# HITACHI
## Inspire the Next

# VARIABLE FREQUENCY DRIVE

# SJ700 Series

# Powerful Inverter

**SJ700**



⊚ **Hitachi Industrial Equipment Systems Co.,Ltd.**

# High performance with Many useful

## High starting Torque, Powerful Drive and easy setting

### High starting Torque 200% at 0.3Hz

Improvement of [Sensorless Vector Control], [Auto Tuning] realize High starting torque 200% and more at 0.3Hz.
Easy adjusting of Motor constant
The best for applications, which need high torque, such as cranes, extruders and lifts.

E.g..Motor Torque and Speed



Torque [%] vs Speed (min$^{-1}$)
200, 0.3Hz, 100, 0, -100, -200
300  600  900  1200  1500  1800
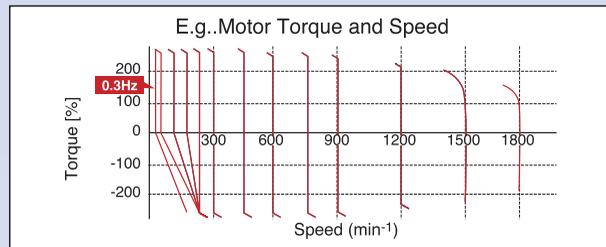
### Hitachi original 0Hz Domain sensorless vector control

Keep 150% * torque at 0Hz speed signal
Crane applications require high torque at starting

*150%torque in case 1 frame big inverter capacity of motor
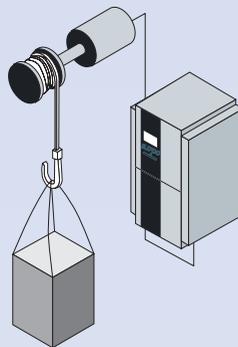
### Position Control Function

With combination of the SJ700 and a motor with an encoder, position control is possible by adding SJ-FB feedback option card to the inverter.
When position control is necessary with conveyor application, the system can be built with lower cost.
According to four parameters (position command, speed command, acceleration time and deceleration time), the SJ700 will move an object from original position A to target position B. After the movement, the inverter keeps servo lock status.

Starting point A

Starting point B
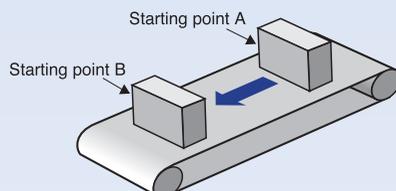
## Trip avoidance function

### Over current & voltage suppress function

Higher internal calculation speed* improve current control performance Over-current suppress and Over-voltage suppress function avoid inverter trip during acceleration and deceleration period.



Frequency
OC-Trip
Motor current

Over-current suppress OFF

Impact load

Suppress current and continues running

Over-current suppress ON
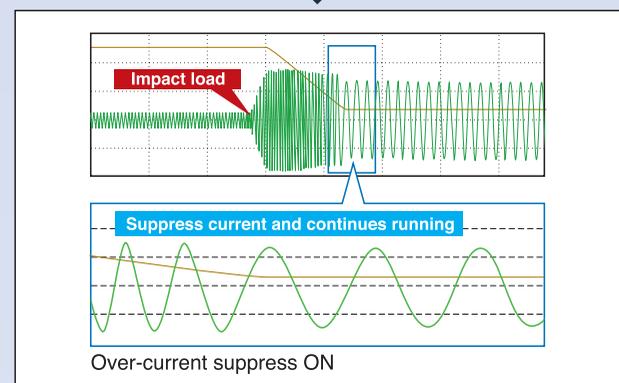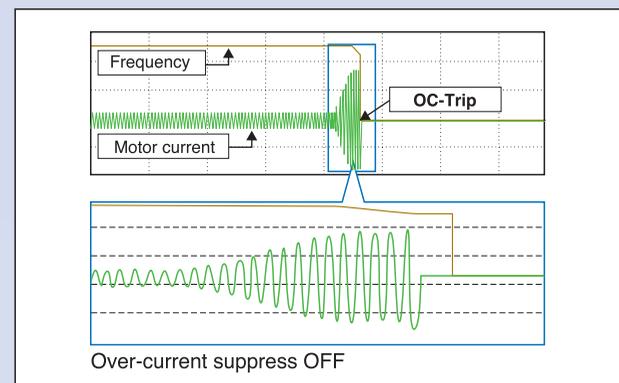
### DC Bus AVR Function During Deceleration

The SJ700 controls deceleration time for DC bus voltage not to exceed over-voltage trip level. This realizes trip-less operation during deceleration.



Motor current
Voltage of the main circuit DC
Output frequency
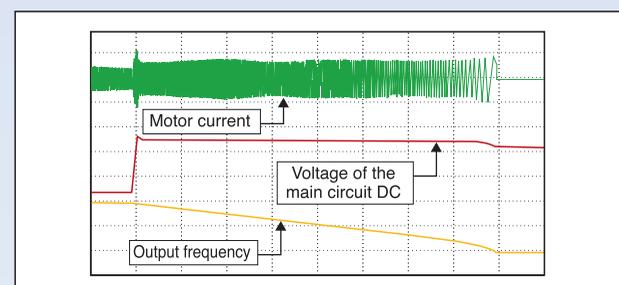
# Functions and User Friendly.

## Programming [EzSQ: Easy Sequence] function

### Inverter control by Built-in Programming function

Simple sequence operation is realized by downloading to an inverter the program created by programming soft EzSQ.
It is also possible to automatic speed control according to a load situation like a swift lift function for crane or a conveyor, and to operate.
Since an external circuit can be simplified, a control board is made small and a cost cut can be aimed at.
Password function is added to prevent program information leaks. This is also useful for unexpected data rewriting or deletion by operation mistake.

#### [The example of a use] Example for Rely sequence

Current INV

SJ700

EzSQ
Programming

Programming window

Download

RYA  FW
RYB  8
CM1

Current INV

SJ700
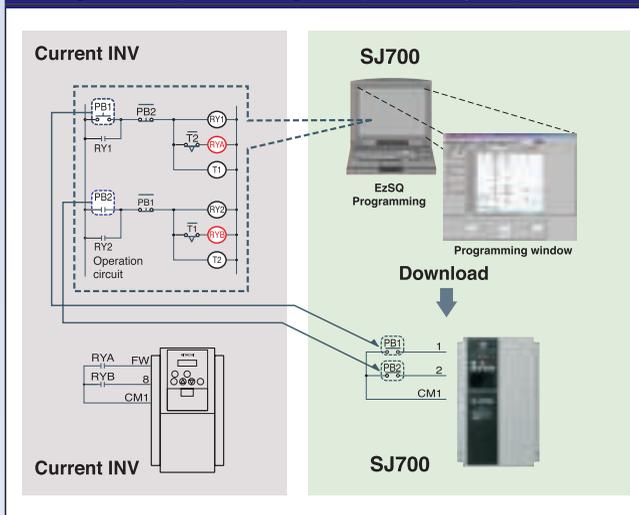
| | Item | Description |
|---|---|---|
| Language Spec | Language type | BASIC Like |
| | Supported Device | Windows(DOS/V)OS:Windows98SE,Windows2000,WindowsXP) |
| | Memory area | 1,024 steps or 6k byte (Smaller of these)Program is stored in internal of inverter. |
| | Programming environment | Editor(Windows),Display(Windows) |
| | | Grammar check(Windows) |
| | | Program download/upload, All clear |
| | Executable format | Interpreter 2.0ms/command (Sub routine supported. 8 nested) |
| I/O function | External input | Contact signal/Open collector signal input (Internal DC24V power supply available) |
| | External digital contact input | 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(03)/4 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.

## Internal Option

### Built-in EMC Filter

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

### Brake circuit up to 22kW

Cost and Space reduction compared with external Braking Controller.

Example (110HFEF2)

EN61800-3 2nd Envinment
［C3］QP Limit Level

Level  [db]

130
120
110
100
90
80
70
60
50
40
30
20
10
0

150k 200k    500k    1M    2M    5M 7M 10M    20M 30M

Frequency  [Hz]

QP: Quasi Peak
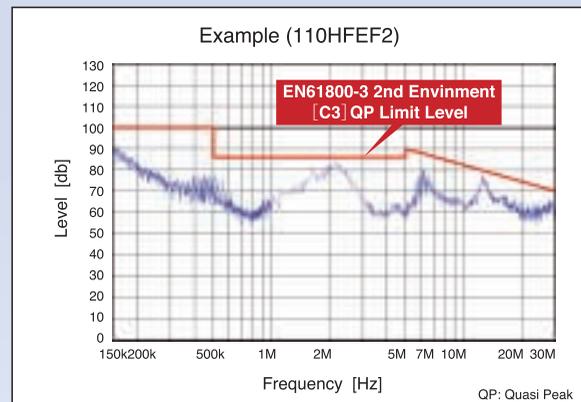
# Ease of Maintenance

## Easy-removable construction for maintenance

Field replacement of cooling fan(s) and DC bus capacitor can be accomplished in a fraction of the time.
Using Logic terminal move to SJ700 without wiring change.
Read SJ300 Parameter by SRW remote operator and write them in to SJ700

Easy-removable
Cooling Fan

Easy-removable
Dc bus Capacitor
(more than 15kW)

SJ300series                              SJ700series

Parameter
read write

Removable Control circuit terminals
(Move to SJ700 without rewiring)

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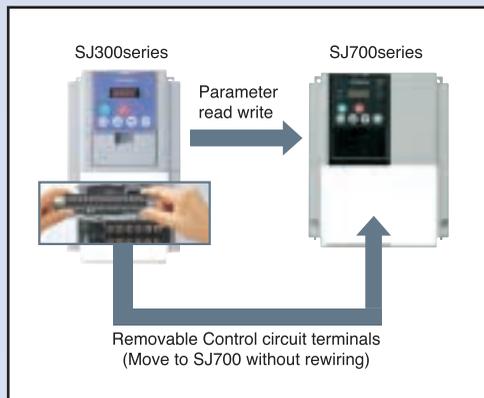
## Long life time components & Life time warning function

### Long life time components
Design lifetime 10 Years or more Dc bus capacitor & Cooling Fan.
Cooling Fan ON/OFF control lead more longer life time.

*Ambient temperature: Average 40 deg C (no corrosive gasses oil mist or dust)
 Design lifetime is calculation and out of guaranty.

### Life time warning function
Avoid trouble before the malfunction by lifetime Warning signal.
The monitor of the temperature rise of a Dc bus capacitor, cooling fan degradation degree, a cooling fin, and a motor can be carried out.
Replace the components before the malfunction.

# Easy Operation

## User selection of Parameter functions

**Data comparison function**

Allows display of only parameters changed from default.

**User selected function**

Display of up to 12 User Defined Parameters U001 to U012.

**Basic mode (default)**

Basic display mode for commonly used parameters.

Chose Basic
Parameter

Basic
mode

Indication only
Basic Parameter
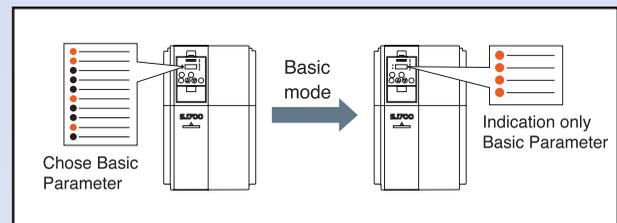
**Other Functions**

-The direct input of function code selection is also attained other than a scroll type allowing for a shorter set up time.
-Continuously pushing the function key for 3 seconds, causes the display to jump to output frequency monitor (d001) mode from every key.

# Network compatibility

The port corresponding to RS-485 Modbus-RTU is equipped as standard.
SJ700 can communicate with DeviceNet PROFIBUS-DP LonWorks with communication options.

-DeviceNet is a trade mark of Open DeviceNet Vender Association, Inc.
-LonWorks is a registered trade mark of Echelon Corporation
-PROFIBUS-DP is a registered trade mark of PROFIBUS Nutzer Organization

Simple & Low cost wiring Ease of installation and replacement
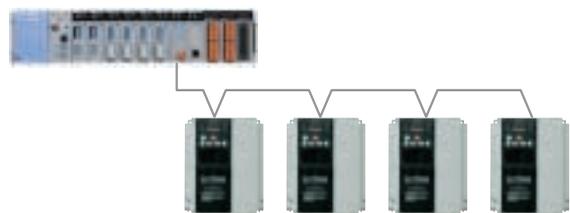
# Global standards

## Conformity to global standards

CE, UL, c-UL, C-Tick approvals.

## Logic input & output Terminal apply sink & source logic

## Wide Input power voltage range

Input voltage 240V for 200V class and 480V for 400V class as standard.

