the current.

The Resolution of Analog Outputs
(voltage, current) is improved to 10 bits.

Standard Specifications

● 400V Class Models

Model name(type name) NJ600B-□□□□ HFF/HF		055 HF	075 HFF	110 HFF	150 HFF	185 HFF	220 HFF	300 HFF	370 HFF	450 HFF	550 HFF	750 HFF	900 HFF	1100 HFF	1320 HFF	1600 HFF	1850 HF	2200 HF	2600 HF	3150 HF	3550 HF
Max.applicable motor capability (4P, kW)		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	260	315	355
Rated Capacity	400V	8.3	11.0	15.2	20.0	25.6	29.7	39.4	48.4	58.8	72.7	93.5	110.8	135.0	159.3	200.9	242	294	349	380	472
	480V	9.9	13.3	18.2	24.1	30.7	35.7	47.3	58.1	70.6	87.2	112.2	133.0	162.1	191.2	241.1	290	352	418	456	566
Rated input AC voltage		Three-phase(3-wire),380～480V(+10%,-15%), 50Hz/60Hz(±5%)																			
Rated output voltage(V)		Three-phase(3-wire), 380～480V (corresponding to the input voltage)																			
Rated output current(A)		14	17	23	30	39	45	60	72	88	105	142	168	208	253	305	350	425	505	550	683
Braking	Regenerative braking	Internal BRD circuit (external discharge resistor)							External dynamic braking unit (optional)												
	Value of Minimum connectable resisitance(Ω)	70	70	35	35	24	24	20	-												
Approx.Weight(kg)		3.5	6	6	6	14	14	14	22	30	30	30	55	55	70	70	72	140	145	160	210
Protective structure		IP20											IP00								
Control system		Sine-wave PWM control																			
Output frequency range		0.1~400Hz（Note 1）																			
Frequency accurancy		Digital setting：maxmium frequency ± 0.01% Simulation setting：± 0.2% (25 ± 10)																			
Frequency setting resolution		Digital input：0.01Hz Analog input：Maximum output frequency/4000 (0 terminal input：12bit/0～+10V), (02 terminal input：12bit/-10～+10V), (OI terminal input：12bit/0～+20mA)																			
Voltage/frequency characteristic		V/f characteristic variable with the base frequency set between 30 to 400Hz,constant- or reduced- torque V/f control, sensorless vector control,0Hz-range sensorless vector control (carrier frequency: 3kHz below), vector control(use option SJ-FB).																			
Speed Variation		±0.5%(sensorless vector control or 0Hz-range sensorless vector control)																			
Rated overload current		120%/60s																			
Acceleration/deceleration time		0.01~3600.0sec (in liner or curved pattern)																			
Starting torque		150%/0.5Hz (in liner or curved pattern)											120%/0.5Hz(do to)								
DC braking		Triggered at motor start-up,when the actual motor frequency exceeds the acceleration frequency set by a stop command,when the actual motor frequency exceeds the frequency set by a frequency command,or by an externally input command(braking force,time,and frequency are variable																			
Input	Frequency setting — Standard operator	Setting with △ ▽ keys																			
	Frequency setting — External signal	DC0 ～ +10V， -10 ～ +10V(input impedance, 10KΩ)， 4 ～ 20mA(input impedance 100Ω) (Note2)																			
	Frequency setting — External port	Setting via RS485 communication																			
	Forward/reverse Start/stop — Standard operator	Start/stop(forward/reverse switching by parameter setting)																			
	Forward/reverse Start/stop — External signal	Forward-operation start/stop commands (reverse-operation start/stop possible when relevant commands are assigned to intelligent input terminals);3-wire input possible(when relevant commands are assigned to control circuit terminals)																			
	Forward/reverse Start/stop — External port	Setting via RS485 communication																			
	Intelligent input terminals	8terminals, NO/NC switchable, sink logic/source logic switchable 【Terminal function】Select eight of 69 functions Reverse operation (RV),Multispeed 1 setting(CF1), Multispeed 2 setting (CF2), Multispeed 3 setting (CF3), Multispeed 4 setting (CF4),Jogging(JG),external DC braking (DB)Second motor control(SET), 2-stage acceleration/deceleration(2CH),free-run stop(FRS),external trip(EXT),unattended start protection(USP),commercial power supply switching(CS),Software lock(SFT),analog input switching(AT),third motor control(SET3),reset(RS), starting by 3-wire input(STA),stopping by 3-wire input (STP),forward/reverse switching by 3-wire input(F/R), PID disable (PID), PID integration reset(PIDC),control gain switching(CAS),acceleration by remote control(UP),deceleration by remote control(DWN),date clearance by remote control(UDC),forcible operation(OPE),multispeed bit 1(SF1), multispeed bit 2(SF2), multispeed bit 3(SF3), multispeed bit 4(SF4), multispeed bit 5(SF5), multispeed bit 6(SF6),multispeed bit 7(SF7),overload restriction selection过(OLR),torque limit selection enabling(TL),torque limit1(TRQ1), torque limit 2(TRQ2), P/PI switching(PPI),braking confirmation(BOK), orientation(ORT), LAD cancellation(LAC),clearance of position deviation(PCLR),permission of 90°-shift phase(STAT),trigger for frequency addition[A145](ADD),forcible-terminal operation(F-TM),permission of torque command input(ATR),cumulative power clearance(KHC),servo-ON(SON),pre-excitation(FOC),analog command holding(AHD), multistage position settings selection 1(CP1), multistage position settings selection 2(CP2), multistage position settings selection 3(CP3),Zero-return limit function (ORL), Zero-return trigger function(ORG),forward drive stop(FOT),reverse drive stop(ROT),speed/position switching(SPD),Pulse counter(PCNT), Pulse counter clear(PCC),emergency stop(EMR) (Note 3),no assignment(no)																			
	Thermistor input terminal	1 terminal(positive temperature coefficient／negative temperature coefficient switchable for resistor)																			

●400V class model (continued)

NJ600B-□□□□ HFF/HF		055 HF	075 HFF	110 HFF	150 HFF	185 HF	220 HFF	300 HFF	370 HFF	450 HFF	550 HFF	750 HFF	900 HFF	1100 HFF	1320 HFF	1600 HFF	1850 HF	2200 HF	2600 HF	3150 HF	3550 HF
Output	Intelligent output terminals	5 open-collector output terminals: NO/NC switchable, sink logic/source logic switchable 1 relay(1c contact)output terminal: NO/NC switchable 【Terminal function】Select six of 51 functions Running(RUN),constant-speed reached(FA1),set frequency overreached(FA2),overload notice advance signal (OL), output deviation for PID(OD),alarm signal(AL),Set frequency reached (FA3),over-torque(OTQ),instantaneous power failure(IP),under voltage(UV),torque limited(TRQ),Operation time over(RNT),plug-in time over(ONT),thermal alarm signal(THM),brake release(BRK),Braking error(BER),0Hz detection signal(ZS),speed deviation maximum(DSE),positioning completed(POK), Set frequency overreached 2(FA4),Set frequency reached 2(FA5), overload notice advance signal 2(OL2),analog O disconnection detection (ODc),analog OI disconnection detection (OIDc),analog O2 disconnection detection (O2Dc),PID feedback comparison(FBV),communication disconnection detection (NDc),logical operation result 1(LOG1),logical operation result 2(LOG2), logical operation result 3(LOG3), logical operation result 4(LOG4), logical operation result 5(LOG5),logical operation result 6(LOG6),capacitor life warning(WAC),cooling-fan speed drop (WAF),starting contact signal(FR),heat sink overheat warning(OHF),low-current indication signal(LOC),inverter ready(IRDY),forward rotation(FWR),reverse rotation(RVR),major error(MJA),window comparison function O(WCO), window comparison function OI(WCOI), window comparison function O2(WCO2) alarm code 0～3(AC0～AC3)																			
	Intelligent monitor output terminals	Analog voltage output(Note4),analog current output(Note4),pulse-string output(A-F,D-F{n-fold,pulse output only},A,T,V,P and so on)																			
Monitoring on display		Output frequency ,output current,output torque,frequency conversion data,trip history,input/output termial status,electirc power ,and others																			
Other functions		V/f free setting(7breakpoints), frequency upper/lower limit, jump center frequency, accelerartion/deceleration according to characteristic curve, Manual torque boost level/breakpoint, energy saving operation, analog meter adjustment, start frequency setting, carrier frequency adjustment, electronic thermal function(available also for free setting), External start/end(frequency/rate), Analog input selection,retry after trip, restart after instantaneous power failure, output of various signal, starting with reduced voltage, overload restriction, initial-value setting,automatic deceleration at power failure,AVR function, fuzzy acceleration/deceleration, auto-tuning (online/offline), High-torque multi-motor operation(sensorless vector control of two motors by one inverter)																			
Carrier frequency variation			0.5~12kHz								0.5~8kHz						0.5~3kHz				
Protective function		Overcurreent protection, overvoltage protection, undervoltage protection,electronic thermal protection, temperature error protection ,instantaneous power failure protection,phase loss input protection, braking-resistor overload protection, groung-fault current detection at power-on, USPerror,external trip,emergency stop trip, CT error, communication error,option board error, and others																			
Operating environment	Ambient temperature/storage temperature(Note5)/humidity	-10 ～45 ℃/-20 ～65 ℃/20 ～ 90%RH(no condensation allowed)																			
	Vibration(Note6)	5.9m/s^2(0.6G)、10~55Hz						2.94m/s^2(0.3G)、10~55Hz										1.96m/s^2(0.2G)、10~55Hz			
	Installation environment	Altitude under 1,000m(environment without corrosive gases and dust) (Note 7)																			
Coating color		(Grey)																			
Internal option		Zero-phase reactor; EMI filter (class C3)															None				
EMC filter		None	(EN61800-3 Class C3)														None				
Parts lifespan		Smothing capacitor: designed lifespan 10 years																			
		Cooling fan: designed lifespan 10 years																			
Option	Feedback option	Vector control with sensor																			
	Digital input option	4-digit BCD,16-bit binary																			
	DeviceNet option	Option to support the open-network DeviceNet function																			
	LonWorks option	Option to support the open-network LonWorks function																			
	Profibus-DP option	Option to support the open-network Profibus-DP function																			
	CANopen option	Option to support the open-network CANopen function																			
Other option		Braking resistor,AC reactor,DC reacter,noise filter,operator cables Harmonic-wave suppressor unit,LCR filter,analog operation panel,controllers for applications regenerative braking unit,controllers for various applications																			

Note 1: When motor frequency over 60Hz, please pre-acknowledge maximum allowable frequency of the inverter.
Note 2: The frequency command will equal the maximum frequency at 9.8V for input voltage DC0～10V,or at 19.6mA for input current 4～20mA.If this characteristic is not satisfactory for your application,contact your sales representative.
Note 3: When emergency stop function is effective(SW1=ON),C001 is set to 18(RS), C003 is set to 64(EMR): C003 is changed to no (no assignment) , after SW1 operate ON→OFF.
Note 4: The analog voltage monitor and analog current monitor are rough output terminal for analog meter connection. The maximum output value might shift a little by the difference of the analog output circuit than 10V or 20mA. Please inquire when there is a possibility that the inconvenience is caused.
Mote 5: The storage temperature refers to the temperature during transport.
Note 6: The vibration tolerance is tested in compliance with JIS C0040 (1999).
Note 7: The density of air decreases by 1% whenever rising by 100m when the altitude exceeds 1000m, Therefore, it is necessary to decrease the calorific value. The calorific value of the main circuit semiconductor such as IGBT is proportional to the current and the voltage. Therefore, please decrease by 1% and use the current rating every time it rises by 100m. Please inquire about using in the high ground of 2500m or more.
Note 8: When sensor-less vector control is selected (A044=03), you may not obtain an intended starting torque or motor may trip depending on the applied motor.
Note 9: The inverter detects IGBT error (E30) as a protection function. However, IGBT error (E30) is not a protection for an output short circuit, therefore there is a possibility that IGBT will get damaged. Moreover, over current protection (E01～04) may be detected, depending on the operational condition of the inverter .

●Model Name Indication

NJ600B - 185 H F F

- Series Name
- Applicable Motor Capacity
  - 075 : 7.5kW
  - ≀ ≀
  - 1600 : 160kW
- Input Power Source
  - H: 3 phase 400Vclass
- F: With Keypad
- F: Integrated EMC Filter

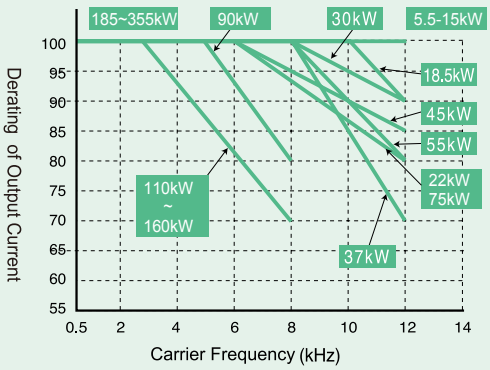
NJ600B - 1850 H F

- Series Name
- Applicable Motor Capacity
  - 055 : 5.5kW
  - 1850 : 185kW
  - ≀ ≀
  - 3550 : 355kW
- Input Power Source
  - H: 3 phase 400Vclass
- F: With Keypad

Applicable Motor (kW)	Universal Vector	
	3 phase 400V class	
	HFF	HF
5.5		●
7.5	●	
11	●	
15	●	
18.5	●	
22	●	
30	●	
37	●	
45	●	
55	●	
75	●	
90	●	
110	●	
132	●	
160	●	
185		●
220		●
260		●
315		●
355		●

Derating Characteristics

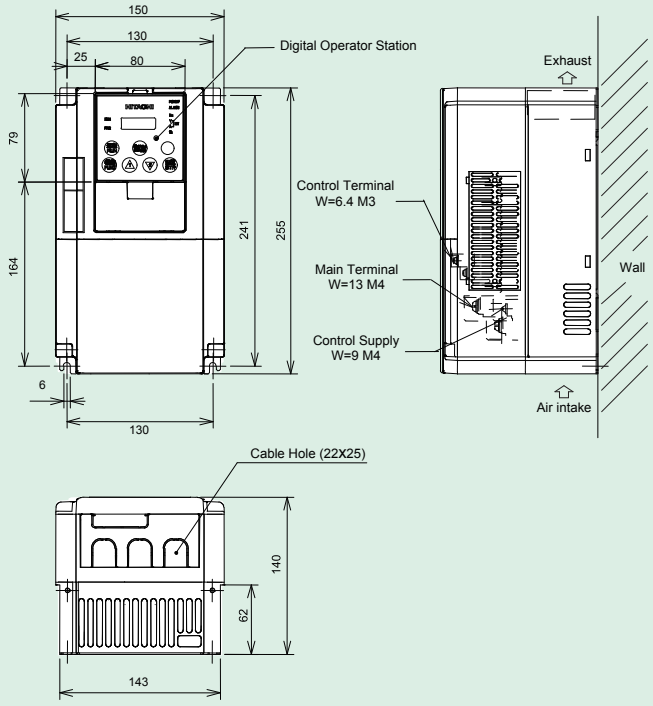
400 V Class (5.5 ~ 355kW) Ambient Temperature 45℃



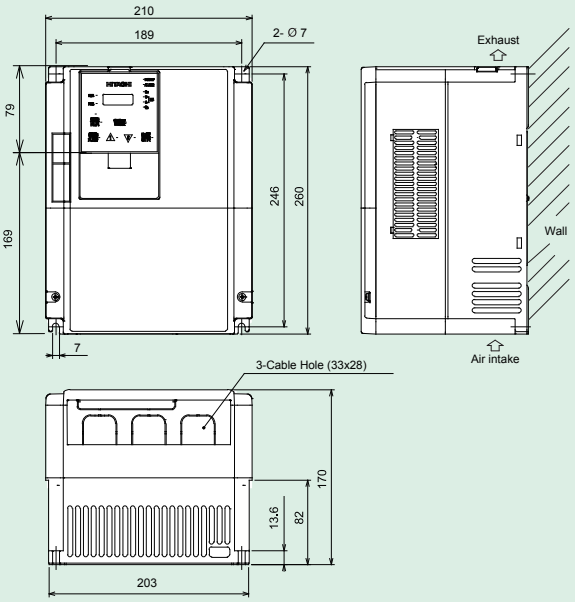
* When the inverter is running at a frequency that over the maximum allowable carrier frequency and above derating at fc=12kHz, the inverter will be on the risk of damage and its lifespan will be shortened .

