

HITACHI INVERTER

HITACHI
Inspire the Next

WJ200N SERIES

Superior control performance!
Superior network!



Compact • Powerful • Excellent



WJ200N

Applications:

In heavy load conditions such as crane, machine tools and etc.

- Crane
- Electric block
- Hoist
- Machine tool
- Press



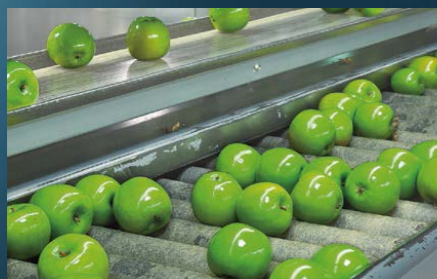
Fan pump

- Water supply
- Sewage drain
- Fountain
- Fan
- Air condition system



Applications in packing, food, and beverage industry

- Packaging machinery
- Slicing machine
- Blender
- Mixing different beverage together
- Fruit sorting



Pursuit of extraordinary performance

1 Compatible with permanent magnet synchronous motor and asynchronous motor **FUNCTION**

The inverter can identify the parameters of the permanent magnet synchronous motor and asynchronous motor automatically and switches between these two applications.

Asynchronous motor and inverter

Permanent magnet synchronous and operator

Asynchronous motor

Permanent magnet synchronous

WJ 200N

2 Superior sensor less vector control
High starting torque of 200% or more at 0.5HZ.

The sensor less vector technology allows high torque at lower speed, which is ideal for applications such as crane, transporter and lifter where high starting torque is needed.

Example: Rotation speed · torque characteristic
Work with Hitachi standard inverter (7.5kw 4poles)

Rated torque (%)

Rotation speed (min⁻¹)

Auto tuning function allows the inverter to check parameters automatically, which contributes to higher performance with more efficiency.

※ Hitachi standard 4 poles asynchronous motor under HD mode

3 Highly reduces the wave velocity
~50% lower than normal models[※]

Significantly reduces the wave velocity of inverter when operating at 0.5HZ.

Example: WJ200N-055HFC

Operating frequency: 0.5Hz · Motor: Hitachi standard 5.5kW 4 poles

※ WJ200N: 5min⁻¹; Normal models: 13min⁻¹

4 Quick stop function **FUNCTION**

The over-excitation stop function is further promoted. Even if there is no braking unit connected, the motor shall stop quickly with over excitation function.

Example: WJ200N-075HFC

OFF

ON

Output current

DC voltage

Output frequency

Dec time:4.2s

Dec time:1.9s

The quick stop function allows the motor to decrease in shorter time, about 2.3 s shorter than that of without this function

6 Deceleration stops at power off **FUNCTION**

The inverter will decelerate until stop by keep the voltage of the main circuit DC section at a constant value when external power supply is turned off. (This function is ideal for textile and rolling machinery which have a strict requirement for pulling force.)

Bus voltage at power on

Constant bus voltage

Trigger voltage threshold

Constant bus voltage control

Output frequency

Power recovery mode

Dec to stop mode

Power recovery

5 Emergency stop function

The emergency stop function shuts off the inverter output through hardware circuit, which largely reduces the cost and ensures the safety.

safe circuit

ST01(GS1)

ST02(GS2)

EDM

emergency stop output/input terminal

safe switch (emergency stop)

no magnet contactor

- save cost
- save space

emergency stop through the inverter circuit

7 Trip avoidance function[※]

Overcurrent/overvoltage suppress function contributes to stable and constant operation.

Overcurrent suppress

OFF

ON

output current

output frequency

trip

※ Please turn off this function when the inverter is used in lifting applications.

Model

WJ200N-004 H F C

Series

Capacity 004:0.4kW~150:15kW

Power supply specification H: 3 phase 400V class

C: China, Europe

Digital operator

List

| Models | 3 phase 400V class (applicable capacity kW) | |
|--------|---|---------|
| | ND mode | HD mode |
| 004 | 0.75 | 0.4 |
| 007 | 1.5 | 0.75 |
| 015 | 2.2 | 1.5 |
| 022 | 3.0 | 2.2 |
| 040 | 5.5 | 4.0 |
| 055 | 7.5 | 5.5 |
| 075 | 11 | 7.5 |
| 110 | 15 | 11 |
| 150 | 18.5 | 15 |

More simple system

1 EzSQ function
Simplifying the system for easier use

Sequence operation is realized by downloading to an inverter a program created with EzSQ (Easy Sequence). In loaded conditions, the crane or conveyor can also achieve automatic speed control. And significant cost will be saved by simplifying and eliminating external hardware.

Power sequence for night mode highly saves the power cost

- Day: Automatically switch to low speed operation during electricity peak hours, thus saving the power cost at day
- Night: Automatically switch to high speed operation during electricity bottom

Operation as below:

Normal inverters
operator panel (switch · counter)
↓
relay circuit
Enclosure Inverter

WJ200N series
operator panel (switch · counter)
↓
Enclosure Inverter

2 INVERTER-INVERTER COMMUNICATION (EzCOM)

To exchange the data between different inverters (maximum 5 inverter), which contributes to more widely applications such as synchronous operation on conveyor, multi pumps control

Inverters with EzCOM network realize inter-communication between main inverters and subordinate inverters

① A→B, C the frequency and operation command of INV A is sent B and C
② B→C, A the output frequency and current of INV B is sent C and A
③ C→A, B the output frequency and current of INV C is sent A and B

Example: To monitor the set frequency, output frequency and voltage of INV B and INV C through INV A

3 Saving enclosure space

The installation distance between inverters is largely decreased.

* No derating when the ambient temperature is below 40°C

4 Built in 2 pulse string input circuit **FUNCTION**

The function not only controls the pulse string speed, but also realizes closed speed control and position control with no need to install extra attachments, which largely saves the cost for the whole system.

Example: easy position control Example: pulse string speed control

Switch between speed control and position control

Output frequency Location counter started
Speed control Position control DR target position
SPD input ON Time

5 Full series built in braking units

Full series built in braking units (braking resistor is optional).

Flexible communication

1 Multi communication ports

WJ200N is incorporated with Standard RS-485 Modbus-RTU (Modbus-RTU, maximum 115.2kbps). It can connect to open network such as EtherCAT, CC-LINK, DeviceNET, Profibus-DP (being developed), PROFINET (being developed). It is equipped with USB (Mini-Port), RS422 (RJ45) port

USB port built in optional board (1 pcs)
RS422 port

2 Register mapping function **FUNCTION**

Any register NO used in the upper computer can be mapped with Hitachi register NO (maximum 10 sets of data can be mapped).

This function allows communication with WJ200N with no need to change the program in the upper computer, which makes it easier to replace the inverter.

Figure

| Used register NO (External register NO) | Ratio | Format | Hitachi register NO (Internal register NO) |
|---|---------------|-------------------------------|--|
| 4001h | Ratio: ×1.000 | Format: without digit numbers | 120Fh (A013) |
| 4002h | Ratio: ×2.000 | Format: without digit numbers | 1210h (A014) |
| 4003h | Ratio: ×1.000 | Format: with digit numbers | 163Bh (P057) |
| ⋮ | | | ⋮ |

Note: When external register is mapped with internal register, the ratio and format can be designated.

Long life span, easy maintenance

1 Long life span
(designed life span for 10year^{**})

WJ200N is composed of components with 10 years of lifespan. Besides, it features cooling fans with ON/OFF switch, which largely extends the inverters' lifespan

* Under average annual temperature of 40°C
* Under conditions of oil free, dust free, mist free and corrosive gases free.
* The lifetime is estimated but not guaranteed.

2 Lifetime Warning Function

WJ200N sends predictive warnings when the temperature of DC bus capacitor goes up or the cooling fans get aged.

3 Easy replacement of cooling fan

No need to replace to cooling fan with tools

Remove the inverter cover
Put off the power plug and replace the fan

More functions

1 2 kinds of load

Choose HD mode or ND mode according to applications.

2 Newly added monitoring functions **FUNCTION**

Analog input signal monitoring (0~10V, 4~20mA)
Pulse string input monitoring
PID bias monitoring
PID output monitoring

3 Multiple external output monitoring (port 2)

4 Password function

The password function allows the inverter to protect the parameters, which effectively prevent mal- functions.

5 Flexible electronic heat protection **FUNCTION**

Overload protection the both the inverter and the motor

6 Rich displaying functions

- Automatically returns to the initial display with no operations within 10 minutes
- Fixed display: No extra function codes is displayed to prevent mal-functions
- User selection monitoring: Any 2 monitoring items can be set and switched by pressing up and down key

3 Data sending/receiving order can be set **FUNCTION**

The data transfer sequence of Modbus-RTU can be set, so as to applied with PLC communication protocol.

Method 1: upper digits start
Method 2: lower digits start
Method 3: lower digits start (special method)

Standard specifications

3 phase 400V class

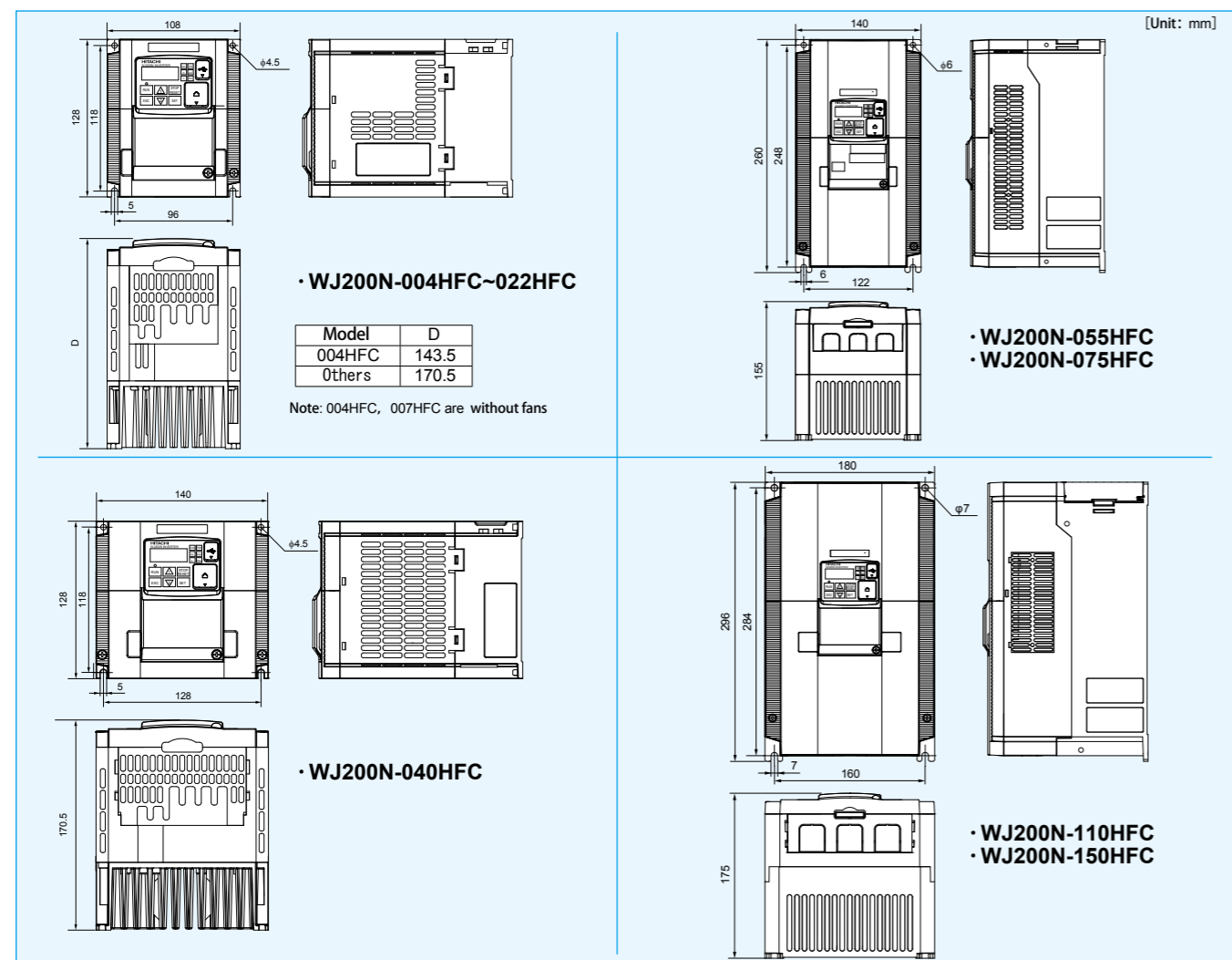
| model (WJ200N-□□□□□□) | | 004HFC | 007HFC | 015HFC | 022HFC | 040HFC | 055HFC | 075HFC | 110HFC | 150HFC | |
|--|------|---|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Applicable capacity ^{※2} | kW | ND | 0.75 | 1.5 | 2.2 | 3.0 | 5.5 | 7.5 | 11 | 15 | 18.5 |
| | | HD | 0.4 | 0.75 | 1.5 | 2.2 | 4.0 | 5.5 | 7.5 | 11 | 15 |
| | HP | ND | 1 | 2 | 3 | 4 | 7.5 | 10 | 15 | 20 | 25 |
| | | HD | 1/2 | 1 | 2 | 3 | 5 | 7.5 | 10 | 15 | 20 |
| Rated output capacity(kVA) | 380V | ND | 1.3 | 2.6 | 3.5 | 4.5 | 7.3 | 11.5 | 15.1 | 20.4 | 25.0 |
| | | HD | 1.1 | 2.2 | 3.1 | 3.6 | 6.0 | 9.7 | 11.8 | 15.7 | 20.4 |
| | 480V | ND | 1.7 | 3.4 | 4.4 | 5.7 | 9.2 | 14.5 | 19.1 | 25.7 | 31.5 |
| | | HD | 1.4 | 2.8 | 3.9 | 4.5 | 7.6 | 12.3 | 14.9 | 19.9 | 25.7 |
| Rated input voltage | | 3phase 380V-15% ~ 480V +10%、50/60Hz ±5% | | | | | | | | | |
| Rated output voltage ^{※3} | | 3phase 380 ~ 480V(according to input voltage) | | | | | | | | | |
| Rated output current(A) | ND | 2.1 | 4.1 | 5.4 | 6.9 | 11.1 | 17.5 | 23.0 | 31.0 | 38.0 | |
| | HD | 1.8 | 3.4 | 4.8 | 5.5 | 9.2 | 14.8 | 18.0 | 24.0 | 31.0 | |
| Value of minimum connectable resistance(Ω) | | 180 | 180 | 180 | 100 | 100 | 70 | 70 | 70 | 35 | |
| Approx weight(kg) | | 1.5 | 1.6 | 1.8 | 1.9 | 2.1 | 3.5 | 3.5 | 4.7 | 5.2 | |

※1 ND: normal load, HD: heavy load(compatible with 2 kinds of load).

※2 Only applied to Hitachi standard 3 phase inverter.When use other inverters, please ensure that the rated current of the motor is lower than that of the inverter.

