Variable Frequency Drives

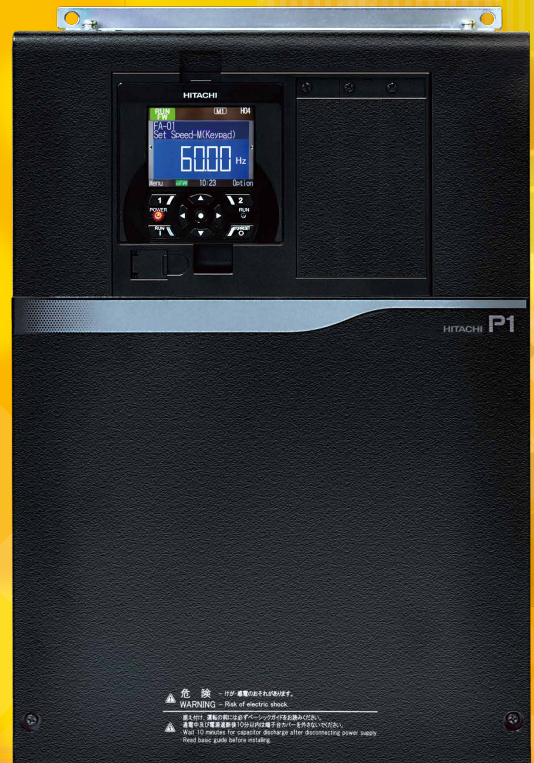# SJ series P1

HITACHI
Inspire the Next

NEW

Intuitively innovative!

At the point where ease of use meets high performance

BE THE NEXT STANDARD

P1

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

Powerful and

SJ series P1, setting the new global standard

1. Easy access to all the functionality

The intuitive color TFT operator and Various convenient features.

2. A High Performance drive for the most demanding of applications

A variety of motors (IM/PM) can be adjustable to drive.
The most stable operation ever.

3. Versatility through multi mode operation, to meet your specific application needs

SJ-P1 meet a wide range of needs by achieving variety of functions necessary for drive systems.

Corresponds to variety of applications.

Fan Pump Crane Conveyors Injection molding

Accessible

Color TFT
Operation Panel
P.3

Option slots **P.10**

USB connector for
PC setting software
(ProdriveNext)
P.15-16

HITACHI

RUN
FW · · M1 H04
FA-01
Set Speed-in(Keypad)

6000 Hz

Menu FW 10:23 Option

1 2
POWER RUN

RUN
T O

HITACHI **P1**

Control Circuit
terminals
P.6, 27, 28

Main circuit
terminals.
P.26

Corresponding to the global standard.
Input voltage is Max.AC500 Voltage.
(400V class)

CE c(UL)us LISTED ◇

P.10

Winder &
re-winder **P.14**

Machine
Tools **P.14**

2

Easy access to all the functionality

Intuitive, easy-to-use LCD operator is standard

version UP

Easily monitor, set, or review operational data and parameters.

●Operation Panel Description

Friendly display

MONITOR SCREEN

Displays Parameters and data.

F1 KEY

Transition to home, cancel, etc.

POWER LED

Turns ON while the panel is powered-on.

RUN KEY

Motor starts rotation when this Key is active.

F2 KEY

Save data, etc.
User defined function of the key is indicated at the bottom right of the screen.

RUN LED

Turns ON while in RUN mode.

STOP / RESET KEY

Decelerate to stop, Reset the tripping.

UP/DOWN/LEFT/RIGHT KEYS& SEL KEY (CENTER)

To move between the screen/ data use UP/DOWN/LEFT/RIGHT.
To select the data, press the SEL key.

Monitor display example

●Features of the operation panel

"Visualization Icon" Easy to understand the inverter status

RUN, STOP, TRIP,OVERLOAD,
FAN LIFE NOTICE and other is very obvious.
For this Icon, error diagnosis is also easy.

Example of "Operation visualization Icon"

RUN FW	The motor is in forward running.
RUN RV	The motor is in reverse running.
TRIP	Inverter is in trip status.
STOP	Operation command is entered, but the inverter is forced stop.
STOP	The inverter is stopped, because Operation command is OFF or frequency command is 0Hz.

LIM	Output frequency is limited by such as overload.
ALT	The inverter is in overload notice or thermal notice.
NRDY	The inverter can not be operated in the RUN command.
FAN	The inverter is in Fan life notice state.
C	The inverter is in Capacitor of Logic board notice state.

"Setting visualization icon"

Some of the setting is easy to understand.

Large character display

Great visibility thanks to the large character display.

Background color can be selected

Selectable from Blue / Green / Black.
Easy visualization can be achieved in every cases!

Assist bar

Show function of F1, F2,
and RUN key to assist user operation.
Also clock information can be shown in this area.

Monitor display example

Real-time at the alarm occurrence is recorded.

Alarm record available based on Real-time-clock.
Date and time can be set in the operator by placing battery.
Speedy fault diagnosis and root cause investigation will be possible, since alarm is record on actual time.
(Note:Battery is prepared by user.)

Multiple languages.

Japanese and English display available as standard.
Other languages also available in near future.

version UP Improvement or added item.

EzSQ EzSQ application case. refer to P17-18 for details.

PM motor PM motor specific function.

●Example of main screen transition and parameter setting

Check at once!
Quick View

Multi-monitor (3lines)

Monitor while setting!
Verify View

Reference screen

Easy to see!
Clear View

Large monitor screen

Quick trouble shoot!
Error View

Trip history screen

Up/down/left/right keys

F1 F1 key   O SEL key

Up/down/left/right keys

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

Intuitive scroll mode!
It is easy to access the parameters you want to set.

F1キー F1   O SELキー

F1 F1 key   O SEL key

Up/down/left/right keys

Select change parameter

Determined by F2 key
Canceled by F1 key

F1 F1 key   O SEL key

Up/down/left/right keys

Select the setting value with the arrow keys

F1 F1 key   O SEL key

Trip information details

Other features!

- Parameter data can be saved in the memory of the operation panel!
  Data can be kept safe even if the inverter fails.
- Operation panel can be also used as copy unit!
- If the battery is used, the real-time data is retained even when the power is cut off of the inverter.
- Operation panel can be remotely connected via option cable ICS-1 or ICS-3.

(Note) While the power is supplied, please do not remove the operation panel!

●Trip monitor

- Display of former models
- Inverter state is easy to understand when an error has occurred.

Error code

Inverter status at trip point

Shown the **inverter is in trip condition.**

Shows the **cause of trip.**

Displays trip event information:
Output frequency at trip point/Motor current at trip point/
DC bus voltage at trip point/Cumulative inverter operation/
Cumulative power-ON time at trip point.

Scroll

Status 1 to 5 indicates the inverter state at the time of the trip occurs.

(Note)Please refer to the user guide for more information.

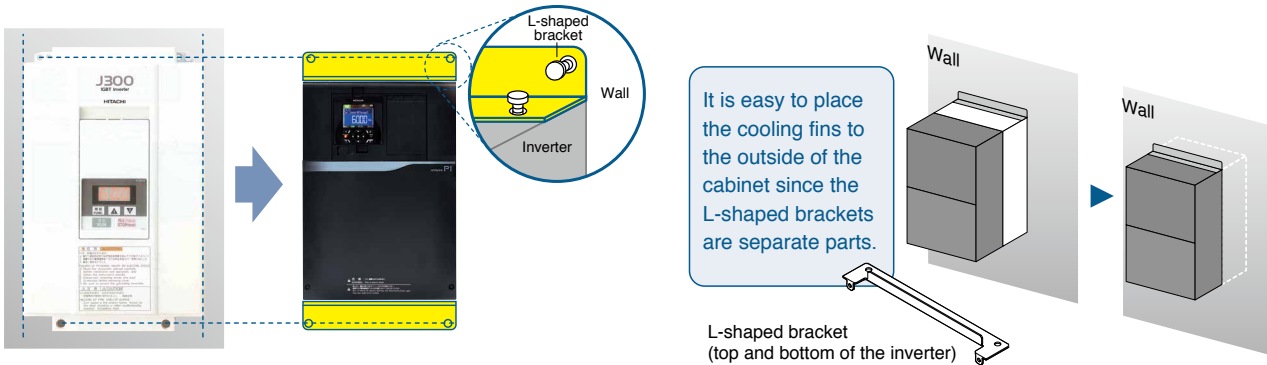(Note)These display is a state of the moment of error occurrence,the actual motor behavior might be different.

4

Easy access to all the functionality

Various convenient features.

Direct field replacement, when needed

version UP

Panel mounting portion is supplied as separate part. (5.5kW or more)
**Even if its body size is different, it is possible to correspond in flexible ways.**

L-shaped bracket

Wall

Inverter

It is easy to place the cooling fins to the outside of the cabinet since the L-shaped brackets are separate parts.

Wall

Wall

L-shaped bracket
(top and bottom of the inverter)

Screw type terminal block is also abailable.

- Optional screw type terminal block is available by removing the standard termina block.
  Note: Removable terminal blocks of SJ300/L 300P/SJ700/L700 can not be mounted on SJ-P1.
- Data conversion can be made via PC setting software (ProDriveNext). (Is in developing)

SJ700 Series

PC setting software
(ProDriveNext)

SJ Series Type P1

Remove standard terminal when using screw type.
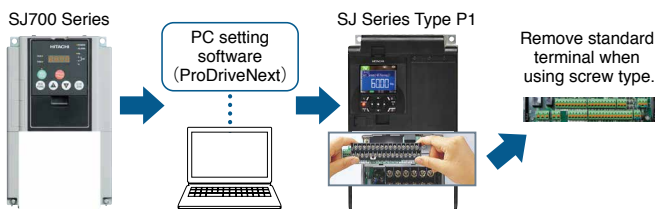
Cooling fan and the main circuit capacitor is designed for 10 years life.

(Note: The ambient temperature is 40 °C (annual average).
Without corrosive gas, flammable gas, oil mist and dust.)
The above design life is a calculated value, not a guaranteed value.
Output current at the calculation is 80% of the rated current of the inverter.)

Monitor lifetime prediction functions.