# Environmental Friendliness

## Micro Surge Voltage suppress function (Patent registered in Japan,USA & Korea)

Hitachi original PWM control suppressing Motor terminal Voltage less than 2 times of INV DC voltage E.
Lower than Hitachi motor Max. insulation voltage (1,250V)
(during regenerating operation increase the DC bus voltage may over motor max. insulation voltage)

Motor terminal voltage

1,250V

E=650V, cable=100m
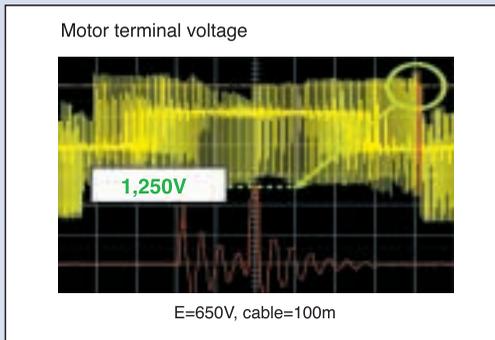
## EU RoHS compliant

EU RoHS compliant by restricting to use hazardous substances.
 (except solder in power module)

## Improvement of environment

Varnish coating of internal PC board & plating of main circuit copper bus bar as standard.

# Versatile Functions

## Instantaneous Power Failure Disregard Function

The SJ700 ignores instantaneous power failure when power fluctuation happens frequently as long as DC bus voltage keeps higher than under-voltage level.

## Emergency stop

Shut down INV output by electric circuit without CPU realize high quality emergency stop.

## Intelligent input terminal and output terminal delay time function

Simplification of an external circuit is possible.

## Active frequency matching function

Restart by motor frequency search restart function without motor remaining voltage.

## Controlled deceleration and stop on power loss

## Analog Input Disconnection Detecting Function

The SJ700 outputs disconnection signal when frequency command through analog input is lost.

## Acceleration/Deceleration curve functions

The pattern (5 kinds) which can be chosen according to a usage is carried.

## Analog Command Holding Function (AHD)

Output frequency can be changed with UP/DOWN Function with analog signal as reference value. The 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 SJ700 detects motor current and automatically reduces carrier frequency according to the current.

## The resolution of a monitor (voltage, current) output is improved to 10 bits.

Powerful Inverter
SJ700

EC97J1095

QUALITY SYSTEM

# STANDARD SPECIFICATIONS

## ● 3-phase 200V class

| Model SJ700- | | US Version | 055LFUF2 | 075LFUF2 | 110LFUF2 | 150LFUF2 | 185LFUF2 | 220LFUF2 | 300LFUF2 | 370LFUF2 | 450LFUF2 | 550LFUF2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Enclosure (*1) | | | IP20 | | | | | | | | | |
| Applicable motor (4-pole, kW(HP)) (*2) | | | 5.5(7.5) | 7.5(10) | 11(15) | 15(20) | 18.5(25) | 22(30) | 30(40) | 37(50) | 45(60) | 55(75) |
| Output Ratings | Rated capacity (KVA) | 200V | 8.3 | 11.0 | 15.9 | 22.1 | 26.3 | 32.9 | 41.9 | 50.2 | 63.0 | 76.2 |
| | | 240V | 9.9 | 13.3 | 19.1 | 26.6 | 31.5 | 39.4 | 50.2 | 60.2 | 75.6 | 91.4 |
| | Rated output current (A) | | 24 | 32 | 46 | 64 | 76 | 95 | 121 | 145 | 182 | 220 |
| | Overload capacity(output current) | | 150%,60sec., 200%,3sec. | | | | | | | | | |
| | Rated output voltage (*3) | | 3-phase (3-wire) 200 to 240V (corresponding to input voltage) | | | | | | | | | |
| Input Rating | Rated input voltage (V) | | 3-phase 200 to 240V+10%, -15%, 50/60Hz±5% | | | | | | | | | |
| Braking | Dynamic braking (Short-time) (*4) | | Built-in BRD circuit (optional resistor) | | | | | | External dynamic braking unit (option) | | | |
| | Minimum value of resistor (Ω) | | 16 | 10 | 10 | 7.5 | 7.5 | 5 | – | | | |
| Vibration (*5) | | | 5.9m/s$^2$(0.6G), 10-55Hz | | | | | | 2.9m/s$^2$(0.3G), 10-55Hz | | | |
| Integrated EMC filter | | | Built-in | | | | | | | | | |
| Zero-phase Reactor | | | Built-in | | | | | | | | | |
| Weight (lbs.) | | | 6(13.2) | 6(13.2) | 6(13.2) | 14(30.8) | 14(30.8) | 14(30.8) | 22(48.4) | 30(66) | 30(66) | 43(94.6) |

## ● 3-phase 400V class

| Model SJ700- | | | 055HFEF2 | 075HFEF2 | 110HFEF2 | 150HFEF2 | 185HFEF2 | 220HFEF2 | 300HFEF2 | 370HFEF2 | 450HFEF2 | 550HFEF2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | European Version | | | | | | | | | | |
| | | US Version | 055HFUF2 | 075HFUF2 | 110HFUF2 | 150HFUF2 | 185HFUF2 | 220HFUF2 | 300HFUF2 | 370HFUF2 | 450HFUF2 | 550HFUF2 |
| Enclosure (*1) | | | IP20 | | | | | | | | | |
| Applicable motor (4-pole, kW(HP)) (*2) | | | 5.5(7.5) | 7.5(10) | 11(15) | 15(20) | 18.5(25) | 22(30) | 30(40) | 37(50) | 45(60) | 55(75) |
| Output Ratings | Rated capacity (KVA) | 400V | 9.7 | 13.1 | 17.3 | 22.1 | 26.3 | 33.2 | 40.1 | 51.9 | 63.0 | 77.6 |
| | | 480V | 11.6 | 15.8 | 20.7 | 26.6 | 31.5 | 39.9 | 48.2 | 62.3 | 75.6 | 93.1 |
| | Rated output current (A) | | 14 | 19 | 25 | 32 | 38 | 48 | 58 | 75 | 91 | 112 |
| | Overload capacity(output current) | | 150%,60sec., 200%,3sec. | | | | | | | | | |
| | Rated output voltage (*3) | | 3-phase (3-wire) 380 to 480V (corresponding to input voltage) | | | | | | | | | |
| Input Rating | Rated input voltage (V) | | 3-phase 380 to 480V +10%, -15%, 50/60Hz±5% | | | | | | | | | |
| Braking | Dynamic braking (Short-time) (*4) | | Built-in BRD circuit (optional resistor) | | | | | | External dynamic braking unit (option) | | | |
| | Minimum value of resistor (Ω) | | 70 | 35 | 35 | 24 | 24 | 20 | – | | | |
| Vibration (*5) | | | 5.9m/s$^2$(0.6G), 10-55Hz | | | | | | 2.9m/s$^2$(0.3G), 10-55Hz | | | |
| Integrated EMC filter | | | Built-in | | | | | | | | | |
| Zero-phase Reactor | | | Built-in | | | | | | | | | |
| Weight (lbs.) | | | 6(13.2) | 6(13.2) | 6(13.2) | 14(30.8) | 14(30.8) | 14(30.8) | 22(48.4) | 30(66) | 30(66) | 30(66) |

## Model Name Indication

**SJ700-055 H F E F 2**

Series Name

Applicable Motor Capacity
004: 0.4kW(1/2HP)
|
4000: 400kW(500HP)

Power Source
L : 3-phase 200V class
H : 3-phase 400V class

F : With keypad

U : US version
E : European version

F : Integrated EMC filter

Version
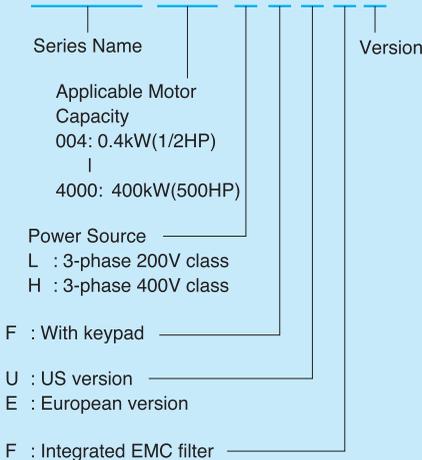
## Model Configuration

● Available    ○ Plan model

| Applicable Motor kW (HP) | 3-phase 200V | 3-phase 400V | | Applicable Motor kW (HP) | 3-phase 200V | 3-phase 400V | |
|---|---|---|---|---|---|---|---|
| | LFUF2 | HFEF2 | HFUF2 | | LFUF2 | HFEF2 | HFUF2 |
| 0.4(1/2) | ○ | | | 30(40) | ● | ● | ● |
| 0.75(1) | ○ | ○ | ○ | 37(50) | ● | ● | ● |
| 1.5(2) | ○ | ○ | ○ | 46(60) | ● | ● | ● |
| 2.2(3) | ○ | ○ | ○ | 55(75) | ● | ● | ● |
| 3.7(5) | ○ | | | 75(100) | ○ | ○ | ○ |
| 4.0(5) | | ○ | ○ | 90(125) | ○ | ○ | ○ |
| 5.5(7.5) | ● | ● | ● | 110(150) | | ○ | ○ |
| 7.5(7.5) | ● | ● | ● | 132(175) | | ○ | ○ |
| 11(15) | ● | ● | ● | 185(250) | | ● | ● |
| 15(20) | ● | ● | ● | 315(400) | | ● | ● |
| 18.5(25) | ● | ● | ● | 400(500) | | ● | ● |
| 22(30) | ● | ● | ● | | | | |

5

# SPECIFICATIONS

## ● General Specifications

| Items | | General Specifications |
|---|---|---|
| Control | Control method | Line to line sine wave pulse-width modulation (PWM) control |
| | Output frequency range (*6) | 0.1-400.0Hz |
| | Frequency accuracy | Digital: ±0.01% of the maximum frequency, Analog: ±0.2%(25±10°C) |
| | Frequency resolution | Digital setting: 0.01Hz, Analog setting: (Maximum frequency)/4,000 (O terminal: 12bit 0-10V, O2 terminal: 12bit -10-+10V) |
| | V/f characteristics | V/f optionally variable (30-400Hz of base frequency), V/f control (constant torque, reduced torque), Sensorless vector control |
| | Speed fluctuation | ±0.5% (sensorless vector control) |
| | Acceleration/deceleration time | 0.01-3,600sec. (Linear/curve, accel./decel. selection), Two-stage accel./decel. |
| | Starting Torque | 200% at 0.3Hz (Sensorless vector control), 150% at around 0Hz (Sensorless vector control, 0Hz domain with motor one frame size down) |
| | Carrier frequency range | 0.5-15.0kHz |
| | DC braking | Performs at start: under set frequency at deceleration, via an external input (braking force, time, and operating frequency). |
| Input signal | Frequency setting — Operator | Up and Down keys |
| | Frequency setting — External signal | DC 0-10V, -10-+10V (input impedance 10kΩ), 4-20mA (input impedance 100Ω) |
| | Frequency setting — External port | Setting via RS485 communication |
| | Forward /reverse Start /stop — Operator | Start/stop commands (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 — Terminals | 8 terminals, NO/NC switchable, sink logic/source logic switchable |
| | Intelligent input terminals — Functions | Reverse operation (RV), Multi-speed 1 setting (CF1), Multi-speed 2 setting (CF2), Multi-speed 3 setting (CF3), Multi-speed 4 setting (CF4), Jogging (JG), external DC braking (DB), 2nd 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), 3rd 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), data clearance by remote control (UDC), forcible operation (OPE), Multi-speed bit 1 (SF1), Multi-speed bit 2 (SF2), Multi-speed bit 3 (SF3), Multi-speed bit 4 (SF4), Multi-speed bit 5 (SF5), Multi-speed bit 6 (SF6), Multi-speed bit 7 (SF7), overload restriction selection (OLR), torque limit selection (enabling/disabling) (TL), torque limit 1 (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), general-purpose input 1 (MI1), general-purpose input 2 (MI2), general-purpose input 3 (MI3), general-purpose input 4 (MI4), general-purpose input 5 (MI5), general-purpose input 6 (MI6), general-purpose input 7 (MI7), general-purpose input 8 (MI8), analog command holding (AHD), no assignment (no) |
| | Thermistor input | 1 terminal (PTC characteristics) |
| Output signal | Intelligent output terminals — Terminals | 5 open-collector output terminals, NO/NC switchable, sink logic/source logic switchable 1 relay (1c-contact) output terminal: NO/NC switchable |
| | Intelligent output terminals — Functions | Running (RUN), constant-speed reached (FA1), set frequency overreached (FA2), overload notice advance signal (1) (OL), output deviation for PID control (OD), alarm signal (AL), set frequency reached (FA3), over-torque (OTQ), instantaneous power failure (IP), undervoltage (UV), torque limited (TRQ), operation time over (RNT), plug-in time over (ONT), thermal alarm signal (THM), brake release (BRK), braking error (BER), 0 Hz 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), PID feedback comparison (FBV), communication line disconnection (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), general-purpose output 1 (M01), general-purpose output 2 (M02), general-purpose output 3 (M03), general-purpose output 4 (M04), general-purpose output 5 (M05), general-purpose output 6 (M06), inverter ready (IRDY), forward rotation (FWR), reverse rotation (RVR), major failure (MJA), alarm code 0 to 3 (AC0 to AC3) |
| | Monitor output terminals | Analog voltage output, analog current output, pulse-string output (e.g., A-F, D-F [n-fold, pulse output only], A, T, V, P) |
| Monitoring on display | | Output frequency, output current, output torque, frequency conversion data, trip history, input/output terminal status, electric power, and others |
| Other functions | | Free V/f setting (7 breakpoints), frequency upper/lower limit, jump (center) frequency, acceleration/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/frequency rate, analog input selection, retry after trip, restart after instantaneous power failure, output of various signals, starting with reduced voltage, overload restriction, initial-value setting, automatic deceleration at power failure, AVR function, fuzzy acceleration/deceleration, online/offline auto-tuning, high-torque multi-motor operation (sensorless vector control of two motors by one inverter) |
| Protective functions | | Overcurrent protection, overvoltage protection, undervoltage protection, electronic thermal protection, temperature error protection, instantaneous power failure protection, phase loss input protection, braking-resistor overload protection, ground-fault current detection at power-on, USP error, external trip, emergency stop trip, CT error, communication error, option board error, and others |
| Environmental conditions | Ambient operating/storage temperature(*7)/ humidity | -10-50°C / -20-65°C / 20-90%RH (No condensation) |
| | Location | Altitude 1,000m or less, indoors (no corrosive gases or dust) |
| Options | Digital input expansion card | SJ-DG (4digits BCD, 16bits binary) |
| | Feedback expansion card | SJ-FB (vector control loop speed sensor) |
| | Network interface card | SJ-DN(DeviceNetTM), SJ-PBT(PROFIBUSR), SJ-LW(LONWORKSR) |
| | Others | EMI filters, input/output reactors, radio noize filters, braking resistors, braking units, LCR filter, communication cables |