※3 The output voltage will decrease with the decrease of the voltage of the power supply

External demensions



General specifications

| Items | | Specifications | |
|--|--|--|--|
| Control system | | sine-wave PWM control | |
| Output frequency range ^{※4} | | 0.10~400.00Hz | |
| Frequency accuracy | | relatively maximum frequency, digital setting±0.01%, analog setting±0.2%(25±10°C) | |
| Frequency setting resolution | | digital input: 0.01Hz, analog input: maximum frequency/1000 | |
| Voltage/frequency characteristic and control mood | | V/F characteristic variable with base frequency set between 30 and 400Hz. constant torque, reduced torque V/f control IM sensorless vector control, IM vector control ASR | |
| Overload capacity | | compatible with 2 modes of load, HD mode: 150%/60sec, ND mode: 120%/60sec | |
| Acceleration time/deccleration time | | 0.01~3600.0sec(in liner or curved pattern) | |
| Starting torque | | 200%/0.5Hz(IM sensorless vector control) | |
| Regenerative braking | | inner braking circuit with transistor | |
| Carrier frequency variation | | 2~15kHz(derating according to operating condition) | |
| Digital operator | | 4-digit 7-segment LED, 7 signal LED, 6 operating keys | |
| Parameter monitoring | | 32 kinds of parameters | |
| Input | frequency setting | standard operator | setting through Δ ∇ keys |
| | | external signal | DC0~+10(input impedance 10kΩ) 4~20mA(input impedance 100Ω)(10 digit resolution) |
| | | external port | setting via RS485 communication/RS422 communication /USB/option board |
| | forward/reverse start/stop | standard operator | start/stop(forward/reverse switching via parameter setting) |
| | | external signal | forward operation start/stop commands, reverse operation start/stop commands (when relevant commands are assigned to intelligent terminals) 3 wire input possible(when relevant commands are assigned to intelligent terminals) |
| | | external port | setting via RS485 communication /RS422communication /USB/option board |
| | intelligent input terminal | terminal 7, NO/NC switch, sink logic/source logic switch(short wires) 【terminal functions】 68 kinds of functions | |
| | thermistor input terminal | terminal 1(only PTC)(also used as intelligent input terminal) | |
| | pulse string terminal | 0~10V(~24V), ~32kHz frequency setting, PID-FB, PID target value, easy PG control(1 phase input) | |
| | safe input | GS 2 input(also used as intelligent input terminal) | |
| Output | intelligent output terminal | 2 open collector output terminals: NO/NC switch, sink/source logic combined 1 relay (1c joint)output terminal: NO/NCswitch, 【terminal functions】 48 kinds of functions | |
| | safe output | EDM 1 output (also used as intelligent output terminal) | |
| | intelligent monitoring output terminal | analog output | Analog voltage(0~10V)output terminal(10 digit resolution) 【terminal functions】 10 kinds of functions |
| | | pulse string output | Pulse string output terminal(0~10V/~32kHz) terminal functions】 12kinds of functions |
| EzSQ | | Program1024, data 3 will be stored at power failure(P129~P131) | |
| Other functions | | 57 kinds of functions | |
| Protection functions | | Overcurrent, overvoltage, electronic thermal, temperature error, ground short detection at power on, overload, input overvoltage, external trip, storage error, CPU error, main circuit error, USP error, communication error, instantaneous power failure protection. | |
| External port | RS422 | RJ45 port, remote control (SOP(-VR), WOP) | |
| | RS485 | Terminal blocks,Modbus-RTU, maximum speed 115.2kbps, point to point communication ,broadcasting, register mapping | |
| | USB | Mini-B port (for PC software use) | |
| | Optional board | Can be equipped with 1 option board(built in),serial communications | |
| Protection degree ^{※5} | | Structure: IP20 | |
| Surrounding temperature /storage temperature /humidity | | -10~50°C/-20~65°C/20~90%RH(no moisture condensation) (derating according to current and carrier frequency), close distance between inverters(derating if needed) | |
| Vibration | | 5.9m/s ² (lower than 0.6G), 10~55Hz | |
| Location | | below sea level 1,000m(no corrosive gas, no dust) | |

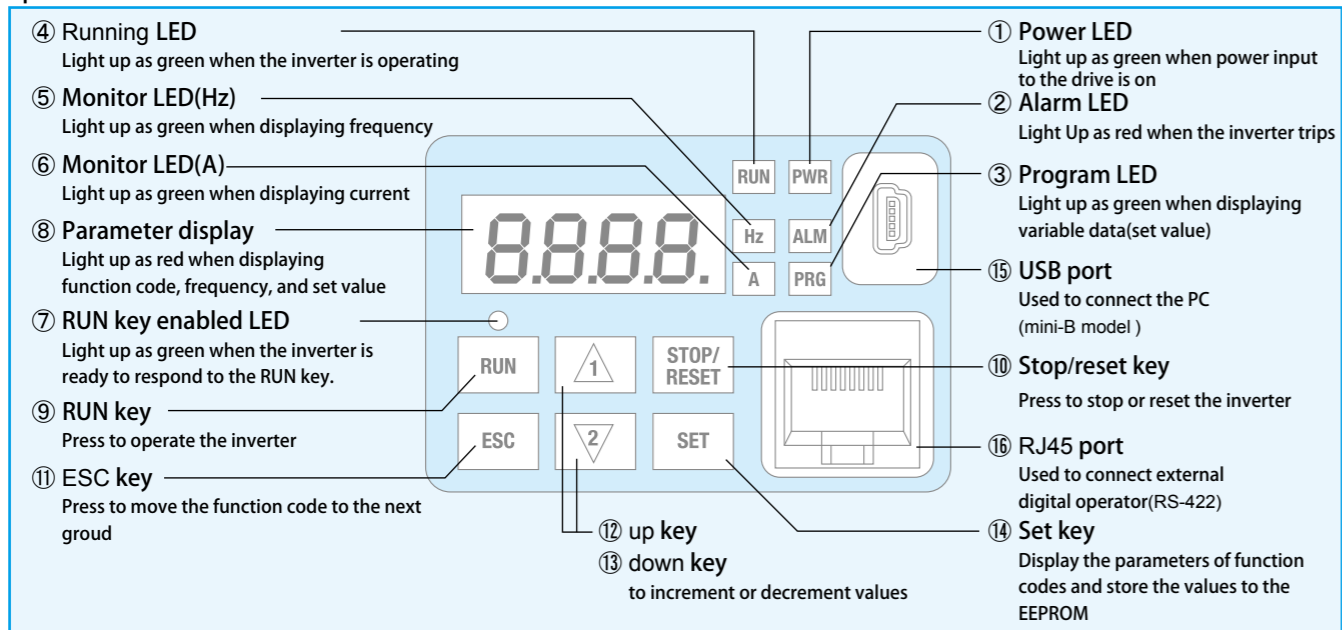
※4 When the motor operates at high than 50/60Hz, please refer to the factory for the maximum applicable rotation speed

※5 The protection method is in line with JEM1030 standard

Operation

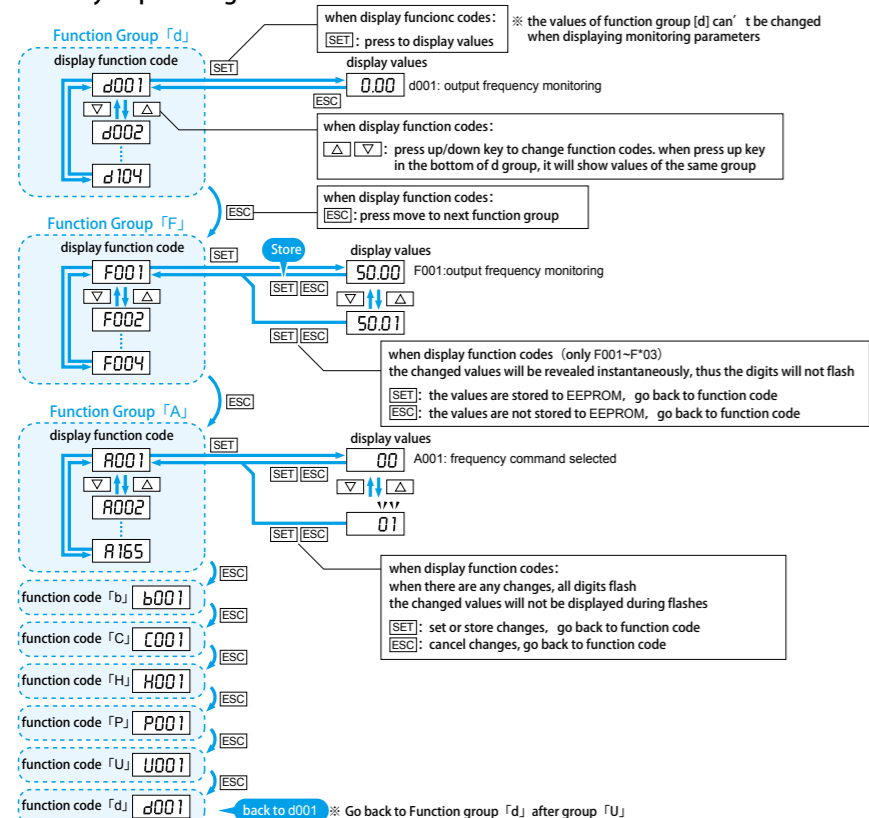
Instruction of the operator

WJ200N series can be operated with the digital operator provided as standard or the remote operator as an extra option.



General keys operation

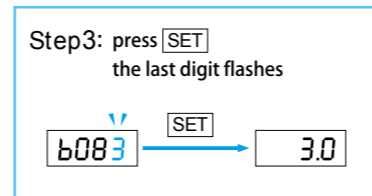
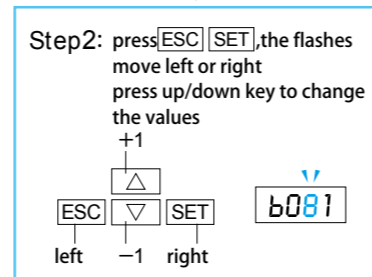
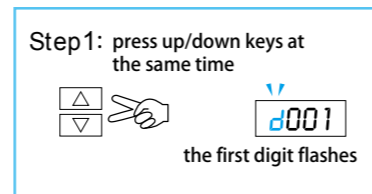
The keys operating method is as below:



Operations in special input modes

When target value is far from the currently displayed value, you can set values more quickly according to the following methods:

Example:



Function list

- If the target values are not displayed, please confirm the specification of "b037". Please specify "b037" to "00" for full display
- When soft lock function b031 is enabled, the parameters cannot be changed during operation
- 「-」 means that the no changes are allowed during operation
- When specify soft lock function b031 as "10", the parameters can be changed during operation.
- ■ symbols the new functions added based on WJ20 series .

Monitoring mode

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Changing during operation (allowed or not) |
|-----------|---|---|---------|---|--|
| d001 | Output frequency monitoring | 0.00~99.99/100.0~400.0 (Hz) | - | ○ | ○ |
| d002 | Output current monitoring | 0.0~655.3(A) | - | - | - |
| d003 | Rotation direction | F(forward rotation) / o(stopped) / r(reverse rotation) | - | - | - |
| d004 | Process variable (PV) , PID feedback monitoring | 0.00~99.99/100.0~999.9/1000.~9999./1000~9999(10000~99990)/100~/1999(100000~999000) | - | - | - |
| d005 | intelligent input terminal status | ON (example) terminal 1,2:ON terminal 3~7:OFF OFF | - | - | - |
| d006 | Intelligent output terminal status | ON (example) terminal 11,12:ON terminal relay:OFF OFF | - | - | - |
| d007 | Scaled output frequency monitoring | 0.00~99.99/100.0~999.9/1000~3999 | - | ○ | ○ |
| d008 | Actual frequency monitoring | 400.~100./-99.9~/ -10.0/-9.99~-0.00/0.00~99.99/100.0~400.0 (Hz) | - | - | - |
| d009 | Torque command monitoring | -200.~+200.(%) | - | - | - |
| d010 | Torque bias monitoring | -200.~+200.(%) | - | - | - |
| d012 | Output torque monitoring | -200.~+200.(%) | - | - | - |
| d013 | Output voltage monitoring | 0.0~600.0(V) | - | - | - |
| d014 | Input power monitoring | 0.0~999.9(kW) | - | - | - |
| d015 | Cumulative power monitoring | 0.0~999.9/1000.~9999./1000~9999(10000~99990)/1100~1999(100000~999000) | - | - | - |
| d016 | Cumulative operation RUN time monitoring | 0~9999./1000~9999(10000~99990)/1100~1999(100000~999000)(hr) | - | - | - |
| d017 | Cumulative power on time monitoring | 0~9999./1000~9999(10000~99990)/1100~1999(100000~999000)(hr) | - | - | - |
| d018 | Hear sink temperature monitoring | -020.~150.0(°C) | - | - | - |
| d022 | Life check monitoring | 1: resistor on the main circuit 2: fan | - | - | - |
| d023 | Program counter | 0~1024 | - | - | - |
| d024 | Program number monitoring | 0000~9999 | - | - | - |
| d025 | User monitoring 0 | -2147483647~2147483647 (including "-", upper 4 digits) | - | - | - |
| d026 | User monitoring 1 | -2147483647~2147483647 (including "-", upper 4 digits) | - | - | - |
| d027 | User monitoring 2 | -2147483647~2147483647 (including "-", upper 4 digits) | - | - | - |
| d029 | Position setting monitoring | -268435455~268435455 (including "-", upper 4 digits) | - | - | - |
| d030 | Position feedback monitoring | -268435455~268435455 (including "-", upper 4 digits) | - | - | - |
| d050 | Two modes of user monitoring | display to values of b160,b161 | - | - | - |
| d060 | Inverter mode monitoring | I-C(IM motor HDmode)/I-V(IM motor ND mode)/P(PM motor) | - | - | - |
| d062 | Frequency command source monitoring | 00:operator/1~15:multi speed 1~15/16:jog frequency/18:Modbus communication/19:option board/21:keypad potentiometer/22:pulse string/23:operation function result/24:Es2SQ/25:[O]input terminal/26:[OI]terminal input/27:[O]+[OI]terminal input | - | - | - |
| d063 | Operation command source monitoring | 1:terminal blocks on main circuit/2:operator/3:Modbus communication/4:option board | - | - | - |
| d080 | Trip counter | 0~9999./1000~6553(10000~65530)(次) | - | - | - |
| d081~d086 | Trip monitoring 1~6 | Reason,frequency(Hz),current(A),voltage acrossPN (V),RUN time (hr),power ON time(hr) | - | - | - |
| d090 | Error monitoring | Error code | - | - | - |
| d102 | DC voltage monitoring | 0.0~999.9/1000.(V) | - | - | - |
| d103 | BRD load factor monitoring | 0.0~100.0(%) | - | - | - |
| d104 | Electronic thermal overload monitoring | 0.0~100.0(%) | - | - | - |
| d130 | Analog input [O] monitoring | 0~1023 | - | - | - |
| d131 | Analog input [OI] monitoring | 0~1023 | - | - | - |
| d133 | Pulse string input monitoring | 0.00~100.00[%] | - | - | - |
| d153 | PID bias monitoring | -9999.00~9999.00[%] | - | - | - |
| d155 | PID output monitoring | 0.00~9999.00[%] (A071=01) / -9999.00~9999.00[%] (A071=02) | - | - | - |

FUNCTION LIST

| Code | Function name | Parameter data or setting | Default | Setting during operation (allowed or not) | Changes during operation (allowed or not) |
|------|-----------------------------|---|---------|---|---|
| F001 | Output frequency setting | 0.0, starting frequency~1st/2nd maximum frequency 0.0~10.0.0(%) (PID feedback monitoring enabled) | 0.00 | ○ | ○ |
| F002 | Acceleration 1 time setting | 0.00(note1)~99.99/100.0~999.9/1000.~3600.(s) | 10.00 | ○ | ○ |