Dimensions

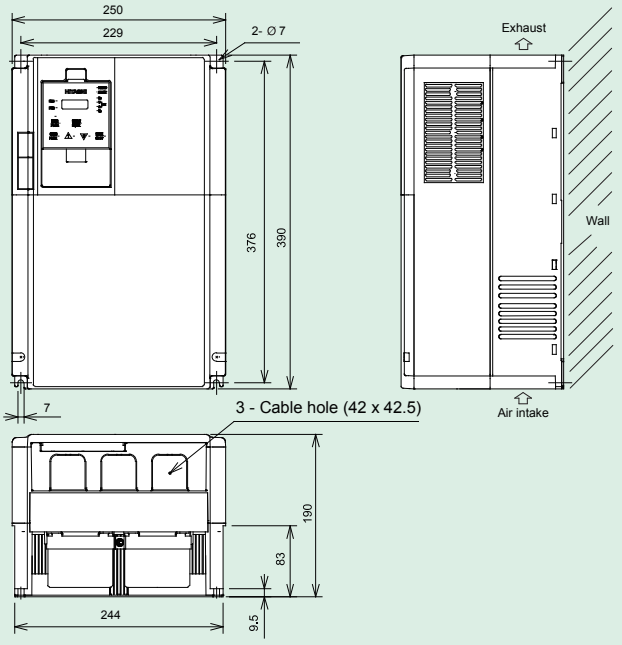
•NJ600B-055HF



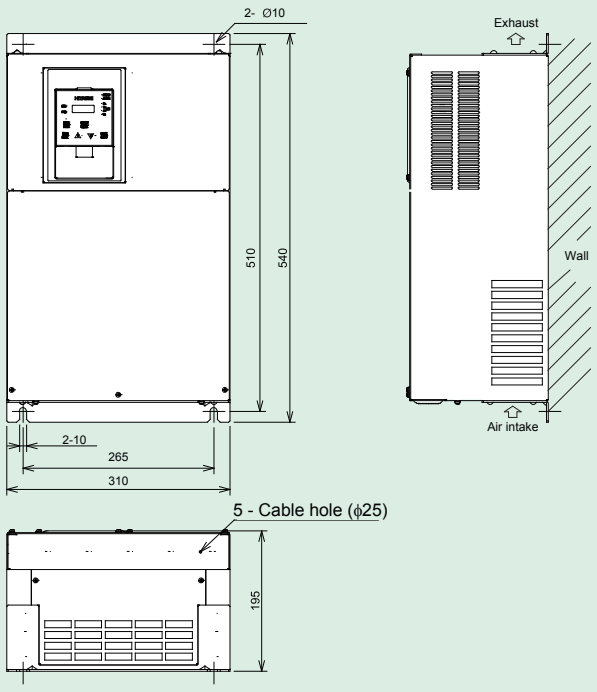
•NJ600B-075 to 150HFF



•NJ600B-185 to 300HFF

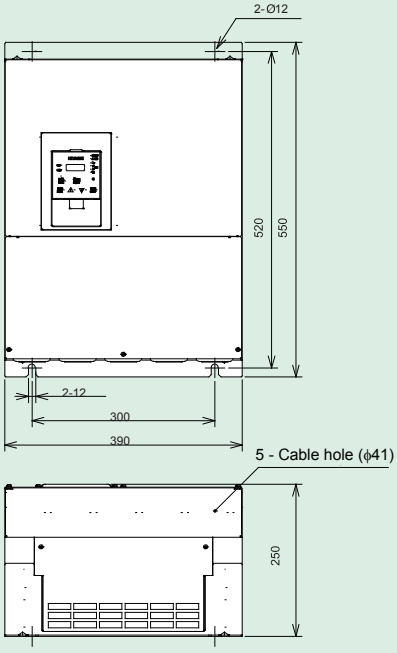


•NJ600B-370HFF

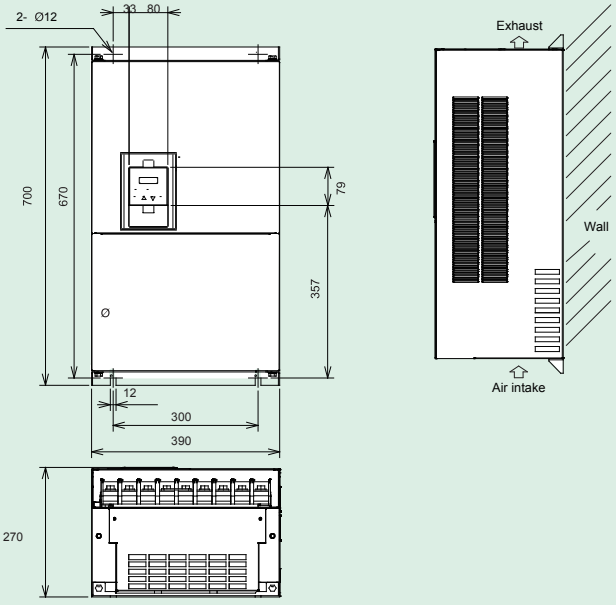


[UNIT: mm]

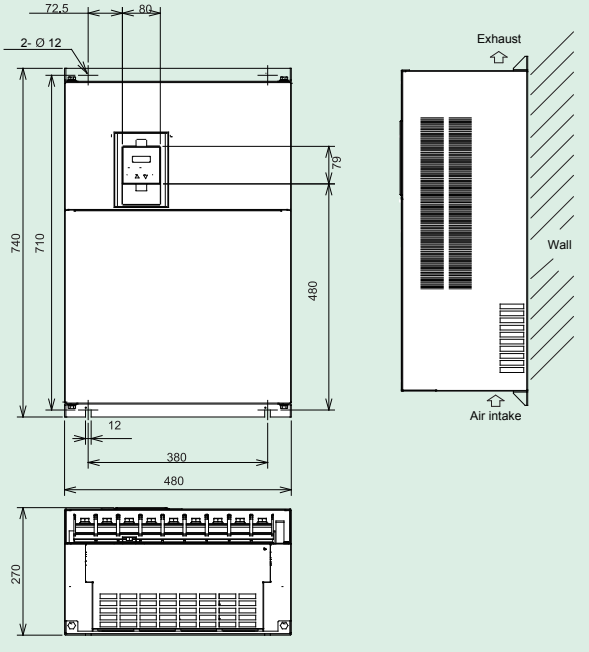
•NJ600B-450 to 750HFF



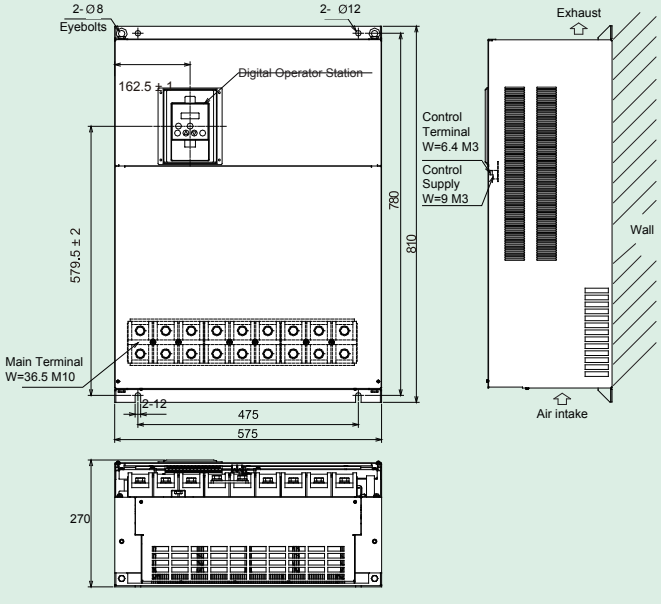
•NJ600B-900 ,1100 HFF



•NJ600B-1320 to 1600HFF

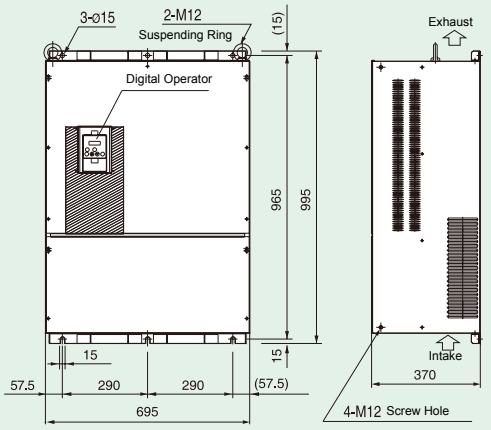


•NJ600B-1850HF

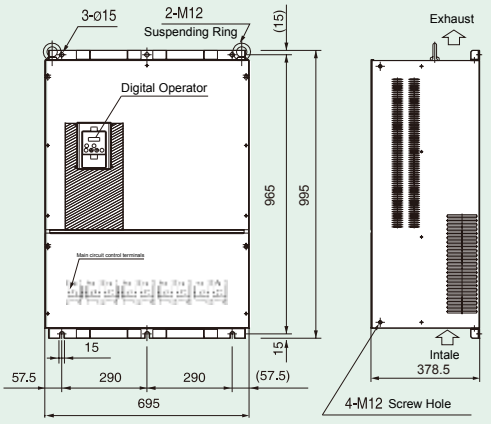


[Unit : mm]

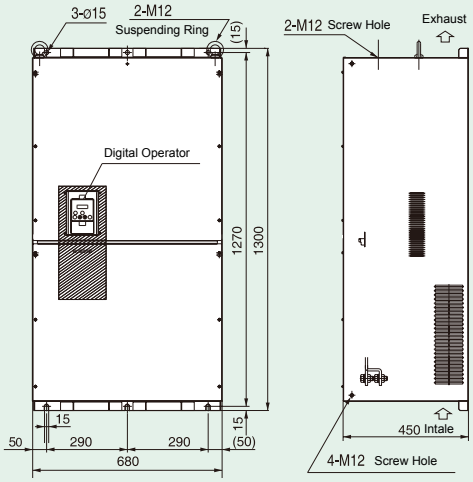
• NJ600B-2200, 2600HF



• NJ600B-3150HF

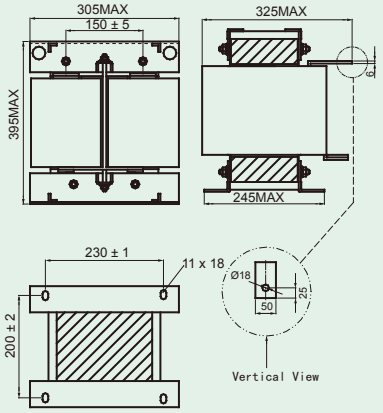


• NJ600B-3550HF

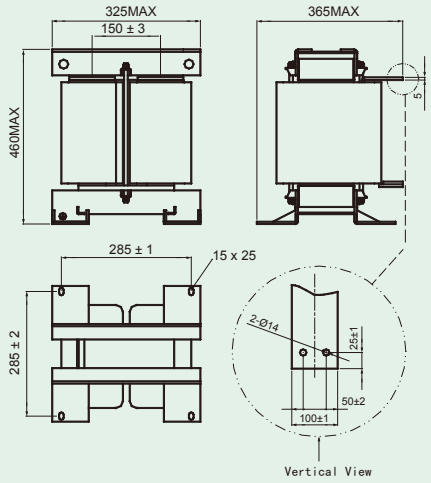


DC Reactor (optional)

• DCL-H-185, DCL-H-220, DCL-H-260



• DCL-H-315, DCL-H-355



[Unit : mm]

Operation

NJ600B Series can be easily operated with the digital operator provided as standard. The digital operator can also be detached and can be used for remote-control. Operator with copy functionand digital operator with potentiometer are also available as options.

●Instructions

Parameter Display
Displays frequency, motor current, rotational speed of the motor, and an alarm code.

Monitor LEDs
Shows drive status.

RUN key enable LED
Lights up when the inverter is ready to respond to the RUN key.

RUN Key
Press to run the motor.

STOP/RESET Key
Press to stop the drive or reset an alarm.

Function Key
Press to set or monitor a parameter value.

Power LED
Lights when the power input to the drive is ON.

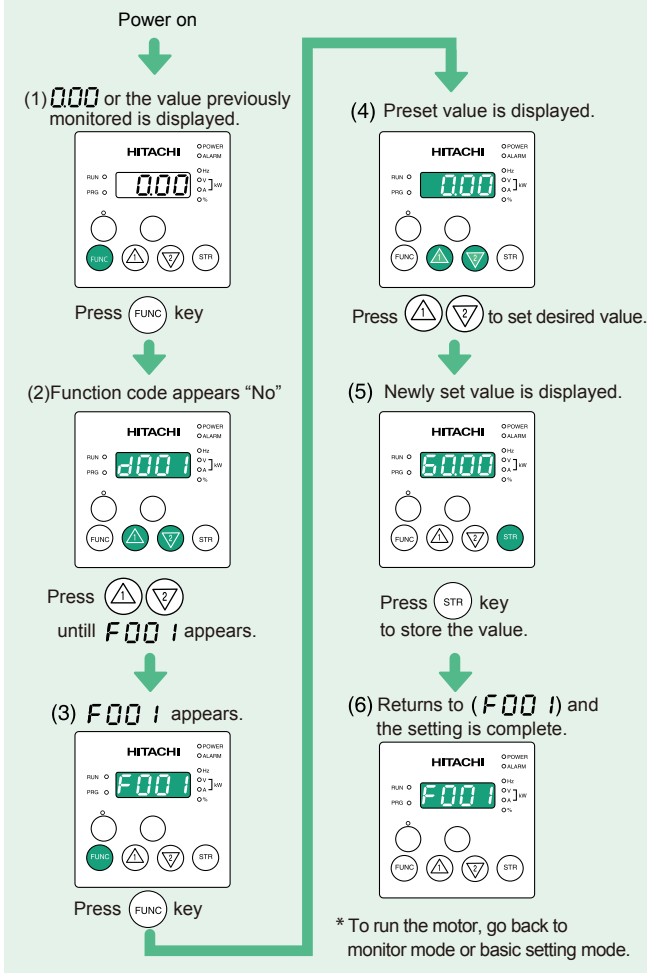
ALARM LED
Lights to indicate that the inverter has tripped.

Display Unit LEDs
Indicates the unit associated with the parameter display.

Store Key
Press to write the new value to the EEPROM.

Up/Down Keys
Press up or down to sequence through parameters and functions shown on the display, and increment/decrement values.

Setting the output frequency



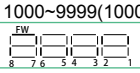
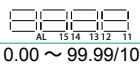
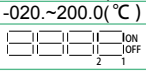
● The contents of a basic mode display.(default)
If a desired parameter is not displayed, check the setting of function "b037" (function code display restriction). To display all parameters, specify "00" for "b037".

No.	Display Code	Item
1	d001~104	Monitor display
2	F001	Output frequency setting
3	F002	Acceleration (1) time setting
4	F003	Deceleration (1) time setting
5	F004	Operation direction setting
6	A001	Frequency source setting
7	A002	Run command source setting
8	A003	Base frequency setting
9	A004	Maximum frequency setting
10	A005	[AT] selection
11	A020	Multi-speed frequency setting
12	A021	Multi-speed 1 setting
13	A022	Multi-speed 2 setting
14	A023	Multi-speed 3 setting
15	A044	1st control method
16	A045	V/f gain setting
17	A085	Operation mode selection
18	b001	Selection of restart mode
19	b002	Allowable under-voltage power failure time
20	b008	Retry-after-trip selection
21	b011	Retry wait time after trip
22	b037	Function code display restriction
23	b083	Carrier frequency setting
24	b084	Initialization mode selection
25	b130	Selection of overvoltage suppression function
26	b131	Setting of overvoltage suppression level
27	C021	Setting of intelligent output terminal 11
28	C022	Setting of intelligent output terminal 12
29	C036	Alarm relay active state

Function List

The default display mode limits the screens (parameters) that can be displayed on the monitor.
To enable the display of all parameters, specify "00" (full display) for the function code display restriction (b037).
To enable the parameters to be changed while the inverter is operating, specify "10" for the software lock mode selection (b031).