*1: The protection method conforms to JEM 1030.
*2: The applicable motor refers to Hitachi standard 3-phase motor (4-pole).
   To use other motors, be sure to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.
*3: The output voltage decreases as the main power supply voltage decreases except for the use of AVR function.
*4: Braking resistor is not integrated in the inverter. Please install optional braking resistor or dynamic braking unit when large braking torque is required.
*5: Conforms to the test method specified in JIS C0040(1999).
*6: To operate the motor beyond 50/60Hz, please consult with the motor manufacturer about the maximum allowable rotation speed.
*7: Storage temperature refers to the temperature in transportation.

# DIMENSIONS

● SJ700-055-110 LFUF2/HFEF2, HFUF2



210 (8.27)
189 (7.44)
24.5 (0.97)
80 (3.15)
Digital Operator
2-φ7 (φ0.28)
79 (3.11)
169 (6.69)
246 (9.69)
260 (10.274)
7 (0.28)
189 (7.44)
3-33X28 (1.30X1.10)
Wiring hole
170 (6.69)
203 (7.99)
13.6 (0.28)
82 (3.23)
Exhaust
Wall
Air intake
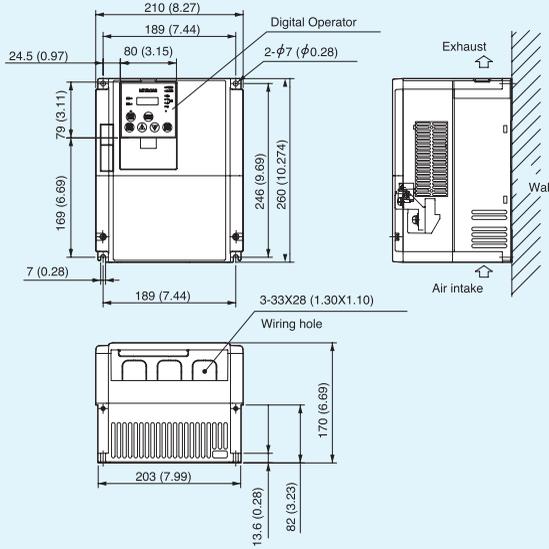
● SJ700-150-220 LFUF2/HFEF2, HFUF2



250 (9.84)
229 (9.02)
2-φ7 (φ0.28)
24.5 (0.97)
80 (3.15)
Digital Operator
79 (3.11)
273.4 (10.75)
376 (14.80)
390 (15.35)
7 (0.28)
229 (9.02)
3-42X42.5 (1.65X1.67)
Wiring hole
33 (3.27)
190 (7.48)
244 (9.61)
9.5 (0.37)
Exhaust
Wall
Air intake
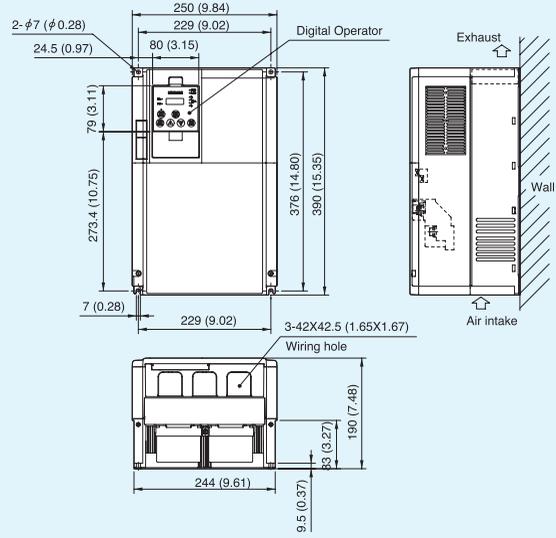
● SJ700-300 LFUF2/HFEF2, HFUF2



45 (1.77)
80 (3.15)
Digital Operator
2-φ10 (φ0.39)
79 (3.11)
368 (14.49)
510 (20.08)
540 (21.26)
10 (0.39)
265 (10.43)
310 (12.20)
5-φ25 (φ0.98)
Wiring Hole
195 (7.68)
Exhaust
Wall
Air intake

● SJ700-370-450 LFUF2/370-550HFEF2, HFUF2



32.5 (1.28)
80 (3.15)
Digital Operator
2-φ12 (φ0.47)
79 (3.11)
277 (10.91)
520 (20.47)
550 (21.65)
12 (0.47)
300 (11.81)
390 (15.35)
5-φ41 (φ1.61)
Wiring Hole
250 (9.84)
Exhaust
Wall
Air intake

● SJ700-550 LFUF2



125 (4.92)
80 (3.15)
Digital Operator
2-φ12 (φ0.47)
79 (3.11)
352 (13.87)
670 (26.38)
700 (27.56)
2-12 (0.47)
380 (14.96)
480 (18.90)
6-φ41 (φ1.61)
Wiring hole
250 (9.84)
Exhaust
Wall
Air intake

[Unit : mm (inch)]
Inches for reference only.

# OPERATION and PROGRAMMING

SJ700 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. Multilingual (English, French, German, Italian , Spanish and Portuguese) operator with copy function (SRW-0EX) and digital operator with potentiometer are also available as options.

**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

Power on

(1) *0.00* or the value previously monitored is displayed.

Press (FUNC) key.

(2) Function code appears.

Press △ ▽ until *F001* appears.

(3) *F001* appears.

Press (FUNC) key.

(4) Preset value is displayed.

Press △ ▽ to set desired value.

(5) Newly set value is displayed.

Press (STR) key to store the value.

(6) Returns to *F001* and the setting is complete.

*To run the motor, go back to monitor mode or basic setting mode.

## ● 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 to d104 | 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 |

# TERMINALS

## MAIN CIRCUIT TERMINALS

### ● Terminal Description

| Terminal Symbol | Terminal Name |
|---|---|
| R(L1), S(L2), T(L3) | Main power supply input terminals |
| U(T1), V(T2), W(T3) | Inverter output terminals |
| PD(+1), P(+) | DC reactor connection terminals |
| P(+), RB(RB) | External braking resistor connection terminals |
| P(+), N(−) | External braking unit connection terminals |
| ⏚ (G) | Ground connection terminal |
| R0(R0), T0(T0) | Control power supply input terminals |

### ● Terminal Arrangement

■ 055−220LFUF2/HFEF2, HFUF2

| RB (RB) | R0 (R0) | T0 (T0) |
|---|---|---|

| R (L1) | S (L2) | T (L3) | PD (+1) | P (+) | N (−) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|---|---|---|

⏚(G)                    ⏚(G)

■ 300−370LFUF2
300−550HFEF2, HFUF2

| R0 (R0) | T0 (T0) |
|---|---|

| ⏚(G) | R (L1) | S (L2) | T (L3) | PD (+1) | P (+) | N (−) | U (T1) | V (T2) | W (T3) | ⏚(G) |
|---|---|---|---|---|---|---|---|---|---|---|

■ 450−550LFUF2

| R0 (R0) | T0 (T0) |
|---|---|

| R (L1) | S (L2) | T (L3) | PD (+1) | P (+) | N (−) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|---|---|---|

⏚(G)                    ⏚(G)
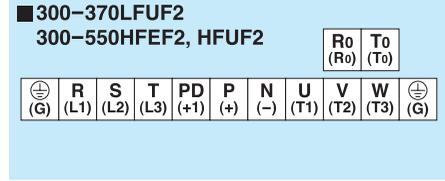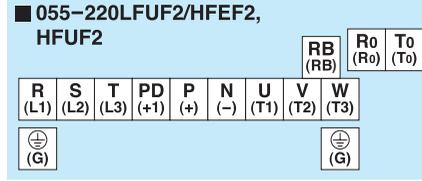
### ● Screw Diameter and Terminal Width
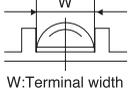
W:Terminal width

| Model | Screw diameter | Terminal width (mm) |
|---|---|---|
| 055,075LFUF2/HFEF2, HFUF2 | M5 | 18 |
| 110LFUF2/HFEF2, HFUF2 | M6 | 18 |
| 150,185LFUF2/150-300HFEF2, HFUF2 | M6 | 23 |
| 220,300LFUF2 | M8 | 23 *1 |
| 370,450LFUF2/370-550HFEF2, HFUF2 | M8 | 29 |
| 550LFUF2 | M10 | 40 *2 |
| R0T0 terminals (All models) | M4 | 9 |

*1 Ground Screw diameter is M6
*2 Ground Screw diameter is M8

## CONTROL CIRCUIT TERMINALS

### ● 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
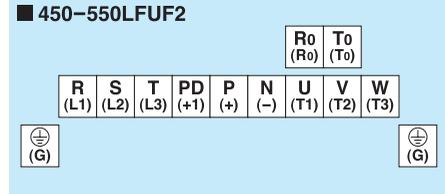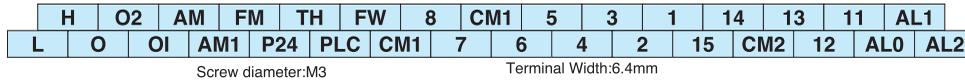
### ● Terminal Description

| | | 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 | 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 | 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. | 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. [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. |
| | Contact Input — Functions | 1 2 3 4 5 6 7 8 | Intelligent Input Terminals | Assign 8 functions to terminals. (Refer to the standard specifications for the functions.) | [Input OFF condition] Voltage between each terminal and PLC: DC 3V max. Input impedance between each terminal and PLC: 4.7Ω |
| | Contact Input — Common Terminal | PLC | Common Terminal for Intelligent Input Terminals, Common Terminal for External Power Supply for PLCs, etc. | 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. | Allowable maximum voltage between each terminal and PLC: DC 27V |
| | Open Collector Output — State | 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 |
| | Open Collector Output | CM2 | Common Terminal for Intelligent Output Terminals | Common terminal for intelligent output terminal 11-15. | Allowable maximum current: 50mA |
| **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 DC0−8V [Input Circuit] DC8V 10kΩ TH Thermistor CM1 1kΩ |
| **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) DC 30V, 8A(R load)/0.6A(L load) AL2-AL0: AC 250V, 1A(R load)/0.2A(L load) DC 30V, 1A(R load)/0.2A(L load) Minimum capacity of relays AL1-AL0, AL2-AL0: AC100V, 10mA  DC5V, 100mA |