Note1) value range

FUNCTION Group A

| Code | Function name | Parameter data or setting | Default | Setting during operation (allowed or not) | Changes during operation (allowed or not) | | |
|---------------------|---|--|--|--|---|---|---|
| Basic setting | A001 | Frequency source setting | 00(keypad potentiometer)/note2)/01(control circuit terminal blocks)/02(operator)/03(Modbus communication)/04(option board)/06(pulse string input)/07(EzSQ)/10(operation function results) | 01 | × | × | |
| | A201 | Frequency source setting, 2nd motor | 00(keypad potentiometer)/note2)/01(control circuit terminal blocks)/02(operator)/03(Modbus communication)/04(option board)/06(pulse string frequency)/07(EzSQ)/10(operation function results) | 01 | × | × | |
| | A002 | Run command source setting | 01(control circuit terminal blocks)/02(operator)/03(Modbus communication)/04(option board) | 01 | × | × | |
| | A202 | Run command source setting, 2nd motor | 01(control circuit terminal blocks)/02(operator)/03(Modbus communication)/04(option board) | 01 | × | × | |
| | A003 | Base frequency | 30.0~maximum frequency (Hz), 1st motor | 50.0 | × | × | |
| | A203 | Base frequency, 2nd motor | 30.0~maximum frequency, 1st motor(Hz) | 50.0 | × | × | |
| | A004 | Maximum frequency setting | Base frequency~400.0 (Hz) | 50.0 | × | × | |
| A204 | Maximum frequency setting, 2nd motor | Base frequency, 2nd motor~400.0 (Hz) | 50.0 | × | × | | |
| Analog input/others | A005 | AT terminal selection | 00(switch between (O) and (OI) terminal)/02(switch between (O) and keypad potentiometer) note 1) / 03(switch between (OI) and keypad potentiometer) note 1) | 00 | × | × | |
| | A011 | [O] starting frequency | 0.00~99.99/100.0~400.0 (Hz) | 0.00 | × | ○ | |
| | A012 | [O] end frequency | 0.00~99.99/100.0~400.0 (Hz) | 0.00 | × | ○ | |
| | A013 | [O] start voltage | 0.~0 end voltage(%) | 0. | × | ○ | |
| | A014 | [O] end voltage | 0 start voltage~100.(%) | 100. | × | ○ | |
| | A015 | [O] start frequency selection | 00(start frequency A011) / 01(0Hz) | 01 | × | ○ | |
| | A016 | External frequency filter time const. | 1.~30. (x2ms)/31.(500ms filter ±0.1Hz with hysteresis) | 8 | × | ○ | |
| | A017 | EzSQ function selection | 00(disabling)/01(PRG terminal enabling)/02(normal enabling) | 00 | ○ | ○ | |
| Multi-speed/jogging | A019 | Multi-speed operation selection | 00(binary, 16 speeds selectable with 4 terminals)/01(Bit : 8 speeds selectable with 7 terminals) | 00 | × | × | |
| | A020 | Multi-speed frequency | 0.00, start frequency~maximum frequency(Hz) | 0.00 | ○ | ○ | |
| | A220 | Multi-speed frequency, 2nd motor | 0.00, start frequency~maximum frequency, 2nd motor(Hz) | 0.00 | ○ | ○ | |
| | A021 ~ A035 | Multi-speed 1-15 setting | 0.00, start frequency~n-th maximum frequency(Hz) | 0.00 | ○ | ○ | |
| | A038 | Jog frequency | Start frequency~9.99(Hz) | 6.00 | ○ | ○ | |
| | A039 | Jog stop mode | 00(free running after JG stops/disabled during operation) / 01(deceleration to stop after JG stops/disabled during operation) / 02(DC braking after JG stops/disabled during operation) / 03(free running after JG stops/enabled during operation) / 04(deceleration to stop after JG stops/enabled during operation) / 05(DC braking after JG stops/abled during operation) | 04 | ○ | ○ | |
| | A041 | Torque boost method selection | 00(manual torque boost) / 01(automatic torque boost) | 00 | × | × | |
| A241 | Torque boost method selection, 2nd motor | 00(manual torque boost) / 01(automatic torque boost) | 00 | × | × | | |
| A042 | Manual torque boost value | 0.0~20.0(%) (ratio to motor voltage A082) | 5.0 | ○ | ○ | | |
| A242 | Manual torque boost value, 2nd motor | 0.0~20.0(%) (ratio to motor voltage A282) | 5.0 | ○ | ○ | | |
| A043 | Manual torque boost frequency adjustment | 0.0~50.0(%) (ratio to base frequency A003) | 5.0 | ○ | ○ | | |
| A243 | Manual torque boost frequency adjustment, 2nd motor | 0.0~50.0(%) (ratio to base frequency A203) | 5.0 | ○ | ○ | | |
| V/F characteristics | A044 | V/F characteristic curve selection, 1st motor | 00(V) / 01(VP to the power of 1.7) / 02(free V/f) / 03*(sensorless vector control) * only under HD mode | 00 | × | × | |
| | A244 | V/F characteristic curve selection, 2nd motor | 00(V) / 01(VP to the power of 1.7) / 02(free V/f) / 03*(sensorless vector control) * only under HD mode | 00 | × | × | |
| | A045 | V/F gain setting | 20.~100.(%) | 100. | ○ | ○ | |
| | A245 | V/F gain setting, 2nd motor | 20.~100.(%) | 100. | ○ | ○ | |
| | A046 | Voltage compensation gain setting for automatic torque boost | 0.~255. | 100. | ○ | ○ | |
| | A246 | Voltage compensation gain setting for automatic torque boost, 2nd motor | 0.~255. | 100. | ○ | ○ | |
| | A047 | Slippage compensation gain setting for automatic torque boost | 0.~255. | 100. | ○ | ○ | |
| | A247 | Slippage compensation gain setting for automatic torque boost, 2nd motor | 0.~255. | 100. | ○ | ○ | |
| | DC braking | A051 | DC braking selection | 00(disabling) / 01(enabling after stop) / 02(output frequency <A052) | 00 | × | ○ |
| | | A052 | DC braking frequency | 0.00~60.00(Hz) | 0.50 | × | ○ |
| A053 | | DC braking delay time | 0.0~5.0(s) | 0.0 | × | ○ | |
| A054 | | DC braking force | 0.~100./70.(%) (HD mode/ND mode) | 50. | × | ○ | |
| A055 | | DC braking time | 0.0~60.0(s) | 0.5 | × | ○ | |
| A056 | | DC braking operation selection | 00(edge operation) / 01(level operation) | 01 | × | ○ | |
| A057 | | DC braking force for starting | 0.~100./70.(%) (HD mode/ND mode) | 0. | × | ○ | |
| A058 | | DC braking time for starting | 0.0~60.0(s) | 0.0 | × | ○ | |
| A059 | | DC braking carrier frequency setting | 2.0~15.0/10.0(kHz) (HD mode/ND mode) | 5.0 | × | ○ | |

Note 2) Enabled when connected to SOP-VR

| Code | Function name | Parameter data or setting | Default | Setting during operation (allowed or not) | Changes during operation (allowed or not) | | |
|--|----------------------|---|--|---|---|---|---|
| Frequency upper/lower limit and jump frequency | A061 | Upper limit | 0.00, frequency lower limit~frequency upper limit(Hz) | 0.00 | × | ○ | |
| | A261 | Upper limit, 2nd motor | 0.00, frequency lower limit~frequency upper limit(Hz), 2nd motor | 0.00 | × | ○ | |
| | A062 | Lower limit | 0.00, start frequency~frequency upper limit(Hz) | 0.00 | × | ○ | |
| | A262 | Lower limit, 2nd motor | 0.00, start frequency~frequency upper limit(Hz), 2nd motor | 0.00 | × | ○ | |
| | A063 | Jump frequency setting 1 | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A064 | Jump frequency width 1 | 0.00~10.00(Hz) | 0.50 | × | ○ | |
| | A065 | Jump frequency 2 | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A066 | Jump frequency width 2 | 0.00~10.00(Hz) | 0.50 | × | ○ | |
| Other | A067 | Jump frequency 2 | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A068 | ump frequency width 3 | 0.00~10.00(Hz) | 0.50 | × | ○ | |
| | A069 | Acceleration stop frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A070 | Acceleration stop time | 0.0~60.0(s) | 0.0 | × | ○ | |
| | A071 | PID control enable | 00(disabling) / 01(enabling) / 02(enabling inverted-data iutput) | 00 | × | ○ | |
| | A072 | PID proportional gain | 0.00~25.00 | 1.0 | ○ | ○ | |
| | A073 | PID integral time constant | 0.0~999.9/1000.~3600.(s) | 1.0 | ○ | ○ | |
| | A074 | PID derivative gain | 0.00~99.99/100.0(s) | 0.00 | ○ | ○ | |
| | A075 | PV scale conversion | 0.01~99.99 | 1.00 | × | ○ | |
| | A076 | PV source setting | 00(current input via (OI)) / 01(voltage input via (O)) / 02(Modbus communication) / 03(pulse string frequency) / 10(operation result output) | 00 | × | ○ | |
| PID control | A077 | Output of inverted PID deviation | 00(disabling) / 01(enabling) | 00 | × | ○ | |
| | A078 | PID variation range | 0.0~100.0(%) | 0.0 | × | ○ | |
| | A079 | Feed forward selection | 00(disabling) / 01(voltage input via (O)) / 02(current input via(OI)) | 00 | × | ○ | |
| | A081 | AVR function selection | 00(always ON) / 01(always OFF) / 02(OFF during deceleration) | 01 | × | × | |
| | A281 | AVR function selection, 2nd motor | 00(always ON) / 01(always OFF) / 02(OFF during deceleration) | 01 | × | × | |
| | A082 | Input voltage selection, 1st motor | 200V class: 200 / 215/220/230/240(V) 400V class: 380 / 400/415/440/460/480(V) | 220/380 | × | × | |
| | A282 | Input voltage selection, 2nd motor | 200V class: 200 / 215/220/230/240(V) 400V class: 380 / 400/415/440/460/480(V) | 220/380 | × | × | |
| | A083 | AVR filter time const | 0.000~10.00(s) | 0.300 | × | ○ | |
| | A084 | Voltage gain during deceleration | 50.~200.(%) | 100. | × | ○ | |
| | A085 | Energy saving operation selected | 00(normal operation) / 01(energy saving operation) | 00 | × | × | |
| Operation mode*acc/dec/function | A086 | Energy saving mode tuning | 0.0~100.0 | 50.0 | ○ | ○ | |
| | A092 | Acceleration 2 time setting | 0.00(note3)~99.99/100.0~999.9/1000.~3600.(s) | 10.00 | ○ | ○ | |
| | A292 | Acceleration 2 time setting, 2nd motor | 0.00(note3)~99.99/100.0~999.9/1000.~3600.(s) | 10.00 | ○ | ○ | |
| | A093 | Deceleration 2 time setting | 0.00(note3)~99.99/100.0~999.9/1000.~3600.(s) | 10.00 | ○ | ○ | |
| | A293 | Deceleration 2 time setting, 2nd motor | 0.00(note3)~99.99/100.0~999.9/1000.~3600.(s) | 10.00 | ○ | ○ | |
| | A094 | Select method to switch to acc2/dec2 profile | 00(switch by 2CH terminal) / 01(switch by setting) / 02(switch only when rotation is reversed) | 01 | × | × | |
| | A294 | Select method to switch to acc2/dec2 profile, 2nd motor | 00(switch by 2CH terminal) / 01(switch by setting) / 02(switch only when rotation is reversed) | 01 | × | × | |
| | A095 | Acc1 to acc2 frequency transition point | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | × | |
| | A295 | Acc1 to acc2 frequency transition point, 2nd motor | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | × | |
| | A096 | Dec1 to dec2 frequency transition point | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | × | |
| | A296 | Dec1 to dec2 frequency transition point, 2nd motor | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | × | |
| | A097 | Acc curve selection | 00(linear) / 01(S curve) / 02(U curve) / 03(inverted U curve) / 04(EL-S curve) | 00 | × | × | |
| | A098 | Dec curve selection | 00(linear) / 01(S curve) / 02(U curve) / 03(inverted U curve) / 04(EL-S curve) | 00 | × | × | |
| | Frequency Adjustment | A101 | [OI] starting frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| | | A102 | [OI] end frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| A103 | | [OI] start current | 0.~01 end current (%) | 20. | × | ○ | |
| A104 | | [OI] end current | 01 start current~100.(%) | 100. | × | ○ | |
| A105 | | [OI] start frequency enable | 00(start frequency A101) / 01(0Hz) | 00 | × | ○ | |
| Acc/dec | A131 | Acc curve constants setting | 01(smallest swelling)~10(largest swelling) | 02 | × | ○ | |
| | A132 | Dec curve constants setting | 01(smallest swelling)~10(largest swelling) | 02 | × | ○ | |
| Operation target freq | A141 | Operation-target frequency selection 1 | 00(digital operator) / 01(keypad potentiometer) note1) / 02(voltage input via(OI)) / 03(current input via (OI)) / 04(Modbus communication) / 05(option board) / 07(pulse string frequency) | 02 | × | ○ | |
| | A142 | Operation-target frequency selection 2 | 00(digital operator) / 01(keypad potentiometer) note1) / 02(voltage input via(OI)) / 03(current input via (OI)) / 04(Modbus communication) / 05(option board) / 07(pulse string frequency) | 03 | × | ○ | |
| | A143 | Operator selection | 00(addition: A141+A142) / 01(subtraction: A141-A142) / 02(multiplication: A141x A142) | 00 | × | ○ | |
| | A145 | Frequency to be added | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A146 | Sign of frequency to be added | 00(frequency command+A145) / 01(frequency command-A145) | 00 | × | ○ | |
| Acc/dec | A150 | EL-S acc curve ratio 1 | 0.~50.(%) | 10. | × | × | |
| | A151 | EL-S acc curve ratio 2 | 0.~50.(%) | 10. | × | × | |
| | A152 | EL-S dec curve ratio 1 | 0.~50.(%) | 10. | × | × | |
| | A153 | EL-S dec curve ratio 2 | 0.~50.(%) | 10. | × | × | |
| | Other | A154 | Dec hold time frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| A155 | | Dec hold time | 0.0~60.0(s) | 0.0 | × | ○ | |
| PID | A156 | PID sleep function activation level | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A157 | PID sleep function activation hold time | 0.0~25.5(s) | 0.0 | × | ○ | |
| Frequency adjustment | A161 | VR start frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A162 | VR end frequency | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | A163 | VR start frequency | 0.~VR end ratio(%) | 0. | × | ○ | |
| | A164 | VR end frequency | VR start ratio~100.(%) | 100. | × | ○ | |
| | A165 | VR start selection | 00(start frequency A161) / 01(0Hz) | 01 | × | ○ | |

note3) data range.