Electrolytic capacitor of control circuit (internal estimation calculation).

Cooling fan.

Easy data copy to multiple inverters.

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

Data read*

Data copy

Data copy

Data copy
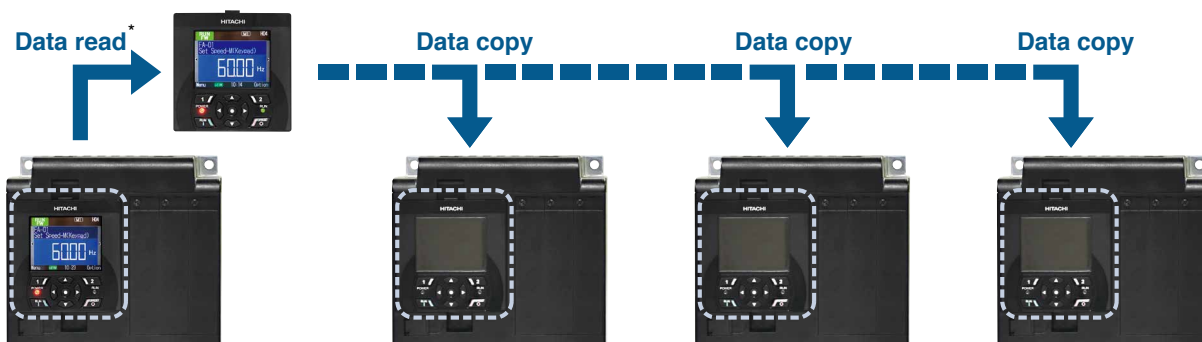
*Can not be read in the case of inverter failure.

Control circuit terminal designed for easy wiring   **version UP**

Easy to use screw less terminal block for control terminal block.
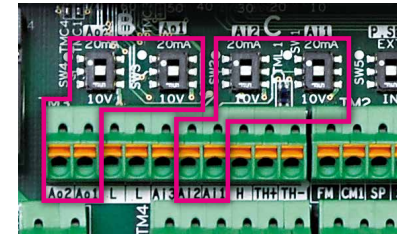
Rod terminal achieved easy wiring.

Modbus communication is standard. 2 communication terminals provided for Modbus communication as standard.

Daisy chain wiring of RS-485 is easy.

0/10V and 4 to 20mA inputs and as well as output are easily selected via DIP switch.
· 2 analog inputs (3inputs in total).
· 2 analog outputs.

Programming ease through the use of 24 VDC to power up inverter CPU memory   **version UP**

**Normal power supply (R0, T0) to CPU. Also possible to utilize an external 24VDC control power supply.**

Parameter setting is also possible with the main power is turned off. Thus saving time and effort. Possible use of logic standby power will also contribute to energy conservation. Connecting to the PLC and Setting via PC configuration software are also available.

OFF
DC24V
PC setting software (ProDriveNext)
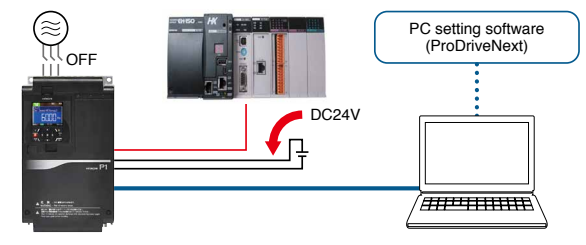
Control Simulation Logic operation without direct motor output   **version UP**

The simulation mode makes it easier to verify connection with the system control equipment.

In the simulation mode, only the motor output is shut off while all inverter functions are enabled. Full simulation allows to generate an alarm by setting the virtual output conditions, such as current etc. utilizing parameter and the analog inputs. Hence, it is possible to confirm the operation of the control equipment without a motor. The simulation mode can also be active by using an external 24VDC power supply.

Virtual setting of output torque etc.

Operation verification without motor.

In the simulation mode, cut off the motor output.
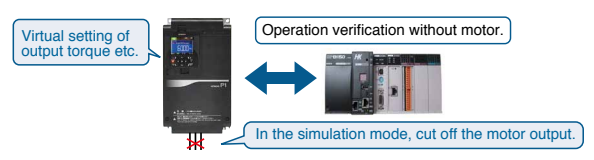
Refer to the Parameter   PA-20 to PA-31

Quick diagnose during failure   **version UP**

The SJ-P1 automatically stores internal data in retentive memory*.
Users can upload the data to a PC for review and diagnosis of issue.

Error occurrence

(*This memory data is cleared at power shutdown.)
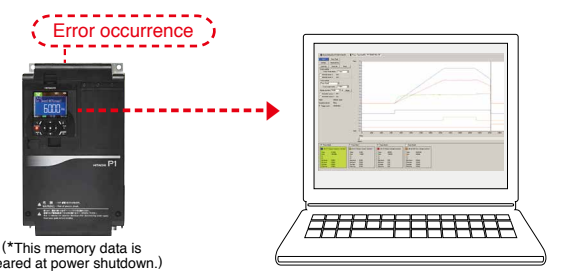
## Easy customize by PC configuration software   **EzSQ**

PC setting software.   ▶ P.15-16

Using the PC configuration software (ProDriveNext), parameter setting, monitor, and diagnosis can be easily achieved.

Easy customizationto your own inverter.   ▶ P.17-18

Specific behavior can be easily programmed into the inverter by BASIC like program.

Micro-B connector
USB cable
Type-A connector
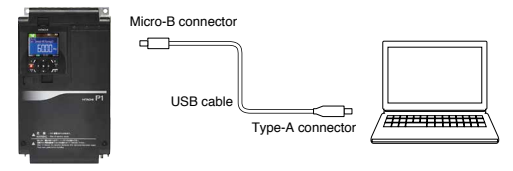
A High Performance drive for the most demanding of applications

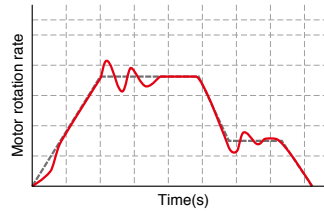## "Smooth operation" in critical and demanding applications, such as vertical lift [version UP]

High starting torque at low speed range while in control of heavy loads. (ND rating). [Sensor less vector control(SLV)] [OHz sensor less vector control]

0.4 to 55kW

200

Output torque(%)

Starting torque *
0.3Hz200%

0.3   46   100

Output frequency(Hz)
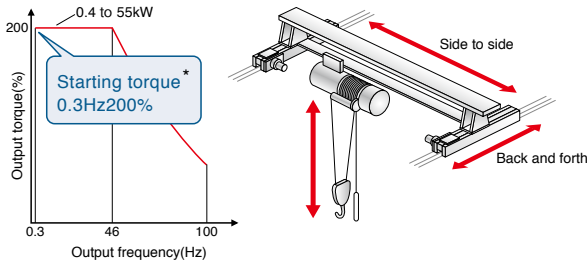
(*Sensorless vector control with ND Rating)

Side to side

Back and forth

Cog-less motor operation for crane, lift, transport, etc.

Trip-less operation for better productivity.

Decreasing overshoot and undershoot contributes to smooth and stabilized operation with reduced load shock. [Gain mapping Function]

Reduction of swinging load, leading to better operational control and productivity.

◎Disable function

Motor rotation rate

Time(s)

◎Enable function

Motor rotation rate

Time(s)

Save on spare control costs [version UP] [PM motor]

Our multi-mode inverter can control both your induction motor, or permanent magnet AC motor. All while offering programmable current limit to protect from demagnetization of the PM motor.

Previously…

Each stock are required

Inverter   PM motor controller

Induction motor   PM motor

By SJ-P1

Available in all

Hitachi's induction motor   Hitachi's PM motor   Other's induction motor   Other's SPM motor   Other's IPM motor
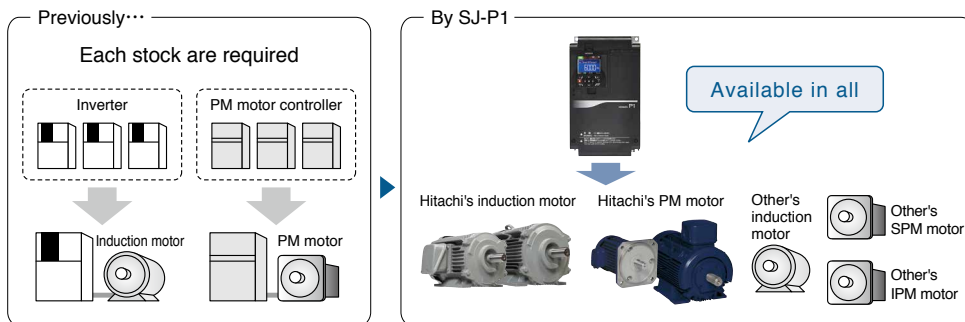
Optimize performance. [Auto-tuning function]

Complicated tuning procedures are avoided through the use of our auto-tuning function to optimize motor performance.

For long time operation (fan, pumps)

Significant energy savings can be obtained in comparison to an induction motor, even in 24 hours 365 days operation.