## ●MONITORING FUNCTIONS and MAIN PROFILE PARAMETERS

[○= Allowed ✕= Not permitted]

| | Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| Monitor Mode | d001 | Output frequency monitor | 0.00 to 99.99, 100.0 to 400.0 (Hz) | - | - | ○ | - |
| | d002 | Output current monitor | 0.0 to 999.9, 1000 to 9999 (A) | - | - | - | - |
| | d003 | Rotation direction minitoring | F (forward rotation), o (stopped), r (reverse rotation) | - | - | - | - |
| | d004 | Process variable (PV), PID feedback monitor | 0.00 to 99.99, 100.0 to 999.9, 1000. to 9999. 1000 to 9999 (10000 to 99990), ⌈100 to ⌈999 (10000 to 999000) | - | - | - | - |
| | d005 | Intelligent input terminal status | (Example) FW, 7, 2, 1 : ON / 8, 6, 5, 4, 3 : OFF | - | - | - | - |
| | d006 | Intelligent output terminal status | (Example) 12, 11 : ON / AL, 15, 14, 13 :OFF | - | - | - | - |
| | d007 | Scaled output frequency monitoring | 0.00 to 99.99, 100.0 to 999.9, 1000. to 9999., 1000 to 3996 (10000 to 39960) | - | - | ○ | - |
| | d008 | Actual-frequency monitoring | -400. to -100., -99.9 to 0.00 to 99.99, 100.0 to 400.0 (Hz) | - | - | - | - |
| | d009 | Torque command monitoring | -200. to +200. (%) | - | - | - | - |
| | d010 | Torque bias monitoring | -200. to +200. (%) | | | - | - |
| | d012 | Torque monitoring | -200. to +200. (%) | - | - | - | - |
| | d013 | Output voltage monitoring | 0.0 to 600.0 (V) | - | - | - | - |
| | d014 | Power monitoring | 0.0 to 999.9 (kW) | - | - | - | - |
| | d015 | Cumulative power monitoring | 0.0 to 999.9, 1000. to 9999..1000 to 9999 (10000 to 99990), ⌈100 to ⌈999 (100000 to 999000) | - | - | - | - |
| | d016 | Cumulative operation RUN time monitoring | 0. to 9999., 1000 to 9999 (10000 to 99990), ⌈100 to ⌈999 (10000 to 9990000) (hr) | - | - | - | - |
| | d017 | Cumulative power-on time monitoring | 0. to 9999., 1000 to 9999 (10000 to 99990), ⌈100 to ⌈999 (10000 to 999000) (hr) | - | - | - | - |
| | d018 | Heat sink temperature monitoring | -020. to 200.0 (℃) | - | - | - | - |
| | d019 | Motor temperature monitoring | -020. to 200.0 (℃) | - | - | - | - |
| | d022 | Life-check monitoring | 1: Capacitor on main circuit board / 2: Cooling-fan speed drop | - | - | - | - |
| | d023 | Program counter | 0 to 512 | - | - | - | - |
| | d024 | Program number monitoring | 0000 to 9999 | - | - | - | - |
| | d025 | User monitor 0 | -2147483647 to 2147483647 (upper 4 digits including "-") | - | - | - | - |
| | d026 | User monitor 1 | -2147483647 to 2147483647 (upper 4 digits including "-") | - | - | - | - |
| | d027 | User monitor 2 | -2147483647 to 2147483647 (upper 4 digits including "-") | - | - | - | - |
| | d028 | Pulse counter | 0 to 2147483647 (upper 4 digits) | - | - | - | - |
| | d029 | Position setting monitor | -1073741823 to 1073741823 (upper 4 digits including "-") | - | - | - | - |
| | d030 | Position feedback monitor | -1073741823 to 1073741823 (upper 4 digits including "-") | - | - | - | - |
| | d080 | Trip Counter | 0. to 9999., 1000 to 6553 (10000 to 65530) (times) | - | - | - | - |
| | d081 d086 | Trip monitoring 1-6 | 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 to 999.9 (V) | - | - | - | - |
| | d103 | BRD load factor monitoring | 0.0 to 100.0 (%) | - | - | - | - |
| | d104 | Electronic thermal overload monitoring | 0.0 to 100.0 (%) | - | - | - | - |
| Setting Mode | F001 | Output frequency setting | 0.0, "start frequency" to "maximum frequency" (or maximum frequency, 2nd/3rd motors) (Hz) 0.0 to 100.0 (when PID function is enabled) | 0.00Hz | 0.00Hz | ○ | ○ |
| | F002 | Acceleration (1) time setting | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F202 | Acceleration (1) time setting, 2nd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F302 | Acceleration (1) time setting, 3rd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F003 | Deceleration (1) time setting | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F203 | Deceleration time setting, 2nd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F303 | Deceleration time setting, 3rd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 30.00s | 30.00s | ○ | ○ |
| | F004 | Keypad Run key routing | 00 (forward rotation), 01 (reverse rotation) | 00 | 00 | ✕ | ✕ |
| Expanded Function | A--- | A Group: Standard functions | | | | | |
| | b--- | b Group: Fine tuning functions | | | | | |
| | C--- | C Group: Intelligent terminal functions | | | | | |
| | H--- | H Group: Motor constants functions | | | | | |
| | P--- | P Group: Expansion card functions | | | | | |
| | U--- | U Group: User-selectable menu functions | | | | | |

## ●A GROUP: STANDARD FUNCTIONS

[○= Allowed ✕= Not permitted]

| | Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | 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 (operation function result) | 01 | 01 | ✕ | ✕ |
| | A002 | Run command source setting | 01 (control circuit terminal block), 02 (digital operator), 03 (RS485), 04 (option 1), 05 (option 2) | 01 | 01 | ✕ | ✕ |
| | A003 | Base frequency setting | 30. to "maximum frequency " (Hz) | 50. | 60. | ✕ | ✕ |
| | A203 | Base frequency setting, 2nd motor | 30. to "maximum frequency, 2nd motor" (Hz) | 50. | 60. | ✕ | ✕ |
| | A303 | Base frequency setting, 3rd motor | 30. to "maximum frequency, 3rd motor" (Hz) | 50. | 60. | ✕ | ✕ |
| | A004 | Maximum frequency setting | 30. to 400. (Hz) | 50. | 60. | ✕ | ✕ |
| | A204 | Maximum frequency setting, 2nd motor | 30. to 400. (Hz) | 50. | 60. | ✕ | ✕ |
| | A304 | Maximum frequency setting, 3rd motor | 30. to 400. (Hz) | 50. | 60. | ✕ | ✕ |
| 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 | 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 | 03 | ✕ | ✕ |
| | A011 | O-L input active range start frequency | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| | A012 | O-L input active range end frequency | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |

*1 This setting is valid only when the OPE-SR is connected.

| | Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| Analog input and others | A013 | O-L input active range start voltabe | 0. to "[O]-[L] input active range end voltage" (%) | 0. | 0. | × | ○ |
| | A014 | O-L input active range end voltabe | "[O]-[L] input active range start voltage" to 100. (%) | 100. | 100. | × | ○ |
| | A015 | O-L input active range start frequency selection | 00 (external start frequency), 01 (0 Hz) | 01 | 01 | × | ○ |
| | A016 | External frequency filter time constant | 1. to 30. or 31. (500 ms filter ±0.1 Hz with hysteresis) | 31. | 31. | × | ○ |
| | A017 | Easy sequence function selection | 00 (disabling), 01 (enabling) | 00 | 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 | 00 | × | × |
| | A020 | Multispeed frequency setting | 0.0 or "start frequency" to "maximum frequency" (Hz) | 0.00 | 0.00 | ○ | ○ |
| | A220 | Multispeed frequency setting, 2nd motor | 0.0 or "start frequency" to "maximum frequency, 2nd motor" (Hz) | 0.00 | 0.00 | ○ | ○ |
| | A320 | Multispeed frequency setting, 3rd motor | 0.0 or "start frequency" to "maximum frequency, 3rd motor" (Hz) | 0.00 | 0.00 | ○ | ○ |
| | A021 \| A035 | Multispeed 1-15 setting | 0.0 or "start frequency" to "n-th maximum frequency" (Hz) | 0.00 | 0.00 | ○ | ○ |
| | A038 | Jog frequency setting | "Start frequency" to 9.99 (Hz) | 1.00 | 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 | 00 | × | ○ |
| V/f Characteristic | A041 | Torque boost method selection | 00(Manual torque boost) / 01(Automatic torque boost) | 00 | 00 | × | × |
| | A241 | Torque boost method selection, 2nd motor | 00(Manual torque boost) / 01(Automatic torque boost) | 00 | 00 | × | × |
| | A042 | Manual torque boost value | 0.0 to 20.0 (%) | 1.0 | 1.0 | ○ | ○ |
| | A242 | Manual torque boost value, 2nd motor | 0.0 to 20.0 (%) | 1.0 | 1.0 | ○ | ○ |
| | A342 | Manual torque boost value, 3rd motor | 0.0 to 20.0 (%) | 1.0 | 1.0 | ○ | ○ |
| | A043 | Manual torque boost frequency adjustment | 0.0 to 50.0 (%) | 5.0 | 5.0 | ○ | ○ |
| | A243 | Manual torque boost frequency adjustment, 2nd motor | 0.0 to 50.0 (%) | 5.0 | 5.0 | ○ | ○ |
| | A343 | Manual torque boost frequency adjustment, 3rd motor | 0.0 to 50.0 (%) | 5.0 | 5.0 | ○ | ○ |
| | A044 | V/F characteristic curve selection, 1st motor | 00 (VC), 01 (VP), 02 (free V/f), 03 (sensorless vector control), 04 (0Hz-range sensorless vector), 05 (vector with sensor) | 00 | 00 | × | × |
| | A244 | V/F characteristic curve selection, 2nd motor | 00 (VC), 01 (VP), 02 (free V/f), 03 (sensorless vector control), 04 (0Hz-range sensorless vector) | 00 | 00 | × | × |
| | A344 | V/F characteristic curve selection, 3rd motor | 00(VC), 01(VP) | 00 | 00 | × | × |
| | A045 | V/f gain setting | 20. to 100. (%) | 100. | 100. | ○ | ○ |
| | A046 | Voltage compensation gain setting for automatic torque boost. 1st motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | A246 | Voltage compensation gain setting for automatic torque boost. 2nd motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | A047 | Slippage compensation gain setting for automatic torque boost, 1st motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | A247 | Slippage compensation gain setting for automatic torque boost, 2nd motor | 0. to 255. | 100. | 100. | ○ | ○ |
| DC Braking | A051 | DC braking enable | 00 (disabling), 01 (enabling), 02 (set frequency only) | 00 | 00 | × | ○ |
| | A052 | DC braking frequency setting | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.50 | 0.50 | × | ○ |
| | A053 | DC braking wait time | 0.0 to 5.0 (s) | 0.0 | 0.0 | × | ○ |
| | A054 | DC braking force during deceleration | 0. to 100. (%) | 0 | 0 | × | ○ |
| | A055 | DC braking time for deceleration | 0.0 to 60.0 (s) | 0.0 | 0.0 | × | ○ |
| | A056 | DC braking/edge or level detection for [DB] input | 00 (edge operation), 01 (level operation) | 01 | 01 | × | ○ |
| | A057 | DC braking force for starting | 0. to 100.(%) | 0. | 0. | × | ○ |
| | A058 | DC braking time for starting | 0.0 to 60.0(s) | 0.0 | 0.0 | × | ○ |
| | A059 | DC braking carrier frequency setting | 0.5 to 15.0(kHz) | 5.0 | 5.0 | × | × |
| 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 | 0.01 | × | ○ |
| | A261 | Frequency upper limit setting, 2nd motor | 0.00 or "2nd minimum frequency limit" to "maximum frequency, 2nd motor" (Hz) | 0.00 | 0.00 | × | ○ |
| | A062 | Frequency lower limit setting | 0.00 or "start frequency" to "maximum frequency limit" (Hz) | 0.00 | 0.00 | × | ○ |
| | A262 | Frequency lower limit setting, 2nd motor | 0.00 or "start frequency" to "maximum frequency, 2nd motor limit" (Hz) | 0.00 | 0.00 | × | ○ |
| | A063 | Jump (center) frequency setting 1 | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | ○ |
| | A064 | Jump (hysteresis) frequency width setting 1 | 0.00 to 10.00 (Hz) | 0.50 | 0.50 | × | ○ |
| | A065 | Jump (center) frequency setting 2 | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | ○ |
| | A066 | Jump (hysteresis) frequency width setting 2 | 0.00 to 10.00 (Hz) | 0.50 | 0.50 | × | ○ |
| | A067 | Jump (center) frequency setting 3 | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | ○ |
| | A068 | Jump (hysteresis) frequency width setting 3 | 0.00 to 10.00 (Hz) | 0.50 | 0.50 | × | ○ |
| | A069 | Acceleration stop time frequency setting | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | ○ |
| | A070 | Acceleration stop time frequency setting | 0.0 to 60.0 (s) | 0.0 | 0.0 | × | ○ |
| PID Control | A071 | PID function enable | 00 (disabling), 01 (enabling), 02 (enabling inverted-data output) | 00 | 00 | × | ○ |
| | A072 | PID proportional gain | 0.2 to 5.0 | 1.0 | 1.0 | ○ | ○ |
| | A073 | PID integral time constant | 0.0 to 999.9, 1000. to 3600.0 (s) | 1.0 | 1.0 | ○ | ○ |
| | A074 | PID derivative gain | 0.00 to 99.99, 100.0 (s) | 0.0 | 0.0 | ○ | ○ |
| | A075 | PV scale conversion | 0.01 to 99.99 | 1.00 | 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 | 00 | × | ○ |
| | A077 | Output of inverted PID deviation | 00(OFF), 01 (ON) | 00 | 00 | × | ○ |
| | A078 | PID variation range | 0.0 to 100.0 (%) | 0.00 | 0.00 | × | ○ |
| AVR | A081 | AVR function select | 00 (always on), 01 (always off), 02 (off during deceleration) | 00 | 00 | × | × |
| | A082 | AVR voltage select | 200 V class: 200, 215, 220, 230, 240 (V)　400 V class: 380, 400, 415, 440, 460, 480 (V) | 230/400 | 230/460 | × | × |
| Operation Mode and acceleration/deceleration function | A085 | Operation mode selection | 00(Normal operation)/ 01(Energy-saving operation)/ 02(Fuzzy operation) | 00 | 00 | × | × |
| | A086 | Energy saving mode tuning | 0.1 to 100.0 | 50.0 | 50.0 | ○ | ○ |
| | A092 | Acceleration (2) time setting | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 15.00 | ○ | ○ |
| | A292 | Acceleration (2) time setting, 2nd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 15.00 | ○ | ○ |
| | A392 | Acceleration (2) time setting, 3rd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 15.00 | ○ | ○ |
| | A093 | Deceleration (2) time setting | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 15.00 | ○ | ○ |
| | A293 | Deceleration (2) time setting, 2nd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 15.00 | ○ | ○ |
| | A393 | Deceleration (2) time setting, 3rd motor | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 15.00 | 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 | 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 | 00 | × | × |
| | A095 | Acc1 to Acc2 frequency transition point | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | × |
| | A295 | Acc1 to Acc2 frequency transition point, 2nd motor | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | × |
| | A096 | Dec1 to Dec2 frequency transition point | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | × |
| | A296 | Dec1 to Dec2 frequency transition point, 2nd motor | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | × |
| | A097 | Acceleration curve selection | 00 (linear), 01 (S curve), 02 (U curve), 03 (inverted-U curve), 04 (EL-S curve) | 00 | 00 | × | × |
| | A098 | Deceleration curve selection | 00 (linear), 01 (S curve), 02 (U curve), 03 (inverted-U curve), 04 (EL-S curve) | 00 | 00 | × | × |
| External frequency adjustment | A101 | OI-L input active range start frequency | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | × |
| | A102 | OI-L input active range end frequency | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | × | ○ |
| | A103 | OI-L input active range start current | 0. to "[OI]-[L] input active range end current" (%) | 20. | 20. | × | ○ |
| | A104 | OI-L input active range end current | "[OI]-[L] input active range start current" to 100. (%) | 100. | 100. | × | ○ |