FUNCTION GROUP B

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | | |
|---|--|---|---|---|--|---|---|
| Restart after instantaneous power failure or trip | b001 | Instantaneous · under-voltage restart mode | 00(trip) / 01(start with 0Hz) / 02(start with matching frequency) / 03(trip after decelerating to stop with matching frequency) / 04(restart with active matching frequency) | 00 | × | ○ | |
| | b002 | Instantaneous · under-voltage power failure time | 0.3~25.0(s) | 1.0 | × | ○ | |
| | b003 | Retry wait time before motor restart | 0.3~100.0(s) | 1.0 | × | ○ | |
| | b004 | Instantaneous power failure · under voltage trip alarm enable | 00(disabling) / 01(enabling) / 02(disabling during stopping and decelerating to stop) | 00 | × | ○ | |
| | b005 | Times of restart after instantaneous power failure | 00(16 times) / 01(unlimited) | 00 | × | ○ | |
| | b007 | Restart frequency threshld | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ | |
| | b008 | Overvoltage · overcurrent restart selection | 00(trip) / 01(start with 0Hz) / 02(start with matching frequency) / 03(trip after deceleration to stop with matching frequency) / 04(restart with active matching frequency) | 00 | × | ○ | |
| | b010 | Retry count after overvoltage · overcurrent | 1~3 times | 3 | × | ○ | |
| | b011 | Retry wait time before overvoltage and overcurrent | 0.3~100.0(s) | 1.0 | × | ○ | |
| | Electronic thermal protection | b012 | Electronic thermal setting | 0.2×rated current~1.0×rated current(A) | rated current | × | ○ |
| | | b212 | Electronic thermal setting, 2nd motor | 0.2×rated current~1.0×rated current(A) | rated current | × | ○ |
| b013 | | Electronic thermal characteristic | 00(reduced torque characteristic) / 01(constant torque characteristic) / 02(free setting) | 01 | × | ○ | |
| b213 | | Electronic thermal characteristic, 2nd motor | 00(reduced torque characteristic) / 01(constant torque characteristic) / 02(free setting) | 01 | × | ○ | |
| b015 | | Free setting, electronic thermal frequency 1 | 0~free setting, electronic thermal frequency 2(Hz) | 0. | × | ○ | |
| b016 | | Free setting, electronic thermal current 1 | 0.00~rated current(A) | 0.0 | × | ○ | |
| b017 | | Free setting, electronic thermal frequency 2 | Free setting, electronic thermal frequency 1~free setting, electronic thermal frequency 3(Hz) | 0. | × | ○ | |
| b018 | | Free setting, electronic thermal current 2 | 0.00~rated current(A) | 0.0 | × | ○ | |
| b019 | | Free setting, electronic thermal frequency 3 | Free setting, electronic thermal frequency 2~400.0(Hz) | 0. | × | ○ | |
| b020 | | Free setting, electronic thermal current 3 | 0.00~rated current(A) | 0.0 | × | ○ | |
| Overload restriction and overcurrent restraint | | b021 | Overload restriction operation mode | 00(disabling) / 01(enabling during acceleration and constant speed) / 02(enabling during constant speed) / 03(enabling during acceleration · low speed(increasing the speed during regeneration)) | 01 | × | ○ |
| | b221 | Overload restriction operation mode, 2nd motor | 00(disabling) / 01(enabling during acceleration and constant speed) / 02(enabling during constant speed) / 03(enabling during acceleration · low speed(increasing the speed during regeneration)) | 01 | × | ○ | |
| | b022 | Overload restriction setting | 0.2×rated current~2.0×rated current(A) (HD mode) 0.2×rated current~1.5×rated current(A) (ND mode) | rated current × 1.50 | × | ○ | |
| | b222 | Overload restriction setting, 2nd motor | 0.2×rated current~2.0×rated current(A) (HD mode) 0.2×rated current~1.5×rated current(A) (ND mode) | rated current × 1.50 | × | ○ | |
| | b023 | Deceleration rate at overload restriction | 0.1~999.9/1000.~3000.(s) | 1.0 | × | ○ | |
| | b223 | Deceleration rate at overload restriction, 2nd motor | 0.1~999.9/1000.~3000.(s) | 1.0 | × | ○ | |
| | b024 | Overload restriction operation mode 2 | 00(disabling) / 01(enabling during acceleration · constant speed) / 02(enabling during constant speed) / 03(enabling during acceleration · low speed(increasing speed during regeneration)) | 01 | × | ○ | |
| | b025 | Overload restriction setting 2 | 0.2×rated current~2.0×rated current(A) (HD mode) 0.2×rated current~1.5×rated current(A) (ND mode) | rated current × 1.50 | × | ○ | |
| | b026 | Deceleration rate at overload restriction 2 | 0.1~999.9/1000.~3000.(s) | 1.0 | × | ○ | |
| | b027 | Overcurrent suppression enable | 00(disabling) / 01(enabling: without reduced voltage)/02(enabling:with reduced voltage) (note 4) | 01(IM mode) 00(PM mode) | × | ○ | |
| | Software lock | b028 | Active matching frequency, scan start frequency | 0.2×rated current~2.0×rated current(A) (HD mode) 0.2×rated current~1.5×rated current(A) (ND mode) | rated current | × | ○ |
| b029 | | Active matching frequency, scan time constant | 0.1~999.9/1000.~3000.(s) | 0.50 | × | ○ | |
| b030 | | Active matching frequency, restart frequency select | 00(frequency at shutoff) / 01(maximum frequency) / 02(set frequency) | 00 | × | ○ | |
| b031 | | Software lock mode selection | 00(SFT terminal ON, disabling change of parameter data except b031 when SFT is ON) / 01(disabling change of parameter data except b031 and frequency settings when SFT is ON) / 02(disabling change of parameter data except b031) / 03(disabling change of parameter data except b031 and frequency setting) / 10(enabling changes during operation) | 10 | × | ○ | |
| Others | b033 | Length of motor ware selection | 5~20. | 10. | ○ | ○ | |
| | b034 | Operation · power on time | 0.~9999.(0~99990)/1000~6553(100000~655350)(hr) | 0. | × | ○ | |
| | b035 | Rotation direction restriction | 00(forward and reverse rotation enabling) / 01(forward rotation enabling) / 02(reverse rotation enabling) | 00 | × | × | |
| | b036 | Reduced voltage start selection | 0(minimum reduced voltage start time)~255(maximum reduced voltage start time) | 2 | × | ○ | |
| | b037 | Display restriction | 00(full display) / 01(function specific display) / 02(user setting+b037) / 03(data comparison display) / 04(basic display) / 05(monitored display) | 00 | × | ○ | |
| | b038 | Initial screen selection | 000(screen displayed when SET key is pressed at last) / 001~060(d001~d060) / 201(F001) | 001 | × | ○ | |
| | b039 | Automatic user-data setting function enable | 00(disabling) / 01(enabling) | 00 | × | ○ | |
| Torque limitation | b040 | Torque limit selection | 00(quadrant-specific setting) / 01(switching by terminal) / 02(analog input) / 03(option board) | 00 | × | ○ | |
| | b041 | Torque limit 1 (forward driving in 4 quadrant mode) | 0.~200.(%) / no(torque limit disabling) | 200. | × | ○ | |
| | b042 | Torque limit 2 (reverse regeneration in 4 quadrant mode) | 0.~200.(%) / no(torque limit disabling) | 200. | × | ○ | |
| | b043 | Torque limit 3 (reverse driving in 4 quadrant mode) | 0.~200.(%) / no(torque limit disabling) | 200. | × | ○ | |
| | b044 | Torque limit 4 (forward regeneration in 4 quadrant mode) | 0.~200.(%) / no(torque limit disabling) | 200. | × | ○ | |
| | b045 | Torque limit LADSTOP enable | 00(disabling) / 01(enabling) | 00 | × | ○ | |
| | b046 | Reverse run protection enable | 00(disabling) / 01(enabling) | 01 | × | ○ | |
| Others | b049 | Loading mode selection | 00(HD mode) / 01(ND mode) | 00 | × | × | |
| | Nonstop operation at instantaneous power failure | b050 | Controller deceleration and stop on power loss (deceleration to stop) / 02(nonstop deceleration to stop (constant voltage, without resume)) / 03(nonstop deceleration to stop (constant voltage, with resume)) | 00 | × | × | |
| | | b051 | DC voltage trigger level during power loss | 0.0~999.9/1000.(V) | 220.0/ 440.0 | × | × |
| | | b052 | OV-LADSTOP threshold at power loss | 0.0~999.9/1000.(V) | 360.0/ 720.0 | × | × |
| | | b053 | Deceleration time at power loss | 0.01~999.9/1000.~3600.(s) | 1.0 | × | × |
| | | b054 | Initial output frequency decrease during power loss | 0.00~10.00(Hz) | 0.00 | × | × |

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | | |
|-------------------|------------------------------|---|--|--|--|---|---|
| Window comparator | b060 | Maximum limit level of window comparators O | 0.~100. (lower limit: b061 + b062 × 2) (%) | 100. | ○ | ○ | |
| | b061 | Minimum limit level of window comparators O | 0.~100. (upper limit: b060 - b 062 × 2) (%) | 0. | ○ | ○ | |
| | b062 | Hysteresis width of window comparators O | 0.~10. (upper limit: (b061 - b062) / 2) (%) | 0. | ○ | ○ | |
| | b063 | Maximum limit level of window comparators OI | 0.~100. (lower limit: b064 + b066 × 2) (%) | 100. | ○ | ○ | |
| | b064 | Minimum limit level of window comparators OI | 0.~100. (upper limit: b063 - b 066 × 2) (%) | 0. | ○ | ○ | |
| | b065 | Hysteresis width of window comparators OI | 0.~10. (upper limit: (b063 - b064) / 2) (%) | 0. | ○ | ○ | |
| | Others | b070 | Operation level at O disconnection | 0.~100 ./no(ignore) | no | × | ○ |
| | | b071 | Operation level at OI disconnection | 0.~100 ./no(ignore) | no | × | ○ |
| | | b075 | Ambient temperature | -10.~50.(°C) | 40. | ○ | ○ |
| | | b078 | Cumulative power data clearance | 00(OFF) / 01(clearance) (back to 00 after clearance) | 00 | ○ | ○ |
| | | b079 | Cumulative power display gain setting | 1.~1000. | 1. | ○ | ○ |
| b082 | | Start frequency | 0.01(注5)~9.99(Hz) | 0.50 | × | ○ | |
| b083 | | Carrier frequency | 2.0~15.0/10.0(kHz) (HD mode/ND mode) ※subject to derating | 2.0 [IM mode] 10.0 [PM mode] | × | ○ | |
| b084 | | Initialization mode | 00(initialization disabling) / 01(clearing the trip history) / 02(initializing the history) / 03(trip history clearance + data initialization) / 04(trip history clearance + data initialization +EzSQ initialization) | 00 | × | × | |
| b085 | | Country code for initialization | 00(option 0) / 01(option1) | 00 | × | × | |
| b086 | | Frequency scaling conversion factor | 0.01~99.99 | 1.00 | ○ | ○ | |
| b087 | | STOP/RESET key enable | 00(enabling) / 01(disabling) / 02(reset enabling) | 00 | × | ○ | |
| Free setting V/f | b088 | Restart mode after FRS | 00(start with 0Hz) / 01(start with matching frequency) / 02(restart with matching frequency) | 00 | × | ○ | |
| | b089 | Automatic carrier frequency reduction | 00(invalid) / 01(valid, based on current) / 02(valid, based on the temperature of heat sink) | 01 [IM mode] 00 [PM mode] | × | × | |
| | b090 | BRD usage ratio | 0.0~100.0(%) | 0.0 | × | ○ | |
| | b091 | Stop mode selection | 00(deceleration→stop) / 01(free running stop) | 00 | × | ○ | |
| | b092 | Cooling fan control | 00(always operating the fan) / 01(operating the fan only during inverter operation<including five minutes after power on and power off>) / 02(base on the temperature of the heat sink) | 01 | × | ○ | |
| | b093 | Cooling fan cumulative operation time clearance | 00(counting operation time) / 01(clearance) | 00 | × | × | |
| | b094 | Initialization selection | 00(all data) / 01(all data except for terminal · communication) / 02(U***logging in function) / 03(except for U***logging in function) | 00 | × | × | |
| | b095 | BRD control | 00(disabling) / 01(enabling<disabling when the motor is stopped>) / 02(enabling<enabling when the motor is stopped>) | 01 | × | ○ | |
| | b096 | BRD ON activation level | 330~380/660~760(V) | 360/720 | × | ○ | |
| | b097 | BRD resistance value setting | Minimum resistance value~600.0Ω | Minimum resistance value | × | ○ | |
| | b100 | Free setting V/f frequency 1 | 0.~free setting V/f frequency 2(Hz) | 0. | × | × | |
| b101 | Free setting V/f voltage 1 | 0.0~800.0(V) | 0.0 | × | × | | |
| b102 | Free setting V/f frequency 2 | Free setting V/f frequency 1~free setting V/f frequency 3(Hz) | 0. | × | × | | |
| b103 | Free setting V/f voltage 2 | 0.0~800.0(V) | 0.0 | × | × | | |
| b104 | Free setting V/f frequency 3 | Free setting V/f frequency 2~free setting V/f frequency 4(Hz) | 0. | × | × | | |
| b105 | Free setting V/f voltage 3 | 0.0~800.0(V) | 0.0 | × | × | | |
| b106 | Free setting V/f frequency 4 | Free setting V/f frequency 3~free setting V/f frequency 5(Hz) | 0. | × | × | | |
| b107 | Free setting V/f voltage 4 | 0.0~800.0(V) | 0.0 | × | × | | |
| b108 | Free setting V/f frequency 5 | Free setting V/f frequency 4~free setting V/f frequency 6(Hz) | 0. | × | × | | |
| b109 | Free setting V/f voltage 5 | 0.0~800.0(V) | 0.0 | × | × | | |
| b110 | Free setting V/f frequency 6 | Free setting V/f frequency 5~free setting V/f frequency 7(Hz) | 0. | × | × | | |
| b111 | Free setting V/f voltage 6 | 0.0~800.0(V) | 0.0 | × | × | | |
| b112 | Free setting V/f frequency 7 | Free setting V/f frequency 6~400.(Hz)s | 0. | × | × | | |
| b113 | Free setting V/f voltage 7 | 0.0~800.0(V) | 0.0 | × | × | | |

Note4) newly added parameter: 02

Note5) data range

Note 6) newly added parameter: 02

● Function group B

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | |
|----------|---------------|-------------------------------|--|---|--|---|
| Others | b166 | R/W selection | 00: R/W allowed / 01: R/W forbidden | 00 | × | ○ |
| | b171 | Inverter mode selection | 00(disabled) / 01(asynchronous motor) / 03(synchronous magnet motor) | 00 | × | × |
| | b180 | Initialization mode selection | 00(enabled) / 01(initialization mode selection) | 00 | × | × |
| Password | b190 | Password setting A | 0000(password function disabling) / 0001~FFFF(password) | 0000 | × | × |
| | b191 | Password authentication A | 0000~FFFF | 0000 | × | × |
| | b192 | Password setting B | 0000(password function disabling) / 0001~FFFF(password) | 0000 | × | × |
| | b193 | Password authentication B | 0000~FFFF | 0000 | × | × |