●Mornitoring Mode

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Monitoring	d001	Output frequency monitoring	0.00~99.99/100.0~400.0(Hz)	–	○	–
	d002	Output current monitoring	0.0~999.9/1000~9999(A)	–	–	–
	d003	Rotation direction minitoring	F (forward rotation)/ o (stopped)/ r (reverse rotation)	–	–	–
	d004	Process variable (PV), PID feedback monitoring	0.00~99.99/100.0~999.9/1000.~9999. 1000~9999(10000~99990)/ 「100~ 「999(100000～999000)	–	–	–
	d005	Intelligent input terminal status	 Terminals FW, 7,2,1:ON Terminals 8,6,5,4,3:OFF	–	–	–
	d006	Intelligent output terminal status	 Terminals 12,11:ON Terminals AL,15,14,13:OFF	–	–	–
	d007	Scaled output frequency monitoring	0.00 ～ 99.99/100.0 ～ 999.9/1000. ～ 9999./ 1000 ～ 3996/(10000~39960)	–	○	–
	d008	Actual-frequency monitoring	-400.~-100./-99.9~0.00~99.99/100.0~400.0(Hz)	–	–	–
	d009	Torque command monitoring	-150.~+150.(%)	–	–	–
	d010	Torque bias monitoring	-150.~+150.(%)	–	–	–
	d012	Torque monitoring	-150.~+150.(%)	–	–	–
	d013	Output voltage monitoring	0.0 ～ 600.0(V)	–	–	–
	d014	Power monitoring	0.0 ～ 999.9(kW)	–	–	–
	d015	Cumulative power monitoring	0.0~999.9/1000.~9999./1000~9999(10000~99990)/ 「100~ 「999(100000~999000)	–	–	–
	d016	Cumulative operation RUN time monitoring	0.~9999./1000~9999(10000~99990)/ 「100~ 「999(100000~999000)(hr)	–	–	–
	d017	Cumulative power-on time monitoring	0.~9999./1000~9999(10000~99990)/ 「100~ 「999(100000~999000)(hr)	–	–	–
	d018	Heat sink temperature monitoring	-020.~200.0(℃)	–	–	–
	d019	Motor temperature monitoring	-020.~200.0(℃)	–	–	–
	d022	Life-check monitoring	 1：Capacitor on main circuit board 2：Cooling-fan speed drop	–	–	–
	d023	Program counter	0~1024	–	–	–
	d024	Program number monitoring	0000~9999	–	–	–
	d025	User monitor 0	-2147483647～+2147483647(upper 4 digits)	–	–	–
	d026	User monitor 1	-2147483647～+2147483647(upper 4 digits)	–	–	–
	d027	User monitor 2	-2147483647～+2147483647(upper 4 digits))including "-")	–	–	–
	d028	Pulse counter	0～2147483647(upper 4 digits)	–	–	–
	d029	Position setting monitor	-1073741823～+1073741823(upper 4 digits)	–	–	–
	d030	Position feedback monitor	-1073741823～+1073741823(upper 4 digits)	–	–	–
	d080	Trip Counter	0.～9999./1000～6553(10000～65530)(times)	–	–	–
	d081 ≀ d086	Trip monitoring 1 ≀ Trip monitoring 6	Factor, frequency (Hz), current (A), voltage across P-N (V), running time (hours), power-on time (hours)	–	–	–
	d090	Programming error monitoring	Warning code	–	–	–
	d102	DC voltage monitoring	0.0~999.9(V)	–	–	–
	d103	BRD load factor monitoring	0.0~100.0(%)	–	–	–
	d104	Electronic thermaloverload monitoring	0.0~100.0(%)	–	–	–
Setting	F001	Output frequency setting	"start frequency" to "maximum frequency"/(or maximum frequency, 2nd/3rd motors)(Hz) 0.0～100.0(when PID function is enabled)	0.00	○	○
	F002	Acceleration (1) time setting	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F202	Acceleration (1) time setting, 2nd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F302	Acceleration (1) time setting, 3rd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F003	Deceleration (1) time setting	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F203	Deceleration time setting, 2nd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F303	Deceleration time setting, 3rd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	30.00	○	○
	F004	Keypad Run key routing	00(forward rotation)/01(reverse rotation)	00	×	×
Extended Functions	A---	Casic function				
	B---	Protecting function、fine tunning function				
	C---	Intelligent terminal function				
	D---	Motor constant function				
	P---	Expansion card				
	U---	User selectable menu function				

● A Group: Standard Functions

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Basic settings	A001	Frequency source setting	00 (keypad potentiometer) (*1), 01 (control circuit terminal block), 02 (digital operator), 03 (RS485), 04 (option 1), 05 (option 2), 06 (pulse-string input), 07 (easy sequence), 10	01	×	×
	A002	Run command source setting	01 (control circuit terminal block), 02 (digital operator), 03 (RS485), 04 (option 1), 05 (option 2)	01	×	×

*1 This setting is valid only when the SOP-VR is connected.

	Code	Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Basic settings	A003	Base frequency setting	30. to "maximum frequency " (Hz)	50.	×	×
	A203	Base frequency setting, 2nd motor	30. to "maximum frequency, 2nd motor" (Hz)	50.	×	×
	A303	Base frequency setting, 3rd motor	30. to "maximum frequency, 3rd motor" (Hz)	50.	×	×
	A004	Maximum frequency setting	30.～400.(Hz)	50.	×	×
	A204	Maximum frequency setting, 2nd motor	30.～400.(Hz)	50.	×	×
	A304	Maximum frequency setting, 3rd motor	30.～400.(Hz)	50.	×	×
Analog input and others	A005	[AT] selection	00 (switching between O and OI terminals), 01 (switching between O and O2 terminals), 02 (switching between O terminal and keypad potentiometer) (*1), 03 (switching between OI terminal and keypad potentiometer) (*1), 04 (switching between O2 and keypad potentiometer) (*1)	00	×	×
	A006	[O2] selection	00 (single), 01 (auxiliary frequency input via O and OI terminals) (nonreversible), 02 (auxiliary frequency input via O and OI terminals) (reversible), 03 (disabling O2 terminal)	03	×	×
	A011	O start frequency	0.00~99.99/100.0~400.0	0.00	×	○
	A012	O end frequency	0.00~99.99/100.0~400.0	0.00	×	○
	A013	O start voltage	0. to "[O]-[L] input active range end voltage" (%)	0.	×	○
	A014	O end voltage	"[O]-[L] input active range start voltage" to 100. (%)	100.	×	○
	A015	O start frequency selection	00 (external start frequency), 01 (0 Hz)	01	×	○
	A016	External frequency filter time const.	1. to 30. or 31. (500 ms filter ±0.1 Hz with hysteresis)	31.	×	○
	A017	Easy sequence function selection	00 (disabling), 01 (enabling)	00	×	×
Multispeed operation and jogging	A019	Multispeed operation selection	00 (binary: 16 speeds selectable with 4 terminals), 01 (bit: 8 speeds selectable with 7 terminals)	00	×	×
	A020	Multispeed frequency setting	0.0 or “start frequency” to “maximum frequency” (Hz)	0.00	○	○
	A220	Multispeed frequency setting, 2nd motor	0.0 or “start frequency” to “maximum frequency, 2nd motor” (Hz)	0.00	○	○
	A320	Multispeed frequency setting, 3rd motor	0.0 or “start frequency” to “maximum frequency, 3rd motor” (Hz)	0.00	○	○
	A021 ｓ A035	Multispeed1-15 setting	0.0 or “start frequency” to “1st maximum frequency” (Hz) 0.0 or “start frequency” to “2nd maximum frequency” (Hz) 0.0 or “start frequency” to “3rd maximum frequency” (Hz) 0.0 or “start frequency” to “n-th maximum frequency” (Hz)	0.00	○	○
	A038	Jog frequency setting	"Start frequency" to 9.99 (Hz)	1.00	○	○
	A039	Jog stop mode	00 (free-running after jogging stops [disabled during operation]), 01 (deceleration and stop after jogging stops [disabled during operation]), 02 (DC braking after jogging stops [disabled during operation]), 03 (free-running after jogging stops [enabled during operation]), 04 (deceleration and stop after jogging stops [enabled during operation]), 05 (DC braking after jogging stops [enabled during operation])	00	×	○
V/f characteristic	A041	Torque boost method selection	00((manual torque boost)/01(automatic torque boost)	00	×	×
	A241	Torque boost method selection, 2nd motor	00((manual torque boost)/01(automatic torque boost)	00	×	×
	A042	Manual torque boost value	0.0~20.0(%)	1.0	○	○
	A242	Manual torque boost value, 2nd motor	0.0~20.0(%)	1.0	○	○
	A342	Manual torque boost value, 3rd motor	0.0~20.0(%)	1.0	○	○
	A043	Manual torque boost frequency adjustment	0.0~50.0(%)	5.0	○	○
	A243	Manual torque boost frequency adjustment, 2nd motor	0.0~50.0(%)	5.0	○	○
	A343	Manual torque boost frequency adjustment, 3rd motor	0.0~50.0(%)	5.0	○	○
	A044	V/F characteristic curve selection, 1st motor	00 (VC), 01 (VP), 02 (free V/f), 03 (sensorless vector control), (*1)04 (0Hz-range sensorless vector), (*1)05 (vector with sensor)	00	×	×
	A244	V/F characteristic curve selection, 2nd motor	00 (VC), 01 (VP), 02 (free V/f), 03 (sensorless vector control), (*1) 04 (0Hz-range sensorless vector)	00	×	×
	A344	V/F characteristic curve selection, 3nd motor	00(VC)/01(VP)	00	×	×
	A045	V/f gain setting	20.-100.(%)	100.0	○	○
	A046	Voltage compensation gain setting for automatic torque boost, 1st motor	0.~255.	100.0	○	○
	A246	Voltage compensation gain setting for automatic torque boost, 2nd motor	0.~255.	100.0	○	○
	A047	Voltage compensation gain setting for automatic torque boost, 3st motor	0.~255.	100.0	○	○
	A247	Voltage compensation gain setting for automatic torque boost, 4st motor	0.~255.	100.0	○	○
DC braking	A051	DC braking enable		00	×	○
	A052	DC braking frequency setting	0.00~99.99/100.0~400.0(Hz)	0.50	×	○
	A053	DC braking wait time	0.0~5.0(s)	0.0	×	○
	A054	DC braking force during deceleration	0.~70.(%)<0.~50.(%)>	0.	×	○
	A055	DC braking time for deceleration	0.0~60.0(s)	0.0	×	○
	A056	DC braking/edge or level detection for [DB] input	00 (edge operation), 01 (level operation)	01	×	○
	A057	DC braking force for starting	0.~70.(%)<0.~50.(%)>	0.	×	○
	A058	DC braking time for starting	0.0-60.0(s)	0.0	×	○
	A059	DC braking carrier frequency setting	0.5～12.0(kHz)（5.5～75kW）；0.5～8.0(kHz)（90～160kW）；0.5～3.0(kHz)（185～355kW）	5.0/2.1	×	×
Frequency upper/lower limit and jump frequency	A061	Frequency upper limit setting	0.00 or "1st minimum frequency limit" to "maximum frequency" (Hz)	0.00	×	○
	A261	Frequency upper limit setting, 2nd motor	0.00 or "2nd minimum frequency limit" to "maximum frequency, 2nd motor" (Hz)	0.00	×	○
	A062	Frequency lower limit setting	0.00 or "start frequency" to "maximum frequency limit" (Hz)	0.00	×	○
	A262	Frequency lower limit setting, 2nd motor	0.00 or "start frequency" to "maximum frequency, 2nd motor limit" (Hz)	0.00	×	○
	A063	Jump (center) frequency setting 1	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A064	Jump (hysteresis) frequency width setting 1	0.00~10.00(Hz)	0.50	×	○
	A065	Jump (center) frequency setting 2	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A066	Jump (hysteresis) frequency width setting 2	0.00~10.00(Hz)	0.50	×	○
	A067	Jump (center) frequency setting 3	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A068	Jump (hysteresis) frequency width setting 3	0.00~10.00(Hz)	0.50	×	○
	A069	Acceleration stop frequency setting	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A070	Acceleration stop time frequency setting	0.0~60.0(s)	0.0	×	○
PID control	A071	PID Function Enable	00 (disabling), 01 (enabling), 02 (enabling inverted-data output)	00	×	○
	A072	PID proportional gain	0.2~5.0	1.0	○	○
	A073	PID integral time constant	0.0~999.9/1000.~3600.0(s)	1.0	○	○
	A074	PID derivative gain	0.00~99.99/100.0(s)	0.00	○	○
	A075	PV scale conversion	0.01~99.99	1.00	×	○
	A076	PV source setting	00 (input via OI), 01 (input via O), 02 (external communication), 03 (pulse-string frequency input), 10 (operation result output)	00	×	○
	A077	Output of inverted PID deviation	00(OFF)/01(ON)	00	×	○
	A078	PID variation range	0.0~100.0(%)	0.0	×	○
	A079	PID feed forward selection	00 (disabled), 01 (O input), 02 (OI input), 03 (O2 input)	00	×	○

*1 This setting is valid only when the SOP-VR is connected.