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| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| A105 | OI-L input start frequency enable | 00 (external start frequency), 1 (0 Hz) | 00 | 00 | ✕ | ○ |
| A111 | O2-L input active range start frequency | -400. to -100., -99.9 to 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| A112 | O2-L input active range end frequency | -400. to -100., -99.9 to 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| A113 | O2-L input active range start voltage | -100. to 02 end-frequency rate (%) | -100. | -100. | ✕ | ○ |
| A114 | O2-L input active range end voltage | "02 start-frequency rate" to 100. (%) | 100. | 100. | ✕ | ○ |
| A131 | Acceleration curve constants setting | 01 (smallest swelling) to 10 (largest swelling) | 02 | 02 | ✕ | ○ |
| A132 | Deceleration curve constants setting | 01 (smallest swelling) to 10 (largest swelling) | 02 | 02 | ✕ | ○ |
| 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 | 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 | 03 | ✕ | ○ |
| A143 | Operator selection | 00 (addition: A141 + A142), 01 (subtraction: A141 - A142), 02 (multiplication: A141 x A142) | 00 | 00 | ✕ | ○ |
| A145 | Frequency to be added | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| A146 | Sign of the frequency to be added | 00 (frequency command + A145), 01 (frequency command - A145) | 00 | 00 | ✕ | ○ |
| A150 | EL-S-curve acceleration ratio 1 | 0. to 50. (%) | 25. | 25. | ✕ | ✕ |
| A151 | EL-S-curve acceleration ratio 2 | 0. to 50. (%) | 25. | 25. | ✕ | ✕ |
| A152 | EL-S-curve deceleration ratio 1 | 0. to 50. (%) | 25. | 25. | ✕ | ✕ |
| A153 | EL-S-curve deceleration ratio 2 | 0. to 50. (%) | 25. | 25. | ✕ | ✕ |

## ●B GROUP: FINE TUNING FUNCTIONS

| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| 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 | 00 | ✕ | ○ |
| b002 | Allowable under-voltage power failure time | 0.3 to 25.0 (s) | 1.0 | 1.0 | ✕ | ○ |
| b003 | Retry wait time before motor restart | 0.3 to 100.0 (s) | 1.0 | 1.0 | ✕ | ○ |
| b004 | Instantaneous power failure/under-voltage trip alarm enable | 00 (disabling), 01 (enabling), 02 (disabling during stopping and decelerating to stop) | 00 | 00 | ✕ | ○ |
| b005 | Number of restarts on power failure/under-voltage trip events | 00 (16 times), 01 (unlimited) | 00 | 00 | ✕ | ○ |
| b006 | Phase loss detection enable | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ○ |
| b007 | Restart frequency threshold | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 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 | 00 | ✕ | ○ |
| b009 | Selection of retry after undervoltage | 00 (16 times), 01 (unlimited) | 00 | 00 | ✕ | ○ |
| b010 | Selection of retry count after overvoltage or overcurrent | 1 to 3 (times) | 3 | 3 | ✕ | ○ |
| b011 | Retry wait time after tripping | 0.3 to 100.0 (s) | 1.0 | 1.0 | ✕ | ○ |
| 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 of inverterx 1..0 | | ✕ | ○ |
| 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 of inverterx 1..0 | | ✕ | ○ |
| 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 of inverterx 1..0 | | ✕ | ○ |
| b013 | Electronic thermal characteristic | 00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting) | 01 | 01 | ✕ | ○ |
| b213 | Electronic thermal characteristic, 2nd motor | 00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting) | 01 | 01 | ✕ | ○ |
| b313 | Electronic thermal characteristic, 3rd motor | 00 (reduced-torque characteristic), 01 (constant-torque characteristic), 02 (free setting) | 01 | 01 | ✕ | ○ |
| b015 | Free-setting electronic thermal frequency (1) | 0. to 400. (Hz) | 0. | 0. | ✕ | ○ |
| b016 | Free-setting electronic thermal current (1) | 0.00 to rated current (A) | 0.0 | 0.0 | ✕ | ○ |
| b017 | Free-setting electronic thermal frequency (2) | 0. to 400. (Hz) | 0. | 0. | ✕ | ○ |
| b018 | Free-setting electronic thermal current (2) | 0.00 to rated current (A) | 0.0 | 0.0 | ✕ | ○ |
| b019 | Free-setting electronic thermal frequency (3) | 0. to 400. (Hz) | 0. | 0. | ✕ | ○ |
| b020 | Free-setting electronic thermal current (3) | 0.00 to rated current (A) | 0.0 | 0.0 | ✕ | ○ |
| 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 | 01 | ✕ | ○ |
| b022 | Overload restriction setting | 0.20 x "rated current" to 1.00 x "rated current" (A) | Rated current x 1.50 | | ✕ | ○ |
| b023 | Deceleration rate at overload restriction | 0.10 to 30.00 (s) | 1.00 | 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 | 01 | ✕ | ○ |
| b025 | Overload restriction setting (2) | 0.20 x "rated current" to 2.00 x "rated current" (A) | Rated current x 1.50 | | ✕ | ○ |
| b026 | Deceleration rate at overload restriction (2) | 0.10 to 30.00 (s) | 1.00 | 1.00 | ✕ | ○ |
| b027 | Overcurrent suppression enable | 00 (disabling), 01 (enabling) | 01 | 01 | ✕ | ○ |
| b028 | Active frequency matching, scan start frequency | 0.20 x "rated current" to 2.00 x "rated current" (A) | Rated current of inverterx 1..0 | | ✕ | ○ |
| b029 | Active frequency matching, scan-time constant | 0.10 to 30.00 (s) | 0.50 | 0.50 | ✕ | ○ |
| b030 | Active frequency matching, restart frequency select | 00 (frequency at the last shutoff), 01 (maximum frequency), 02 (set frequency) | 00 | 00 | ✕ | ○ |
| 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 | 01 | ✕ | ○ |
| b034 | RUN/ power-on warning time | 0. to 9999. (0 to 99990), 1000 to 6553 (10000 to 655300) (hr) | 0. | 0. | ✕ | ○ |
| b035 | Rotational direction restriction | 00 (enabling both forward and reverse rotations), 01 (enabling only forward rotation), 02 (enabling only reverse rotation) | 00 | 00 | ✕ | ✕ |
| b036 | Reduced voltage start selection | 0 (minimum reduced voltage start time) to 255 (maximum reduced voltage start time) | 06 | 06 | ✕ | ○ |
| b037 | Function code display restriction | 00 (full display), 01 (function-specific display), 02 (user setting), 03 (data comparison display), 04 (basic display) | 04 | 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 | 01 | ✕ | ○ |
| b039 | Automatic user-parameter setting function enable | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ○ |
| b040 | Torque limit selection | 00 (quadrant-specific setting), 01 (switching by terminal), 02 (analog input), 03 (option 1), 04 (option 2) | 00 | 00 | ✕ | ○ |
| b041 | Torque limit(1) (Forward-driving in 4-quadrant mode) | 0. to 200. (%), no (disabling torque limitation) | 150. | 150. | ✕ | ○ |
| b042 | Torque limit(2) (Reverse-regenerating in 4-quadrant mode) | 0. to 200. (%), no (disabling torque limitation) | 150. | 150. | ✕ | ○ |
| b043 | Torque limit(3) (Reverse-driving in 4-quadrant mode) | 0. to 200. (%), no (disabling torque limitation) | 150. | 150. | ✕ | ○ |
| b044 | Torque limit(4) (Forward-regenerating in 4-quadrant mode) | 0. to 200. (%), no (disabling torque limitation) | 150. | 150. | ✕ | ○ |
| b045 | Torque limit LADSTOP enable | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ○ |
| b046 | Reverse RUN protection enable | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ○ |
| b050 | Controlled deceleration and stop on power loss | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ✕ |
| b051 | DC bus voltage trigger level during power loss | 0.0 to 999.9, 1000. (V) | 0.0 | 0.0 | ✕ | ✕ |
| b052 | Over-voltage threshold during power loss | 0.0 to 999.9, 1000. (V) | 0.0 | 0.0 | ✕ | ✕ |
| b053 | Deceleration time setting during power loss | 0.01 to 99.99, 100.0 to 999.9, 1000. to 3600. (s) | 1.00 | 1.00 | ✕ | ✕ |
| b054 | Initial output frequency decrease during power loss | 0.00 to 10.00 (Hz) | 0.00 | 0.00 | ✕ | ✕ |
| b055 | Proportional gain setting for nonstop operation at power loss | 0.00 to 2.55 | 0.20 | 0.20 | ○ | ○ |

[O= Allowed ✕= Not permitted]