"High speed rotation" for non-traditional applications

version UP **PM motor**

590Hz at the maximum operation is available for precise metal processing. For PM motor, also up to 400Hz. (actual output frequency depends on motor)

SJ700   P1

Control	Frequency
Sensorless vector control· Vector control	120Hz (SJ700) / 400Hz (P1)
V/f control	400Hz (SJ700) / 590Hz (P1)
PM motor control	400Hz (P1)

→ Output frequency
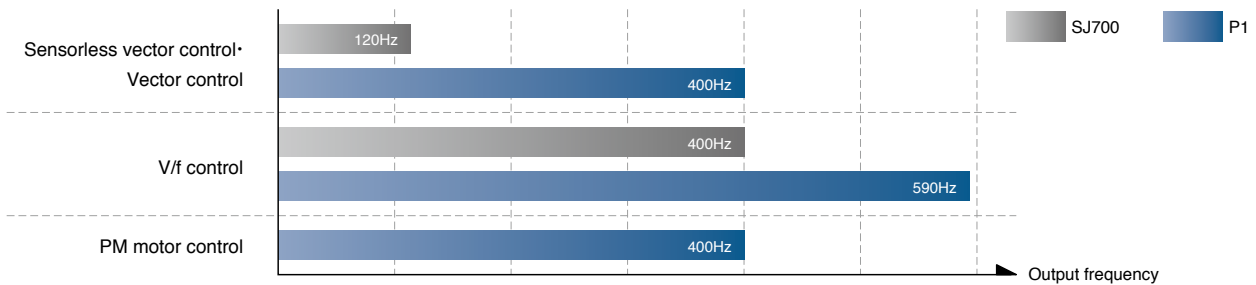
For metal tooling

High speed rotation contributes the high quality of metal processing.
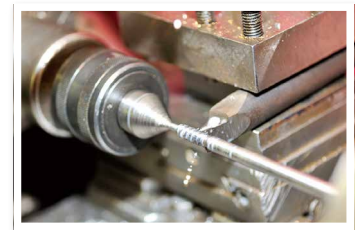
Refer to the Parameter Hb105/Hd105

Reduce trips on acceleration and deceleration

version UP

Automatic speed adjustment manages ideal acceleration / deceleration speed to reduce the trip possibility from over current, over voltage, and impact load.

Over magnetize function

OFF
Motor Current
DC Voltage
Output Frequency
OFF

ON
Motor Current
DC Voltage
Output Frequency
ON
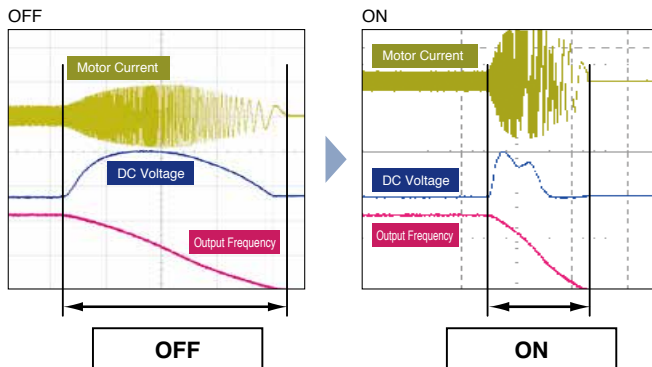
Over-current suppress function

OFF
Trip
Motor Current
Output Frequency

ON
Motor Current
Output Frequency
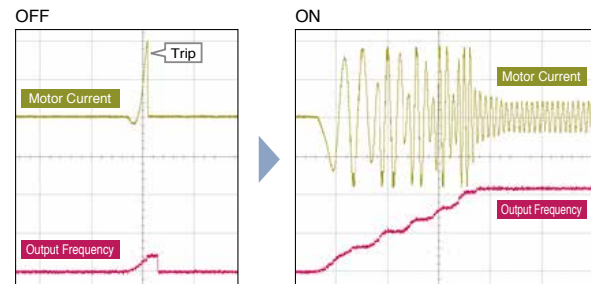
*Turn off this function for lifting equipment.

Refer to the Parameter bA140 to /bA120 to

*Image of the output frequency and output current.

Versatility through multi mode operation, to meet your specific application needs.

SJ-P1 meet a wide range of needs by achieving variety of functions

Certified "functional safety" international standard

version UP

Certified functional safety. (Certification in process)

Third party certified electrical safety,
In compliance to IEC61508, IEC/EN61800-5-2 SIL3 STO, available as standard.

● IEC/EN 60204-1 Stop Cat.0
● EN/ISO13849-1 Cat.3, PLe
● IEC61508, IEC/EN61800-5-2, IEC/EN62061 SIL3 STO

PLe/Cat3, SIL3 STO as standard

MTTFd
low
Medium
High

PL								SIL
a								non
b								
c								1
d								2
e								3

| Cat. DC | B non | 1 non | 2 low | 2 medium | 3 low | 3 medium | 4 high |

Standard (without option cassette)

STO (Safe torque off)

SS1, SLS and others are available with slot-in option cassette. (In design phase)

Optional (needs slot-in card)

SS1 (Safe stop 1)

SBC (Safe brake control)

SLS (Safely-limited speed)

SDI (Safe direction)

SSM (Safe speed monitor)

"Save space and save cost" by multi rating function!

version UP PM motor

Triple-rated for Induction motor for various applications is selectable. Dual-rated for PM motor control. Multiple rating helps to save space and cost.

Rating	VLD(Very Light Load)	LD(Light Load)	ND(Normal Load)
Induction motor	←		→
PM motor		←	→
Applications	Fan・Pump	Metal tooling・Conveyer	Crane・Mixer
Overload current rating	110% 60sec, 120% 3sec	120% 60sec, 150% 3sec	150% 60sec, 200% 3sec
Example 400V/18.5kW Max rated output current	47.0A	43.0A	39.0A

Refer to the Parameter Ub-03

necessary for drive systems.

Easy customize with "Slot-in" option cassette

version UP

Cassette type option boards for intuitive installation.

● Visible indicators on the various option boards allow for user to verify functionality with ease.
● Tasks such as setting a station number is simplified by use of a rotary selection switch.
● Replacement is also simplified by the cassette design. Replacement after failure is also easy.
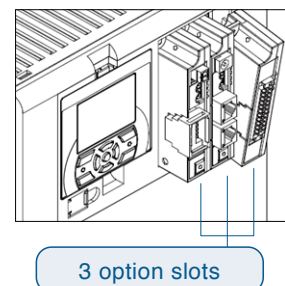
Options List.
Ethernet
EtherCAT
PROFIBUS-DP
PROFINET ※
Feedback
Safety ※
Analog input and output ※

※Contact Sales Office for availability

3 option slots

Network options available for system expansion.

・Option commuication and standard Modbus-RTU can be used together.

・Following fieldbus network available with option on slot （PROFIBUS-DP, PROFINET, EtherCAT, Ethernet ）

(Modbus is a registered trademark of Modicon Inc. EtherCAT® is registered trademark and patented technology, licensed by Beckoff Automation GmbH, Germany. Other company names and product names mentioned are the property of the respective trademarks or registered trademarks.)

"High quality" to comply international standards

Corresponds to the EC directive, UL and cUL in order to guarantee the quality and safety. Equipped with a quality that is recognized in Europe.

EC directive	LVD : IEC61800-5-1 EMC directive : IEC61800-3
UL	Power Conversion Equipment/UL61800-5-1

Built-in noise filters corresponding to the European EMC Directive. （IEC61800-3 2nd Environment Category C3）

Since complies with the RoHS, Environmental considerations also sufficient.

Example (P1-00600-LFF)

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

Level[dBμV]

QP:Quasi Peak
Frequency [Hz]
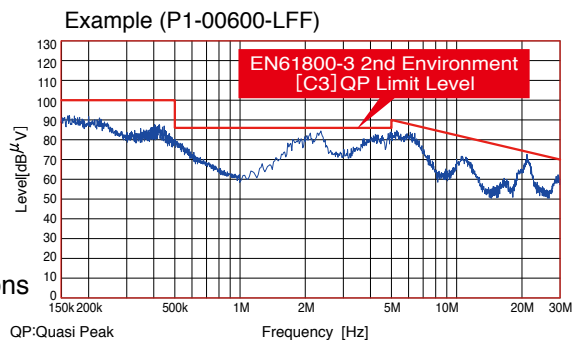
Braking circuit is built-in. Further "Space and Cost saving"

version UP

The regenerative braking circuit is built-in, therefore a separate regenerative braking unit (BRD) is not necessary. Saving space and cost.

Regenerative braking unit(BRD) Unnecessary

Applicable models
● 200V class 0.4 to 22kW
● 400V class 0.75 to 55kW
  (400V class 45kW and 55kW is the order)

RB
Regenerative braking unit(BRD)
BRD
Other inverter

RB
SJ-P1

Expand energy savings in applications
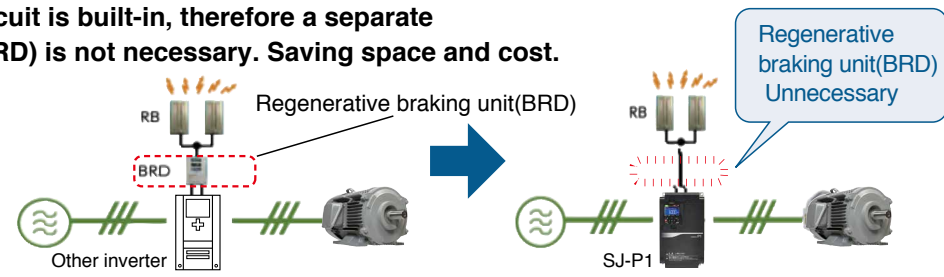
The SJ-P1 inverter is applicable in a wide variety of applications. Introducing

Fan & Pump

PM motor

【Energy saving by the inverter】

● **Optimize for energy savings in pumping applications.**

By utilizing the SJ-P1 inverter control versus the valve control, significant energy saving can be obtained over the various flow rates.

☐Examples of energy-saving effect

valve control

76%   91%

Energy-saving effect

61%

22%

Inverter control

Power(%) / Flow rate(%)

【Further energy saving by the PM motor】

● **Corresponds to both Induction motor and PM motor.**

By using a PM motor, further energy savings can be realized.(Please refer to the motor efficiency graph of right)
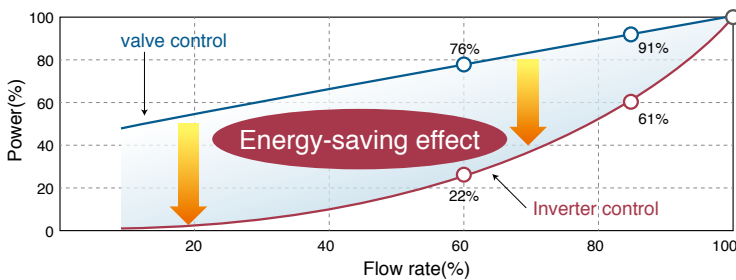
● **Obtain the high performance from your PM motor by using our simple adjustment.**

By PM motor auto-tuning function, the characteristics of the motor will be optimized for best performance.