● Function group B

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | |
|-----------------------------|---------------|--|--|---|--|---|
| Intelligent input terminal | C001 | Input terminal 1 | 00(FW:forward rotation) / 01(RV:reverse rotation) / 02(CF1:multipspeed 1 setting) / 03(CF2:multipspeed 2 setting) / 04(CF3:multipspeed 3 setting) / 05(CF4:multipspeed 4 setting) / 06(JG:jogging) / 07(DB:external DC braking) / 08(SE: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(SF1:software lock) / 16(AT:analog input voltage/current select) / 18(RS:reset) / 19(PTC:external thermal resistor only for C005) / 20(STA:starting by 3-wire input) / 21(STP:operating by 3-wire input) / 22(F/R:forward/reverse switching by 3-wire input) / 23(PID:PID disabling) / 24(PIDC:PID reset) / 27(UP:remote control UP function) / 28(DWN:remote control DOWN function) / 29(UDC:remote control data clearing) / 31(OPE:forcible operation) / 32(SF1:multipspeed bit 1) / 33(SF2:multipspeed bit 2) / 34(SF3:multipspeed bit 3) / 35(SF4:multipspeed bit 4) / 36(SF5:multipspeed bit 5) / 37(SF6:multipspeed bit 6) / 38(SF7:multipspeed 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) / 44(BOK:braking confirmation) / 46(LAC:LAD cancellation) / 47(PCLR:clearance of position deviation) / 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) / 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) / 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) / 73(SPD:speed / position switching) / 77(GS1:gate suppression 1) / 78(GS2:gate suppression 2) / 81(485:EzCOM start) / 82(PRG:EzSQ start terminal) / 83(HLD:acc/dec to stop) / 84(ROK:operation allowed signal) / 85(EB: detect rotation direction, only for C007) / 86(DISP: display fixation) / 91(PSET: preset for EzSQ control) (note 8) / no(NO: no designation) | 00(FW) | × | ○ |
| | C002 | Input terminal 2 | | 01(RV) | × | ○ |
| | C003 (note7) | Input terminal 3 | | 02(CF1) | × | ○ |
| | C004 (note7) | Input terminal 4 | | 03(CF2) | × | ○ |
| | C005 | Input terminal 5 | | 09(2CH) | × | ○ |
| | C006 | Input terminal 6 | | 18(RS) | × | ○ |
| | C007 | Input terminal 7 | | 13(USP) | × | ○ |
| | C011 ~ C017 | Input terminal 1~8 | 00(a contact(NO:Normally Open)) / 01(b contact(NC:Normally Closed)) | 00 | × | ○ |
| Intelligent output terminal | C021 (note9) | Output terminal 11 | 00(RUN:running) / 01(FA1:constant-speed reached) / 02(FA2:set frequency overreached) / 03(OL:overload notice advance signal) / 04(OD:output deviation for PID control) / 05(AL:alarm signal) / 06(FA3:set frequency reached) / 07(OTQ:over/under torque) / 09(UV:undervoltage signal) / 10(TRQ:torque limited) / 11(RNT:operation time over) / 12(ONT:plug-in time over) / 13(THM:thermal alarm signal) / 19(BRK:thermal alarm signal) / 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) / 31(FBV:PID feedback comparison) / 32(NDC:PID feedback comparison) / 33(LOG1:logical operation result 1) / 34(LOG2:logical operation result 2) / 35(LOG3:logical operation result 3) / 39(WAC:capacitor life warning) / 40(WAF:cooling-fan speed drop) / 41(FR:starting contact signal) / 42(OHF:starting contact signal) / 43(LOC:low-current indication signal) / 44(MO1:general-purpose output 1) / 45(MO2:general-purpose output 2) / 46(MO3:general-purpose output 3) / 50(IRDY:general-purpose output) / 51(FWR:forward rotation) / 52(RVR:reverse rotation) / 53(MJA:major failure) / 54(WCO:major failure O) / 55(WCOI:major failure OI) / 58(FREF:frequency command | 01(FA1) | × | ○ |
| | C022 | Output terminal 12 | | 00(RUN) | × | ○ |
| | C026 | Alarm relay terminal | | 05(AL) | × | ○ |
| | C027 | PWM/ pulse string [EO] terminal selection | 00(output frequency) / 01(output current) / 02(output torque) / 03(digital output frequency) / 04((output voltage) / 05(input power) / 06((input power) / 07(LADfrequency) / 08(digital current monitoring) / 10(motor temperature) / 12(general-purpose output YA0) / 15(pulse string input monitoring) / 16(option board) | 07 | × | ○ |
| Analog monitoring | C028 | Analog output [AM] terminal | 00(output frequency) / 01(output current) / 02(output torque) / 04(output voltage) / 05(input power) / 06(thermal protection load rate) / 07(LAD frequency) / 10(heat sink temperature) / 11(output torque<with symbol>) / 13(general output) / 16(option board) | 07 | × | ○ |
| | C030 | Digital current monitor reference value | 0.20×rated current~2.00×rated current(A) (digital current monitoring output, output frequency 1440Hz) | rated current | ○ | ○ |
| | C031 | Terminal 11 contact selection | 00(a contact (NO:Normally Open)) / 01(b contact (NC:Normally Closed)) | 00 | × | ○ |
| Intelligent output terminal | C032 | Terminal 12 contact selection | 00(a contact (NO:Normally Open)) / 01(b contact (NC:Normally Closed)) | 00 | × | ○ |
| | C036 | Output terminal contact selection of relay | 00(a contact (NO:Normally Open)) / 01(b contact (NC:Normally Closed)) | 01 | × | ○ |

Note 7) When safe switch function is enabling, the parameter of C003=77(GS1), C004=78(GS2) (77(GS1), 78(GS2) can't be set freely)

Note 8) Newly added parameter: 91

Note 9) When EDM switch is enabled, C021 is forcibly enforced as 62(EDM). Please note that when EDM is switched between ON and OFF, C021 is specified as "NO"

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|------|---|---|--------------------|---|--|
| C038 | Low-current indication signal output mode selection | 00(output during acceleration/deceleration and constant speed operation) / 01(output during constant speed) | 01 | × | ○ |
| C039 | Low-current indication signal detection level | 0.0~2.00×rated current(A) | rated current | ○ | ○ |
| C040 | Overload signal output mode | 00(output during acceleration/deceleration and constant speed operation) / 01(output during constant speed) | 01 | × | ○ |
| C041 | Overload level setting | 0.0~2.00×rated current((A) | rated current×1.5 | ○ | ○ |
| C241 | Overload level setting, 2nd motor | 0.0~2.00×rated current((A) | | ○ | ○ |
| C042 | Frequency arrival setting for accel | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| C043 | Frequency arrival setting for decel. | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| C044 | PID deviation level setting | 0.0~100.0(%) | 3.0 | × | ○ |
| C045 | Frequency arrival setting for acceleration 2 | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| C046 | Frequency arrival setting for deceleration 2 | 0.00~99.99/100.0~400.0(Hz) | 0.00 | × | ○ |
| C047 | Pulse string input/output full scale value transformation | 0.01~99.99 | 1.00 | ○ | ○ |
| C052 | Feedback comparison signal level OFF | 0.0~100.0(%) | 100.0 | × | ○ |
| C053 | Feedback comparison signal level ON | 0.0~100.0(%) | 0.0 | × | ○ |
| C054 | Over/under torque selection | 00(overtorque) / 01(undertorque) | 00 | × | ○ |
| C055 | Over/under torque level setting (forward driving) | 0.~200.(%) | 100. | × | ○ |
| C056 | Over/under torque level setting (reverse regeneration) | 0.~200.(%) | 100. | × | ○ |
| C057 | Over/under torque level setting (reverse driving) | 0.~200.(%) | 100. | × | ○ |
| C058 | Over/under torque level setting (forward regeneration) | 0.~200.(%) | 100. | × | ○ |
| C059 | Over/under torque output signal mode selection | 00(output during acceleration/deceleration and constant speed operation) / 01(output during constant speed) | 01 | × | ○ |
| C061 | Electronic thermal warning level setting | 0.~100.(%) | 90. | × | ○ |
| C063 | Zero speed detection level | 0.00~99.99/100.0(Hz) | 0.00 | × | ○ |
| C064 | Heat sink overheat warning level | 0.~110.(°C) | 100. | × | ○ |
| C071 | Communication speed selection | 03(2400bps) / 04(4800bps) / 05(9600bps) / 06(19.2kbps) / 07(38.4kbps) / 08(57.6kbps) / 09(76.8kbps) / 10(115.2kbps) | 05 | × | ○ |
| C072 | Communication address selection | 1.~247. | 1. | × | ○ |
| C074 | Communication parity selection | 00(no parity) / 01(even parity) / 02(odd parity) | 00 | × | ○ |
| C075 | Communication stop bit selection | 1(1bit) / 2(2bit) | 1 | × | ○ |
| C076 | Selection of operation after communication error | 00(trip) / 01(trip after decelerate to stop) / 02(ignore) / 03(free run stop) / 04(decelerate to stop) | 02 | × | ○ |
| C077 | Communication timeout limit before tripping | 0.00(disabling)/0.01~99.99(s) | 0.00 | × | ○ |
| C078 | Communication wait time | 0.~1000.(ms) | 0. | × | ○ |
| C081 | O input span calibration | 0.0~200.0(%) | 100. | ○ | ○ |
| C082 | O1 input span calibration | 0.0~200.0(%) | 100. | ○ | ○ |
| C085 | Thermistor input tuning | 0.0~200.0(%) | 100. | ○ | ○ |
| C091 | Debug mode enable | Intended for factory adjustment, please don't change this parameter | 00 | ○ | ○ |
| C096 | Communication selection | 00(Modbus-RTU) / 01(communication between inverters) / 02(communication between inverters<management>) | 00 | × | × |
| C098 | EzCOM starting address | 1.~8. | 1. | × | × |
| C099 | EzCOM ending address | 1.~8. | 1. | × | × |
| C100 | EzCOM starting selection | 00(485 terminal) / 01(always) | 00 | × | × |
| C101 | UP/DWN memory selection | 00(not store the frequency data) / 01(store the frequency data) | 00 | × | ○ |
| C102 | Reset mode selection | 00(resetting the trip when RS is ON) / 01(resetting the trip when RS is OFF) / 02(enabling resetting only upon tripping<resetting when RS is ON>) / 03(resetting only trip) | 00 | ○ | ○ |
| C103 | Restart mode after reset | 00(restart with 0Hz) / 01(restart with matching frequency) / 02(restart with active matching frequency) | 00 | × | ○ |
| C104 | UP/DWN terminal clearance mode | 00(0Hz) / 01(the parameter of EEPROM during power on) | 00 | × | ○ |
| C105 | EO gain adjustment | 50.~200.(%) | 100. | ○ | ○ |
| C106 | AM gain adjustment | 50.~200.(%) | 100. | ○ | ○ |
| C109 | AM bias adjustment | 0.~100.(%) | 0. | ○ | ○ |
| C111 | Overload setting 2 | 0.00~2.00×rated current(A) | rated current×1.15 | ○ | ○ |

● Function group H

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | | |
|------------------|--|---|--|--|--|---|---|
| Control constant | H001 | Automatic tuning | 00(disabling) / 01(enabling without rotation) / 02(enabling with rotation) | 00 | × | × | |
| | H002 | Motor data selection | 00(Hitachi standard tuned) / 02(auto tuned data) | 00 | × | × | |
| | H202 | Motor data, 2nd motor | 00(Hitachi standard tuned) / 02(auto tuned data) | (note10) | × | × | |
| | H003 | Motor capacity | 0.1/0.2/0.4/0.55/0.75/1.1/1.5/2.2/3.0/3.7/4.0/5.5/7.5/11.0/15.0/18.5(kW) | (note10) | × | × | |
| | H203 | Motor capacity, 2nd motor | 0.1/0.2/0.4/0.55/0.75/1.1/1.5/2.2/3.0/3.7/4.0/5.5/7.5/11.0/15.0/18.5(kW) | (note10) | × | × | |
| | H004 | Motor poles | 2/4/6~/46/48(poles) | 4. | × | × | |
| | H204 | Motor poles, 2nd motor | 2/4/6/8/10(poles) | 4. | × | × | |
| | H005 | Motor speed constant | 1.~1000. | 100. | ○ | ○ | |
| | H205 | Motor speed constant, 2nd motor | 1.~1000. | 100. | ○ | ○ | |
| | H006 | Motor stabilization constant | 0.~255. | 100. | ○ | ○ | |
| | H206 | Motor stabilization constant, 2nd motor | 0.~255. | 100. | ○ | ○ | |
| | H020 | Motor constant R1 | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H220 | Motor constant R1, 2nd motor | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H021 | Motor constant R2 | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H221 | Motor constant R2, 2nd motor | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H022 | Motor constant L | 0.01~99.99/100.0~655.3(mH) | (note10) | × | × | |
| | H222 | Motor constant L, 2nd motor | 0.01~99.99/100.0~655.3(mH) | (note10) | × | × | |
| | H023 | Motor constant IO | 0.01~99.99/100.0~655.3(A) | (note10) | × | × | |
| | H223 | Motor constant IO, 2nd motor | 0.01~99.99/100.0~655.3(A) | (note10) | × | × | |
| | H024 | Motor constant J | 0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.(kgm ²) | (note10) | × | × | |
| | H224 | Motor constant J, 2nd motor | 0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.(kgm ²) | (note10) | × | × | |
| | H030 | Motor constant R1 (auto tuning) | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H230 | Motor constant R1, 2nd motor (auto tuning) | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H031 | Motor constant R2 (auto tuning) | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H231 | Motor constant R2, 2nd motor (auto tuning) | 0.001~9.999/10.00~65.53(Ω) | (note10) | × | × | |
| | H032 | Motor constant L (auto tuning) | 0.01~99.99/100.0~655.3(mH) | (note10) | × | × | |
| | H232 | Motor constant L, 2nd motor (auto tuning) | 0.01~99.99/100.0~655.3(mH) | (note10) | × | × | |
| | H033 | Motor constant IO (auto tuning) | 0.01~99.99/100.0~655.3(A) | (note10) | × | × | |
| | H233 | Motor constant IO, 2nd motor (auto tuning) | 0.01~99.99/100.0~655.3(A) | (note10) | × | × | |
| | H034 | Motor constant J (auto tuning) | 0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.(kgm ²) | (note10) | × | × | |
| | H234 | Motor constant J, 2nd motor (auto tuning) | 0.001~9.999/10.00~99.99/100.0~999.9/1000.~9999.(kgm ²) | (note10) | × | × | |
| | H050 | V/f control compensation gain (with FB) | 0.00~10.00(times) | 0.20 | ○ | ○ | |
| | H051 | Integral time setting for V/f control compensation gain (with FB) | 0.~1000.(s) | 2 | ○ | ○ | |
| | PM motor parameters (note 11) | H102 | PM motor data selection | 00(Hitachi standard tuned) / 01(auto tuned data) | 00 | × | × |
| | | H103 | PM motor capacity selection | 0.1/0.2/0.4/0.55/0.75/1.1/1.5/2.2/3.0/3.7/4.0/5.5/7.5/11.0/15.0/18.5(kW) | (note10) | × | × |
| | | H104 | PM motor poles | 2/4/6/8/10/12/14/16/18/20/22/24/26/28/30/32/34/36/38/40/42/44/46/48(poles) | (note10) | × | × |
| | | H105 | PM motor rated current | (0.00~1.00) x rated current(A) | (note10) | × | × |
| | | H106 | PM motor constant R(resistor) | 0.001~65.535(Ω) | (note10) | × | × |
| | | H107 | PM motor constant Ld(d-axis inductance) | 0.01~655.35(mH) | (note10) | × | × |
| | | H108 | PM motor constant Lq(q-axis inductance) | 0.01~655.35(mH) | (note10) | × | × |
| | | H109 | PM motor constant Ke (induced voltage constant) | 0.0001~6.5535(V/(rad/s)) | (note10) | × | × |
| | | H110 | PM motor constant J(moment of inertia) | 0.001~9999.000(kgm ²) | (note10) | × | × |
| | | H111 | PM motor constant R(resistor) | 0.001~65.535(Ω) | (note10) | × | × |
| | | H112 | PM motor constant Ld(daxis inductance) | 0.01~655.35(mH) | (note10) | × | × |
| | | H113 | PM motor constant Lq(qaxis inductance) | 0.01~655.35(mH) | (note10) | × | × |
| | | H116 | PM speed response | 1~1000(%) | 100 | ○ | ○ |
| | | H117 | PM starting current | 20.00~100.00(%) | 70.00 | × | × |
| | | H118 | PM starting time | 0.01~60.00(s) | 1.00 | × | × |
| | | H119 | PM stability constant | 0~120(%) | 100 | × | × |
| | | H121 | PM minimum frequency | 0.0~25.5(%) | 8.0 | ○ | ○ |
| H122 | | PM no load current | 0.00~100.00(%) | 10.00 | ○ | ○ | |
| H123 | | PM starting method selection | 00(disabling starting position detection) / 01(enabling starting position detection) | 00 | × | × | |
| H131 | | PM starting position detection(0V standby times) | 0~255 | 10 | × | × | |
| H132 | PM starting position detection (standby times detection) | 0~255 | 10 | × | × | | |
| H133 | PM starting position detection (detection times) | 0~255 | 30 | × | × | | |
| H134 | PM starting position detection voltage gain | 0~200 | 100 | × | × | | |

Note 10) The defaults are different for different models

Note 11) PM motor data (the data for H102~H134 are only displayed on under PM mode).