| Code | | Function Name | Monitored data or setting | Default Setting -FE(CE) | -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| Window comparator | b056 | Integral time setting for nonstop operation at power loss | 0.0 to 9.999 /10.00 to 65.55 | 0.100 | 0.100 | ○ | ○ |
| | b060 | Maximum-limit level of window comparators O | 0. to 100. (lower limit : b061 + b062 / 2) (%) | 100 | 100 | ○ | ○ |
| | b061 | Minimum-limit level of window comparators O | 0. to 100. (lower limit : b060 - b062 / 2) (%) | 0 | 0 | ○ | ○ |
| | b062 | Hysteresis width of window comparators O | 0. to 10. (lower limit : b061 - b062 / 2) (%) | 0 | 0 | ○ | ○ |
| | b063 | Maximum-limit level of window comparators OI | 0. to 100. (lower limit : b064 + b066 / 2) (%) | 100 | 100 | ○ | ○ |
| | b064 | Minimum-limit level of window comparators OI | 0. to 100. (lower limit : b063 - b066 / 2) (%) | 0 | 0 | ○ | ○ |
| | b065 | Hysteresis width of window comparators OI | 0. to 10. (lower limit : b063 - b064 / 2) (%) | 0 | 0 | ○ | ○ |
| | b066 | Maximum-limit level of window comparators OI | -100. to 100. (lower limit : b067 + b068 / 2) (%) | 100 | 100 | ○ | ○ |
| | b067 | Minimum-limit level of window comparators O/OI/O2 | -100. to 100. (lower limit : b066 - b068 / 2) (%) | -100 | -100 | ○ | ○ |
| | b068 | Hysteresis width of window comparators O/OI/O2 | 0. to 10. (lower limit : b066 - b067 / 2) (%) | 0 | 0 | ○ | ○ |
| | b070 | Operation level at O disconnection | 0 to 100 (%) or "no" (ignore) | 255(no) | 255(no) | ✕ | ○ |
| | b071 | Operation level at OI disconnection | 0 to 100 (%) or "no" (ignore) | 255(no) | 255(no) | ✕ | ○ |
| | b072 | Operation level at O2 disconnection | 0 to 100 (%) or "no" (ignore) | 127(no) | 127(no) | ✕ | ○ |
| Others | b078 | Cumulative input power data clearance | Clearance by setting "01" and pressing the STR key | 00 | 00 | ○ | ○ |
| | b079 | Cumulative input power display gain setting | 1. to 1000. | 1. | 1. | ✕ | ✕ |
| | b082 | Start frequency adjustment | 0.10 to 9.99 (Hz) | 0.50 | 0.50 | ✕ | ○ |
| | b083 | Carrier frequency setting | 0.5 to 15.0 (kHz) (subject to derating) | 5.0 | 5.0 | ✕ | ✕ |
| | 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 | 00 | ✕ | ✕ |
| | b085 | Country code for initialization | 00 (Japan), 01 (EU), 02 (U.S.A.) | 01 | 01 | ✕ | ✕ |
| | b086 | Frequency scaling conversion factor | 0.1 to 99.0 | 1.0 | 1.0 | ○ | ○ |
| | b087 | STOP key enable | 00 (enabling), 01 (disabling), 02 (disabling only the function to stop) | 00 | 00 | ✕ | ○ |
| | b088 | Restart mode after FRS | 00 (starting with 0 Hz), 01 (starting with matching frequency), 02 (starting with active matching frequency) | 00 | 00 | ✕ | ○ |
| | b089 | Automatic carrier frequency reduction | 00: invalid, 01: valid | 00 | 00 | ✕ | ✕ |
| | b090 | Dynamic braking usage ratio | 0.0 to 100.0 (%) | 0.0 | 0.0 | ✕ | ○ |
| | b091 | Stop mode selection | 00 (deceleration until stop), 01 (free-run stop) | 00 | 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 | 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 | 00 | ✕ | ○ |
| | b096 | Dynamic braking activation level | 330 to 380, 660 to 760(V) | 360/720 | 360/720 | ✕ | ○ |
| | b098 | Thermistor for thermal protection control | 00 (disabling the thermistor), 01 (enabling the thermistor with PTC), 02 (enabling the thermistor with NTC) | 00 | 00 | ✕ | ○ |
| | b099 | Thermal protection level setting | 0. to 9999. (Ω) | 3000. | 3000. | ✕ | ○ |
| Free setting of V/f characteristic | b100 | Free-setting V/f frequency (1) | 0. to "free-setting V/f frequency (2)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b101 | Free-setting V/f voltage (1) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b102 | Free-setting V/f frequency (2) | 0. to "free-setting V/f frequency (3)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b103 | Free-setting V/f voltage (2) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b104 | Free-setting V/f frequency (3) | 0. to "free-setting V/f frequency (4)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b105 | Free-setting V/f voltage (3) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b106 | Free-setting V/f frequency (4) | 0. to "free-setting V/f frequency (5)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b107 | Free-setting V/f voltage (4) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b108 | Free-setting V/f frequency (5) | 0. to "free-setting V/f frequency (6)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b109 | Free-setting V/f voltage (5) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b110 | Free-setting V/f frequency (6) | 0. to "free-setting V/f frequency (7)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b111 | Free-setting V/f voltage (6) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| | b112 | Free-setting V/f frequency (7) | 0. to "free-setting V/f frequency (8)" (Hz) | 0. | 0. | ✕ | ✕ |
| | b113 | Free-setting V/f voltage (7) | 0.0 to 800.0 (V) | 0.0 | 0.0 | ✕ | ✕ |
| Others | b120 | Brake control enable | 00 (disabling), 01 (enabling) | 00 | 00 | ✕ | ○ |
| | b121 | Brake wait time for release | 0.00 to 5.00 (s) | 0.00 | 0.00 | ✕ | ○ |
| | b122 | Brake wait time for acceleration | 0.00 to 5.00 (s) | 0.00 | 0.00 | ✕ | ○ |
| | b123 | Brake wait time for stopping | 0.00 to 5.00 (s) | 0.00 | 0.00 | ✕ | ○ |
| | b124 | Brake wait time for confirmation | 0.00 to 5.00 (s) | 0.00 | 0.00 | ✕ | ○ |
| | b125 | Brake release frequency setting | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| | b126 | Brake release current setting | 0.0 to 2.00 x "rated current" | Rated current of inverter 1..0 | | ✕ | ○ |
| | b127 | Braking frequency | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| | b130 | Overvoltage suppression enable | 00 (disabling the restraint), 01 (decelerating and stagnating), 02 (enabling acceleration) | 00 | 00 | ✕ | ○ |
| | b131 | Overvoltage suppression level | 330 to 390 (V) (200 V class model), 660 to 780 (V) (400 V class model) | 380/760 | 380/760 | ✕ | ○ |
| | b132 | Acceleration and deceleration rate at overvoltage suppression | 0.10 to 30.00 (s) | 1.00 | 1.00 | ✕ | ○ |
| | b133 | Overvoltage suppression propotional gain | 0.00 to 2.55 | 0.50 | 0.50 | ○ | ○ |
| | b134 | Overvoltage suppression Integral time | 0.000 to 9.999 / 10.00 to 63.53 (s) | 0.060 | 0.060 | ○ | ○ |

## ●C GROUP: INTELLIGENT TERMINAL FUNCTIONS

[O= Allowed ✕= Not permitted]

| Code | | Function Name | Monitored data or setting | Default Setting -FE(CE) | -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| Intelligent input terminals | C001 | Terminal [1] function (*2) | 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: pre-excitation), 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(RS) | 18(RS) | ✕ | ○ |
| | C002 | Terminal [2] function | | 16(AT) | 16(AT) | ✕ | ○ |
| | C003 | Terminal [3] function (*2) | | 06(JG) | 06(JG) | ✕ | ○ |
| | C004 | Terminal [4] function | | 11(FRS) | 11(FRS) | ✕ | ○ |
| | C005 | Terminal [5] function | | 09(2CH) | 09(2CH) | ✕ | ○ |
| | C006 | Terminal [6] function | | 03(CF2) | 13(USP) | ✕ | ○ |
| | C007 | Terminal [7] function | | 02(CF1) | 02(CF1) | ✕ | ○ |
| | C008 | Terminal [8] function | | 01(RV) | 01(RV) | ✕ | ○ |

*2 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".

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| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | Default Setting -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| C011 | Terminal (1) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C012 | Terminal (2) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C013 | Terminal (3) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C014 | Terminal (4) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C015 | Terminal (5) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C016 | Terminal (6) active state | 00(NO) / 01(NC) | 00 | 01 | ✕ | ○ |
| C017 | Terminal (7) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C018 | Terminal (8) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C019 | Terminal FW active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| 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) | 01(FA1) | 01(FA1) | ✕ | ○ |
| C022 | Terminal (12) function | | 00(RUN) | 00(RUN) | ✕ | ○ |
| C023 | Terminal (13) function | | 03(OL) | 03(OL) | ✕ | ○ |
| C024 | Terminal (14) function | | 07(OTO) | 07(OTO) | ✕ | ○ |
| C025 | Terminal (15) function | | 40(WAF) | 40(WAF) | ✕ | ○ |
| C026 | Alarm relay terminal function | (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.) | 05(AL) | 05(AL) | ✕ | ○ |
| C027 | FM signal 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 | 00 | ✕ | ○ |
| C028 | AM signal 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 | 00 | ✕ | ○ |
| C029 | AMI signal 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 | 00 | ✕ | ○ |
| C030 | Digital current monitor reference value | 0.20 x "rated current" to 2.00 x "rated current" (A) (Current with digital current monitor output at 1,440 Hz) | Rated current of inverterx 1..0 | | ○ | ○ |
| C031 | Terminal (11) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C032 | Terminal (12) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C033 | Terminal (13) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C034 | Terminal (14) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C035 | Terminal (15) active state | 00(NO) / 01(NC) | 00 | 00 | ✕ | ○ |
| C036 | Alarm relay terminal active state | 00(NO) / 01(NC) | 01 | 01 | ✕ | ○ |
| 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 | 01 | ✕ | ○ |
| C039 | Low-current indication signal detection level | 0.0 to 2.00 x "rated current" (A) | Rated current of inverterx 1..0 | | ✕ | ○ |
| C040 | Overload signal output mode | 00 (output during acceleration/deceleration and constant-speed operation), 01 (output only during constant-speed operation) | 01 | 01 | ✕ | ○ |
| C041 | Overload level setting | 0.0 to 2.00 x "rated current" (A) | Rated current of inverterx 1..0 | | ✕ | ○ |
| C042 | Frequency arrival setting for accel. | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| C043 | Frequency arrival setting for decel. | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| C044 | PID deviation level setting | 0.0 to 100.0 (%) | 3.0 | 3.0 | ✕ | ○ |
| C045 | Frequency arrival setting for acceleration (2) | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| C046 | Frequency arrival setting for deceleration (2) | 0.00 to 99.99, 100.0 to 400.0 (Hz) | 0.00 | 0.00 | ✕ | ○ |
| C052 | Maximum PID feedback data | 0.0 to 100.0 (%) | 100.0 | 100.0 | ✕ | ○ |
| C053 | Minimum PID feedback data | 0.0 to 100.0 (%) | 0.0 | 0.0 | ✕ | ○ |
| C055 | Over-torque(Forward-driving) level setting | 0. to 200. (%) | 100. | 100. | ✕ | ○ |
| C056 | Over-torque(Reverse-regenerating) level setting | 0. to 200. (%) | 100. | 100. | ✕ | ○ |
| C057 | Over-torque(Reverse-driving) level setting | 0. to 200. (%) | 100. | 100. | ✕ | ○ |
| C058 | Over-torque(Forward-regenerating) level setting | 0. to 200. (%) | 100. | 100. | ✕ | ○ |
| C061 | Electronic thermal warning level setting | 0. to 100. (%) | 80. | 80. | ✕ | ○ |
| C062 | Alarm code input | 00(Disabled) / 01(3-bit) / 02(4-bit) | 00 | 00 | ✕ | ○ |
| C063 | Zero speed detection level | 0.00 to 99.99, 100.0 (Hz) | 0,00 | 0,00 | ✕ | ○ |
| C064 | Heat sink overheat warning level | 0. to 200.0 (℃) | 120. | 120. | ✕ | ○ |
| C071 | Communication speed selection | 02 (loopback test), 03 (2,400 bps), 04 (4,800 bps), 05 (9,600 bps), 06 (19,200 bps) | 04 | 04 | ✕ | ○ |
| C072 | Node allocation | 1. to 32. | 1. | 1. | ✕ | ○ |
| C073 | Communication data length selection | 7 (7 bits), 8 (8 bits) | 7 | 7 | ✕ | ○ |
| C074 | Communication parity selection | 00 (no parity), 01 (even parity), 02 (odd parity) | 00 | 00 | ✕ | ○ |
| C075 | Communication stop bit selection | 1 (1 bit), 2 (2 bits) | 1 | 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 | 02 | ✕ | ○ |
| C077 | Communication timeout limit before tripping | 0.00 to 99.99 (s) | 0.00 | 0.00 | ✕ | ○ |
| C078 | Communication wait time | 0. to 1000. (ms) | 0. | 0. | ✕ | ○ |
| C079 | Communication mode selection | 00(ASCII), 01(Modbus-RTU) | 00 | 00 | ✕ | ○ |
| C081 | O input span calibration | 0. to 9999., 1000 to 6553(10000 to 65530) | Factory set | | ✕ | ○ |
| C082 | OI input span calibration | 0. to 9999., 1000 to 6553(10000~65530) | | | ✕ | ○ |
| C083 | O2 input span calibration | 0. to 9999., 1000 to 6553(10000~65530) | | | ✕ | ○ |
| C085 | Thermistor input tuning | 0.0 to 999.9, 1000. | | | ✕ | ○ |
| C091 | Debug mode enable | (Do not change this parameter, which is intended for factory adjustment.) | 00 | 00 | ✕ | ✕ |
| C101 | UP/DOWN memory mode selection | 00 (not storing the frequency data), 01 (storing the frequency data) | 00 | 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]) | 00 | 00 | ○ | ○ |
| C103 | Restart mode after reset | 00 (starting with 0 Hz), 01 (starting with matching frequency), 02 (restarting with active matching frequency) | Rated current of inverterx 1..0 | | ✕ | ○ |
| C105 | FM gain adjustment | 50. to 200. (%) | 100. | 100. | ○ | ○ |
| C106 | AM gain adjustment | 50. to 200. (%) | 100. | 100. | ○ | ○ |