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
AVR	A081	AVR function select	00 (always on), 01 (always off), 02 (off during	00	×	×
AVR	A082	AVR voltage select	400 V class 380/400/415/440/460/480(V)	400	×	×
Operation mode and acceleration/deceleration function	A085	Operation mode selection	00 (normal operation), 01 (energy-saving operation), 02 (fuzzy operation)	00	×	×
	A086	Energy saving mode tuning	0.0~100.0	50.0	○	○
	A092	Acceleration (2) time setting	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A292	Acceleration (2) time setting, 2nd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A392	Acceleration (2) time setting, 3rd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A093	Deceleration (2) time setting, 2nd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A293	Deceleration (2) time setting, 3rd motor	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A393	Select method to switch to Acc2/Dec2 profile	0.01~99.99/100.0~999.9/1000.~3600.(s)	15.00	○	○
	A094	Select method to switch to Acc2/Dec2 profile	00 (switching by 2CH terminal), 01 (switching by setting), 02 (switching only when rotation is reversed)	00	×	×
	A294	Select method to switch to Acc2/Dec2, 2nd motor	00 (switching by 2CH terminal), 01 (switching by setting), 02 (switching only when rotation is reversed)	00	×	×
	A095	Acc1 to Acc2 frequency transition point	0.00~99.99/100.0~400.0(Hz)	0.00	×	×
	A295	Acc1 to Acc2 frequency transition point, 2nd motor	0.00~99.99/100.0~400.0(Hz)	0.00	×	×
	A096	Dec1 to Dec2 frequency transition point	0.00~99.99/100.0~400.0(Hz)	0.00	×	×
	A296	Dec1 to Dec2 frequency transition point, 2nd motor	0.00~99.99/100.0~400.0(Hz)	0.00	×	×
	A097	Acceleration curve selection	00 (linear), 01 (S curve), 02 (U curve), 03 (inverted-U curve), 04 (EL-S curve)	00	×	×
	A098	Deceleration curve setting	00 (linear), 01 (S curve), 02 (U curve), 03 (inverted-U curve), 04 (EL-S curve)	00	×	×
External frequency adjustment	A101	[OI]-[L] input active range start frequency	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A102	[OI]-[L] input active range end frequency	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A103	[OI]-[L] input active range start current	0. to "[OI]-[L] input active range end current" (%)	20.	×	○
	A104	[OI]-[L] input active range end current	"[OI]-[L] input active range start current" to 100. (%)	100.	×	○
	A105	[OI]-[L] input start frequency enable	00 (external start frequency), 01 (0 Hz)	00	×	○
	A111	[O2]-[L] input active range start frequency	-400.～-100./-99.9～0.00～99.99/100.0～400.0(Hz)	0.00	×	○
	A112	[O2]-[L] input active range end frequency	-400.～-100./-99.9～0.00～99.99/100.0～400.0(Hz)	0.00	×	○
	A113	[O2]-[L] input active range start voltage	-100. to 02 end-frequency rate (%)	-100.	×	○
	A114	[O2]-[L] input active range end voltage	"02 start-frequency rate" to 100. (%)	100.	×	○
Acceleration/deceleration	A131	Acceleration curve constants setting	01 (smallest swelling) to 10 (largest swelling)	02	×	○
Acceleration/deceleration	A132	Deceleration curve constants setting	01 (smallest swelling) to 10 (largest swelling)	02	×	○
Operation-target frequency	A141	Operation-target frequency selection 1	00 (digital operator), 01 (keypad potentiometer), 02 (input via O), 03 (input via OI), 04 (external communication), 05 (option 1), 06 (option 2), 07 (pulse-string frequency input)	02	×	○
	A142	Operation-target frequency selection 2	00 (digital operator), 01 (keypad potentiometer), 02 (input via O), 03 (input via OI), 04 (external communication), 05 (option 1), 06 (option 2), 07 (pulse-string frequency input)	03	×	○
	A143	Operator selection	00 (addition: A141 + A142), 01 (subtraction: A141 - A142), 02 (multiplication: A141 x A142)	00	×	○
	A145	Frequency to be added	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	A146	Sign of the frequency to be added	00 (frequency command + A145), 01 (frequency command - A145)	00	×	○
Acceleration/deceleration	A150	EL-S-curve acceleration ratio 1	0.~50.(%)	25.	×	×
Acceleration/deceleration	A151	EL-S-curve acceleration ratio 2	0.~50.(%)	25.	×	×
Acceleration/deceleration	A152	EL-S-curve deceleration ratio 1	0.~50.(%)	25.	×	×
Acceleration/deceleration	A153	EL-S-curve deceleration ratio 2	0.~50.(%)	25.	×	×

*1 This setting is valid only when the SOP-VR is connected.

● B Grounp: Fine Tuning Functions

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Restart after instantaneous power failure or tripping	b001	Selection of restart mode	00 (tripping), 01 (starting with 0 Hz), 02 (starting with matching frequency), 03 (tripping after deceleration and stopping with matching frequency), 04 (restarting with active matching frequency)	00	×	○
	b002	Allowable under-voltage power failure time	0.3~25.0(s)	1.0	×	○
	b003	Retry wait time before motor restart	0.3~100.0(s)	1.0	×	○
	b004	Instantaneous power failure/ under-voltage trip alarm enable	00 (disabling), 01 (enabling), 02 (disabling during stopping and decelerating to stop)	00	×	○
	b005	Number of restarts on power failure/under-voltage trip events	00 (16 times), 01 (unlimited)	00	×	○
	b006	Phase loss detection enable	00 (disabling), 01 (enabling)	00	×	○
	b007	Restart frequency threshold	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	b008	Selection of retry after tripping	00 (tripping), 01 (starting with 0 Hz), 02 (starting with matching frequency), 03 (tripping after deceleration and stopping with matching frequency), 04 (restarting with active matching frequency)	00	×	○
	b009	Selection of retry after undervoltage	00 (16 times), 01 (unlimited)	00	×	○
	b010	Selection of retry count after overvoltage or overcurrent	times 1~3	3	×	○
	b011	Retry wait time after tripping	0.3~100.0(s)	1.0	×	○
Electronic thermal function	b012	Electronic thermal setting (calculated within the inverter from current output)	0.20 x "rated current" to 1.00 x "rated current" (A)	Rated current	×	○
	b212	Electronic thermal setting (calculated within the inverter from current output), 2nd motor	0.20 x "rated current" to 1.00 x "rated current" (A)	Rated current	×	○
	b312	Electronic thermal setting (calculated within the inverter from current output), 3rd motor	0.20 x "rated current" to 1.00 x "rated current" (A)	Rated current	×	○
	b013	Electronic thermal characteristic	00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting)	01	×	○
	b213	Electronic thermal characteristic, 2nd motor	00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting)	01	×	○
	b313	Electronic thermal characteristic, 3rd motor	00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting)	01	×	○
	b015	Free setting, electronic thermal frequency (1)	0.~400.0(Hz)	0.	×	○
	b016	Free setting, electronic thermal current (1)	0.0 to rated current (A)	0.0	×	○
	b017	Free setting, electronic thermal frequency (2)	0.~400.0(Hz)	0.	×	○
	b018	Free setting, electronic thermal current (2)	0.0 to rated current (A)	0.0	×	○
	b019	Free setting, electronic thermal frequency (3)	0.~400.0(Hz)	0.	×	○
	b020	Free setting, electronic thermal current (3)	0.0 to rated current (A)	0.0	×	○

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Overload restriction and overcurrent restraint	b021	Overload restriction operation mode	00 (disabling), 01 (enabling during acceleration and deceleration), 02 (enabling during constant speed), 03 (enabling during acceleration and deceleration (increasing the speed during regeneration)	01	×	○
	b022	Overload restriction setting	0.20 x "rated current" to 1.50 x "rated current" (A)	1.50 (5.5~160kW) × INV rated current 1.20 (185~355kW) × INV rated current	×	○
	b023	Deceleration rate at overload restriction	0.10~30.00(s)	1.00	×	○
	b024	Overload restriction operation mode (2)	00 (disabling), 01 (enabling during acceleration and deceleration), 02 (enabling during constant speed), 03 (enabling during acceleration and deceleration (increasing the speed during regeneration)	01	×	○
	b025	Overload restriction setting (2)	0.20 x "rated current" to 1.50 x "rated current" (A)	1.50 (5.5~160kW) × INV rated current 1.20 (185~355kW) × INV rated current	×	○
	b026	Deceleration rate at overload restriction (2)	0.10~30.00(s)	1.00	×	○
	b027	Overcurrent suppression enable	00 (disabling), 01 (enabling)	01	×	○
	b028	Active frequency matching, scan start frequency	0.20 x "rated current" to 1.50 x "rated current" (A)	1.50 (5.5~160kW) × INV rated current 1.20 (185~355kW) × INV rated current	×	○
	b029	Active frequency matching, scan-time constant	0.10~30.00(s)	0.50	×	○
	b030	Active frequency matching, restart frequency select	00 (frequency at the last shutoff), 01 (maximum frequency), 02 (set frequency)	00	×	○
Software lock	b031	Software lock mode selection	00 (disabling change of data other than "b031" when SFT is on), 01 (disabling change of data other than "b031" and frequency settings when SFT is on), 02 (disabling change of data other than "b031"),03 (disabling change of data other than "b031" and frequency settings), 10 (enabling data changes during operation)	01	×	○
Others	b034	Run/power-on warning time	0.~9999.(0~99990)/1000~6553(10000~655300)(hr)	0.	×	○
	b035	Rotational direction restriction	00 (enabling both forward and reverse rotations), 01 (enabling only forward rotation),02 (enabling only reverse rotation)	00	×	○
	b036	Reduced voltage start selection	0 (minimum reduced voltage start time) to 255 (maximum reduced voltage start time)	6	×	○
	b037	Function code display restriction	00 (full display), 01 (function-specific display), 02 (user setting), 03 (data comparison display), 04 (basic display)	04	×	○
	b038	Initial-screen selection	00 (screen displayed when the STR key was pressed last), 01 (d001), 02 (d002), 03 (d003), 04 (d007), 05 (F001)	01	×	○
	b039	Automatic user-parameter setting function enable	00 (disabling), 01 (enabling)	00	×	○
Torque limitation	b040	Torque limit selection	00 (quadrant-specific setting), 01 (switching by terminal), 02 (analog input), 03 (option 1), 04 (option 2)	00	×	○
	b041	Torque limit 1 (forward-driving in 4-quadrant mode)	0.20 x "rated current" to 1.50 x "rated current" (A)	1.50 (5.5~160kW) × INV rated current 1.20 (185~355kW) × INV rated current	×	○
	b042	Torque limit 2)(reverse-regenerating in 4-quadrant mode)				
	b043	Torque limit 3)(reverse-driving in 4-quadrant mode)				
	b044	Torque limit 4)(forward-regenerating in 4-quadrant mode)				
	b045	Torque limit LADSTOP enable	00 (disabling), 01 (enabling)	00	×	○
Non-stop operation at momentary power failure	b046	Reverse Run protection enable	00 (disabling), 01 (enabling)	00	×	○
	b050	Controller deceleration and stop on power loss	00 (disabling), 01 (nonstop deceleration to stop), 02 (DC voltage constant control, without resume), 03 (with resume)	00	×	×
	b051	DC bus voltage trigger level during power loss	0.0~999.9/1000.(V)	440.0	×	×
	b052	Over-voltage threshold during power loss	0.0~999.9/1000.(V)	720.0	×	×
	b053	Deceleration time setting during power loss	0.01~99.99/100.0~999.9/1000.~3600.(s)	1.00	×	×
	b054	Initial output frequency decrease during power loss	0.00~10.00(Hz)	0.00	×	×
	b055	Proportional gain setting for nonstop operation	0.00~2.55	0.20	○	○
	b056	Integral time setting for nonstop operation	0.000~9.999/10.00~65.53(s)	0.100	○	○
Window comparator	b060	Maximum-limit level of window comparators O	0. to 100. (lower limit : b061 + b062 *2) (%)	100.	○	○
	b061	Minimum-limit level of window comparators O	0. to 100. (lower limit : b060 - b062 * 2) (%)	0.	○	○
	b062	Hysteresis width of window comparators O	0. to 10. (lower limit : b061 - b062 / 2) (%)	0.	○	○
	b063	Maximum-limit level of window comparators OI	0. to 100. (lower limit : b064 + b066 *2) (%)	100.	○	○
	b064	Minimum-limit level of window comparators OI	0. to 100. (lower limit : b063 - b066 *2) (%)	0.	○	○
	b065	Hysteresis width of window comparators OI	0. to 10. (lower limit : b063 - b064 / 2) (%)	0.	○	○
	b066	Maximum-limit level of window comparators OI	-100. to 100. (lower limit : b067 + b068* 2) (%)	100.	○	○
	b067	Minimum-limit level of window comparators O/OI/O2	-100. to 100. (lower limit : b066 - b068 * 2) (%)	-100.	○	○
	b068	Hysteresis width of window comparators O/OI/O2	0. to 10. (lower limit : b066 - b067 / 2) (%)	0.	○	○
	b070	Operation level at O disconnection	0. to 100. (%) or "no" (ignore)	no	×	○
	b071	Operation level at OI disconnection	0. to 100. (%) or "no" (ignore)	no	×	○
	b072	Operation level at O2 disconnection	-100. to 100. (%) or "no" (ignore)	no	×	○
Others	b078	Cumulative input power data clearance	Clearance by setting "01" and pressing the STR key	00	○	○
	b079	Cumulative input power display gain setting	1.~1000.	1.	○	○
	b082	Start frequency adjustment	0.10~9.99(Hz)	0.50	×	○
	b083	Carrier frequency setting	0.5 to 12.0(KHz),(5.5 kw～160kw) ; 0.5 to 3.0(KHz),(185kw～355kw) ,(subject to derating)(Referring to p9)	3.0	×	×
	b084	Initialization mode (parameters or trip history)	00 (clearing the trip history), 01 (initializing the data), 02 (clearing the trip history and initializing the data)	00	×	×
	b085	Country code for initialization	01 (CHINA/EU)	01	×	×
	b086	Frequency scaling conversion factor	0.1~99.0	1.0	○	○
	b087	STOP key enable	00 (enabling), 01 (disabling), 02 (disabling only the function to stop)	00	×	○
	b088	Restart mode after FRS	00 (starting with 0 Hz), 01 (starting with matching frequency), 02 (starting with active matching frequency)	00	×	○
	b089	Automatic carrier frequency reduction	00: invalid, 01: valid	00	×	×
	b090	Dynamic braking usage ratio	0.0 to 100.0 (%)	0.0	×	○
	b091	Stop mode selection	00 (deceleration until stop), 01 (free-run stop)	00	×	○
	b092	Cooling fan control	00 (always operating the fan), 01 (operating the fan only during inverter operation <including 5 minutes after power-on and power-off>)	00	×	○
	b095	Dynamic braking control	00 (disabling), 01 (enabling <disabling while the motor is topped>), 02 (enabling <enabling also while the motor is topped>)	00	×	○
	b096	Dynamic braking activation level	660~760(V)	720	×	○
	b098	Thermistor for thermal protection control	00 (disabling the thermistor), 01 (enabling the thermistor with PTC), 02 (enabling the thermistor with NTC)	00	×	○
	b099	Thermal protection level setting	0.0~9999.(½)	3000.	×	○

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Free setting of V/f characteristic	b100	Free-setting V/f frequency (1)	0. to "free-setting V/f frequency (2)" (Hz)	0.	×	×
	b101	Free-setting V/f voltage (1)	0.0~800.0 (V)	0.0	×	×
	b102	Free-setting V/f frequency (2)	0. to "free-setting V/f frequency (3)" (Hz)	0.	×	×
	b103	Free-setting V/f voltage (2)	0.0~800.0 (V)	0.0	×	×
	b104	Free-setting V/f frequency (3)	0. to "free-setting V/f frequency (4)" (Hz)	0.	×	×
	b105	Free-setting V/f voltage (3)	0.0~800.0 (V)	0.0	×	×
	b106	Free-setting V/f frequency (4)	0. to "free-setting V/f frequency (5)" (Hz)	0.	×	×
	b107	Free-setting V/f voltage (4)	0.0~800.0 (V)	0.0	×	×
	b108	Free-setting V/f frequency (5)	0. to "free-setting V/f frequency (6)" (Hz)	0.	×	×
	b109	Free-setting V/f voltage (5)	0.0~800.0 (V)	0.0	×	×
	b110	Free-setting V/f frequency (6)	0. to "free-setting V/f frequency (7)" (Hz)	0.	×	×
	b111	Free-setting V/f voltage (6)	0.0~800.0 (V)	0.0	×	×
	b112	Free-setting V/f frequency (7)	0.~400.(Hz)	0.	×	×
	b113	Free-setting V/f voltage (7)	0.0~800.0 (V)	0.0	×	×
Others	b120	Brake Control Enable	00 (disabling), 01 (enabling)	00	×	○
	b121	Brake Wait Time for Release	0.00~5.00(s)	0.00	×	○
	b122	Brake Wait Time for Acceleration	0.00~5.00(s)	0.00	×	○
	b123	Brake Wait Time for Stopping	0.00~5.00(s)	0.00	×	○
	b124	Brake Wait Time for Confirmation	0.00~5.00(s)	0.00	×	×
	b125	Brake Release Frequency Setting	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	b126	Brake Release Current Setting	0.0 to 1.50 x "rated current"	INV rated current	×	○
	b127	Braking frequency	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	b130	Overvoltage suppression enable	00 (disabling the restraint), 01 (controlled deceleration), 02 (enabling acceleration)	00	×	○
	b131	Overvoltage suppression level	660 to 780 (V) (400 V class model)	760	×	○
	b132	Acceleration and deceleration rate at overvoltage suppression	0.10~30.00(s)	1.00	×	○
	b133	Overvoltage suppression propotional gain	0.00~2.55	0.50	○	○
	b134	Overvoltage suppression Integral time	0.000~9.999/10.00~65.53(s)	0.060	○	○