☐Efficiency comparison of the induction motor and the PM motor

※Data is 3600min-1 series , Dynamometer test

Hitachi's PM motor

motor efficiency(%) / rated output (kW)

— Hitachi's PM motor
— IE2 Level
-- Conventional induction motor
-·- Premium efficiency motor（IEC60034-30 IE3）
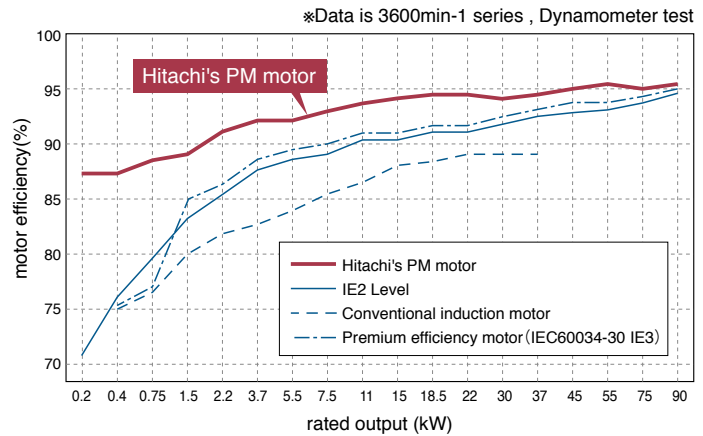
☐Hitachi induction motor and PM motor

■**Induction motor**

Premium efficiency motor (IE3)

■**Permanent magnet motor**

Recommended function

● PM motor drive ● Multiple rating ● Modbus communication
● PID control ● PID Sleep mode ● PID Soft-start function
● Automatic energy-saving function

Refer to the next page

such as fan, pump and compressor.

more useful features of each application!

New application features! Fan & Pump

Optimal PID functions for Fan & Pump applications

At the time of the PID function start-up, the SJ-P1 will reduce the output to eliminate water hammer effect on the system.

Output frequency

Soft-start activation level

Without function: Large shock

Function active: Small shoc

time

RUN command

PID operating state

Soft-start function active time
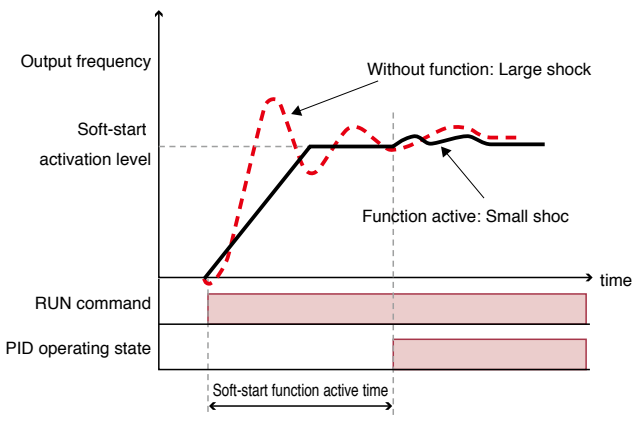
Refer to the Parameter AH-75 to

Execute a stop command of the operation when it is unnecessary, saving energy and wear on motor and pump system.

pressure

PID target

PID wake level

Output frequency

PID sleep level

Energy-saving interval
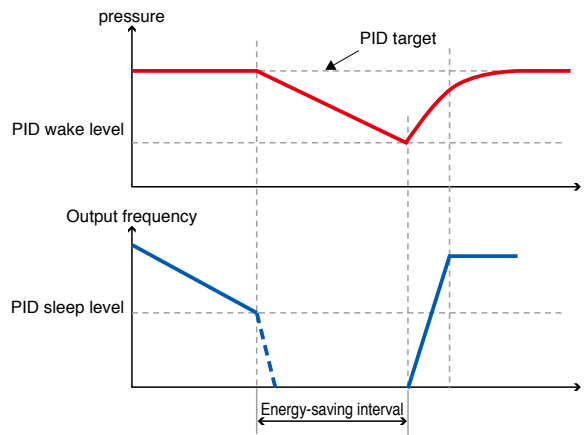
Refer to the Parameter AH-85 to

Hydraulic pump
EzSQ

●**Energy-saving achieved by EzSQ (programming function).**

By increasing the rotation speed when pressure is necessary, and reducing the rotational speed during standby, the SJ-P1 will optimize energy consumption. In addition, EzSQ can utilize signals from external sources such as a pressure sensor and/or a relay circuit. Therefore, cost reduction and space saving can be achieved.

Hydraulic pump

Pressure sensor
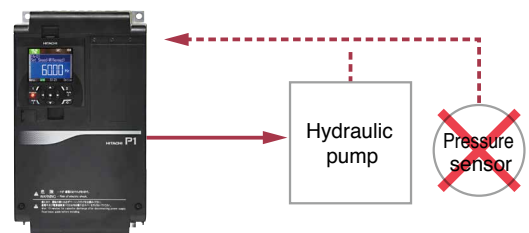
☐Example of the results of the hydraulic pump energy-saving test

Inverter operation
EzSQ (programming function)

Example of the results
Reduction of 45%
of the cumulative power!
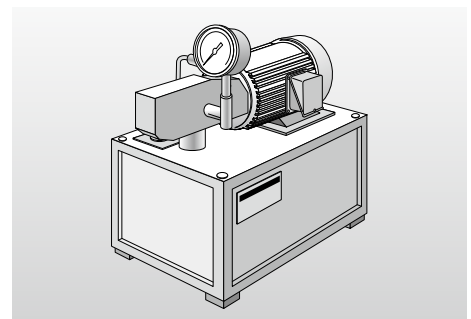
Recommended function   ●Multiple rating ●PID control ●PM motor drive
●Sensorless vector control ●EzSQ(programming function)

12

High Performance Applications

Hitachi inverters are used in a wide variety of industries because

Crane, Lift, Automatic warehouse `EzSQ`

● **Provides smooth drive control even for heavy weights.**

Provide stable drive control even for the heavy weights (such as winding of the cranes) by high start-up torque (0.3Hz, 200%).
*Note Hitachi Induction motor 4P (ND load/Sensor-less vector control)

● **Reduce the shock such as swing load by multi setting speed response gain.**

Gain mapping function provides a vibration reduction and stable operation.
It will be also effective in the tact time reduction.

● **Space-saving and cost-down by the EzSQ(programming function).**

By using EzSQ, it is possible to reduce components by eliminating the host controller for the drive, thus saving-space and cost.

Traversing

lifting/ lowering

Back and forth
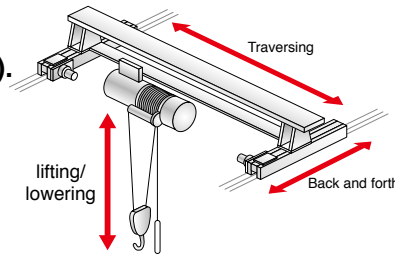
Recommended function ● Sensorless vector control ● Gain mapping function
● EzSQ(programming function)

Injection molding machine

● **Torque control can be applied to the injection molding machine.**

"Overload warning signal" and "Over torque signal" can apply the operation timing of the injection and mold clamping axis.

Pellets of raw materials

Hopper

Dissolved raw materials

Mold

Control the clamping axis by detecting the output torque

Motor

Motor

Pressurization
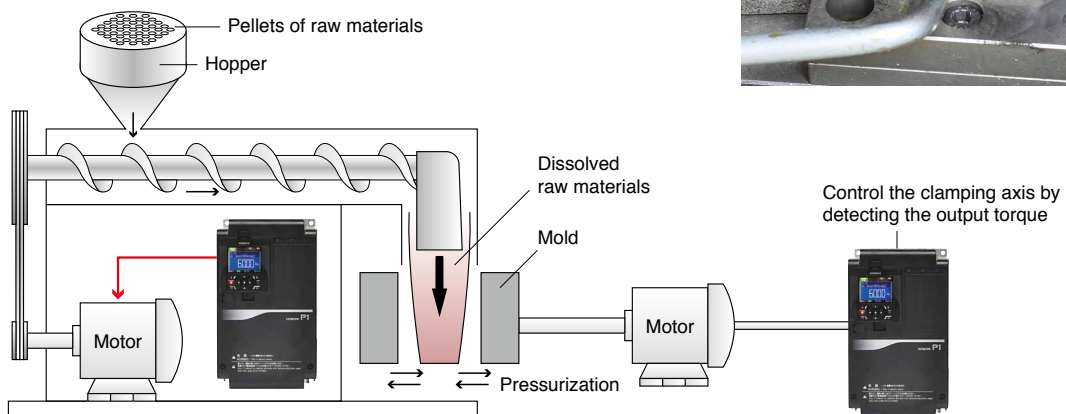
Recommended function ● Torque control ● Torque limit function ● Overload signal
● Over torque signal ● Overload restriction function

of its high efficiency and high quality.

Winder

● **Utilizing Gain Control.**

When you allow the speed response gain to be variable by the output frequency band, the drive is more stable.
This is suitable for winder and re-winder applications.

● **In Winding machine applications highly precise rotation is required.**

For closed-Loop application optional feedback board is required.
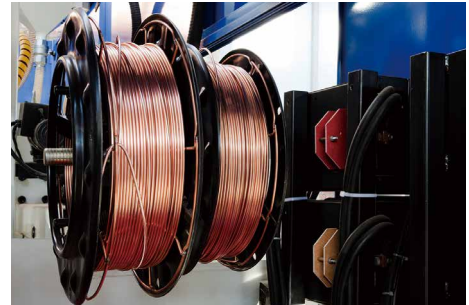
Recommended function ● Vector control (feedback option board required)
● Gain mapping function ● Torque control

Grinder

EzSQ | PM motor

● **Miniaturization by utilizing a PM motor.**

Hitachi supports PM motor control.

● **Further support to high-quality machining applications.**

Maximum output frequency is 590Hz (induction motor) and 400Hz (PM motor).