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| Code | | Function Name | Monitored data or setting | Default Setting | | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| | | | | -FE(CE) | -FU(UL) | | |
| Meter adjustment | C107 | AMI gain adjustment | 50. to 200. (%) | 100. | 100. | ○ | ○ |
| | C109 | AM bias adjustment | 0. to 100. (%) | 0. | 0. | ○ | ○ |
| | C110 | AMI bias adjustment | 0. to 100. (%) | 20. | 20. | ○ | ○ |
| Terminal | C111 | Overload setting (2) | 0.0 to 2.00 x "rated current" (A) | Rated current of inverterx 1..0 | | ✕ | ○ |
| Adjustment | C121 | O input zero calibration | 0. to 9999., 1000 to 6553 (10000 to 65530) | | | ○ | ○ |
| | C122 | OI input zero calibration | 0. to 9999., 1000 to 6553 (10000 to 65530) | Factory set | | ○ | ○ |
| | C123 | O2 input zero calibration | 0. to 9999., 1000 to 6553 (10000 to 65530) | | | ○ | ○ |
| Output terminal operation function | C130 | Output 11 on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ○ | ○ |
| | C131 | Output 11 off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C132 | Output 12 on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C133 | Output 12 off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C134 | Output 13 on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C135 | Output 13 off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C136 | Output 14 on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C137 | Output 14 off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C138 | Output 15 on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C139 | Output 15 off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C140 | Output RY on-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C141 | Output RY off-delay time | 0.0 to 100.0 (s) | 0.0 | 0.0 | ✕ | ○ |
| | C142 | Logical output signal 1 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C143 | Logical output signal 1 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C144 | Logical output signal 1 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| | C145 | Logical output signal 2 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C146 | Logical output signal 2 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C147 | Logical output signal 2 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| | C148 | Logical output signal 3 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C149 | Logical output signal 3 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C150 | Logical output signal 3 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| | C151 | Logical output signal 4 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C152 | Logical output signal 4 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C153 | Logical output signal 4 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| | C154 | Logical output signal 5 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C155 | Logical output signal 5 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C156 | Logical output signal 5 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| | C157 | Logical output signal 6 selection 1 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C158 | Logical output signal 6 selection 2 | Same as the settings of C021 to C026 (except those of LOG1 to LOG6) | 00 | 00 | ✕ | ○ |
| | C159 | Logical output signal 6 operator selection | 00 (AND), 01 (OR), 02 (XOR) | 00 | 00 | ✕ | ○ |
| Input terminal response | C160 | Input terminal response time setting 1 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C161 | Input terminal response time setting 2 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C162 | Input terminal response time setting 3 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C163 | Input terminal response time setting 4 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C164 | Input terminal response time setting 5 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C165 | Input terminal response time setting 6 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C166 | Input terminal response time setting 7 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C167 | Input terminal response time setting 8 | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| | C168 | Input terminal response time setting FW | 0. to 200. (×2ms) | 1 | 1 | ✕ | ○ |
| other | C169 | Multistage speed/position determination time | 0. to 200. (×10ms) | 0 | 0 | ✕ | ○ |

## ●H GROUP: MOTOR CONSTANTS FUNCTIONS

| Code | | Function Name | Monitored data or setting | Default Setting | | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|---|
| | | | | -FE(CE) | -FU(UL) | | |
| Control constants | H001 | Auto-tuning Setting | 00 (disabling auto-tuning), 01 (auto-tuning without rotation), 02 (auto-tuning with rotation) | 00 | 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 | 00 | ✕ | ✕ |
| | H202 | Motor data selection, 2nd motor | 00 (Hitachi standard data), 01 (auto-tuned data), 02 (auto-tuned data [with online auto-tuning function]) | 00 | 00 | ✕ | ✕ |
| | H003 | Motor capacity, 1st motor | 0.20 to 75.00 (kW) | | | ✕ | ✕ |
| | H203 | Motor capacity, 2nd motor | 0.20 to 75.00 (kW) | Factory set | | ✕ | ✕ |
| | H004 | Motor poles setting, 1st motor | 2, 4, 6, 8, 10 (poles) | 4 | 4 | ✕ | ✕ |
| | H204 | Motor poles setting, 2nd motor | 2, 4, 6, 8, 10 (poles) | 4 | 4 | ✕ | ✕ |
| | H005 | Motor speed constant, 1st motor | 0.001 to 9.999, 10.00 to 80.00 (10.000 to 80.000) | 1,590 | 1,590 | ○ | ○ |
| | H205 | Motor speed constant, 2nd motor | 0.001 to 9.999, 10.00 to 80.00 (10.000 to 80.000) | 1,590 | 1,590 | ○ | ○ |
| | H006 | Motor stabilization constant, 1st motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | H206 | Motor stabilization constant, 2nd motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | H306 | Motor stabilization constant, 3rd motor | 0. to 255. | 100. | 100. | ○ | ○ |
| | H020 | Motor constant R1, 1st motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H220 | Motor constant R1, 2nd motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H021 | Motor constant R2, 1st motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H221 | Motor constant R2, 2nd motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H022 | Motor constant L, 1st motor | 0.01 to 99.99, 100.0 to 655.3 (mH) | | | ✕ | ✕ |
| | H222 | Motor constant L, 2nd motor | 0.01 to 99.99, 100.0 to 655.3 (mH) | | | ✕ | ✕ |
| | H023 | Motor constant Io | 0.01 to 99.99, 100.0 to 655.3 (A) | | | ✕ | ✕ |
| | H223 | Motor constant Io, 2nd motor | 0.01 to 99.99, 100.0 to 655.3 (A) | | | ✕ | ✕ |
| | H024 | Motor constant J | 0.001 to 9.999, 10.00 to 99.99, 100.0 to 999.9, 1000. to 9999. | | | ✕ | ✕ |
| | H224 | Motor constant J, 2nd motor | 0.001 to 9.999, 10.00 to 99.99, 100.0 to 999.9, 1000. to 9999. | Depending on motor capacity | | ✕ | ✕ |
| | H030 | Auto constant R1, 1st motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H230 | Auto constant R1, 2nd motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H031 | Auto constant R2, 1st motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H231 | Auto constant R2, 2nd motor | 0.001 to 9.999, 10.00 to 65.53 (Ω) | | | ✕ | ✕ |
| | H032 | Auto constant L, 1st motor | 0.01 to 99.99, 100.0 to 655.3 (mH) | | | ✕ | ✕ |
| | H232 | Auto constant L, 2nd motor | 0.01 to 99.99, 100.0 to 655.3 (mH) | | | ✕ | ✕ |
| | H033 | Auto constant Io, 1st motor | 0.01 to 99.99, 100.0 to 655.3 (A) | | | ✕ | ✕ |
| | H233 | Auto constant Io, 2nd motor | 0.01 to 99.99, 100.0 to 655.3 (A) | | | ✕ | ✕ |

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| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| H034 | Auto constant J, 1st motor | 0.001 to 9.999, 10.00 to 99.99, 100.0 to 999.9, 1000. to 9999. | Depending on motor capacity | | X | X |
| H234 | Auto constant J, 2nd motor | 0.001 to 9.999, 10.00 to 99.99, 100.0 to 999.9, 1000. to 9999. | | | X | X |
| H050 | PI proportional gain for 1st motor | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H250 | PI proportional gain for 2nd motor | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H051 | PI integral gain for 1st motor | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H251 | PI integral gain for 2nd motor | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H052 | P proportional gain setting for 1st motor | 0.01 to 10.00 | 1.00 | 1.00 | O | O |
| H252 | P proportional gain setting for 2nd motor | 0.01 to 10.00 | 1.00 | 1.00 | O | O |
| H060 | Zero LV lmit for 1st motor | 0.0 to 100.0 | 100. | 100. | O | O |
| H260 | Zero LV lmit for 2nd motor | 0.0 to 100.0 | 100. | 100. | O | O |
| H061 | Zero LV starting boost current for 1st motor | 0. to 50. (%) | 50. | 50. | O | O |
| H261 | Zero LV starting boost current for 2nd motor | 0. to 50. (%) | 50. | 50. | O | O |
| H070 | Terminal selection PI proportional gain setting | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H071 | Terminal selection PI integral gain setting | 0.0 to 999.9, 1000. | 100.0 | 100.0 | O | O |
| H072 | Terminal selection P proportional gain setting | 0.00 to 10.00 | 1.00 | 1.00 | O | O |
| H073 | Gain switching time | 0. to 9999. (ms) | 100. | 100. | O | O |

## ●P GROUP: EXPANSION CARD FUNCTIONS

| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| P001 | Operation mode on expansion card 1 error | 00 (tripping), 01 (continuing operation) | 00 | 00 | X | O |
| P002 | Operation mode on expansion card 2 error | 00 (tripping), 01 (continuing operation) | 00 | 00 | X | O |
| P011 | Encoder pulse-per-revolution (PPR) setting | 128. to 9999., 1000 to 6500 (10000 to 65000) (pulses) | 1024 | 1024 | X | X |
| P012 | Control pulse setting | 00 (ASR), 01 (APR), 02 (APR2), 03 (HAPR) | 00 | 00 | X | X |
| P013 | Pulse input mode setting | 00 (mode 0), 01 (mode 1), 02 (mode 2) | 00 | 00 | X | X |
| P014 | Home search stop position setting | 0. to 4095. | 0. | 0. | X | O |
| P015 | Home search speed setting | "start frequency" to "maximum frequency" (up to 120.0) (Hz) | 5.00 | 5.00 | X | O |
| P016 | Home search direction setting | 00 (forward), 01 (reverse) | 00 | 00 | X | X |
| P017 | Home search completion range setting | 0. to 9999., 1000 (10000) (pulses) | 5. | 5. | X | O |
| P018 | Home search completion delay time setting | 0.00 to 9.99 (s) | 0.00 | 0.00 | X | O |
| P019 | Electronic gear set position selection | 00 (feedback side), 01 (commanding side) | 0.0 | 0.0 | X | O |
| P020 | Electronic gear ratio numerator setting | 0. to 9999. | 0.0 | 0.0 | X | O |
| P021 | Electronic gear ratio denominator setting | 0. to 9999. | 1 | 1 | X | X |
| P022 | Feed-forward gain setting | 0.00 to 99.99, 100.0 to 655.3 | 0.00 | 0.00 | X | O |
| P023 | Position loop gain setting | 0.00 to 99.99, 100.0 | 0.50 | 0.50 | X | O |
| P024 | Position bias setting | -204 (-2048.) / -999. to 2048 | 0. | 0. | X | O |
| P025 | Temperature compensation thermistor enable | 00 (no compensation), 01 (compensation) | 00 | 00 | X | O |
| P026 | Over-speed error detection level setting | 0.0 to 150.0 (%) | 135.0 | 135.0 | X | O |
| P027 | Speed deviation error detection level setting | 0.00 to 99.99, 100.0 to120.0 (Hz) | 7.50 | 7.50 | X | X |
| P028 | Numerator of motor gear ratio | 0. to 9999. | 1. | 1. | X | O |
| P029 | Denominator of motor gear ratio | 0. to 9999. | 1. | 1. | X | O |
| P031 | Accel./decel. time input selection | 00 (digital operator), 01 (option 1), 02 (option 2), 03 (easy sequence) | 00 | 00 | X | X |
| P032 | Positioning command input selection | 00 (digital operator), 01 (option 1), 02 (option 2) | 00 | 00 | X | O |
| P033 | Torque command input selection | 00 (O terminal), 01 (OI terminal), 02 (O2 terminal), 03 (digital operator) | 00 | 00 | X | X |
| P034 | Torque command setting | 0. to 200. (%) | 0. | 0. | O | O |
| P035 | Polarity selection at the torque command input via O2 terminal | 00 (as indicated by the sign), 01 (depending on the operation direction) | 00 | 00 | X | X |
| P036 | Torque bias mode | 00 (disabling the mode), 01 (digital operator), 02 (input via O2 terminal) | 00 | 00 | X | X |
| P037 | Torque bias value | -200. to +200. (%) | 0. | 0. | O | O |
| P038 | Torque bias polarity selection | 00 (as indicated by the sign), 01 (depending on the operation direction) | 00 | 00 | X | X |
| P039 | Speed limit for torque-controlled operation (forward rotation) | 0.00 to "maximum frequency" (Hz) | 0.00 | 0.00 | O | O |
| P040 | Speed limit for torque-controlled operation (reverse rotation) | 0.00 to "maximum frequency" (Hz) | 0.00 | 0.00 | O | O |
| P044 | DeviceNet comm watchdog timer | 0.00 to 99.99 (s) | 1.00 | 1.00 | X | X |
| 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 | 01 | X | X |
| P046 | DeviceNet polled I/O : Output instance number | 20, 21, 100 | 21 | 21 | X | X |
| P047 | DeviceNet polled I/O : input instance number | 70, 71, 101 | 71 | 71 | X | X |
| 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 | 01 | X | X |
| 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 (poles) | 00 | 00 | X | X |
| P055 | Pulse-string frequency scale | 1.0 to 50.0 (kHz) | 25.0 | 25.0 | X | O |
| P056 | Time constant of pulse-string frequency filter | 0.01 to 2.00 (s) | 0.10 | 0.10 | X | O |
| P057 | Pulse-string frequency bias | -100. to +100. (%) | 0. | 0. | X | O |
| P058 | Pulse-string frequency limit | 0. to 100. (%) | 100. | 100. | X | O |
| P060 — P067 | Multistage position setting 0-7 | Position setting range reverse side – forward side (upper 4 digits including "-") | 0 | 0 | O | O |
| P068 | Zero-return mode selection | 00(Low) / 01 (Hi1) / 00 (Hi2) | 00 | 00 | O | O |
| P069 | Zero-return direction selection | 00 (FW) / 01 (RV) | 00 | 00 | O | O |
| P070 | Low-speed zero-return frequency | 0.00 – 10.00 (Hz) | 0.00 | 0.00 | O | O |
| P071 | High-speed zero-return frequency | 0.00 – 99.99 / 100.0 – Maximum frequency setting, 1st motor (Hz) | 0.00 | 0.00 | O | O |
| P072 | Position range specification (forward) | 0 – 268435455 (when P012 = 02)  0 – 1073741823 (When P012 = 03) (upper 4 digits) | 268435455 | 268435455 | O | O |
| P073 | Position range specification (reverse) | -268435455 – 0  (when P012 = 02)  -1073741823 - 0 (When P012 = 03) (upper 4 digits) | -268435455 | -268435455 | O | O |
| P074 | Teaching selection | 00 (X00) / 01 (X01) / 02 (X02) / 03 (X03) /04 (X04) / 05 (X05) / 06 (X06) / 07 (X07) | 00 | 00 | O | O |
| P100 — P131 | Easy sequence user parameter U (00)-(31) | 0. to 9999., 1000 to 6553 (10000 to 65535) | 0. | 0. | O | O |