● C Group:Intellect Terminal Functions

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Intelligent input terminals	C001	Terminal [1] function (*3)	01 (RV: Reverse RUN), 02 (CF1: Multispeed 1 setting), 03 (CF2: Multispeed 2 setting), 04 (CF3: Multispeed 3 setting), 05 (CF4: Multispeed 4 setting), 06 (JG: Jogging), 07 (DB: external DC braking), 08 (SET: Set 2nd motor data), 09 (2CH: 2-stage acceleration/deceleration), 11 (FRS: free-run stop), 12 (EXT: external trip), 13 (USP: unattended start protection), 14: (CS: commercial power source enable), 15 (SFT: software lock), 16 (AT: analog input voltage/current select), 17 (SET3: 3rd motor control), 18 (RS: reset), 20 (STA: starting by 3-wire input), 21 (STP: stopping by 3-wire input), 22 (F/R: forward/reverse switching by 3-wire input), 23 (PID: PID disable), 24 (PIDC: PID reset), 26 (CAS: control gain setting), 27 (UP: remote control UP function), 28 (DWN: remote control DOWN function), 29 (DWN: remote control data clearing), 31 (OPE: forcible operation), 32 (SF1: multispeed bit 1), 33 (SF2: multispeed bit 2), 34 (SF3: multispeed bit 3), 35 (SF4: multispeed bit 4), 36 (SF5: multispeed bit 5), 37 (SF6: multispeed bit 6), 38 (SF7: multispeed bit 7), 39 (OLR: overload restriction selection), 40 (TL: torque limit enable), 41 (TRQ1: torque limit selection bit 1), 42 (TRQ2: torque limit selection bit 2), 43 (PPI: P/PI mode selection), 44 (BOK: braking confirmation), 45 (ORT: orientation), 46 (LAC: LAD cancellation), 47 (PCLR: clearance of position deviation), 48 (STAT: pulse train position command input enable), 50 (ADD: trigger for frequency addition [A145]), 51 (F-TM: forcible-terminal operation), 52 (ATR: permission of torque command input), 53 (KHC: cumulative power clearance), 54 (SON: servo-on), 55 (FOC: forcing), 56 (MI1: general-purpose input 1), 57 (MI2: general-purpose input 2), 58 (MI3: general-purpose input 3), 59 (MI4: general-purpose input 4), 60 (MI5: general-purpose input 5), 61 (MI6: general-purpose input 6), 62 (MI7: general-purpose input 7), 63 (MI8: general-purpose input 8), 65 (AHD: analog command holding), 66 (CP1: multistage position settings selection 1), 67 (CP2: multistage position settings selection 2), 68 (CP3: multistage position settings selection 3), 69 (ORL: Zero-return limit function), 70 (ORG: Zero-return trigger function), 71 (FOT: forward drive stop), 72 (ROT: reverse drive stop), 73 (SPD: speed / position switching), 74 (PCNT: pulse counter), 75 (PCC: pulse counter clear), no (NO: no assignment)	18 *3)	×	○
	C002	Terminal [2] function		16	×	○
	C003	Terminal [3] function (*3)		06 *3)	×	○
	C004	Terminal [4] function		11	×	○
	C005	Terminal [5] function		09	×	○
	C006	Terminal [6] function		03	×	○
	C007	Terminal [7] function		02	×	○
	C008	Terminal [8] function		01	×	○
	C011 ~ C018	Terminal [1]-[8] active state	00(NO)/ 01(NC)	00	×	○
	C019	Terminal [FW] active state	00(NO)/ 01(NC)	00	×	○
Intelligent output terminals	C021	Terminal [11] function	00 (RUN: running), 01 (FA1: constant-speed reached), 02 (FA2: set frequency overreached), 03 (OL: overload notice advance signal (1)), 04 (OD: output deviation for PID control), 05 (AL: alarm signal), 06 (FA3: set frequency reached), 07 (OTQ: over-torque), 08 (IP: instantaneous power failure), 09 (UV: undervoltage), 10 (TRQ: torque limited), 11 (RNT: operation time over), 12 (ONT: plug-in time over), 13 (THM: thermal alarm signal), 19 (BRK: brake release), 20 (BER: braking error), 21 (ZS: 0 Hz detection signal), 22 (DSE: speed deviation maximum), 23 (POK: positioning completed), 24 (FA4: set frequency overreached 2), 25 (FA5: set frequency reached 2), 26 (OL2: overload notice advance signal (2)), 27 (Odc: Analog O disconnection detection), 28 (OIDc: Analog OI disconnection detection), 29 (O2Dc: Analog O2 disconnection detection), 31 (FBV: PID feedback comparison), 32 (NDc: communication line disconnection), 33 (LOG1: logical operation result 1), 34 (LOG2: logical operation result 2), 35 (LOG3: logical operation result 3), 36 (LOG4: logical operation result 4), 37 (LOG5: logical operation result 5), 38 (LOG6: logical operation result 6), 39 (WAC: capacitor life warning), 40 (WAF: cooling-fan speed drop), 41 (FR: starting contact signal), 42 (OHF: heat sink overheat warning), 43 (LOC: low-current indication signal), 44 (M01: general-purpose output 1), 45 (M02: general-purpose output 2), 46 (M03: general-purpose output 3), 47 (M04: general-purpose output 4), 48 (M05: general-purpose output 5), 49 (M06: general-purpose output 6), 50 (IRDY: inverter ready), 51 (FWR: forward rotation), 52 (RVR: reverse rotation), 53 (MJA: major failure), 54(WCO: window comparator O), 55(WCOI: window comparator OI), 56 (WCO2: window comparator O2) (When alarm code output is selected for "C062", functions "AC0" to "AC2" or "AC0" to "AC3" [ACn: alarm code output] are forcibly assigned to intelligent output terminals 11 to 13 or 11 to 14, respectively.)	01	×	○
	C022	Terminal [12] function		00	×	○
	C023	Terminal [13] function		03	×	○
	C024	Terminal [14] function		07	×	○
	C025	Terminal [15] function		40	×	○
	C026	Alarm relay terminal function		05	×	○

*3) When the emergency stop function is enabled (SW1 = ON), "18" (RS) and "64" (EMR) are forcibly written to parameters "C001" and "C003", respectively. (You cannot arbitrarily write "64" to "C001".) If the SW1 signal is turned off and then turned on, "no" (no assignment) is set in parameter "C003".

	Code	Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Analog monitoring	C027	[FM] siginal selection	00 (output frequency), 01 (output current), 02 (output torque), 03 (digital output frequency), 04 (output voltage), 05 (input power), 06 (electronic thermal overload), 07 (LAD frequency), 08 (digital current monitoring), 09 (motor temperature), 10 (heat sink temperature), 12 (general-purpose output YA0)	00	×	○
	C028	[AM] siginal selection	00 (output frequency), 01 (output current), 02 (output torque), 04 (output voltage), 05 (input power), 06 (electronic thermal overload), 07 (LAD frequency), 09 (motor temperature), 10 (heat sink temperature), 11 (output torque [signed value]), 13 (general-purpose output YA1)	00	×	○
	C029	[AMI] siginal selection	00 (output frequency), 01 (output current), 02 (output torque), 04 (output voltage), 05 (input power), 06 (electronic thermal overload), 07 (LAD frequency), 09 (motor temperature), 10 (heat sink temperature), 14 (general-purpose output YA2)	00	×	○
	C030	Digital current monitor reference value	0.20 x "rated current" to 1.50 x "rated current" (A) (Current with digital current monitor output at 1,440 Hz)	INV rated current	○	○
Intelligent output terminals	C031 ~ C035	Terminal [11]~[15] active state	00 (NO) / 01 (NC)	00	×	○
	C036	Alarm relay active state	00 (NO) / 01 (NC)	01	×	○
Levels and output terminal status	C038	Low-current indication signal output mode selection	00 (output during acceleration/deceleration and constant-speed operation), 01 (output only during constant-speed operation)	01	×	○
	C039	Low-current indication signal detection level	0. 00 to 1.50 x "rated current" (A)	INV rated current	○	○
	C040	Overload signal output mode	00 (output during acceleration/deceleration and constant-speed operation), 01 (output only during constant-speed operation)	01	×	○
	C041	Overload level setting	0.00 to 1.50 x "rated current" (A)	INV rated current	○	○
	C042	Frequency arrival setting for accel.	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	C043	Frequency arrival setting for decel.	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	C044	PID deviation level setting	0.0~100.0(%)	3.0	×	○
	C045	Frequency arrival setting for acceleration (2)	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	C046	Frequency arrival setting for deceleration (2)	0.00~99.99/100.0~400.0(Hz)	0.00	×	○
	C052	Maximum PID feedback data	0.0~100.0(%)	100.	×	○
	C053	Minimum PID feedback data	0.0~100.0(%)	0.0	×	○
	C055	Over-torque (forward-driving) level setting	0.~150.(%)	100.	×	○
	C056	Over-torque (reverse regenerating) level setting	0.~150.(%)	100.	×	○
	C057	Over-torque (reverse driving) level setting	0.~150.(%)	100.	×	○
	C058	Over-torque (forward regenerating) level setting	0.~150.(%)	100.	×	○
	C061	Electronic thermal warning level setting	0.~100.(%)	80.	×	○
	C062	Alarm code output	00 (disabling), 01 (3 bits), 02 (4 bits)	00	×	○
	C063	Zero speed detection level	0.00~99.99/100.0(Hz)	0.00	×	○
	C064	Heat sink overheat warning level	0.~200.(℃)	120.0	×	○
Communication function	C071	Communication speed selection	02 (loopback test), 03 (2,400 bps), 04 (4,800 bps), 05 (9,600 bps), 06 (19,200 bps)	04	×	○
	C072	Node allocation	1.~32.	1.	×	○
	C073	Communication data length selection	7 (7 bits), 8 (8 bits)	7	×	○
	C074	Communication parity selection	00 (no parity), 01 (even parity), 02 (odd parity)	00	×	○
	C075	Communication stop bit selection	1 (1 bit), 2 (2 bits)	1	×	○
	C076	Selection of the operation after communication error	00 (tripping), 01 (tripping after decelerating and stopping the motor), 02 (ignoring errors), 03 (stopping the motor after free-running), 04 (decelerating and stopping the motor)	02	×	○
	C077	Communication timeout limit before tripping	0.00~99.99(s)	0.00	×	○
	C078	Communication wait time	0.0~1000.(ms)	0.	×	○
	C079	Communication mode selection	00(ASCII)/ 01(Modbus-RTU)	00	×	○
Adjustment	C081	[O] input span calibration	0.~ 9999./1000~ 6553(10000~ 65530)	Factory setting	○	○
	C082	[OI] input span calibration	0.~ 9999./1000~ 6553(10000~ 65530)	Factory setting	○	○
	C083	[O2] input span calibration	0.~9999./1000~6553(10000~65530)	Factory setting	○	○
	C085	Thermistor input tuning	0.0~999.9/1000.	Factory setting	○	○
	C091	Debug mode enable	(Do not change this parameter, which is intended for factory adjustment.)	00	×	×
Others	C101	Up/Down memory mode selection	00 (not storing the frequency data), 01 (storing the frequency data)	00	×	○
	C102	Reset mode selection	00 (resetting the trip when RS is on), 01 (resetting the trip when RS is off), 02 (enabling resetting only upon tripping [resetting when RS is on]), 03(resetting only trip)	00	○	○
	C103	Restart mode after reset	00 (starting with 0 Hz), 01 (starting with matching frequency), 02 (restarting with active matching frequency)	00	×	○
Meter adjustment	C105	FM gain adjustment	50.~200.(%)	100.	○	○
	C106	AM gain adjustment	50.~200.(%)	100.	○	○
	C107	AMI gain adjustment	50.~200.(%)	100.	○	○
	C109	AM bias adjustment	0.~100.(%)	0.	○	○
	C110	AMI bias adjustment	0.~100.(%)	20.	○	○
	C111	Overload setting (2)	0.00 to 1.50 x "rated current" (A)	INV rated current	○	○
	C121	[O] input zero calibration	0.~ 9999./1000~ 6553(10000~ 65530)	Factory setting	○	○
	C122	[OI] input zero calibration	0.~ 9999./1000~ 6553(10000~ 65530)	Factory setting	○	○
	C123	[O2] input zero calibration	0.~9999./1000~6553(10000~65530)	Factory setting	○	○
Output terminal operation function	C130	Output 11 on-delay time	0.0~100.0(s)	0.0	×	○
	C131	Output 11 off-delay time	0.0~100.0(s)	0.0	×	○
	C132	Output 12 on-delay time	0.0~100.0(s)	0.0	×	○
	C133	Output 12 off-delay time	0.0~100.0(s)	0.0	×	○
	C134	Output 13 on-delay time	0.0~100.0(s)	0.0	×	○
	C135	Output 13 off-delay time	0.0~100.0(s)	0.0	×	○
	C136	Output 14 on-delay time	0.0~100.0(s)	0.0	×	○
	C137	Output 14 off-delay time	0.0~100.0(s)	0.0	×	○
	C138	Output 15 on-delay time	0.0~100.0(s)	0.0	×	○
	C139	Output 15 off-delay time	0.0~100.0(s)	0.0	×	○
	C140	Output RY on-delay time	0.0~100.0(s)	0.0	×	○
	C141	Output RY off-delay time	0.0~100.0(s)	0.0	×	○
	C142	Logical output signal 1 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C143	Logical output signal 1 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C144	Logical output signal 1 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
	C145	Logical output signal 2 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Output terminal operation function	C146	Logical output signal 2 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C147	Logical output signal 2 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
	C148	Logical output signal 3 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C149	Logical output signal 3 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C150	Logical output signal 3 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
	C151	Logical output signal 4 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C152	Logical output signal 4 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C153	Logical output signal 4 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
	C154	Logical output signal 5 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C155	Logical output signal 5 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C156	Logical output signal 5 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
	C157	Logical output signal 6 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C158	Logical output signal 6 selection 2	Same as the settings of C021 to C026 (except those of LOG1 to LOG6)	00	×	○
	C159	Logical output signal 6 operator selection	00(AND)/ 01(OR)/ 02(XOR)	00	×	○
Input terminal response	C160	Input terminal response time setting 1	0.~200.(× 2ms)	1	×	○
	C161	Input terminal response time setting 2	0.~200.(× 2ms)	1	×	○
	C162	Input terminal response time setting 3	0.~200.(× 2ms)	1	×	○
	C163	Input terminal response time setting 4	0.~200.(× 2ms)	1	×	○
	C164	Input terminal response time setting 5	0.~200.(× 2ms)	1	×	○
	C165	Input terminal response time setting 6	0.~200.(× 2ms)	1	×	○
	C166	Input terminal response time setting 7	0.~200.(× 2ms)	1	×	○
	C167	Input terminal response time setting 8	0.~200.(× 2ms)	1	×	○
	C168	Input terminal response time setting FW	0.~200.(× 2ms)	1	×	○
Other	C169	Multistage speed/position determination time	0.~200.(× 10ms)	0	×	○