● **EzSQ expands the possibility for a wide variety of simpler applications.**

By utilizing the EzSQ program operation functionality, The drive logic (EzSQ) can be developed and edited to optimize the motor operation based on conditional or logical programming to enhance and increase production.
In addition, the programming functionality can reduce cost, function, and panel space as well as some of the logic allocated to the controller and peripheral devices.
 e. g. Depend on application desired operation, the logic program (EzSQ) can control many of the of operational parameters, such as frequency, overload level, overload signals and others.
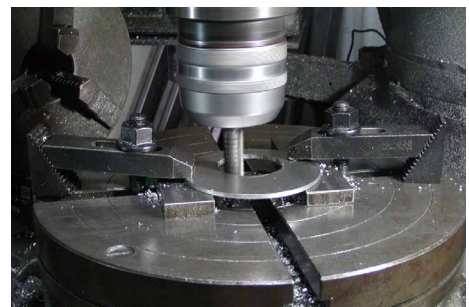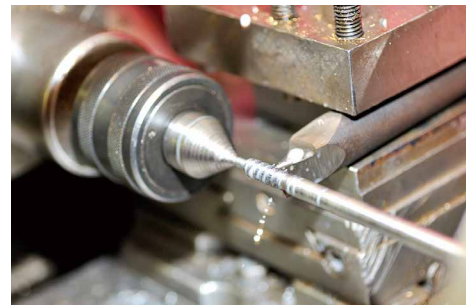
Recommended function ● PM motor drive ● EzSQ(programming function)

14

PC setting Software

Hitachi's ProDriveNext Software

Easy configuration, such as start/stop and fault diagnosis.

ProDriveNext(PC setting software)

ProDriveNext supports various functions.

Easy Setup & Easy data management.
Parameter comparison is also enhanced.
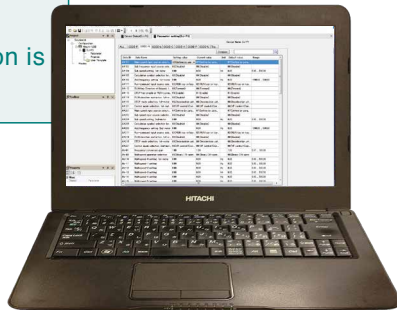
Easy connection via USB

Ethernet is also available (optional)

Micro-B connector

Type-A connector

USB cable
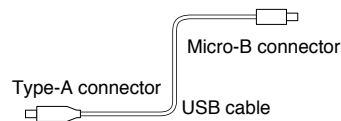
Monitor Function.

All display parameters can be monitored.

Monitor display format can be uniquely customized by selecting the required items, and can be displayed in a tabular or graphical format.

Monitor item select dialog

Device Name: SJ-P1

No.	Data ID	Data Name
1	dA-01	Output frequency monitor
2	dA-02	Output current monitor
3	dA-03	Rotation direction monitor
4	dA-04	Frequency reference monitor(After calcula…
5	dA-06	Output frequency scale conversion monitor
6	dA-10	Observer speed monitor (at OLV)
7	dA-15	Torque reference monitor(After calculation)
8	dA-16	Torque limit monitor
9	dA-17	Output Torque monitor
10	dA-18	Output Voltage monitor
11	dA-28	Pulse counter monitor
12	dA-30	Input power monitor
13	dA-32	Accumulation input power monitor

Optional Items
- ☑ Monitor
- ☐ CODE-A
- ☐ CODE-b
- ☐ CODE-C
- ☐ CODE-H
- ☐ CODE-P
- ☐ CODE-U
- ☐ Trip

Select   Cancel

Cycle: 200 msec   Monitor Status: Running

Device Name	Data ID	Data Name	Process value	Unit
SJ-P1	dA-01	Output frequency monitor	10	Hz
SJ-P1	dA-02	Output current monitor	1.39	A
SJ-P1	dA-03	Rotation direction monitor	F(Forward RUN)	
SJ-P1	dA-04	Frequency reference monitor(After calcu…	10	Hz
SJ-P1	dA-06	Output frequency scale conversion moni…	10	
SJ-P1	dA-17	Output Torque monitor	0	%
SJ-P1	dA-18	Output Voltage monitor	40	V
SJ-P1	dA-30	Input power monitor	0	kW
SJ-P1	dA-34	Output power monitor	0.02	kW
SJ-P1	dA-40	DC-bus voltage monitor	278.9	Vdc
SJ-P1	dA-42	Electronic thermal Load rating monitor (…	0	%
SJ-P1	FA-01	Main Speed reference monitor	10	Hz
SJ-P1	FA-15	Torque reference monitor	0	%
SJ-P1	FA-16	Torque bias monitor	0	%

【Table type monitor】

Set   MonitorStatus: Stopping   Cycle: 200 msec
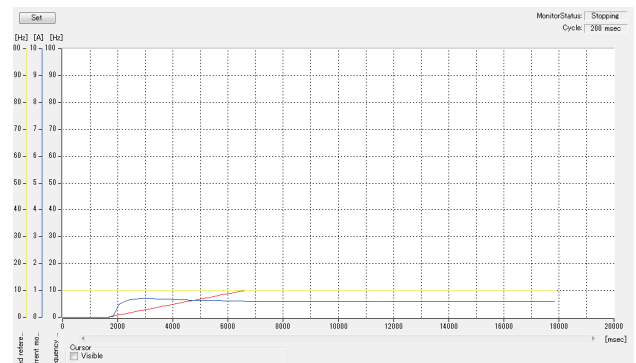
【Graph type monitor】

EzSQ version UP

Parameter Setting.

Changes made by keyboard input.

Changed parameters highlighted "PINK" which indicates that it needs to be download to the device.

Data ID	Data Name	Setting value	Current value	Unit	Default value	Range
AA101	Main speed input source selecti...	07:(Setting by para...	07:(Setting by para...		07:(Setting by para...	
AA102	Sub frequency input source sele...	00:(Disable)	00:(Disable)		00:(Disable)	
AA104	Sub speed setting, 1st-motor	0.00	0.00	Hz	0.00	0.00 ... 590.00
AA105	Calculation symbol selection for...	00:(Disable)	00:(Disable)		00:(Disable)	
AA106	Add frequency setting, 1st-motor	0.00	0.00	Hz	0.00	−590.00 ... 590.00
AA111	Run-command input source sele...	02:(RUN key on key...	02:(RUN key on key...		02:(RUN key on key...	
AA-12	RUN-key Direction of Keypad, 1...	00:(Forward)	00:(Forward)		00:(Forward)	
AA-13	STOP-key enable at RUN-comm...	01:(Enable)	01:(Enable)		01:(Enable)	
AA114	RUN-direction restriction, 1st-m...	00:(Disable)	00:(Disable)		00:(Disable)	
AA115	STOP mode selection, 1st-motor	00:(Deceleration unt...	00:(Deceleration unt...		00:(Deceleration unt...	
AA121	Control mode selection, 1st-mot...	08:(Sensor less ve ▼	00:(VF control (Con...		00:(VF control (Con...	
AA201	Main speed input source selecti...	07:(Setting by para...	07:(Setting by para...		07:(Setting by para...	
AA202	Sub speed input source selectio...	00:(Disable)	00:(Disable)		00:(Disable)	
AA204	Sub speed setting, 2nd-motor	0.00	0.00	Hz	0.00	0.00 ... 590.00
AA205	Calculation symbol selection for...	00:(Disable)	00:(Disable)		00:(Disable)	
AA206	Add frequency setting, 2nd-motor	0.00	0.00	Hz	0.00	−590.00 ... 590.00
AA211	Run-command input source sele...	02:(RUN key on key...	02:(RUN key on key...		02:(RUN key on key...	
AA214	RUN-direction restriction, 1st-m...	00:(Disable)	00:(Disable)		00:(Disable)	

【Parameter setting display】

Extensive parameter comparison function.

Parameter management is supported by comparison functions below.
 [Setting value] - [Current value],
 [Setting value] - [Default value]
 [Setting value] - [File value]

Device Name:SJ-P1
SetData is compared with Default value.
FA-01	Main Speed reference monitor	Setting value 10.00	Default value 0.00
FA-12	Deceleration time monitor	Setting value 20.00	Default value 30.00
AA111	Run-command input source selection, 1st-motor	Setting value 00:(Terminal [FW]/[RV])	Default value 02:(RUN key on keypad)
AA121	Control mode selection, 1st-motor	Setting value 08:(Sensor less vector contr...	Default value 00:(VF control (Constant tor...
Ad-01	Torque reference input source selection	Setting value 02:(Setting by Terminal [Ai2])	Default value 07:(Setting by parameter)
Ad-11	Torque bias input source selection	Setting value 02:(Setting by Terminal [Ai2])	Default value 00:(Disable)
AF101	DC braking selection, 1st-motor	Setting value 01:(Enable)	Default value 00:(Disable)
bA126	Overload restriction 2 mode selection, 1st-motor	Setting value 02:(Enable during constant s...	Default value 01:(Enable during accel. and ...

8 of data mismatching were detected.

Data Trace function support an failure diagnosis.

By frequency reached, alarm or other signal trigger, the internal data of inverter is stored in real-time in the internal memory*.
Operation adjustment and failure analysis becomes more quickly.

(*This memory data is cleared at power shutdown.)
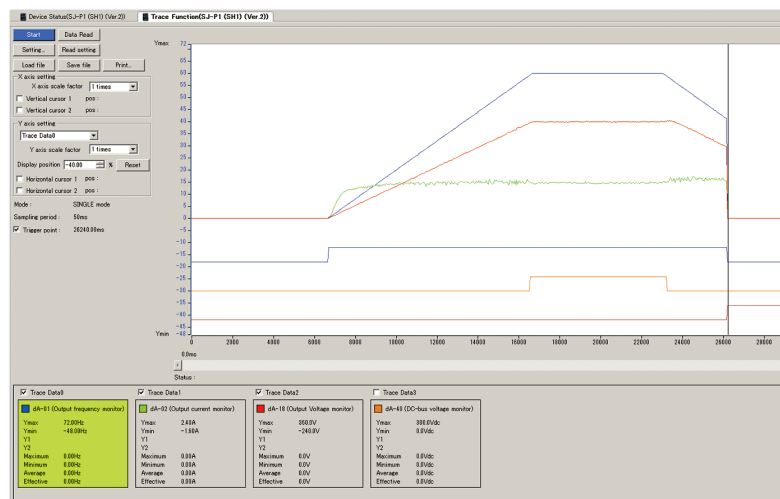
Please contact us for ProDriveNext software package.