## ●U GROUP: USER-SELECTABLE MENU FUNCTIONS

| Code | Function Name | Monitored data or setting | Default Setting -FE(CE) | -FU(UL) | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|---|---|---|---|---|---|---|
| U001 — P012 | User selected functions 1-12 | no/d001 to P131 | no | no | O | O |

# PROTECTIVE FUNCTIONS

| 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 |
| 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 |
| 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 |
| Out of operation due to under-voltage | Due to insufficient voltage, the inverter has turned off its output and been trying to restart. If it fails to restart, it goes into the under-voltage error. | | ---- | UV.WAIT |
| 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 |

*1: Reset operation is acceptable 10 seconds after the trip.
*2: Check the parameters when EEPROM error occurs.
*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.

## 〈Status Display〉

| Code | Description | Code | Description | Code | Description | Code | Description | Code | Description |
|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|
| 0 | Reset | 2 | Deceleration | 4 | Acceleration | 6 | Starting | 8 | Overload Restriction |
| 1 | Stop | 3 | Constant Speed | 5 | f0 Stop | 7 | DB | 9 | Forcible or servo-on |

## 〈How to access the details about the present fault〉

E07.2 ← → 60.00 ← → 4.00 ← → 270.0 ← → 15. ← → 18.

Error code  Status at trip point | Output frequency at trip point | Motor current at trip point | Voltage between P(+) and N(—) at trip point | Cumulative inverter RUN time at trip point | Cumulative power-on time at trip point

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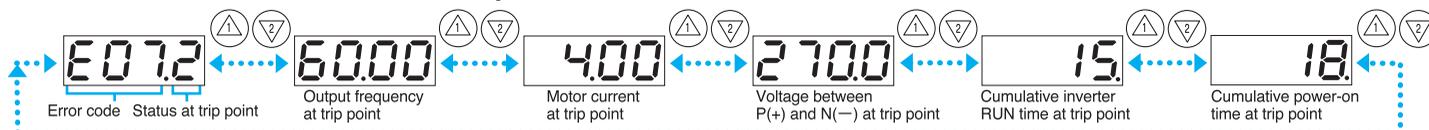
# CONNECTING DIAGRAM

## ● Source type logic

In case of 400V class, place a transformer for operating circuit to receive 200V.



200V-240V+10%, -15%
50/60Hz±5%

R(L1)
S(L2)
T(L3)

SJ700

(T1)U
(T2)V
(T3)W
(+1)PD

IM

DC link choke

(*2)Remove connection with J51
when RoTo power is supplied
externally

R
T(J51)  (*2)
R0
T0

Control power source

Dynamic braking unit (BRD)

(+)P
RB
(-)N

P      RB
N      R1
       R2

AL1  RB
AL2  P

AL1  RB
AL2  P

For 30kW(40HP) and over

For up to 22kW(30HP)

P24
PLC
CM1

Short-circuit
bar

Forward command       FW

Intelligent input
terminals (8 terminals)

8
7
6
1

AL0
AL1
AL2

Intelligent relay
output contacts

P    P
RB   RB
N   Braking resistor(RB)

(Inverter)

(To operating circuit)

FM monitor output
(PWM)

FM
CM1

Thermistor

TH

15

DC24V

11

CM2

Intelligent output terminals

Frequency
setting device
500-2kΩ

H

DC0-10V
(12bit)

O

DC-10-+10V
(12bit)

O2

10kΩ

DC0-10V

DC4-20mA(12bit)

OI

10kΩ

L

100Ω

DC10V

SP
SN

RP

SN

RS-485
Serial communication port

DC0-10V(10bit)

AM

AM monitor output
(Analog output)

AMI

AM monitor output
(Analog output)

DC4-20mA(10bit)

(G)

Expansion card 1

Expansion card 2

Option

| Terminal Name | FW, 1, 2, 3, 4, 5, 6, 7, 8 | FM, TH | H, O, O2, OI, AM, AMI |
|---|---|---|---|
| Common terminal | P24 | CM1 | L |

Customer wiring
(Outside the inverter)

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# CONNECTING DIAGRAM

## ● Sink type logic

In case of 400V class, place a transformer for operating circuit to receive 200V.



| Terminal Name | FW, 1, 2, 3, 4, 5, 6, 7, 8, FM, TH | H, O, O2, OI, AM, AMI |
|---|---|---|
| Common terminal | CM1 | L |

200V~240V+10%, −15%
50/60Hz±5%

R(L1)
S(L2)
T(L3)

(*2)Remove connection with J51
when RoTo power is supplied
externally

T(J51) (*2)
R0
T0

Control power source

SJ700

(T1)U
(T2)V
(T3)W
(+1)PD

IM

DC link choke

Dynamic braking unit (BRD)

(+)P
RB
(−)N

P       RB
N       R1
        R2

AL1  RB
AL2  P

AL1  RB
AL2  P

For 30kW(40HP) and over

For up to 22kW(30HP)

(Inverter)
P    P
RB   RB
N  Braking resistor(RB)

(To operating circuit)

P24

Short-circuit bar

PLC

FW

Forward command

8
7
6

Intelligent input
terminals(8 terminals)

1

FM monitor output
(PWM)

− +

FM
CM1

Thermistor

Frequency
setting device
500~2kΩ

TH

H

DC0~10V
(12bit)

O

DC−10~+10V
(12bit)

O2

10kΩ

DC0~10V

DC4~20mA(12bit)

OI

10kΩ

L

100Ω

DC10V

DC0~10V(10bit)

AM monitor output
(Analog output)

AM

AMI

AM monitor output
(Analog output)

DC4~20mA(10bit)

(G)

AL0
AL1
AL2

Intelligent relay
output contacts

DC24V

15

11

CM2

Intelligent output terminals

SP
SN
RP
SN

RS-485
Serial communication port

Expansion card 1

Expansion card 2

Option

Customer wiring
(Outside the inverter)

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# DIFFERENCE and COMPATIBILITY
# of SJ700 series and SJ300 series

| Items | | | SJ300 series | SJ700 series |
|---|---|---|---|---|
| Copying the parameter settings | | | you can copy the parameter settings from the SJ300 series into the SJ700 series.<br>(that you cannot copy the parameter settings from the SJ700 series to the SJ300 series because the SJ700 series has many new functions and additional parameters.) | |
| Parameter display mode. | | | No display mode selection.<br>(full display) | Basic display mode/Data comparison function addition.<br>Note:basic display mode [factory setting])<br>To display all parameters,specify "00" for "b037". |
| Change function | | Retry or trip parameter | Instantaneous power failure/under-voltage/overvoltage/overcurrent:It sets up by b001. | Instantaneous power failure/under-voltage:It sets up by b001.<br>overvoltage/overcurrent:It sets up by b008. |
| | | A016:External frequency filter time const. | Default:8 | Default:31 Note1 |
| | | A105:[OI]-[L] input start frequency enable | Default:01(external start frequency) | Default:00(0Hz) |
| | | C025:Terminal [15] function | Default:08(instantaneous power failure) | Default:40(cooling-fan speed drop) |
| | | b012,b212,b312:<br>Electronic thermal function | Setting upper limit:120% | Setting upper limit:100% |
| | | d007:<br>Scaled output frequency monitoring | you can not change the output frequency setting by using the △ and/or ▽ key. | you can not change the output frequency setting by using the △ and/or ▽ key. |
| | | A038:Jog frequency setting | Setting range:0 to 999Hz | Setting range:<br>0.01 to 999Hz(0Hz setup is impossible) |
| Terminal | Control Circuit | Removable | Removable | Removable<br>(You can mount the SJ300 series into the SJ700 series.) |
| | | Position | 055 to 220L/H,370 to 550L/H:same position.     300L/H:97mm upper part from SJ300. | |
| | Main Circuit | Screw diameter | 370H:M6 | 370H:M8 |
| | | Position | 055 to 110L/H:10mm upper part from SJ300.<br>150 to 300L/H:20mm upper part from SJ300.550L:30mm upper part from SJ300.<br>370,450L/H,550H:same position. | |
| | | Arrangement | 055 to 110L/H:Two steps,150 to 550L/H:One step | 055 to 550L/H:One step |
| | | Others | 150 to 220L/H:RB t here is not a terminal. | 150 to 220L/H:RB t here is a terminal. |
| Easy-removable Dc bus Capacitor | | | All the models are possible. | 15kW or more is possible. |
| Dynamic Brake circuit | | | up to 11kW | up to 22kW |
| Minimum value of resistor(Ω) | | 055L | 17 | 16 |
| | | 075L | 17 | 10 |
| | | 110L | 17 | 10 |
| | | 055H | 50 | 35 |
| | | 075H | 50 | 35 |
| Dimensions | | Installation | 055L/H:Those with no compatibility.075 to 550L/H:Those with compatibility. | |
| | | External radiating fin | 055L/H:Those with no compatibility.075 to 550L/H:Those with compatibility. | |
| Digital operator position | | | 055L/H:5mm upper part from SJ300. 300L/H:97mm upper part from SJ300.<br>075 to 220L/H,370 to 550L/H:same position. | |
| Option boards | | SJ-DG | Those with compatibility. | |
| | | SJ-FB | | |
| | | SJ-DN | Those with compatibility.<br>Note:Since the SJ700 series has many new functions and additional parameters,<br>some functions of the SJ-DN, SJ-LW, and SJ-PBT (option boards conforming to the open network specifications) cannot be implemented on the SJ700 series. | |
| | | SJ-LW | | |
| | | SJ-PBT | | |
| | | Option boards | 150 to 220L/H,370L/H:same position.300L/H:97mm upper part from SJ300. | |

Note1:Since a response falls the V/F characteristic curve selection SLV should make this setup small.

# FOR CORRECT OPERATION

## ● 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. *Explosion-proof verification is not available for SJ700 Series. |
| 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]

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| 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, or (3) enhance the insulation of the motor coil. |

## ● Notes on Use

### [Drive]

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|---|---|
| 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 SJ700 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]

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| 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 50˚C.(Carrier frequency and output current must be reduced in the range of 40 to 50˚C.) |

## [Main power supply]

| 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.<br>(A) The unbalance factor of the power supply is 3% or higher. (Note)<br>(B) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500 kVA or more).<br>(C) Abrupt power supply changes are expected.<br>Examples:<br>　(1) Several inverters are interconnected with a short bus.<br>　(2) A thyristor converter and an inverter are interconnected with a short bus.<br>　(3) An installed phase advance capacitor opens and closes.<br>In cases (A), (B) and (C), it is recommended to install an AC reactor on the main power supply side.<br>Note: Example calculation with $V_{RS}$ = 205V, $V_{ST}$ = 201V, $V_{TR}$ = 200V<br>　　　$V_{RS}$ : R-S line voltage, $V_{ST}$ : S-T line voltage, $V_{TR}$ : T-R line voltage<br><br>$$\text{Unbalance factor of voltage} = \frac{\text{Max. line voltage (min.) - Mean line voltage}}{\text{Mean line voltage}} \times 100$$<br>$$= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5\,(\%)$$ |
|---|---|
| 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.)<br>(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 SJ700 Series does not need a thermal relay for motor protection due to the internal electronic protective circuit.  A thermal relay, however, should be used:<br>● during continuous running outside a range of 30 to 60 Hz.<br>● for motors exceeding the range of electronic thermal adjustment (rated current).<br>● when several motors are driven by the same inverter; install a thermal relay for each motor.<br>● 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.  When this distance is exceeded, use CVD-E (current-voltage converter) or RCD-E (remote control device).  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.
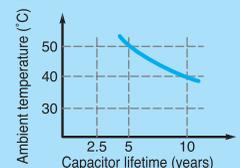


### Precaution for Correct Usage

● 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 a serious accident.
● 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.