● H Group:Motor Constants Functions

Code		Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Control constants	H001	Auto-tuning Setting	00 (disabling auto-tuning), 01 (auto-tuning without rotation), 02 (auto-tuning with rotation)	00	×	×
	H002	Motor data selection, 1st motor	00 (Hitachi standard data), 01 (auto-tuned data), 02 (auto-tuned data [with online auto-tuning function])	00	×	×
	H202	Motor data selection, 2nd motor	00 (Hitachi standard data), 01 (auto-tuned data),	00	×	×
	H003	Motor capacity, 1st motor	5.5~355(kW)	Factory setting	×	×
	H203	Motor capacity, 2nd motor	5.5~355(kW)	Factory setting	×	×
	H004	Motor poles setting, 1st motor	2, 4, 6, 8, 10 (poles)	4	×	×
	H204	Motor poles setting, 2nd motor	2, 4, 6, 8, 10 (poles)	4	×	×
	H005	Motor speed constant, 1st motor	0.001~9.999/10.00~80.00(10.000~80.000)	1.590	○	○
	H205	Motor speed constant, 2nd motor	0.001~9.999/10.00~80.00(10.000~80.000)	1.590	○	○
	H006	Motor stabilization constant, 1st motor	0.~255.	100.	○	○
	H206	Motor stabilization constant, 2nd motor	0.~255.	100.	○	○
	H306	Motor stabilization constant, 3rd motor	0.~255.	100.	○	○
	H020	Motor constant R1, 1st motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H220	Motor constant R1, 2nd motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H021	Motor constant R2, 1st motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H221	Motor constant R2, 2nd motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H022	Motor constant L, 1st motor	0.00~99.99/100.0~655.3(mH)	(*5)	×	×
	H222	Motor constant L, 2nd motor	0.00~99.99/100.0~655.3(mH)	(*5)	×	×
	H023	Motor constant Io	0.00~99.99/100.0~655.3(A)	(*5)	×	×
	H223	Motor constant Io, 2nd motor	0.00~99.99/100.0~655.3(A)	(*5)	×	×
	H024	Motor constant J	0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.	(*5)	×	×
	H224	Motor constant J, 2nd motor	0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.	(*5)	×	×
	H030	Auto constant R1, 1st motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H230	Auto constant R1, 2nd motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H031	Auto constant R2, 1st motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H231	Auto constant R2, 2nd motor	0.001~9.999/10.00~65.53(Ω)	(*5)	×	×
	H032	Auto constant L, 1st motor	0.00~99.99/100.0~655.3(mH)	(*5)	×	×
	H232	Auto constant L, 2nd motor	0.00~99.99/100.0~655.3(mH)	(*5)	×	×
	H033	Auto constant Io, 1st motor	0.00~99.99/100.0~655.3(A)	(*5)	×	×
	H233	Auto constant Io, 2nd motor	0.00~99.99/100.0~655.3(A)	(*5)	×	×
	H034	Auto constant J, 1st motor	0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.	(*5)	×	×
	H234	Auto constant J, 2nd motor	0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.	(*5)	×	×
	H050	PI proportional gain for 1st motor	0.0~999.9/1000.	100.	○	○
	H250	PI proportional gain for 2nd motor	0.0~999.9/1000.	100.	○	○
	H051	PI integral gain for 1st motor	0.0~999.9/1000.	100.	○	○
	H251	PI integral gain for 2nd motor	0.0~999.9/1000.	100.	○	○
	H052	P proportional gain setting for 1st motor	0.01~10.00	1.00	○	○
	H252	P proportional gain setting for 2nd motor	0.01~10.00	1.00	○	○
	H060	Zero LV Imit for 1st motor	0.0~70.0	70.	○	○
	H260	Zero LV Imit for 2nd motor	0.0~70.0	70.	○	○
	H061	Zero LV starting boost current for 1st motor	0.~50.(%)	50.	○	○
	H261	Zero LV starting boost current for 2nd motor	0.~50.(%)	50.	○	○
	H070	Terminal selection PI proportional gain setting	0.0~999.9/1000.	100.	○	○
	H071	Terminal selection PI integral gain setting	0.0~999.9/1000.	100.	○	○
	H072	Terminal selection P proportional gain setting	0.00~10.00	1.0	○	○
	H073	Gain switching time	0.~9999.(ms)	100.	○	○

● P Group: Expansion Card Functions

	Code	Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Optional functions	P001	Operation mode on expansion card 1 error	00 (tripping), 01 (continuing operation)	00	×	○
	P002	Operation mode on expansion card 2 error	00 (tripping), 01 (continuing operation)	00	×	○
	P011	Encoder pulse-per-revolution (PPR) setting	128. to 9999., 1000 to 6553(10000 to 65535) (pulses)	1024.	×	×
	P012	Control pulse setting	00 (ASR), 01 (APR), 02 (APR2), 03 (HAPR)	00	×	×
	P013	Pulse train mode setting	00 (mode 0), 01 (mode 1), 02 (mode 2)	00	×	×
	P014	Home search stop position setting	0.~4095.	0.	×	○
	P015	Home search speed setting	"start frequency" to "maximum frequency" (up to 120.0) (Hz)	5.00	×	○
	P016	Home search direction setting	00 (forward), 01 (reverse)	00	×	×
	P017	Home search completion range setting	0. to 9999., 1000 (10000) (pulses)	5.	×	○
	P018	Home search completion delay time setting	0.00~9.99(s)	0.00	×	○
	P019	Electronic gear set position selection	00 (feedback side), 01 (commanding side)	00	×	○
	P020	Electronic gear ratio numerator setting	1.~9999.	1.	○	○
	P021	Electronic gear ratio numerator setting	1.~9999.	1.	○	○
	P022	Feed-forward gain setting	0.00~99.99/100.0~655.3	0.00	○	○
	P023	Position loop gain setting	0.00~99.99/100.0	0.50	○	○
	P024	Position bias setting	-204(-2048.)/-999.~2048.	0.	○	○
	P025	Temperature compensation thermistor enable	00 (no compensation), 01 (compensation)	00	×	○
	P026	Over-speed error detection level setting	0.0~150.0(%)	135.0	×	○
	P027	Speed deviation error detection level setting	0.00~99.99/100.0~120.0(Hz)	7.50	×	○
	P028	Numerator of motor gear ratio	1.~9999.	1.	×	○
	P029	Denominator of motor gear ratio	1.~9999.	1.	×	○
	P031	Accel/decel time input selection	00 (digital operator), 01 (option 1), 02 (option 2), 03 (easy sequence)	00	×	×
	P032	Positioning command input selection	00 (digital operator), 01 (option 1), 02 (option 2), 03 (easy sequence)	00	×	○
	P033	Torque command input selection	00 (O terminal), 01 (OI terminal), 02 (O2 terminal), 03 (digital operator)	00	×	×
	P034	Torque command setting	0.~150.(%)	0.	○	○
	P035	Polarity selection at the torque command input via O2 terminal	00 (as indicated by the sign), 01 (depending on the operation direction)	00	×	×
	P036	Torque bias mode	00 (disabling the mode), 01 (digital operator), 02 (input via O2 terminal)	00	×	×
	P037	Torque bias value	-150.~+150.(%)	0.	○	○
	P038	Torque bias polarity selection	00 (as indicated by the sign), 01 (depending on the operation direction)	00	×	×
	P039	Speed limit for torque-controlled operation (forward rotation)	0.00 to "maximum frequency" (Hz)	0.00	○	○
	P040	Speed limit for torque-controlled operation (reverse rotation)	0.00 to "maximum frequency" (Hz)	0.00	○	○
	P044	DeviceNet comm watchdog timer	0.00~99.99(s)	1.00	×	×
	P045	Inverter action on DeviceNet comm error	00 (tripping), 01 (tripping after decelerating and stopping the motor), 02 (ignoring errors), 03 (stopping the motor after free-running), 04 (decelerating and stopping the motor)	01	×	×
	P046	DeviceNet polled I/O: Output instance number	20/21/100	21	×	×
	P047	DeviceNet polled I/O: Input instance number	70/71/101	71	×	×
	P048	Inverter action on DeviceNet idle mode	00 (tripping), 01 (tripping after decelerating and stopping the motor), 02 (ignoring errors), 03 (stopping the motor after free-running), 04 (decelerating and stopping the motor)	01	×	×
	P049	DeviceNet motor poles setting for RPM	0/2/4/6/8/10/12/14/16/18/20/22/24/26/28/30/32/34/36/38	0	×	×
	P055	Pulse-string frequency scale	1.0~50.0(kHz)	25.0	×	○
	P056	Time constant of pulse-string frequency filter	0.01~2.00(s)	0.10	×	○
	P057	Pulse-string frequency bias	-100.~+100.(%)	0.	×	○
	P058	Pulse-string frequency limit	0.~100.(%)	100.	×	○
Absolute position control	P060	Multistage position setting 0	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P061	Multistage position setting 1	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P062	Multistage position setting 2	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P063	Multistage position setting 3	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P064	Multistage position setting 4	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P065	Multistage position setting 5	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P066	Multistage position setting 6	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P067	Multistage position setting 7	Position setting range reverse side to forward side (upper 4 digits including "-")	0	○	○
	P068	Zero-return mode selection	00(Low)/ 01(Hi1)/ 02(Hi2)	00	○	○
	P069	Zero-return direction selection	00(FW)/ 01(RV)	00	○	○
	P070	Low-speed zero-return frequency	0.00~10.00(Hz)	0.00	○	○
	P071	High-speed zero-return frequency	0.00 to 99.99 / 100.0 to Maximum frequency setting, 1st motor (Hz)	0.00	○	○
	P072	Position range specification (forward)	0 to +268435455 (when P012 = 02) 0 to +1073741823 (when P012 = 03) (upper 4 digits)	268435455	○	○
	P073	Position range specification (reverse)	0 to +268435455 (when P012 = 02) 0 to +1073741823 (when P012 = 03) (upper 4 digits)	-268435455	○	○
	P074	Teaching selection	00(X00)/ 01(X01)/ 02(X02)/ 03(X03)/ 04(X04)/ 05(X05)/ 06(X06)/ 07(X07)	00	○	○
Easy sequence function	P100 ~ P131	Easy sequence user parameter U(00)~U(31)	0.~9999./1000~6553(10000~65535)	0.	○	○

(*5) Depanding on the motor capacity

● U Group: User-selected Menu Funcions

	Code	Function name	Monitored data or setting	Default	Setting during operation (allowed or not)	Change during operation (allowed or not)
Parameters for Users	U001 ~ U012	User-selected function 1~12	no/d001~P131	no	○	○

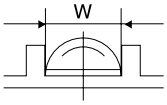
Terminals

(1) Main Circuit Terminals

●Terminal Description

Terminal Symbol	Terminal Name	Functions
R(L1),S(L2),T(L3)	Main power supply input terminals	Connecting the power supply
U(T1),V(T2),W(T3)	Inverter output terminals	Connecting the motor
PD(+1),P(+)	DC reactor connection terminals	Connecting DC reactor
P(+),RB(RB)	External braking resistor connection terminals	Connecting braking resistor
P(+),N(-)	External braking unit connection terminals	Connecting braking unit
⏚ (G)	Ground connection terminal	Connecting the ground(avoiding electric shock, eliminating noise)
R0(R0),T0(T0)	Control power supply input terminals	Connecting the control power supply

● Screw Diameter and Terminal Width



W:Terminal width

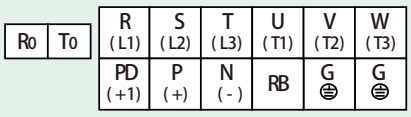
Model	Screw diameter	Ground Screw	Terminal width (mm)
055HF	M4	M4	13
075-110HFF	M5	M5	17.5
150HFF	M6	M5	17.5
185-370HFF	M6	M6	23
450-750HFF	M8	M8	29
900,1100HFF	M10	M8	29
1320,1600HFF,	M10	M8	40
1850HF	M10	M8	40
2200,2600HF	M16	M12	36.5
3150HF	M12	M12	42
3550HF	M16	M12	45
R0T0 terminals (All models)	M4	M14	9

Note 1)

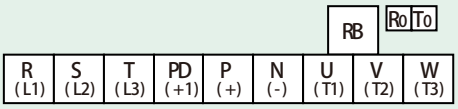
(*1) When connected with bare wire instead of press wire, please use the washers provided in the product package.

●Terminal Arrangement

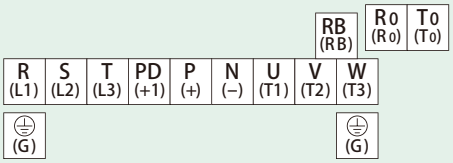
· NJ600B-055HF



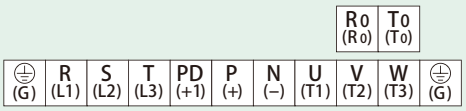
·NJ600B-075,110,150HFF



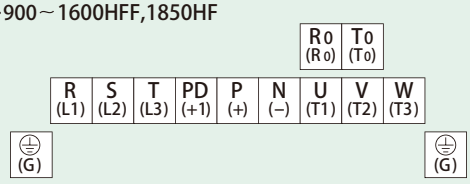
·185～300HFF



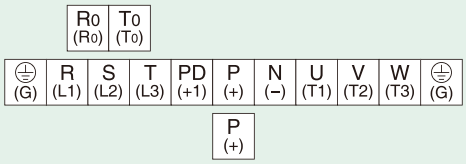
·370～750HFF



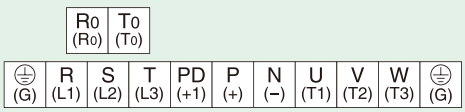
·900～1600HFF,1850HF



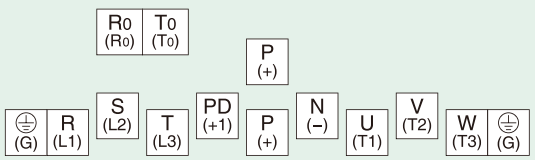
· 2200,2600HF



·3150HF

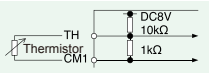


· 3550HF



(2) Control Circuit Terminals

●Terminal Description

			Symbol	Name	Explanation of Terminals	Ratings
Analog	Power Supply		L	Common Terminal for Analog Power Source	Common terminal for H, O, O2, OI, AM, and AMI. Do not ground.	—
			H	Power Source for Frequency Setting	Power supply for frequency command input	DC 10V, 20mA max.
	Frequency Setting		O	Frequency Command Terminal(Voltage)	Maximum frequency is attained at DC 10V in DC 0-10V range. Set the voltage at A014 to command maximum frequency below DC 10V.	Input impedance: 10kΩ, Allowable input voltage range: DC -0.3-+12V
			O2	Frequency Command Extra Terminal	O2 signal is added to the frequency command of O or OI in DC 0-±10V range. By changing configuration, frequency command can be input also at O2 terminal.	Input impedance:10kΩ, Allowable input voltage range: DC 0-±12V
			OI	Frequency Command Terminal (Current)	Maximum frequency is attained at DC 20mA in DC 4-20mA range. When the intelligent terminal configured as AT is on, OI signal is enabled.	Input impedance: 100Ω, Allowable input voltage range: DC 0-24mA
	Monitor Output		AM	Analog Output Monitor (Voltage)	Selection of one function from: Output frequency, output current, torque, output voltage, input power, electronic thermal load ratio, and LAD frequency, motor temperature, heat sink temperature, common output terminals.	DC 0-10V, 2mA max.
			AMI	Analog Output Monitor (Current)		DC 4-20mA, 250Ω max.
Digital	Monitor Output		FM	Digital Monitor (Voltage)	[DC0-10V output (PWM output)] Selection of one function from: Output frequency, output current, torque, output voltage, input power, electronic thermal load ratio, and LAD frequency, motor temperature, heat sink temperature, common output terminals. [Digital pulse output (Pulse voltage DC 0/10V)] Outputs the value of output frequency as digital pulse (duty 50%)	Digital output frequency range: 0-3.6kHz, 1.2mA max.
	Power Supply		P24	Power Terminal for Interface	Internal power supply for input terminals. In the case of source type logic, common terminal for contact input terminals.	DC 24V, 100mA max.
			CM1	Common Terminal for Interface	Common terminal for P24, TH, and FM. In the case of sink type logic, common terminal for contact input terminals. Do not ground.	—
	Contact Input	Run Command	FW	Forward Command Input	The motor runs forward when FW terminal is ON, and stops when FW is OFF.	[Input ON condition] Voltage between each terminal and PLC: DC 18V min. [Input OFF condition] Voltage between each terminal and PLC: DC 3V max. Input impedance between each terminal and PLC: 4.7Ω Allowable maximum voltage between each terminal and PLC: DC 27V
		Functions	1 5 2 6 3 7 4 8	Intelligent Input Terminals	Assign 8 functions to terminals. □Terminal 1 and 3 is for urgent stop,	
		Common Terminal	PLC	Common Terminal for Intelligent Input Terminals	Select sink or source logic with the short-circuit bar on the control terminals. Sink logic: Short P24 to PLC / Source logic: Short CM1 to PLC. When applying external power source, remove the short-circuit bar and connect PLC terminal to the external device.	
	Open Collector Output	Status	11 12 13 14 15	Intelligent Output Terminals	Assign 5 functions to open collector outputs. When the alarm code is selected at C062, terminal 11-13 or 11-14 are reserved for error codes of inverter trip. (Refer to the standard specifications for the functions.) Both sink and source logic are always applicable between each terminal and CM1.	Decrease in voltage between each terminal and CM2: 4V max. during ON Allowable maximum voltage: DC 27V Allowable maximum current: 50mA
			CM2	Common Terminal for Intelligent Output Terminals	Common terminal for intelligent output terminal 11-15.	
Analog	Analog Input	Sensor	TH	Thermistor Input Terminals	The inverter trips when the external thermistor detects abnormal temperature. Common terminal is CM1. [Recommended thermistor characteristics] Allowable rated power: 100mW or over. Impedance in the case of abnormal temperature: 3kΩ Note: Thermal protection level can be set between 0 and 9999Ω.	Allowable input voltage range:PC 0~8V 
Digital	Relay Output	State/Alarm	AL0 AL1 AL2	Alarm Output Terminals	In default setting, an alarm is activated when inverter output is turned off by a protective function.	Maximum capacity of relays AL1-AL0: AC 250V, 2A(R load)/0.2A(L load) AL2-AL0:AC 250V, 1A(R load)/0.2A(L load) Minimum capacity of relays AC100V, 10mA DC5V, 100mA