● Function group P

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | |
|------------------------|---------------|---|---|---|--|---|
| Others | P001 | Operation mode on expansion card 1 error | 00(tripping) / 01(continuing operation) | 00 | × | ○ |
| | P003 | Pulse string input terminal EA selection | 00(frequency setting(including PID)) / 01(encoder feedback) / 02(input terminal for EzSQ) | 00 | × | × |
| | P004 | FB pulse string input selection | 00(signal phase pulse string input) / 01(2 phase pulse string1) / 02(2 phase pulse string2) / 03(signal phase pulse string+direction) | 00 | × | × |
| FB control | P011 | Encoder pulse strings | 32.~1024.(pulse string) | 512. | × | × |
| | P012 | EzSQ position control | 00(disabling EzSQ position control) / 02(enabling EzSQ position control) | 00 | × | × |
| | P014 | Creeping pulse ratio | 0.0~400.0[%] | 125.0 | × | × |
| | P015 | Crawling speed setting | Starting frequency~10.0(Hz) | 5.00 | × | ○ |
| | P017 | EzSQ position control Home search completion range setting | 0~10000[pulse string] | 50 | × | × |
| | P026 | Overspeed error detection level setting | 0.0~150.0 (%) | 115.0 | × | ○ |
| | P027 | Overspeed deviation error detection level setting | 0.00~99.99/100.0~120.0(Hz) | 10.00 | × | ○ |
| Others | P031 | Accel/decel time input selection | 00(operator) / 03(EzSQ) | 00 | × | × |
| | P033 | Accel/decel time input selection | 00(O terminal) / 01(OI terminal) / 03(operator) / 06(option) | 00 | × | × |
| Torque control | P034 | Torque comma nd setting | 0.~200.(%) | 0. | ○ | ○ |
| | P036 | Torque bias mode | 00(无) / 01(operator) / 05(option) | 00 | × | × |
| | P037 | Torque bias v alue | -200.~+200.(%) | 0. | ○ | ○ |
| | P038 | Torque bias polarity selection | 00(as indicated by the sign) / 01(depending on the operation direction) | 00 | × | × |
| | P039 | Speed limit for torque-controlled operation (forward rotation) | 0.00~99.99/100.0~120.0(Hz) | 0.00 | × | × |
| | P040 | Speed limit for torque-controlled operation (reverse rotation) | 0.00~99.99/100.0~120.0(Hz) | 0.00 | × | × |
| | P041 | Speed/torque switch time | 0.~1000.(ms) | 0. | × | × |
| | P044 | Communication error detection time setting | 0.00~99.99(s) | 1.00 | × | × |
| Communication | P045 | Operation action on communication error | 00(tripping) / 01(tripping after deceleration to stop) / 02(ignore) / 03(free run stop) / 04(deceleration to stop) | 01 | × | × |
| | P046 | Output instance nu mber | 00~20 | 00 | × | × |
| | P048 | Inverter action on DeviceNet idle mode | 00(tripping) / 01(tripping after decelerating and stopping the motor) / 02(ignoring errors) / 03(stopping the motor after free-running) / 04(decelerating and stopping the motor) | 01 | × | × |
| | P049 | Motor poles setting | 0/2/4/6~/46/48(poles) | 0 | × | × |
| Pulse string | P055 | Pulse-string frequency scale | 1.0~32.0(kHz) | 25.0 | × | ○ |
| | P056 | Time constant of pulse-string frequency filter | 0.01~2.00(s) | 0.10 | × | ○ |
| | P057 | Pulse-string frequency bias | -100.~+100.(%) | 0. | × | ○ |
| | P058 | Pulse-string frequency bias | 0.~100.(%) | 100. | × | ○ |
| | P059 | Pulse-string input lower limit setting | 0.01~20.00[%] | 1.00 | × | ○ |
| | P060 | Position command 0~7 | Position setting range reverse side to forward side (upper 4 digits including -) | 0 | ○ | ○ |
| | P067 | Zero-return mode selection | 00(low speed) / 01(high speed) | 00 | ○ | ○ |
| | P069 | Zero-return direction selection | 00(FW) / 01(RV) | 01 | ○ | ○ |
| | P070 | Low speed zero-return frequency | 0.00~10.00(Hz) | 5.00 | ○ | ○ |
| EzSQ position | P071 | High speed zero-return frequency | 0.00~99.99/100.0~maximum frequency (Hz), 1st motor | 5.00 | ○ | ○ |
| | P072 | Position range specification(forward) | 0~268,435,455 (upper 4 digits) | 268435455 | ○ | ○ |
| | P073 | Position range specification(reverse) | -268,435,455~0 (upper 4 digits including) | -268435455 | ○ | ○ |
| | P075 | Position mode selection | 00(limited) / 01(unlimited) | 00 | × | × |
| | P077 | Encoder discontneted detection time | 0.0~10.0(s) | 1.0 | ○ | ○ |
| | P080 | EzSQ position control Location restart range setting | 0~10000[pulse string] | 0 | × | × |
| | P081 | Position data stored at power off | 00:unstored/01:stored | 0 | × | ○ |
| | P082 | Position data at power off (4 times of set data) | Designated position range reverse to forward *upper 4 digits | 0 | ○ | ○ |
| | P083 | Preset position data (the same with position command, other than 4 times) | Designated position range reverse to forward *upper 4 digits | 0 | ○ | ○ |
| | EzSQ program | P100 | EzSQ function user parameter U(00)~U(31) | 0.~9999./1000~6553(10000~65535) | 0. | ○ |
| P131 | | EzCOM data | 1.~5. | 5. | ○ | ○ |
| Communication inverter | P141 | EzCOM destination node 1 | 1.~247. | 1. | ○ | ○ |
| | P142 | EzCOM destination node 1 register | 0000h~FFFFh | 0000 | ○ | ○ |
| | P143 | EzCOM source 1 counter | 0000h~FFFFh | 0000 | ○ | ○ |
| | P144 | EzCOM destination node 2 | 1.~247. | 2. | ○ | ○ |
| | P145 | EzCOM destination node 2 register | 0000h~FFFFh | 0000 | ○ | ○ |
| | P146 | EzCOM source 2 counter | 0000h~FFFFh | 0000 | ○ | ○ |
| | P147 | EzCOM destination node 3 | 1.~247. | 3. | ○ | ○ |
| | P148 | EzCOM destination node 3 register | 0000h~FFFFh | 0000 | ○ | ○ |
| | P149 | EzCOM source 3 counter | 0000h~FFFFh | 0000 | ○ | ○ |
| | P150 | EzCOM destination node 4 | 1.~247. | 4. | ○ | ○ |
| | P151 | EzCOM destination node 4 register | 0000h~FFFFh | 0000 | ○ | ○ |
| | P152 | EzCOM source 4 counter | 0000h~FFFFh | 0000 | ○ | ○ |
| | P153 | EzCOM destination node 5 | 1.~247. | 5. | ○ | ○ |
| | P154 | EzCOM destination node 5 register | 0000h~FFFFh | 0000 | ○ | ○ |
| | P155 | EzCOM source 5 counter | 0000h~FFFFh | 0000 | ○ | ○ |

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) | |
|--------------------------------|---|---|---|---|--|---|
| P160 ~ P169 | Option I/F written to command register 1~10 | 0000h~FFFFh | 0000 | ○ | ○ | |
| P170 ~ P179 | Option I/F read command register 1~10 | 0000h~FFFFh | 0000 | ○ | ○ | |
| P180 | Profibus node address | 0~125. | 0. | × | × | |
| P181 | Profibus clearance mode selection | 00(clearance) / 01(keep last value) | 00 | × | × | |
| P182 | Profibus Map selection | 00(PPO mode) / 01(common mode) | 00 | × | × | |
| P185 | CANOpen node address | 0~127 | 0 | × | × | |
| P186 | CANOpen communication speed | 00(auto) / 01(10kbps) / 02(20kbps) / 03(50kbps) / 04(125kbps) / 05(250kbps) / 06(500kbps) / 07(800kbps) / 08(1Mbps) | 06 | × | × | |
| P190 | CompoNet MAC address | 00~63 | 0 | × | × | |
| P192 | DeviceNet MAC ID | 00~63 | 63 | × | × | |
| P195 | ML2 frame length | 00 (32 bytes) / 01 (17bytes) | 00 | × | × | |
| P196 | ML2 Node address | 21h~3Eh | 21h | × | × | |
| /data sent or received setting | P200 | Register mapping function | 00:standard Modbus address/01:enabling Modbus mapping function | × | ○ | |
| | P201 ~ P210 | External register 1~10 | 0000h~FFFFh | × | ○ | |
| | P211 ~ P220 | External register format 1~10 | 00:no signs, words of data/01:signs, words of data | × | ○ | |
| | P221 ~ P230 | Ratio 1~10 | 0.001~65.535 | × | ○ | |
| | P301 ~ P310 | Internal register 1~10 | 0000h~FFFFh | × | ○ | |
| | P400 | Data sent/received order | 00:upper digits in priority/01: lower digits in priority/02:lower digits in priority(in special mode) | 00 | × | ○ |

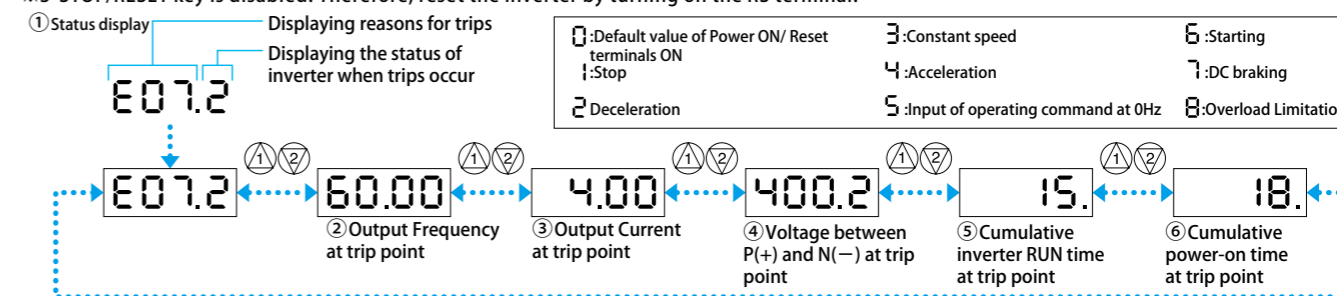
Extended Function U

| Code | Function name | Parameter range | Default | Setting during operation (allowed or not) | Change during operation (allowed or not) |
|----------------|---------------|-------------------|--------------|---|--|
| User parameter | U001 | User selection 1 | no/d001~P183 | ○ | ○ |
| | U002 | User selection 2 | no/d001~P183 | ○ | ○ |
| | U032 | User selection 32 | no/d001~P183 | ○ | ○ |

Protection function

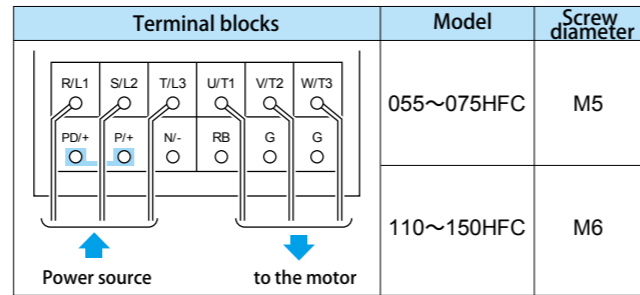
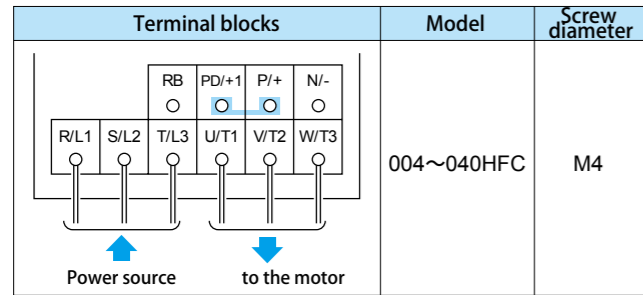
| Items | Content | Error code | |
|--|---|----------------|-----|
| Overcurrent protection | When the motor shafts or significantly accelerates/decelerates, large amount of current flow through the inverter, causing the inverter output to be short circuited. The protection circuit will automatically trip when the inverter output 200% of rated current. | constant speed | E01 |
| | | decelerating | E02 |
| | | accelerating | E03 |
| | | others | E04 |
| Overload protection ^{※1} | Specify b910 as "00" to monitor the output current of the inverter. The inverter trips when the internal thermal protection function detects inverter/motor overload. | E05 | |
| Motor overload protection ^{※1} | Specify b910 as "00" to "03" to monitor the output current of the inverter. The inverter trips when the internal thermal protection function detects motor overload. | E05 | |
| Braking resistor overload protection | When the regenerative braking resistor exceeds the usage time allowance or an overvoltage caused by the stop of the BRD function is detected, the inverter trips and turns off its output. | E06 | |
| Overvoltage protection | When the DC bus voltage exceeds a threshold, due to the regenerative energy from the motor, the inverter trips and turns off its output. The inverter trips when the DC voltage exceeds 400 V (200V class)/ 800V (400V class) | E07 | |
| EEPROM errors ^{※2} | When the internal EEPROM memory has problems due to external noise or excessive temperature, the inverter trips and turns off its output. (Sometimes, the CPU error is displayed) | E08 | |
| Undervoltage error | When the DC voltage is decreased to a threshold, the main circuit will not work normally, so when the input voltage is lower than rated current, the inverter trips and turns off its output. When the DC voltage is around 175V DC (200V class)/345V DC (400V class), the inverter trips. | E09 | |
| CT error | When abnormal operation occurs in the built in CT, the inverter trips and turns off the output | E10 | |
| CPU error ^{※2} | When a malfunction in the built in CPU occurs, the inverter trips and turns off its output. Note) Wrong EEPROM value will also cause CPU error. | E11 | |
| External trip | When a signal to an intelligent input terminal configured as EXT occurs, the inverter trips and turns off its output | E12 | |
| USP error | An error occurs when power is cycled while the inverter is in RUN mode. (only when UPS function is enabling) | E13 | |
| Ground fault ^{※2} | 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 | |
| Input overvoltage protection | When the input voltage is higher than the specific value, it is detected 100 seconds after power-up and the inverter trips and turns off its output. When the overvoltage protection function detects the P-N voltage around 390V DC(200V class)/780V DC(400V class), the inverter trips. | E15 | |
| Temperature error | When the circuit for heat sink temperature detection function is disconnected, the inverter trips and turns off its output | E19 | |
| Inverter thermal trip | When the inverter internal temperature is overheat due to high ambient temperature or cooling fan malfunction, the inverter trips and turns off its output. | E21 | |
| CPU communication error | When the built in CPU communication malfunctions, the inverter trips | E22 | |
| Main circuit error | When an error occurs on the main circuit, the inverter trips | E25 | |
| IGBT error ^{※2} | When an instantaneous overcurrent occurs or the main module temperature is overheat, the inverter trips and turns off its output to protect main circuit element. | E30 | |
| Thermistor error | When the thermistor inside the motor detects temperature higher than the specified value, the inverter trips and turns off its output | E35 | |
| Braking error | Then inverter turns off its output when it can't 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) | o | |
| Emergency stop ^{※3} | When specify function b145 as "01", the inverter trips | E37 | |
| Low speed overload protection | Specify function b910 as "00": if overload occurs during motor operation at a low speed at 0.2Hz or less, the electronic thermal protection circuit in the inverter will detect the overload and shut off the inverter output. (a high frequency may be recorded as the error history data) | E38 | |
| Inverter overload protection ^{※1} | Specify function b910 as "01~03": when the thermal protection function detects overload, the inverter trips and turns off its output. (a high frequency will be displayed) | E38 | |
| Operator connecting error | When the disconnection with external operator malfunction, the inverter trips | E40 | |
| 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 | |
| EzSQ function error | Error indications by protective functions with the EzSQ function used | E43~E59 | |
| Expansion card 1 connection error | An error has been detected in an expansion card or at its connecting terminals | E60~E69 | |
| Encoder disconnected | When the encoder is disconnected, the inverter trips | E80 | |
| Overspeed | When the motor rotate at maximum frequency×overspeed error detection level, the inverter trips | E81 | |
| Trip out of position range | When the current position is out of position range, the inverter trips | E83 | |

※1 Reset operation is acceptable 10 seconds after the trip
 ※2 The inverter will not accept reset commands input via the RS terminal or entered by STOP/RESET key. Therefore, turn off the inverter power. If the same errors occur after the inverter is restart, it may be because the memory function is disabled or can't store the parameter correctly. Please initialize the operator and set the parameter again.
 ※3 STOP/RESET key is disabled. Therefore, reset the inverter by turning on the RS terminal.