Easily Customizable

Hitachi's programming function (EzSQ) and inverter-to-inverter
your VFD for each application beyond available fixed parameters.

EzSQ (programming function for customization)

Line	Label	Mnemonic	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5	P
7		case	1					
8		call	RUN_FW					
9		case	2					
10		call	RUN_RV					
11		case	3					
12		call	WAIT_RUN					
13		case else						
14		call	STOP					
15		end select						
16		goto	LOOP					
17								
18		sub	STOP					
19		UBw=	Xw	and	3			
20		if	UBw	<>	2	then	LBLO	
21		FW=	1					
22		timer set	TD(0)	U(00)				
23		U(31)=			1			
24	LBLO	end sub						
25								

Hitachi's EzSQ makes it possible to achieve a level of control that cannot be realized by a general purpose inverter. Providing a unique solution and added value through cost savings and improved performance.
Simultaneous execution task in SJ-P1 extended to 5tasks/2ms.(SJ700 is 1task/2ms.)

The program is created on a PC setting software (ProDriveNext).
It is easy to programming because similar BASIC!

micro-B connector

USB cable

Type-A connector
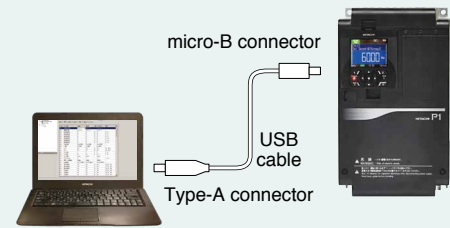
The program is easy to create with available condition branches and timer settings.

EzCOM Inverter-to-Inverter communication

SJ-P1 makes it possible to have Inverter-to-Inverter communication without a PLC or PC.〔EzCOM function]

It is easy to build a small coarsely synchronized system using multiple inverters.
Since SJ-P1 can use both of EzCOM and external communication option cassette, you can create a system that does not require complicated control components.
(The maximum number of EzCOM units is 8 inverters)

For example, Hitachi's PLC

communication   communication

EzCOM   EzCOM

Field network communication, for example EtherCAT

Available together, EzCOM communication and field network communication options.
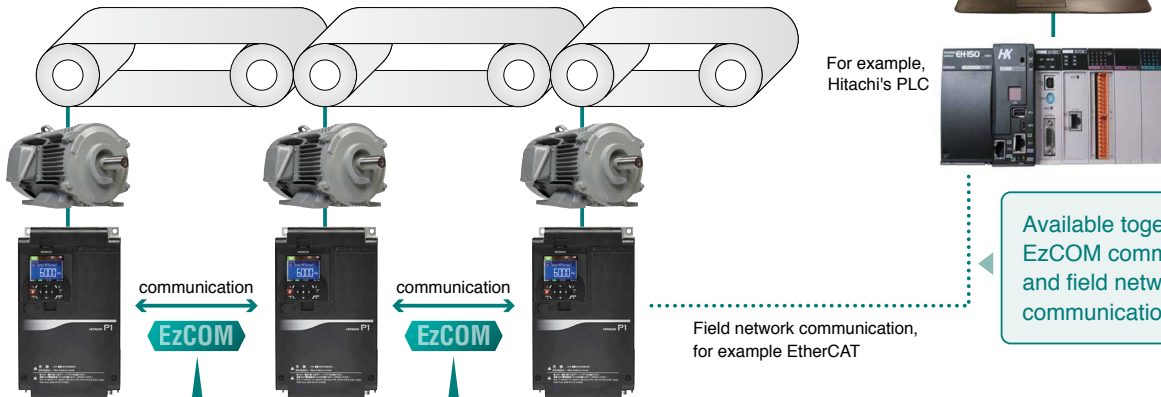
By simple wiring and easy parameter settings, the synchronous operation can be achieved without the host controller (Resulting in cost and wiring savings).

communication (EzCOM) allows you to uniquely customize

EzSQ Your own "Add-on-value" by EzSQ(programming function) EzCOM version UP

Application case 1

Reduction of the external circuit components.

In a system that would normally require external circuit components such as a relay, timer and switch, it is possible to reduce the use of those external components by using the EzSQ (programming function).

For example the Forward, Reverse, and Stop system shown below are part of the external relay circuit which are no longer required when using EzSQ function.

PB1(Forward)

PB2(Reverse)

PB3(Stop)
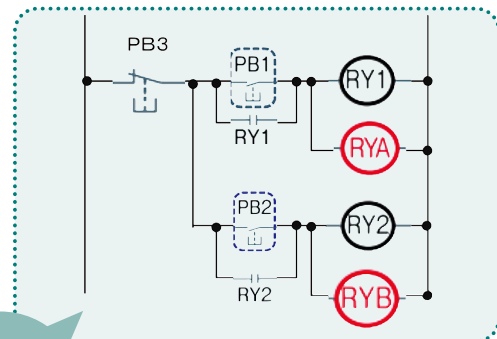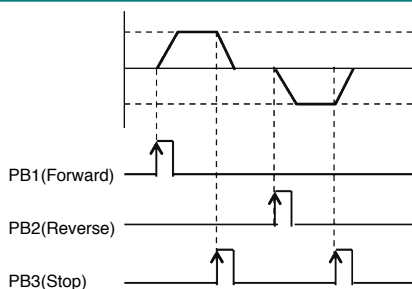
Not Required !

Application case 2

Advanced operation pattern is reproduced without sensors.

Mixing Machine:
At first mixing the material slowly and then increasing the mixing speed (by monitoring the load current). This speed change can be done automatically when using EzSQ.
Advanced speed patterns can be easily created for each application.

Application case 3

Multiple control is easy.

Winder:
EzCOM is a simple communication function that can be used for winders that would previously required multiple controllers. Construction of multiple systems can be simply achieved by reducing wiring works. Maintenance is also easy.

Application case 4

Check for water leakage without sensors.

Pump control:
Attaching a sensor to various places of the drainage pipe is costly.
EzSQ program that outputs an alarm to calculate the water leakage from the operating status of the pump can be utilized in place of a sensor.

◎For example of Water leakage detections from pipe.

Pipe

Inverter

Water leak

Pump

Water leakage warning signal
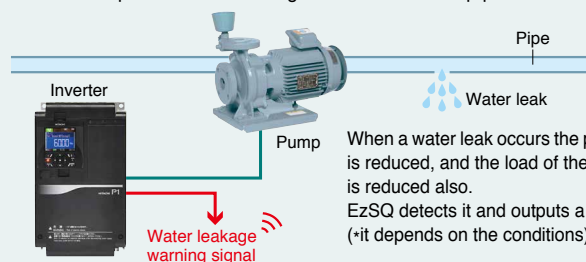
When a water leak occurs the pressure is reduced, and the load of the inverter is reduced also.
EzSQ detects it and outputs a warning (∗it depends on the conditions).

Further examples of EzSQ use

●For reducing maintenance cost…
→Water leakage detections from pipe, Dust blowouts for fans.

●For additional protective features…
→Avoiding water hammers, Multi speed adjustment during mixing process.

●For further energy savings…
→ Ideal output controls for fan & pumps, Sleep modes for conveyers non-regular used

●For stand-alone works on multi uses…
→Automatic operations of the fan and pumps based on user customization PID

Contact Hitachi for more information!

EzSQ function can enable following.
With the combination of these, customized functions can be easily implemented.
●Collect information of inverter's internal data such as load current, frequency, and etc.
●Input and output IO (including analogue IOs) can be freely assigned to your own function.
●Arithmetic operations (internal calculation), Rewriting inverter parameters, Sequential programming(such as conditions branches), Internal timers, and more other functions…

Model configuration

- **SJ series** model name indication

$$P1 - 00175 - H\ F\ \square\ F$$

- Type Name
- Motor maximum rated current (at VLD rated current)
  - 00001: 0.1A
    - to
  - 99999: 9999.9A

- F: Integrated EMC filter
- Region
  - E: Europe version
  - U: North America version
  - None:Japan version
- F: with keypad
- Power Source
  - L: 3-phase 200V class
  - H: 3-phase 400V class

● Lineup

● Available

Applicable motor (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132
3-phase 200 V (ND rating)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
3-phase 400 V (ND rating)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

(Note) The applicable motor refers to Hitachi standard 3-phase motor (4-pole).
To use other motors, be sure to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.