●Terminal Arrangement

H	O2	AM	FM	TH	FW	8	CM1	5	3	1	14	13	11	AL1
L	O	OI	AM1	P24	PLC	CM1	7	6	4	2	15	CM2	12	AL0	AL2

Screw diameter:M3 Terminal Width:6.4mm

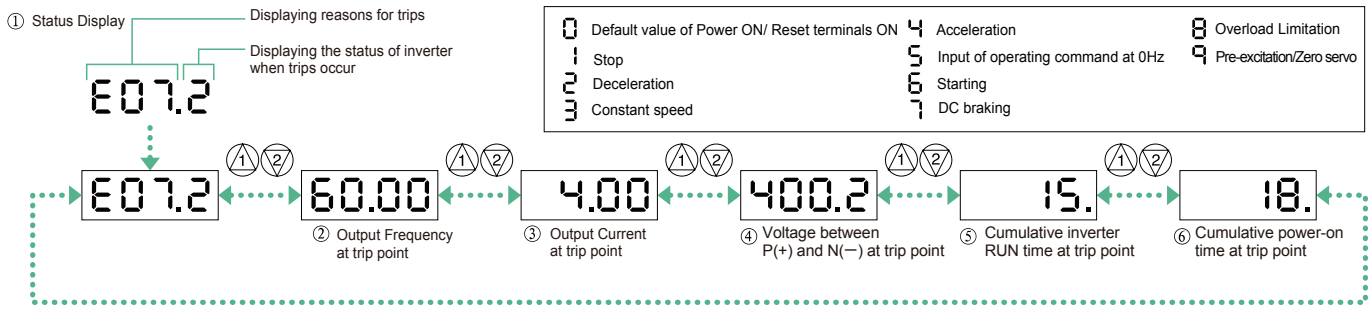
Protective Function

● Error Codes

Name	Cause(s)		Display on digital operator	Display on remote operator/copy unit ERR1****
Over-current protection	The inverter output was short-circuited, or the motor shaft is locked or has a heavy load. These conditions cause excessive current for the inverter, so the inverter output is turned off.	While at constant speed	E01	OC.Drive
		During deceleration	E02	OC.Decel
		During acceleration	E03	OC.Accel
		Others	E04	Over.C
Overload protection(*1)	When a motor overload is detected by the electronic thermal function, the inverter trips and turns off its output.		E05	Over.L
Braking resistor overload protection	When the regenerative braking resistor exceeds the usage time allowance or an over-voltage caused by the stop of the BRD function is detected, the inverter trips and turns off its output.		E06	OL.BRD
Over-voltage protection	When the DC bus voltage exceeds a threshold, due to regenerative energy from the motor, the inverter trips and turns off its output.		E07	Over.V
EEPROM error(*2)	When the built-in EEPROM memory has problems due to noise or excessive temperature, the inverter trips and turns off its output.		E08	EEPROM
Under-voltage error	A decrease of internal DC bus voltage below a threshold results in a control circuit fault. This condition can also generate excessive motor heat or cause low torque. The inverter trips and turns off its output.		E09	Under.V
CT(Current transformer) error	If a strong source of electrical interference is close to the inverter or abnormal operations occur in the built-in CT, the inverter trips and turns off its output.		E10	CT
CPU error	When a malfunction in the built-in CPU has occurred, the inverter trips and turns off its output.		E11	CPU
External trip	When a signal to an intelligent input terminal configured as EXT has occurred, the inverter trips and turns off its output.		E12	EXTERNAL
USP error	An error occurs when power is cycled while the inverter is in RUN mode if the Unattended Start Protection (USP) is enabled. The inverter trips and does not go into RUN mode until the error is cleared.		E13	USP
Ground fault	The inverter is protected by the detection of ground faults between the inverter output and the motor during power-up tests. This feature protects the inverter only.		E14	GND.Flt.
Input over-voltage protection	When the input voltage is higher than the specified value, it is detected 60 seconds after power-up and the inverter trips and turns of its output.		E15	OV.SRC
Instantaneous power failure	When power is cut for more than 15ms, the inverter trips and turns off its output. If power failure continues, the error will be cleared. The inverter restarts if it is in RUN mode when power is cycled.		E16	Inst.P-F
Temperature error due to low cooling-fan speed	The inverter will display the error code shown on the right if the lowering of cooling-fan speed is detected at the occurrence of the temperature error described below.		E20	OH.stFAN
Inverter thermal trip	When the inverter internal temperature is higher than the specified value, the thermal sensor in the inverter module detects the higher temperature of the power devices and trips, turning off the inverter output.		E21	OH FIN
Gate array error	Communication error has occurred between CPU and gate array.		E23	GA.COM
Phase loss detection	One of three lines of 3-phase power supply is missing.		E24	PH.Fail
Main circuit error (*3)	The inverter will trip if the gate array cannot confirm the on/off state of IGBT because of a malfunction due to noise or damage to the main circuit element.		E25	Main.Cir
Cooling-fan speed drop signal	If the rotation speed of the internal cooling fan decreases so that the cooling effect decreases,inverter output turns OFF for protection.(available only for SJ700 1850-4000)		E29	Fan. Slow
IGBT error	When an instantaneous over-current has occurred, the inverter trips and turns off its output to protect main circuit element.		E30	IGBT
Thermistor error	When the thermistor inside the motor detects temperature higher than the specified value, the inverter trips and turns off its output.		E35	TH
Braking error	The inverter turns off its output when it can not detect whether the braking is ON or OFF within waiting time set at b024 after it has released the brake. (When braking is enabled at b120)		E36	BRAKE
Emergency stop (*4)	If the EMR signal (on three terminals) is turned on when the slide switch (SW1) on the logic board is set to ON, the inverter hardware will shut off the inverter output and display the error code shown on the right.		E37	EMR
Low-speed overload protection	If overload occurs during the motor operation at a very low speed at 0.2 Hz or less, the electronic thermal protection circuit in the inverter will detect the overload and shut off the inverter output. (2nd electronic thermal control) (Note that a high frequency may be recorded as the error history data.)		E38	OL-LowSP
Modbus communication error	If timeout occurs because of line disconnection during the communication in Modbus-RTU mode, the inverter will display the error code shown on the right. (The inverter will trip according to the setting of "C076".)		E41	NET.ERR
Easy sequence function Error	Error indications by protective functions with the easy sequence function used.		E43	PRG.CMD
			E44	PRG.NST
			E45	PRG.ERR1
Expansion card 1 connection error	An error has been detected in an expansion card or at its connecting terminals.		E60 ~ E69	OP1-0 ~ OP1-9
Expansion card 2 connection error			E70 ~ E79	OP2-0 ~ OP2-9
Modbus Communication Error	A trip occurs to display errors in case of timeout caused by offline under the terms and conditions of Modbus-RTU(according to the settings of C076)		E41	NET.ERR
User trip	Errors will be displayed in case of a trip		F500 ~ F599	PRG-0 ~ PRG 9

(*1): Reset operation is acceptable 10 seconds after the trip.
(*2): Check the parameters when EEPROM error occurs. If EEPROM errors reoccur after power on, please reset the parameters after default.
(*3): The inverter will not accept reset commands input via the RS terminal or entered by the STOP/RESET key. Therefore, turn off the inverter power.
(*4): The inverter will not accept the reset command entered from the digital operator. Therefore, reset the inverter by turning on the RS terminal.

• Method to Monitor Trips

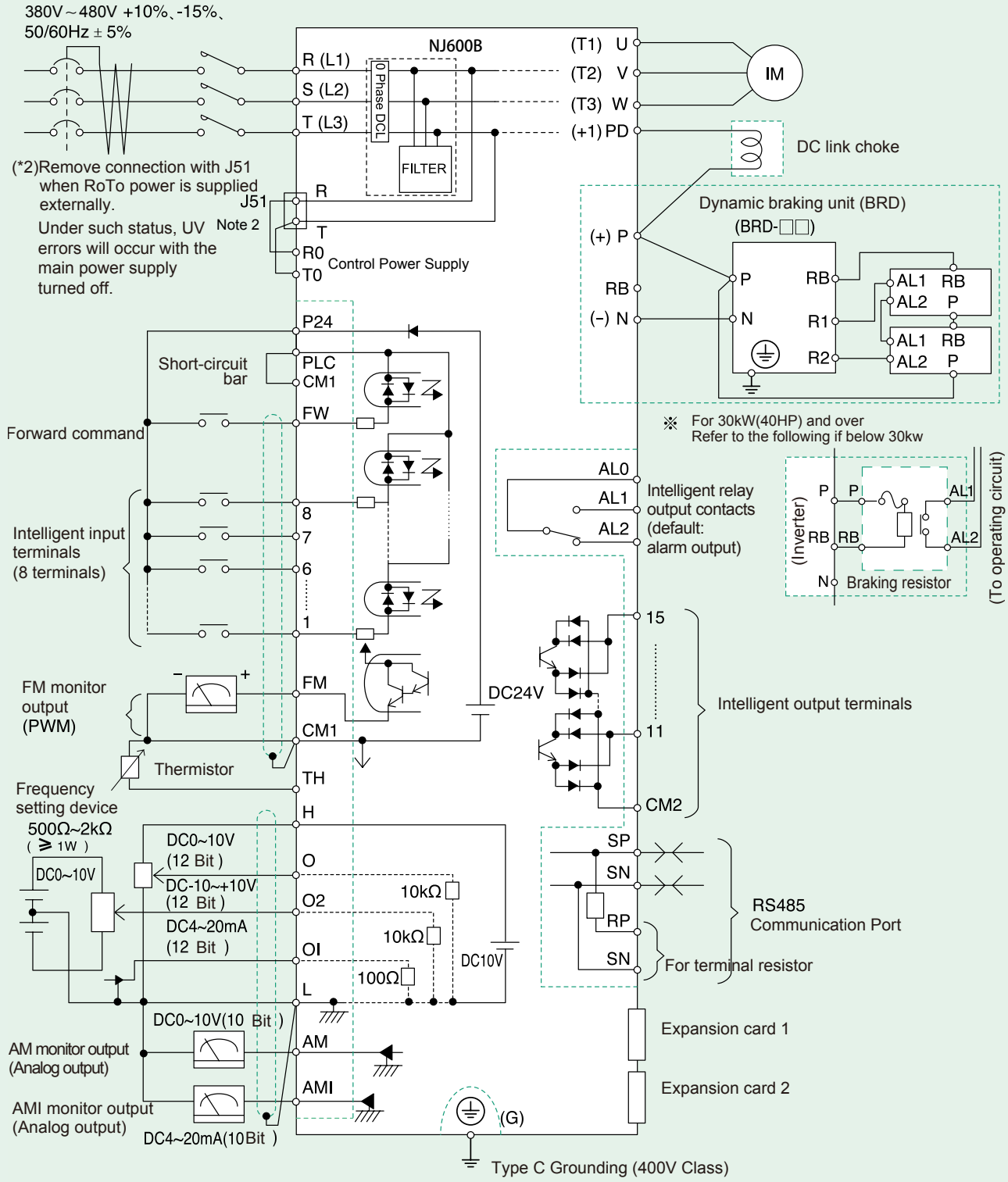


Note: This is the status during an inverter trip, not the actual status of the motor.
Eg: Under PID control command or analog signal(voltage/current) input frequency command, the motor is operating at constant speed, but the inverter displays imperceptible acceleration/deceleration because of the fluctuation of analog signals.

Connecting Diagram

●Source Type Logic

400V class



Terminal Name	FW、1、2、3、4、5、6、7、8	FM、TH	H、O、O2、OI、AM、AMI	11、12、13、14、15
Common terminal	P24	CM1	L	CM2

Note1:Please note that each common terminal is different.

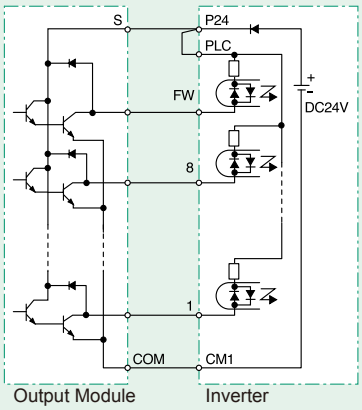
Connection to PLC

Connection to the Module of Hitachi PLC EH Series

● Connection to Input Terminals

1.Using Internal Power Supply of The Inverter

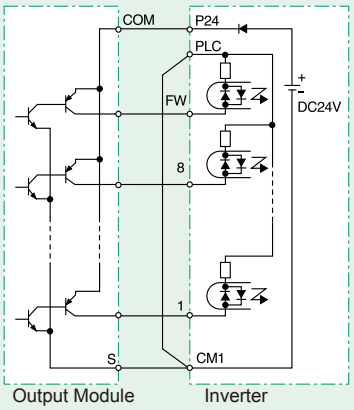
1) Sink type logic



Output Module (EH-YT□□)

Inverter

2) Source type logic



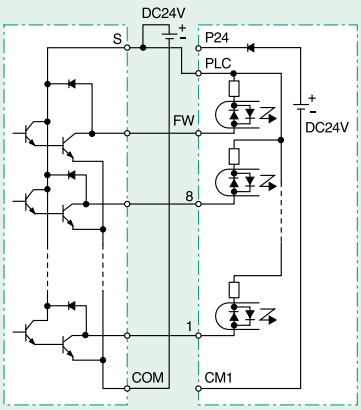
Output Module (EH-YTP□□)

Inverter

(Note: Place short-circuit bar between PLC and CM1 instead of P24 and PLC)

2.Using External Power Supply

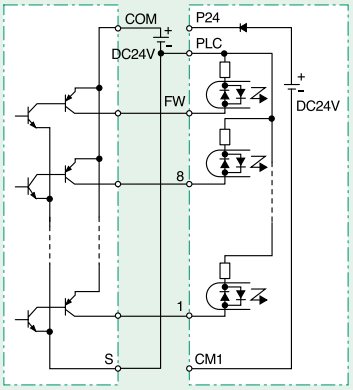
1) Sink type logic



(EH-YT□□)

(Note: Take off the short-circuit bar between PLC and P24)

2) Source type logic



Output Module (EH-YTP□□)

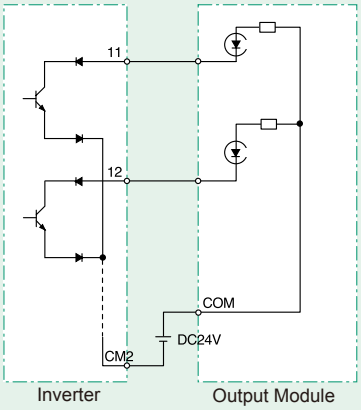
Inverter

(Note: Take off the short-circuit bar between PLC and P24)

(Note: Be sure to turn on the inverter after turning on the PLC and its external power source to prevent the parameters in the inverter from being modified.)