Terminal blocks

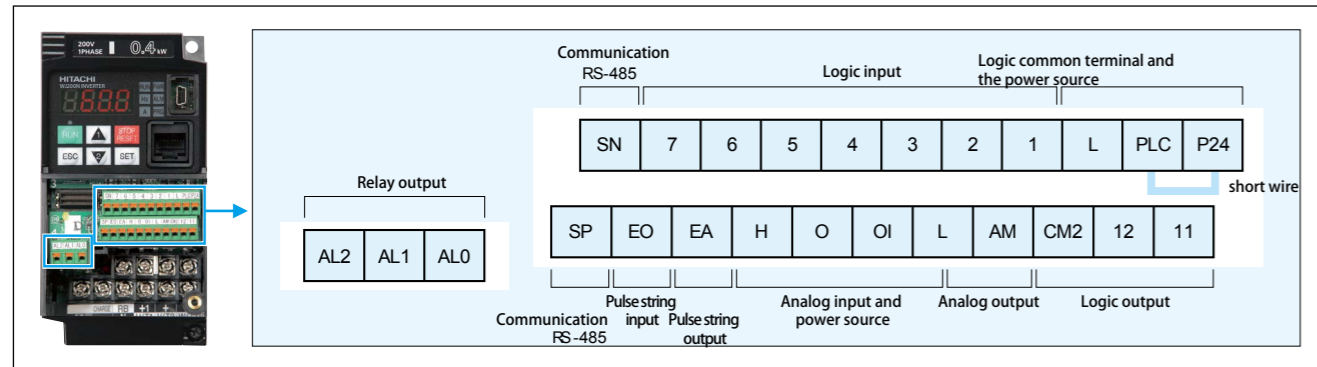
Terminal order of the main circuit



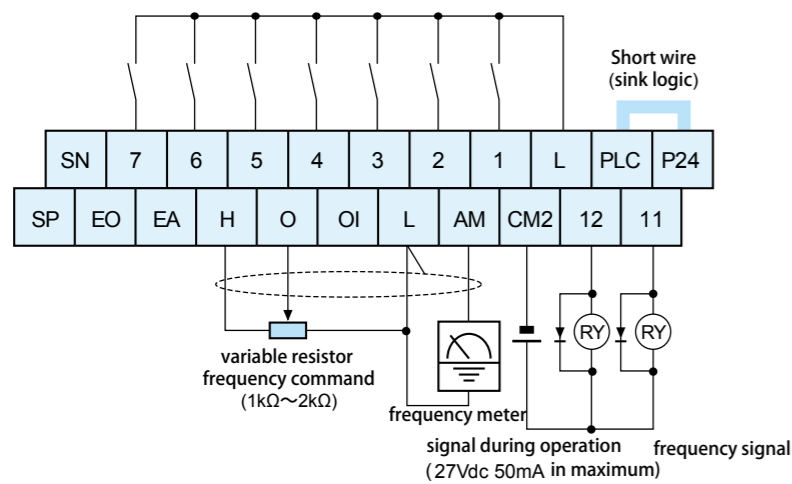
Switch ON/OFF

| Name | Definition |
|--------------------------|---|
| ① End resistor switch | For RS-485 terminal Turn on the switch to connect to the 200Ω built in resistor |
| ② Safety function switch | Turn on the switch to use the safety function. Ensure to turn on the switch at power off |
| ③ EDM switch | Turn on the switch to start EDM output. Ensure to turn on or off the switch at power off |

Terminal order of the control circuit

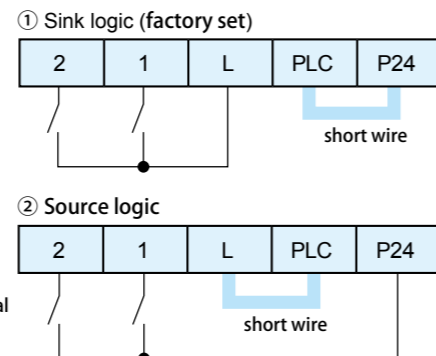


Wire connection of the control circuit terminals (factory set)



Logic switch methods for intelligent input terminals

The factory set for intelligent input terminal is sink logic. If switch the input control logic to source logic, please remove the short wire between P24 and PLC, and connect PLC and L terminals

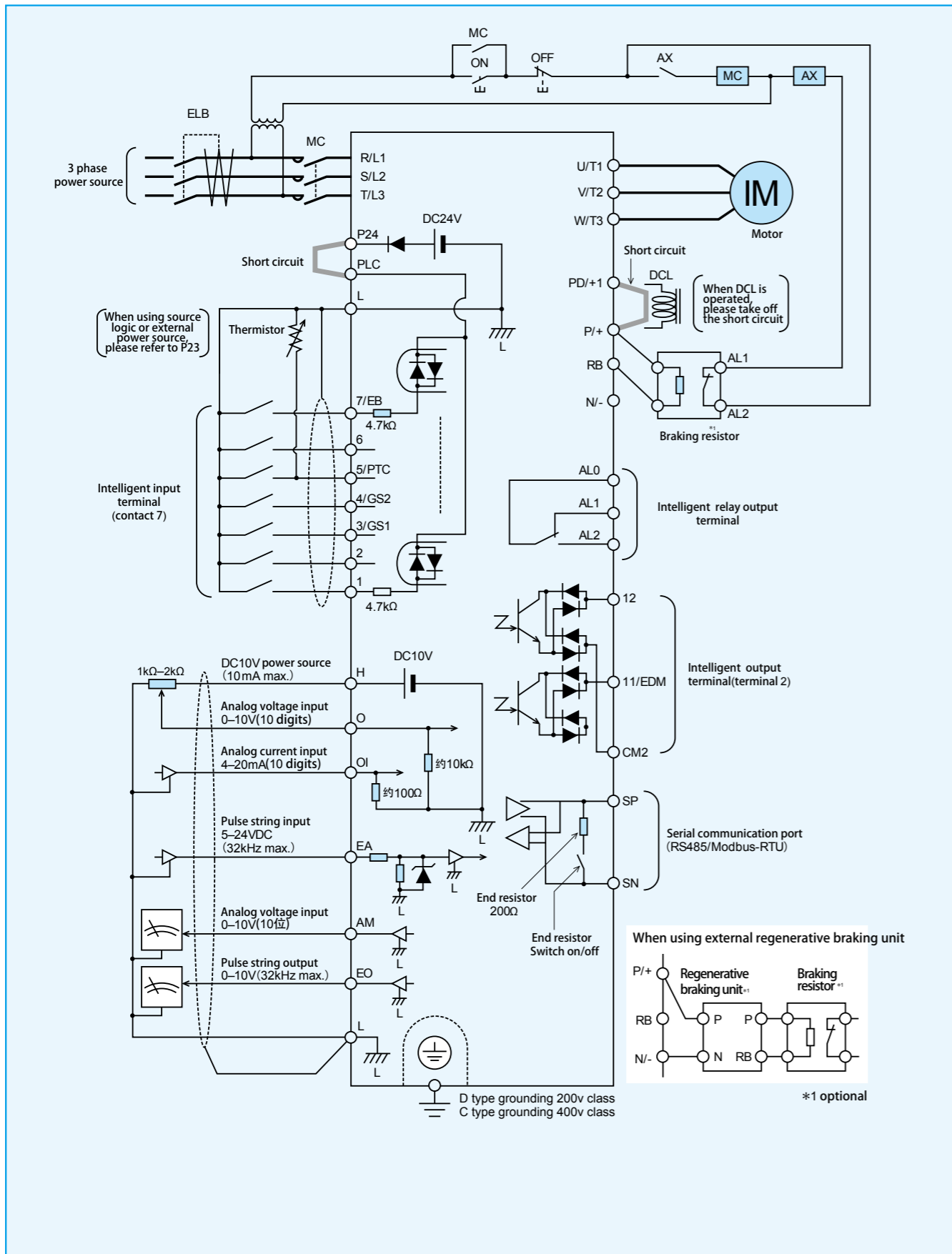


Terminal functions of the control circuit

| | | Terminal name | Content | Electrical Characteristics | | |
|--------|-------------------------|---|---|--|---|---|
| Analog | Power source | L | Public terminals for input signal | Public terminals for internal power source, digital input, analog input output | | |
| | | H | Power source for frequency setting | DC10V power source Connected when input frequency to O terminal via variable resistor | Maximum 10mA output | |
| | Frequency input setting | O | Frequency command terminal (analog voltage input) | frequency command DC0~10V | Input impedance: about 10kΩ Allowance input: -0.3~+12VDC | |
| | | OI | Frequency command terminal (analog current input) | Frequency command 4~20mA | Input impedance: about 100Ω Allowance input: 0~24mA | |
| | Sensor input | 5/PTC | External thermistor input (if compatible with intelligent input terminal, specify the parameter for C005) | Connected to the external thermistor, assign command "19:PTC" to the terminal The inverter trips if over 3KΩ | PTC mode | |
| Output | AM | Analog monitoring (Analog voltage output) | Output signals with DC voltage 0~10V Adjust via specifying the parameter of C106) and C109 | Use meter Consult separately if used for control | | |
| Digits | Power source | L | Public terminals for input signal | Public terminals for internal power source, digital input, analog input output | | |
| | | P24 | Power source terminal for input signal | Power source with DC voltage 24 V (public terminal for source logic) | Maximum 100mA output | |
| | | PLC | Power source terminal for input terminal | Sink logic input: short connected to P24 Source logic input: short connected to L Remove the short circuit when drive with external power source | | |
| | Input | Crist | 7~1 | Intelligent input terminal | Select 7 functions from 69 kinds of functions and allocate to terminal 1 to 7 (for both source logic and sink logic) | Input-PLC voltage ON voltage 18V in minimum OFF voltage 3V in maximum Allowance voltage: 27VDC in maximum Load current 5mA(24V) |
| | | | 4/GS2 3/GS1 | Safety input | Enabling when safety switch is turned on | |
| | | Pulsestring | EA | Pulse string input-A | For frequency setting (please note the internal circuit is different from input terminal 7/EB) 32kHz in maximum | Input-L voltage ON voltage 4V in minimum OFF voltage 1V in maximum Allowance voltage 27VDC |
| | | | 7/EB | Pulse string input-B | For frequency setting (please note the internal circuit is different from input terminal EA) 2kHz in maximum | ON voltage 18V in minimum OFF voltage 3V in maximum Allowance voltage 27VDC Allowance voltage 5mA(24V) |
| | Open collector | 11 12 | Intelligent output terminal | Select 2 functions from 48 kinds of functions and allocate to terminal 11 to 12 (for both source logic and sink logic) | Open collector output terminals-CM2 ON: voltage decreases below 4V Allowance voltage 27V in maximum Allowance current 50mA in maximum | |
| | | 11/ EDM | Safety monitoring | Enabling when EDM switch is turned on | | |
| | | CM2 | Public terminal for intelligent output terminal | Public terminal for intelligent output terminal 11-12 | | |
| Output | Relay | AL0 AL1 AL2 | Intelligent relay output terminal | Select from 48 functions and allocate C contact output | Maximum contact capacity AL1-AL0:AC250V 2A(Resistive) 0.2A(inductive) AL2-AL0:AC250V 1A(Resistive) 0.2A(inductive) Minimum contact capacity AC100V,10mA DC5V,100mA | |
| | | EO | Digital pulse string output | Pulse string at 32kHz in maximum | DC10V output Maximum allowance current 2mA | |
| | Serial communication | SP SN | MODBUS port (RS-485) | RS-485 port 115.2kbps in maximum SP RS-485 differential(+)signal SN RS-485 differential(-)signal | Internal end resistor 200Ω Slide switch | |

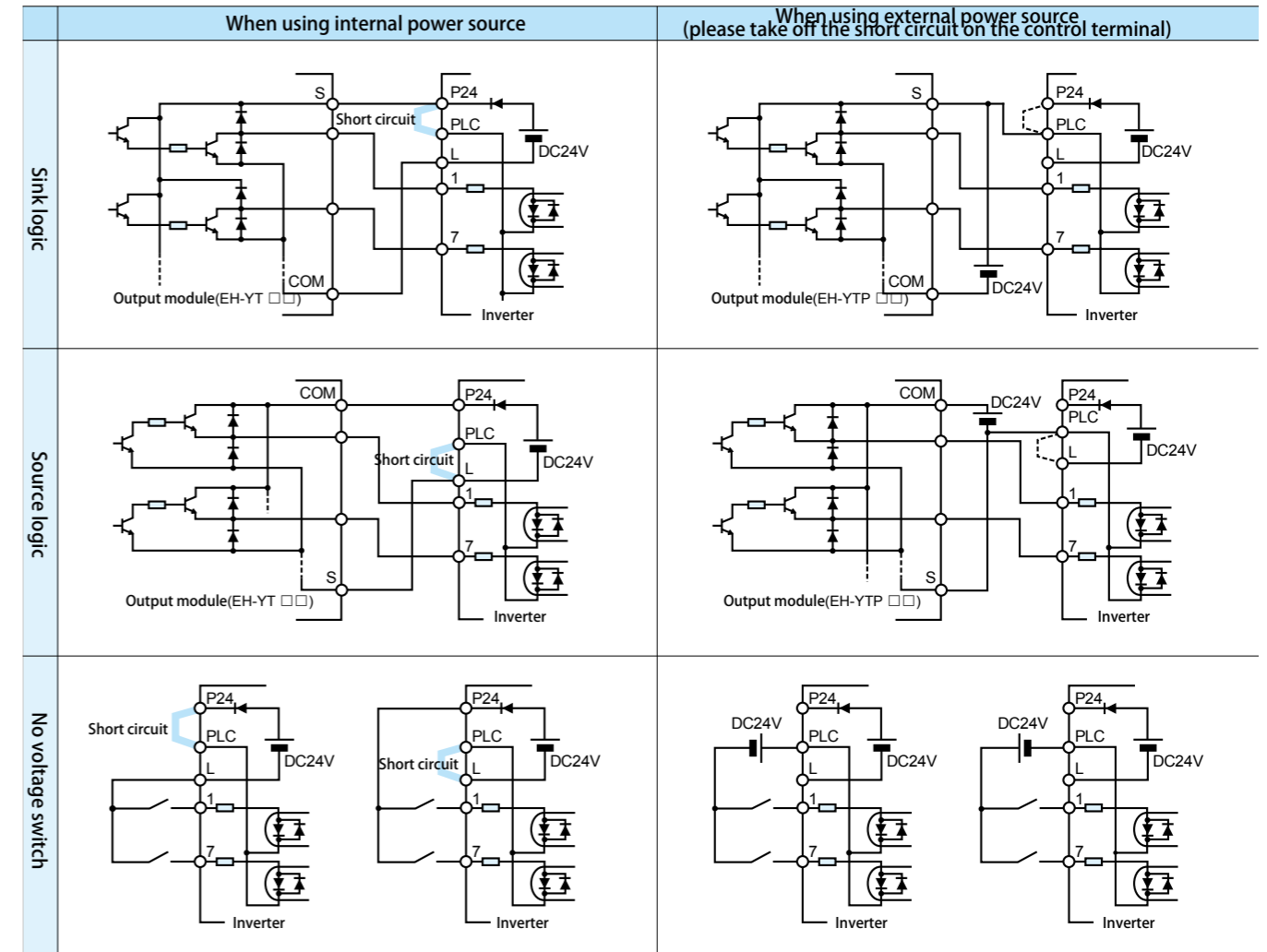
Connecting diagram

Standard connecting diagram (sink logic)