Applicable motor capacity by rating

● Overload current rating

VLD	(Very light duty):	110% 60sec, 120% 3sec
LD	(Light duty):	120% 60sec, 150% 3sec
ND	(Normal duty)：	150% 60sec, 200% 3sec

● 200V class

ND Rating Code	Model name	VLD (Very light duty)		LD (Light duty)		ND (Normal duty)	
P1-□□-LF□F		Motor capacity (kW(HP)) (4pole)	Rated current (A)	Motor capacity (kW(HP)) (4pole)	Rated current (A)	Motor capacity (kW(HP)) (4pole)	Rated current (A)
004	00044	0.75 (1)	4.4	0.75 (1)	3.7	0.4 (1/2)	3.2
007	00080	1.5 (2)	8.0	1.5 (2)	6.3	0.75 (1)	5.0
015	00104	2.2 (3)	10.4	2.2 (3)	9.4	1.5 (2)	8.0
022	00156	3.7 (5)	15.6	3.7 (5)	12.0	2.2 (3)	11.0
037	00228	5.5 (7.5)	22.8	5.5 (7.5)	19.6	3.7 (5)	17.5
055	00330	7.5 (10)	33	7.5 (10)	30	5.5 (7.5)	25
075	00460	11 (15)	46	11 (15)	40	7.5 (10)	32
110	00600	15 (20)	60	15 (20)	56	11 (15)	46
150	00800	18.5 (25)	80	18.5 (25)	73	15 (20)	64
185	00930	22 (30)	93	22 (30)	85	18.5 (25)	76
220	01240	30 (40)	124	30 (40)	113	22 (30)	95
300	01530	37 (50)	153	37 (50)	140	30 (40)	122
370	01850	45 (60)	185	45 (60)	169	37 (50)	146
450	02290	55 (75)	229	55 (75)	210	45 (60)	182
550	02950	75 (100)	295	75 (100)	270	55 (75)	220

● 400V class

ND Rating Code	Model name	VLD (Very light duty)		LD (Light duty)		ND (Normal duty)	
P1-□□-HF□F		Motor capacity (kW(HP)) (4pole)	Rated current (A)	Motor capacity (kW(HP)) (4pole)	Rated current (A)	Motor capacity (kW(HP)) (4pole)	Rated current (A)
007	00041	1.5 (2)	4.1	1.5 (2)	3.1	0.75 (1)	2.5
015	00054	2.2 (3)	5.4	2.2 (3)	4.8	1.5 (2)	4.0
022	00083	3.7 (5)	8.3	3.7 (5)	6.7	2.2 (3)	5.5
037	00126	5.5 (7.5)	12.6	5.5 (7.5)	11.1	3.7 (5)	9.2
055	00175	7.5 (10)	17.5	7.5 (10)	16	5.5 (7.5)	14.8
075	00250	11 (15)	25	11 (15)	22	7.5 (10)	19
110	00310	15 (20)	31	15 (20)	29	11 (15)	25
150	00400	18.5 (25)	40	18.5 (25)	37	15 (20)	32
185	00470	22 (30)	47	22 (30)	43	18.5 (25)	39
220	00620	30 (40)	62	30 (40)	57	22 (30)	48
300	00770	37 (50)	77	37 (50)	70	30 (40)	61
370	00930	45 (60)	93	45 (60)	85	37 (50)	75
450	01160	55 (75)	116	55 (75)	105	45 (60)	91
550	01470	75 (100)	147	75 (100)	135	55 (75)	112
750	01760	90 (125)	176	90 (125)	160	75 (100)	150
900	02130	110 (150)	213	110 (150)	195	90 (125)	180
1100	02520	132 (175)	252	132 (175)	230	110 (150)	217
1320	03160	160 (220)	316	160 (220)	290	132 (175)	260

Standard Specifications

● 200V class specifications

Model name (P1-□□-L)			00044	00080	00104	00156	00228	00330	00460	00600	00800	00930	01240	01530	01850	02290	02950
Applicable motor capacity (4 poles) (kW) (*1)		VLD	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		LD	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
		ND	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Output	Rated output current (A)	VLD	4.4	8.0	10.4	15.6	22.8	33.0	46.0	60.0	80.0	93.0	124	153	185	229	295
		LD	3.7	6.3	9.4	12.0	19.6	30.0	40.0	56.0	73.0	85.0	113	140	169	210	270
		ND	3.2	5.0	8.0	11.0	17.5	25.0	32.0	46.0	64.0	76.0	95.0	122	146	182	220
	Overload current rating (*2)	VLD	110% 60sec / 120% 3sec														
		LD	120% 60sec / 150% 3sec														
		ND	150% 60sec / 200% 3sec														
	Rated output voltage		3-phase (3-wire) 200 to 240 V (corresponding to input voltage)														
	Rated capacity (kVA) — 200V	VLD	1.5	2.8	3.6	5.4	7.9	11.4	15.9	20.8	27.7	32.2	43.0	53.0	64.1	79.3	102.2
		LD	1.3	2.2	3.3	4.2	6.8	10.4	13.9	19.4	25.3	29.4	39.1	48.5	58.5	72.7	93.5
		ND	1.1	1.7	2.8	3.8	6.1	8.7	11.1	15.9	22.2	26.3	32.9	42.3	50.6	63.0	76.2
	Rated capacity (kVA) — 240V	VLD	1.8	3.3	4.3	6.5	9.5	13.7	19.1	24.9	33.3	38.7	51.6	63.6	76.9	95.2	122.6
		LD	1.5	2.6	3.9	5.0	8.1	12.5	16.6	23.3	30.3	35.3	47.0	58.2	70.3	87.3	112.2
		ND	1.3	2.1	3.3	4.6	7.3	10.4	13.3	19.1	26.6	31.6	39.5	50.7	60.7	75.7	91.5
Input	Rated input AC voltage (*3)		Main circuit power supply: 3-phase 200 to 240V 50/60 Hz, Control power supply: 1-phase 200 to 240V 50/60 Hz														
	Permissible AC voltage/Frequency fluctuation		AC voltage : 170 to 264V 50/60 Hz, Frequency :±5%														
	Power supply capacity (kVA) (*4)	VLD	2.0	3.6	4.7	7.1	10.3	15.0	20.9	27.2	36.3	42.2	56.3	69.4	83.9	103.9	133.8
		LD	1.7	2.9	4.3	5.4	8.9	13.6	18.1	25.4	33.1	38.6	51.3	63.5	76.7	95.3	122.5
		ND	1.5	2.3	3.6	5.0	7.9	11.3	14.5	20.9	29.0	34.5	43.1	55.3	66.2	82.6	99.8
Carrier frequency range (*5)		VLD	0.5 to 10.0kHz														
		LD	0.5 to 12.0kHz														
		ND	0.5 to 16.0kHz														
Starting torque (*6)			200% / 0.3Hz														
Braking	Regenerative Braking		Internal BRD circuit (external discarge resistor)											Ext. regen. braking unit			
	Minimum resistance value (Ω)		50	50	35	35	35	16	10	10	7.5	7.5	5	–	–	–	–
Protective structure			IP20 – UL Open Type														
Aprox. weight (kg)			4	4	4	4	4	7	7	7	16	16	16	22	30	30	43

● 400V class specifications

Model name (P1-□□-H)			00041	00054	00083	00126	00175	00250	00310	00400	00470	00620	00770	00930	01160	01470	01760	02130	02520	03160
Applicable motor capacity (4 poles) (kW) (*1)		VLD	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
		LD	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
		ND	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132
Output	Rated output current (A)	VLD	4.1	5.4	8.3	12.6	17.5	25.0	31.0	40.0	47.0	62.0	77.0	93.0	116	147	176	213	252	316
		LD	3.1	4.8	6.7	11.1	16.0	22.0	29.0	37.0	43.0	57.0	70.0	85.0	105	135	160	195	230	290
		ND	2.5	4.0	5.5	9.2	14.8	19.0	25.0	32.0	39.0	48.0	61.0	75.0	91.0	112	150	180	217	260
	Overload current rating (*2)	VLD	110% 60sec / 120% 3sec																	
		LD	120% 60sec / 150% 3sec																	
		ND	150% 60sec / 200% 3sec																	
	Rated output voltage		3-phase (3-wire) 380 to 500V (corresponding to input voltage)																	
	Rated capacity (kVA) — 400V	VLD	2.8	3.7	5.8	8.7	12.1	17.3	21.5	27.7	32.6	43.0	53.3	64.4	80.4	101.8	121.9	147.6	174.6	218.9
		LD	2.1	3.3	4.6	7.7	11.1	15.2	20.1	25.6	29.8	39.5	48.5	58.9	72.7	93.5	110.9	135.1	159.3	200.9
		ND	1.7	2.8	3.8	6.4	10.3	13.2	17.3	22.2	27.0	33.3	42.3	52.0	63.0	77.6	103.9	124.7	150.3	180.1
	Rated capacity (kVA) — 500V	VLD	3.6	4.7	7.2	10.9	15.2	21.7	26.8	34.6	40.7	53.7	66.7	80.5	100.5	127.3	152.4	184.5	218.2	273.7
		LD	2.7	4.2	5.8	9.6	13.9	19.1	25.1	32.0	37.2	49.4	60.6	73.6	90.9	116.9	138.6	168.9	199.2	251.1
		ND	2.2	3.5	4.8	8.0	12.8	16.5	21.7	27.7	33.8	41.6	52.8	65.0	78.8	97.0	129.9	155.9	187.9	225.2
Input	Rated input AC voltage (*3)		Main circuit power supply: 3-phase 380 to 500V 50/60 Hz, Control power supply: 1-phase 380 to 500V 50/60 Hz																	
	Permissible AC voltage/Frequency fluctuation		AC voltage:323 to 550V 50/60 Hz, Frequency :±5%																	
	Power supply capacity (kVA) (*4)	VLD	3.7	4.9	7.5	11.4	15.9	22.7	28.1	36.3	42.6	56.3	69.9	84.4	105.2	133.4	159.7	193.2	228.6	286.7
		LD	2.8	4.4	6.1	10.1	14.5	20.0	26.3	33.6	39.0	51.7	63.5	77.1	95.3	122.5	145.2	176.9	208.7	263.1
		ND	2.3	3.6	5.0	8.3	13.4	17.2	22.7	29.0	35.4	43.5	55.3	68.0	82.6	101.6	136.1	163.3	196.9	235.9
Carrier frequency range (*5)		VLD	0.5 to 10.0kHz														0.5 to 8.0kHz			
		LD	0.5 to 12.0kHz														0.5 to 8.0kHz			
		ND	0.5 to 16.0kHz														0.5 to 10.0kHz			
Starting torque (*6)			200% / 0.3Hz														180% / 0.3Hz			
Braking	Regenerative Braking		Internal BRD circuit (external discarge resistor)													(*7)	Ext. regen. Braking unit			
	Minimum resistance value (Ω)		100	100	100	70	70	35	35	24	24	20	15	15	10	10	–	–	–	–
Protective structure			IP20 – UL Open Type														IP00			
Aprox. weight (kg)			4	4	4	4	7	7	7	16	16	16	22	30	30	30	55	55	70	70

*1: The applicable motor refers to Hitachi standard 3-phase motor (4-pole). To use other motors, be sure to prevent the rated motor current (50Hz) from exceeding the rated output current of the inverter.
*2: Electronic thermal protection is valid in accordance to derating.   *3: In order to comply with the Low Voltage Directive (LVD), it must be connected to a neutral grounding supply. 200V class: -Pollution degree 2 -Overvoltage category 3. 400V class: -Pollution degree 2 -Overvoltage category 3 (In the case the input supply is 380 to 460Vac) -Overvoltage category 2 (If the input supply is 460Vac or more).
*4: The power supply capacity is the value of the output rated current at 220V / 440V. The impedance at the supply side may be affected by the wiring, breaker, input reactor, etc.   *5: Carrier frequency may be limited in the range according to the use of drive.   *6: The values for the sensorless vector control are assigned according to the values in the ND rating in the Hitachi standard motor table. Torque characteristics may vary by the control system and the motor in use.   *7: Usually, an external regenerative braking is necessary. By your order it is possible to include the built-in braking circuit. By attaching the braking resistor the regenerative braking unit is no longer required.