● Connection to Output Terminals

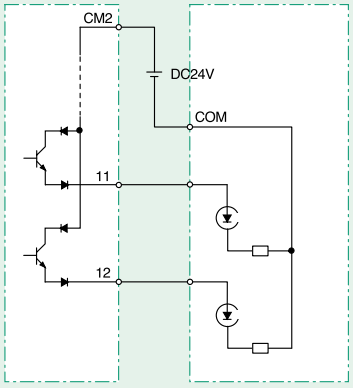
1) Sink type logic



Inverter

Output Module (EH-XD□□)

2) Source type logic

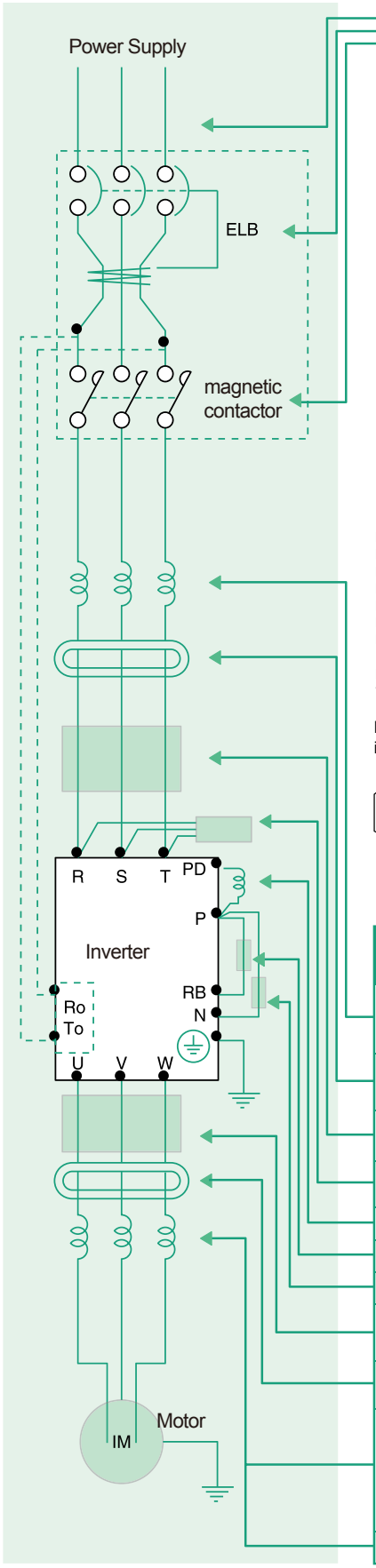


Inverter

Output Module (EH-XD□□)

Wiring and Accessories

● Standard Wiring and Accessories



	Motor output (kW)	Applicable inverter model	Gauge of power line cable (mm²) (Terminals: R, S, T, U, V, W, P, PD, and N)	External braking resistor across terminals P and RB (mm²)	Signal lines	Applicable device	
						Earth-leakage breaker (ELB)	Magnetic contactor (MC)
400 V class	5.5	NJ600B-055HF	3.5	3.5	0.75㎟ poles shielded wire	EX50C(30A)	HK20
	7.5	NJ600B-075HFF	3.5	3.5		EX50C(30A)	HK25
	11	NJ600B-110HFF	5.5	5.5		EX50C (30A)	HK35
	15	NJ600B-150HFF	8	5.5		EX60B (60A)	HK35
	18.5	NJ600B-185HFF	14	8		EX60B (60A)	HK50
	22	NJ600B-220HFF	14	8		RX100 (75A)	HK50
	30	NJ600B-300HFF	22	14		RX100 (100A)	H65
	37	NJ600B-370HFF	38	—		RX100 (100A)	H80
	45	NJ600B-450HFF	38	—		RX225B (150A)	H100
	55	NJ600B-550HFF	60	—		RX225B (175A)	H125
	75	NJ600B-750HFF	100(38×2)	—		RX225B (225A)	H150
	90	NJ600B-900HFF	100(38×2)	—		RX225B (225A)	H200
	110	NJ600B-1100HFF	150(60×2)	—		RX400B (350A)	H250
	132	NJ600B-1320HFF	80×2	—		RX400B (350A)	H300
	160	NJ600B-1600HFF	100×2	—		RX400B (350A)	H400
	185	NJ600B-1850HF	200	—		RX400B(400A)	H400C
	220	NJ600B-2200HF	200	—		RX600B(500A)	H600C
	260	NJ600B-2600HF	300	—		RX800B(700A)	H800C
	315	NJ600B-3150HF	400	—		RX800B(700A)	H800C
	355	NJ600B-3550HF	400	—		RF-1000CBN(1000A)	H800C

Note1: The accessories are specially used in Hitachi 4 pole squirrel-cage motor
Note2: Please use the breaker with proper capacity(inverter compatible circuit breaker)
Note3: Be sure to use thick wire cable for power wiring if the distance exceeds 20m (66ft)
Note4: Be sure to use ELB to ensure safety
Note5: It is recommended to use heat resisting insulated wire(75℃)
Note6: The wire diameter is designed based on HIV wire
Note7: P terminals of regenerating braking units is maxmium applicable size
For detailed information, please refer to the user manual.
Note8: It recommended to use two wires of 100 ㎟ for terminal R,S,T,U,V,W.
* Please use 0.75 ㎟ wire for alarm output connection

Please choose the current sensitivity according to the equivalent value of inverter-power source distance and inverter-motor distance.(ℓ)

ℓ	Current Sensitivity (mA
100m and below	50
300m and below	100

When the accessory wire is over 100m, please use CV wire instead. Because the leakage current of the HIV wire is 8 times higher than that of the CV wire. The current sensitivity is as following.(Please use 8 times higher current sensitivity when using HIV wire.)

Name	Effectiveness				Function
	Radiated Noise	Conducted Noise	Harmonics Noise	Surge Voltage Suppress	
Input side AC reactor (ALI-□□□2)		△	○		This is useful in suppressing harmonics induced on the power supply lines, or when the main power voltage imbalance exceeds 3% (and power source capacity is more than 500kVA), or to smooth out line fluctuations. It also improves the power factor.
Radio noise filter (NF-□□□)	○	△			Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise
EMI filter (ZCL-□)	○	○			Reduces the conducted noise on the power supply wiring generated by the inverter. Connect to the inverter input side.
Capacitor filter (CF1-□)	○	△			The capacitor filter reduces radiated noise from the main power wires in the inverter input side
DC link choke (DCL-□-□□)			○		Suppresses harmonics generated by the inverter.
Braking resistor Regenerating braking unit (BRD-□□□)					This is useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capability.
Output side noise filter (ACF-C□)	○	○		△	Reduces radiated noise from wiring in the inverter output side.
Radio noise filter (Zero Reactor) (ZCL-□□□)	○	△			Electrical noise interference may occur on nearby equipment such as a radio receiver. This magnetic choke filter helps reduce radiated noise (can also be used on input).
Output side AC reactor (ACL-□2-□□□)		△		△	This reactor reduces the vibration in the motor caused by the inverter's switching waveforms, by smoothing the waveforms to approxiate commercial power quality. It is also useful when wiring from the inverter to the motor is more than 10m in length, to reduce harmonics.
LCR filter	△	○		○	Sine wave shaping filter for the output side.

For Correct Operation

Precaution for Usage

- Before use, be sure to read through the Instruction Manual to insure proper use of the inverter.
- Note that the inverter requires electrical wiring; a trained specialist should carry out the wiring.
- The inverter in this catalog is designed for general industrial applications. For special applications in fields such as aircraft, outer space, nuclear power, electrical power, transport vehicles, clinics, and underwater equipment, please consult with us in advance.
- For application in a facility where human life is involved or serious losses may occur, make sure to provide safety devices to avoid any accidents.
- The inverter is intended for use with a three-phase AC motor. For use with a load other than this, please consult with us.

Information in this brochure is subject to change without notice.

Application to Motors

[Application to general-purpose motors]

Operating frequency	The overspeed endurance of a general-purpose motor is 120% of the rated speed for 2 minutes (JIS C4 004). For operation at higher than 60Hz, it is required to examine the allowable torque of the motor, useful life of bearings, noise, vibration, etc. In this case, be sure to consult the motor manufacturer as the maximum allowable rpm differs depending on the motor capacity, etc.
Torque characteristics	The torque characteristics of driving a general-purpose motor with an inverter differ from those of driving it using commercial power (starting torque decreases in particular). Carefully check the load torque characteristic of a connected machine and the driving torque characteristic of the motor.
Motor loss and temperature increase	An inverter-driven general-purpose motor heats up quickly at lower speeds. Consequently, the continuous torque level (output) will decrease at lower motor speeds. Carefully check the torque characteristics vs speed range requirements.
Noise	When run by an inverter, a general-purpose motor generates noise slightly greater than with commercial power.
Vibration	When run by an inverter at variable speeds, the motor may generate vibration, especially because of (a) unbalance of the rotor including a connected machine, or (b) resonance caused by the natural vibration frequency of a mechanical system. Particularly, be careful of (b) when operating at variable speeds a machine previously fitted with a constant speed motor. Vibration can be minimized by (1) avoiding resonance points using the frequency jump function of the inverter, (2) using a tire-shaped coupling, or (3) placing a rubber shock absorber beneath the motor base.
Power transmission mechanism	Under continued, low-speed operation, oil lubrication can deteriorate in a power transmission mechanism with an oil-type gear box (gear motor) or reducer. Check with the motor manufacturer for the permissible range of continuous speed. To operate at more than 60 Hz, confirm the machine's ability to withstand the centrifugal force generated.

[Application to special motors]

Gear motor	The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly in case of oil lubrication, pay attention to the low frequency range.)
Brake-equipped motor	For use of a brake-equipped motor, be sure to connect the braking power supply from the primary side of the inverter.
Pole-change motor	There are different kinds of pole-change motors (constant output characteristic type, constant torque characteristic type, etc.), with different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor. Also see: Application to the 400V-class motor.
Submersible motor	The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor.
Explosion-proof motor	Inverter drive is not suitable for a safety-enhanced explosion-proof type motor. The inverter should be used in combination with a pressure-proof explosion-proof type of motor.
Synchronous (MS) motor High-speed (HFM) motor	In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to proper inverter selection, consult the manufacturer.
Single-phase motor	A single-phase motor is not suitable for variable-speed operation by an inverter drive. Therefore, use a three-phase motor.

[Application to the 400V-class motor]

A system applying a voltage-type PWM inverter with IGBT may have surge voltage at the motor terminals resulting from the cable constants including the cable length and the cable laying method. Depending on the surge current magnification, the motor coil insulation may be degraded. In particular, when a 400V-class motor is used, a longer cable is used, and critical loss can occur, take the following countermeasures:
(1) install the LCR filter between the inverter and the motor
(2) install the AC reactor between the inverter and the motor
(3) enhance the insulation of the motor coil.

Notes on Use

[Drive]

Run/Stop	Run or stop of the inverter must be done with the keys on the operator panel or through the control circuit terminal. Do not operate by installing a electromagnetic contactor (Mg) in the main circuit.
Emergency motor stop	When the protective function is operating or the power supply stops, the motor enters the free run stop state. When an emergency stop is required or when the motor should be kept stopped, use of a mechanical brake should be considered.
High-frequency run	A max. 400Hz can be selected on the NJ600B Series. However, a two-pole motor can attain up to approx. 24,000 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor above 60 Hz. A full line of high-speed motors is available from Hitachi.

[Installation Location and Operating Environment]

Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily collect, as well as areas that are dusty, subject to corrosive gasses, mist of liquid for grinding, or salt. Install the inverter away from direct sunlight in a well-ventilated room that is free of vibration. The inverter can be operated in the ambient temperature range from -10 to 45˚C.(Carrier frequency and output current must be reduced in the range of 40 to 50˚C.)

[Main PowerSupply]

Installation of an AC reactor on the input side	In the following examples involving a general-purpose inverter, a large peak current flows on the main power supply side, and is able to destroy the converter module. Where such situations are foreseen or the connected equipment must be highly reliable, install an AC reactor between the power supply and the inverter. Also, where influence of indirect lightning strike is possible, install a lightning conductor. (A) The unbalance factor of the power supply is 3% or higher. (Note) (B) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500 kVA or more). (C) Abrupt power supply changes are expected. Examples: (1) Several inverters are interconnected with a short bus. (2) A thyristor converter and an inverter are interconnected with a short bus. (3) An installed phase advance capacitor opens and closes. In cases (A), (B) and (C), it is recommended to install an AC reactor on the main power supply side. Note: Example calculation with V_{RS} = 205V, V_{ST} = 201V, V_{TR} = 200V V_{RS} : R-S line voltage, V_{ST} : S-T line voltage, V_{TR} : T-R line voltage $\text{Unbalance factor of voltage} = \frac{\text{Max. line voltage (min.)} - \text{Mean line voltage}}{\text{Mean line voltage}} \times 100$ $= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5\ (\%)$
Using a private power generator	An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform of the generator. Generally, the generator capacity should be five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system.

● Notes on Peripheral Equipment Selection

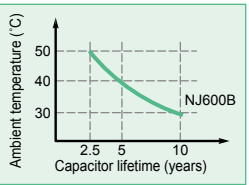
Wiring connections		(1) Be sure to connect main power wires with R(L1), S(L2), and T(L3) terminals (input) and motor wires to U(T1), V(T2), and W(T3) terminals (output). (Incorrect connection will cause an immediate failure.) (2) Be sure to provide a grounding connection with the ground terminal (⏚).
Wiring between inverter and motor	Electromagnetic contactor	When an electromagnetic contactor is installed between the inverter and the motor, do not perform on-off switching during running operation.
	Thermal relay	When used with standard applicable output motors (standard three-phase squirrel-cage four-pole motors), the NJ600B Series does not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used: ● During continuous running outside a range of 30 to 60 Hz. ● For motors exceeding the range of electronic thermal adjustment(rated current). ● When several motors are driven by the same inverter; install a thermal relay for each motor. ● The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10 m or more, the thermal relay tends to turn off readily. In this case, provide an AC reactor on the output side or use a current sensor.
Installing a circuit breaker		Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. Choose an inverter-compatible circuit breaker. The conventional type may malfunction due to harmonics from the inverter. For more information, consult the circuit breaker manufacturer.
Wiring distance		The wiring distance between the inverter and the remote operator panel should be 20 meters or less. Shielded cable should be used on the wiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.)
Earth leakage relay		If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter).
Phase advance capacitor		Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor.

● High-frequency Noise and Leakage Current

(1) High-frequency components are included in the input/output of the inverter main circuit, and they may cause interference in a transmitter, radio, or sensor if used near the inverter. The interference can be minimized by attaching noise filters (option) in the inverter circuitry.
(2) The switching action of an inverter causes an increase in leakage current. Be sure to ground the inverter and the motor.

● Lifetime of Primary Parts

Because a DC bus capacitor deteriorates as it undergoes internal chemical reaction, it should normally be replaced every 10 years. (10 years is not the guaranteed lifespan but rather, the expected design lifespan.) Be aware, however, that its life expectancy is considerably shorter when the inverter is subjected to such adverse factors as high temperatures or heavy loads exceeding the rated current of the inverter.
JEMA standard is the 5 years at ambient temperature 40˚C used in 12 hours daily. (according to the " Instructions for Periodic Inspection of General-Purpose Inverter " (JEMA).)
Also, such moving parts as a cooling fan should be replaced. Maintenance inspection and parts replacement must be performed by only specified trained personnel. Please plan to replace new INV depends on the load, ambient condition in advance.



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