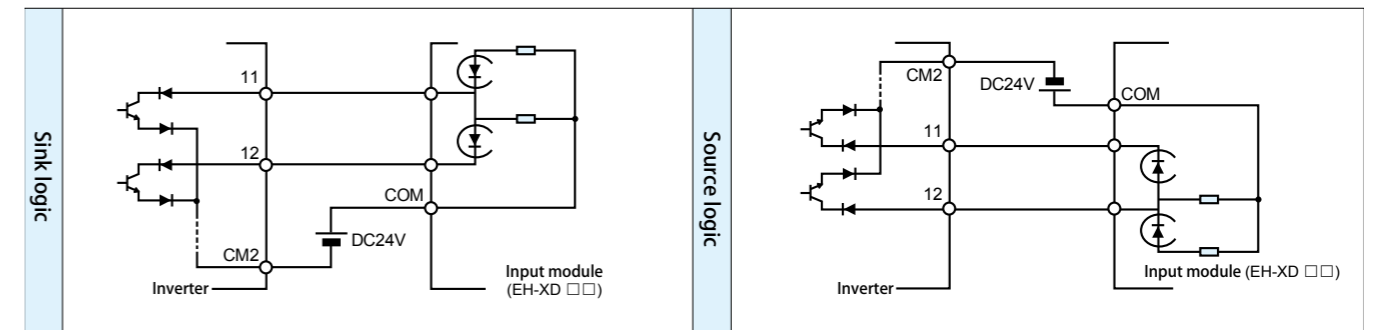


Connecting to the PLC

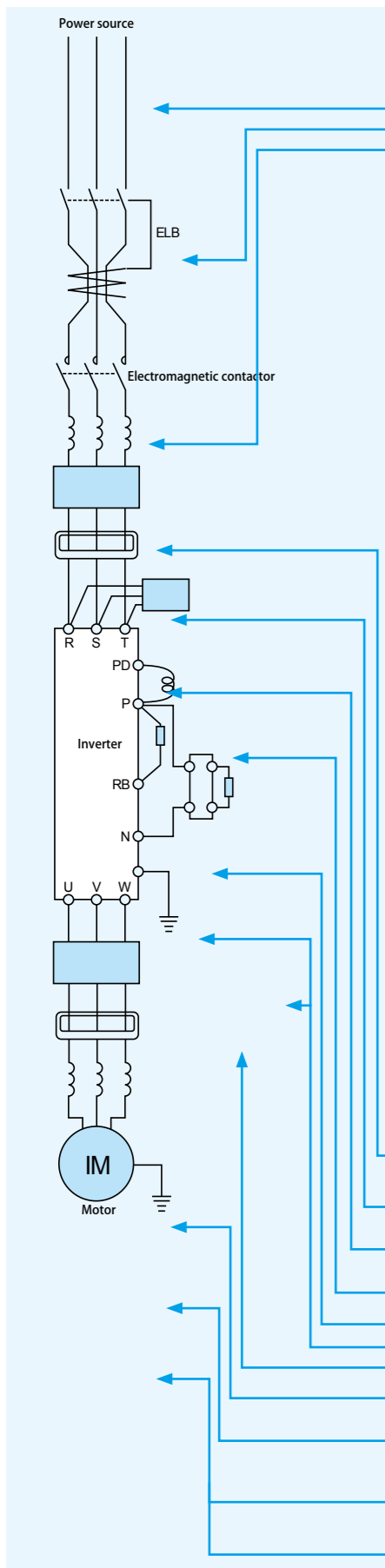
Connection between intelligent input terminal and PLC



Connection between intelligent output terminal and PLC



Wiring and accessories



Standard wiring and accessories

Please refer to the following table for the connection of the main circuit and fastening torque of terminal screws

| Voltage | Applicable (kW) [HDmode] | Model | Wiring | | | Applicable accessories ^{※1} | | |
|--------------|--------------------------|--------|---|---|----------------------|--|----------------------------|---------------------------------|
| | | | Power wire AWG (mm ²) ※3※4 | Terminal screw and terminal blocks dimension (mm) | Fastening torque N·m | Earth leakage circuit breakers (ELB) ※2※5 | Electro-magnetic contactor | Fuse (class J) rated 600V ※6 |
| 3 phase 400V | 0.4 | 004HFC | AWG16(1.25) | M4(10) | 1.4 | EX50(5A) | H10C | 10A |
| | 0.75 | 007HFC | AWG16(1.25) | M4(10) | 1.4 | EX50(10A) | H10C | 10A |
| | 1.5 | 015HFC | AWG16(1.25) | M4(10) | 1.4 | EX50(10A) | H10C | 10A |
| | 2.2 | 022HFC | AWG14(2.0) | M4(10) | 1.4 | EX50(15A) | H20 | 10A |
| | 4.0 | 040HFC | AWG12(3.5) | M4(10) | 1.4 | EX50(20A) | H20 | 15A |
| | 5.5 | 055HFC | AWG10(5.5) | M5(13) | 3.0 | EX50(30A) | H25 | 15A |
| | 7.5 | 075HFC | AWG10(5.5) | M5(13) | 3.0 | EX50(50A) | H35 | 20A |
| | 11 | 110HFC | AWG6(14) | M6(17.5) | 3.9~5.1 | EX60B(60A) | H35 | 30A |
| | 15 | 150HFC | AWG6(14) | M6(17.5) | 3.9~5.1 | EX100B(75A) | H65C | 40A |

- ※1 Applicable accessories are used for Hitachi standard 4 poles squirrel motor
- ※2 Please use breaker with proper capacity (inverter compatible circuit breaker)
- ※3 Please use leakage breaker to ensure safety
- ※4 It's recommended to use heat resisting insulated wire (enduring 75°C)
- ※5 When the wiring distance is over 20m, please use thicker power line
- ※6 Please use required torque to fasten the terminal screws. It may cause fire if the screw is not fastened enough. If the screw is over tight, it may harm the terminal block
- ※7 Please distinguish the sensitivity current of the leakage breaker according to the total wire length of inverter-power source and inverter-motor. Please use Please use time delay type leakage circuit breaker. If use high speed leakage circuit breaker, it may cause malfunctions.
- ※8 When use CV wire and metal pipewire for connection, it will cause leakage current of 30mA/km
- ※9 The leakage current of IV wire is 8 times higher, so please use amperemeter with 8 times of sensitivity. When the total wire is over 100m, please use CV wire.

| Wire length | Sensitivity current (mA) |
|-------------|--------------------------|
| 100m以下 | 30 |
| 300m以下 | 100 |

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

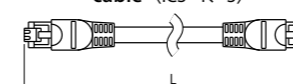
Remote operator cable

The following operators can be used in WJ200N for remote control

| | potentiometer | remote control | copy function | |
|-------------|---------------|----------------|---------------|--|
| OPE-SR mini | ○ | ○ | — | ●ICS-1 (1m) ●ICS-3 (3m) Please use the following items when customers use their own wire |
| SOP | ○ | ○ | — | |
| SOP-VR | — | ○ | — | |
| WOP | — | ○ | ○ | |

recommended cables

cable (ICS-1, 3)



| Model | wire length L(m) |
|-------|------------------|
| ICS-1 | 1 |
| ICS-3 | 3 |

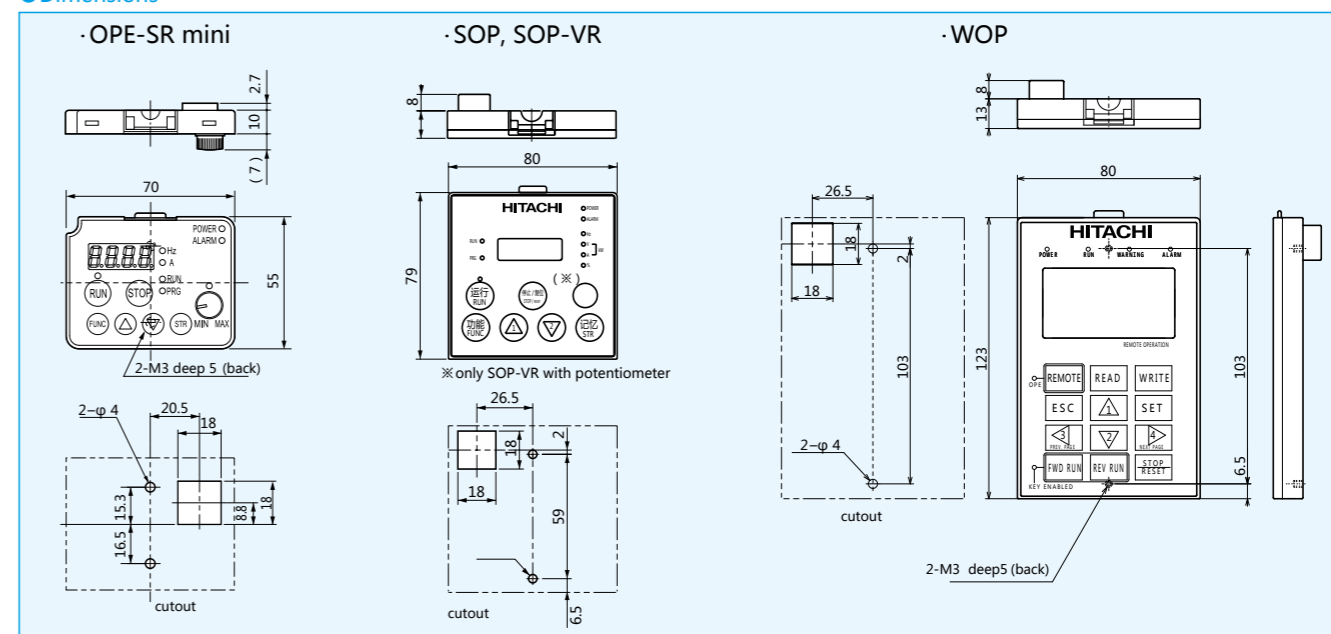
(Note) Please use the following items when customers use their own wire
Maximum length 3m.(with connectors in both sides)

(Model) HUTP5EPC 4P-LF-□-B-□ Connector:RJ45
Cable: meeting the EIA568 standards (UTP 5 cable)
cable color length (m)

Operator



Dimensions



⚠ FOR CORRECT OPERATION

- 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 serious accidents.
- The inverter is intended for use with a three-phase AC motor. For use with a load other than this, please consult with us.

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. |
| Submersible motor | The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor. |
| Explosion-proof motor | Inverter drive is not suitable for a safety-enhanced explosion-proof type motor. The inverter should be used in combination with a pressure-proof explosion-proof type of motor. |
| Synchronous (MS) motor High-speed (HFM) motor | In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to proper inverter selection, consult the manufacturer. |
| Single-phase motor | A single-phase motor is not suitable for variable-speed operation by an inverter drive. Therefore, use a three-phase motor. |

<Application to the 400V-class motor>

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

Notes on Use

<Drive>

| | |
|----------------------|--|
| Run/Stop | Run or stop of the inverter must be done with the keys on the operator panel or through the control circuit terminal. Do not operate by installing an electromagnetic contactor (MC) 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 WJ200N Series. However, a two-pole motor can attain up to approx. 24,000 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor above 60 Hz. A full line of high-speed motors is available from Hitachi. |

<Installation location and operating environment>

Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily collect, as well as areas that are dusty, subject to corrosive gasses, mist of liquid for grinding, or salt. Install the inverter away from direct sunlight in a well-ventilated room that is free of vibration. The inverter can be operated in the ambient temperature range from -10 to 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 of current flows on the main power supply side, and is able to destroy the converter module. Where such situations are foreseen or the connected equipment must be highly reliable, install an AC reactor between the power supply and the inverter. Also, where influence of indirect lightning strike is possible, install a lightning conductor. (A) The unbalance factor of the power supply is 3% or higher. (Note) (B) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500kVA or more). (C) Abrupt power supply changes are expected. Examples: (1) Several inverters are interconnected with a short bus. (2) A thermistor converter and an inverter are interconnected with a short bus. (3) An installed phase advance capacitor opens and closes. In cases (A), (B) and (C), it is recommended to install an AC reactor on the main power supply side. Note: Example calculation with VRS = 205V, VST = 201V, VTR = 200V VRS : R-S line voltage, VST : S-T line voltage, VTR : T-R line voltage Unbalance factor of voltage = $\frac{\text{Max. line voltage (min.)} - \text{Mean line voltage}}{\text{Mean line voltage}} \times 100$ $= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5(\%)$ |
| Using a private power generator | An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform of the generator. Generally, the generator capacity should be five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system. |

Notes on Peripheral Equipment Selection

| | | |
|-----------------------------------|--|---|
| Wiring connections | (1) Be sure to connect main power wires with R(L1), S(L2), and T(L3) terminals (input) and motor wires to U(T1), V(T2), and W(T3) terminals (output). (Incorrect connection will cause an immediate failure.) (2) Be sure to provide a grounding connection with the ground terminal (⊕) | |
| Wiring between inverter and motor | Electromagnetic contactor | When an electromagnetic contactor is installed between the inverter and the motor, do not perform on-off switching during running operation. |
| | Thermal relay | When used with standard applicable output motors (standard three-phase squirrel-cage four-pole motors), the WJ200N series does not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used: During continuous running outside a range of 30 to 60 Hz. For motors exceeding the range of electronic thermal adjustment (rated current). When several motors are driven by the same inverter; install a thermal relay for each motor. The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10 m or more, the thermal relay tends to turn off readily. In this case, provide an AC reactor on the output side or use a current sensor. |
| Installing a circuit breaker | Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. Choose an inverter-compatible circuit breaker. The conventional type may malfunction due to harmonics from the inverter. For more information, consult the circuit breaker manufacturer. | |
| Wiring distance | The wiring distance between the inverter and the remote operator panel should be 20 meters or less. Shielded cable should be used on the wiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.) | |
| Earth leakage relay | If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter). | |
| Phase advance capacitor | Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor. | |

High-frequency Noise and Leakage Current

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

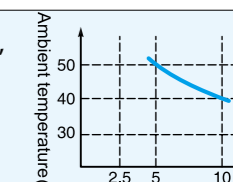
Lifetime of Primary Parts

Because the electrolytic capacitor and cooling grid deteriorate as it undergoes internal chemical reaction, they 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.

The life span is as the right figure if used in 24 hours daily.

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") Also, such moving parts as a cooling fan should be replaced. Maintenance inspection and parts replacement must be performed by only specified trained personnel. Please plan to replace new INV depends on the load, ambient condition in advance.



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