Items			General Specifications	
PWM system			Sine-wave PWM system	
Output frequency range (*1)			0.00 to 590.00Hz	
Frequency accuracy			For the highest frequency, digital ±0.01%, analogue ±0.2% (25±10°C)	
Frequency resolution			Digital: 0.01Hz, Analogue: Max. frequency / 4000 (Ai1 terminal / Ai2 terminal: 12 bit / 0 to +10V or 0 to +20 mA, Ai3 terminal: 12 bit / -10 to +10V)	
Control system (*2)		IM	V/f control (constant torque / reduced torque / free), Automatic boost control,V/f control with encoder (constant torque / reduced torque / free), Automatic boost control with encoder, Cascade type sensorless vector control, 0Hz sensorless vector control, Cascade type vector control with encoder (position and torque).	
		SM/PMM	Methods of synchronous startup for vectorless smart control / Methods of IVMS startup for vectorless smart control	
Speed fluctuation (*3)			±0.5% (sensorless vector control)	
Acceleration/deceleration time			0.00 to 3600.00s (Linear, S-curve, U-curve, Inverted-U-curve, EL-S-curve)	
Display			Output frequency, Output current, output torque, trip history, input/output terminal function, input/output power (*4), PN voltage, etc.	
Start functions			DC braking after the start, matching frequency after the start, active frequency matching start, Low-voltage start, retry restart.	
Stop functions			After free run stop, deceleration stop; DC braking or external DC braking operation (Braking force, time, adjustment of operation speed)	
Stall prevention function			Overload limit function, overcurrent supression, overvoltage suppresion function	
Protection functions (*5)			Overcurrent error, overload error, brake resistor overload, overvoltage error, memory error, undervoltage error, current detector error, CPU error, external trip error, USP error, ground error, supply overvoltage error, power loss error, temperature detector error, Cooling-fan rotation speed decrease, temperature error, phase input error, IGBT error, phase output error, thermistor error, brake error, low-speed range overload error, inverter overload, RS485communication error, RTC error etc.	
Other functions			V/f free setting (7 points), upper and lower frequency limit, frequency jump, curve acceleration and deceleration, manual torque boost, energy-saving operation, analogue output adjustment, minimum speed, carrier frequency adjustment, motor electronic thermal function(free is possible), inverter thermal function, external start-end(speed and rate), frequency input selection, trip retry, restart stop, various signal output, initialization setting, PID control, auto-decel at shut-off, brake control function, commercial switching function, auto-tuning (on/offline) etc.	
Input	Frequency setting	Panel	Up, down left and right keys to the set parameter.	
		External signal (*6)	Ai1 / Ai2 terminal (Current and Voltage is able to switched.)	0 to 10Vdc (input impedance: 10kΩ) / 0 to 20mA (input impedance: 100Ω)
			Ai3 terminal	-10 to +10Vdc (Input impedance: 10kΩ)
			Multi-speed terminal	16multi-speed (With the use of the intelligent input terminal)
			Pulse train-input	Maximum 32 kHz ×2
		External port	RS485serial communication (Protocol: Modbus-RTU, Maximum: 115.2kbps)	
	Forward / reverse Start / stop	Panel	By RUN / Stop key (With the set parameter, forward / reverse can be switched)	
		External signal	Forward (FW) / Reverse (RV) / 3-wire input allowed (STA,STP,FR) (When input terminal functions are assigned)	
		External port	RS485serial communication (Protocol: Modbus-RTU, Maximum: 115.2kbps)	
	Intelligent input terminals		11 terminals (A or B terminal accept a pulse train) FW (Forward rotation) / RV (Reverse rotation), CF1 to 4 (Multi-speed 1 to 4), SF1 to 7 (Multi-speed bit 1 to 7), ADD (Trigger for frequency addition), SCHG (Command change), STA (3-wire start) / STP (3-wire stop) / FR (Forward / reverse by 3-wire), AHD (Analogue command holding, FUP (Remote control up) / FDN (Remote control down), UDC (Remote data clearance), F-OP(Forcible operation), SET (2nd-motor), RS (Reset), JG (Jogging), DB (External DC braking), 2CH (2-stage acc / decel), FRS (Free-run stop), EXT (External trip), USP (Unattended start protection), CS (Commercial power supply switching), SFT (Software lock), BOK (Braking confirmation), OLR (Overload restriction selection), KHC (Accumulated input power clear), OKHC (Accumulated input), PID (PID1 disable), PIDC (PID1 integration reset), PID2 (PID2 disable), PIDC2 (PID2 integration reset), SVC1 to 4 (PID1 multistage target value 1 to 4), PRO (PID gain change), PIO1 (PID output change), SLP (SLEEP trigger) / WAKE (WAKE trigger), TL (Enable torque limit), TRQ1/2 (Torque limit 1/2), PPI (P/PI switching), CAS (Control gain switching), FOC (Forcing), ATR (Enable torque command input), TBS (Enable torque bias), LAC (Acceleration / Deceleration cancellation), Mi1 to 11 (General-purpose input1 to 11), PCC (Pulse counter clearance), ECOM (EzCOM activation), PRG (EzCOM programme start), HLD (Acc / decel stop), REN (Motion enable signal), DISP (Display lock), PLA (Pulse train input A), PLB (Pulse train input B), DTR (Data trace start), DISP (Display lock), SON (servo on), ORT (orientation), PCLR (Clearance of position deviation), STAT (pulse train position command input enable), PUP (Position bias (ADD)), PDN (Position bias (SUB)), CP1 to 4 (Multistage position settings selection 1 to 4), ORL (Limit signal of Homing function), ORG (Start signal of Homing function), FOT (Forward Over Travel), ROT (Reserve Over Travel), SPD (speed / position switching), PSET (Position data presetting),	
	Backup supply terminal		P+ / P-: DC24V input (Input allowable voltage: 24V±10%)	
	STO input terminal		2 terminals (Simultaneous input)	
	Thermistor input terminal		1 terminal (PTC / NTC resistor allowed)	
Output	Intelligent output terminals		Transistor output terminal 5, 1a contact relay 1 point, 1c contact relay 1 point	
	Intelligent alarm relay (1a, 1c)		RUN (While in run), FA1 to 5 (Reached frequency signal), IRDY (Inverter ready), FWR (Forward rotation), RVR (Reverse rotation), FREF (panel frequency reference), REF (panel motion operation), SETM (2nd-motor selected), AL (Alarm signal), MJA (Major failure signal), OTQ (Over-torque), IP (Power loss), UV (Undervoltage), TRQ (Torque limited), IPS (Decel. Power loss), RNT (RUN time exceeded), ONT (ON time exceeded), THM (Motor electronic thermal warning), THC (Electronic thermal warning), WAC (Capacitor life warning), WAF (Cooling-fan life warning), FR (Operation signal), OHF (heat sink overheat warning), LOC / LOC2 (Low-current indication signal), OL / OL2 (Overload warning signal 1/2), BRK (Brake release), BER (Brake error), ZS (0Hz detection signal), OD / OD2 (Output deviation for PID control), FBV / FBV2 (PID feedback comparison), NDc (Communication disconnection), Ai1Dc / Ai2Dc / Ai3Dc (Analogue Ai1 / Ai2 / Ai3 disconnection), WCAi1 / WCAi2 / WCAi3 (Window comparator Ai1 / Ai2 / Ai3), LOG1 to 7 (logical operation result 1 to 7), MO1 to 7 (General-output 1 to 7), OVS (Over-Voltage power supply), PCMP (Pulse counter compare output), WFT (Trace function waiting for trriger), TRA (Trace function data logging), PDD (Position deviation over), POK (Positioning completed),etc.	
	EDM output terminal		Functional safety diagnostic output	
	Output terminal monitor (*7)		The data of the monitor can be selected by the parameter of the output.	
EMC filter activation (*8)			EMC filter can be activated (method to switch bares)	
PC external access			USB Micro-B	
Environment	Ambient temperature (*9)		-10 to 50°C (ND), -10 to 45°C (LD), -10 to 40°C (VLD)	
	Storage temperature(*10)		-20 to 65°C	
	Level of humidity		20 to 90%RH(No condensation allowed)	
	Vibration tolerance (*11)		P1-00044-L (P1-004L) to P1-01240-L (P1-220L), P1-00041-H (P1-004H) to P1-00620H (P1-220H)	5.9m/s² (0.6G), 10 to 55Hz
			More than P1-01530-L (P1-300L), More than P1-00770-H (P1-300H)	2.94m/s² (0.3G), 10 to 55Hz
	Installation Place (*12)		A maximum altitude of 1000 m, without gases or dust.	
Components life span			Main circuit smoothing capacitors is 10 years. / Cooling-fan is 10 years.	
Conformity standars (*13)			UL, cUL, CE marking, RCM, KC (planned), EAC (planned), NK (planned), functional safety (STO: SIL3, Cat 3/PLe)	
Optional slots			3 ports	
Option	Input / ouput		Analogue input / output option, relay output option	
	Communication		Ethernet (Modbus TCP), EtherCAT, PROFIBUS-DP, PROFINET	
	Feedback		Line driver input (RS422), push-pull input, resolver input	
	Temperature detector		Optional temperature measuring sensor	
Other optional components			Braking resistor, AC reactor, noise filter, operator cable, harmonics supresion unit, noise filter, LCRfilter, analog panel, regenerative braking unit, PC software ProdriveNext, relay expansion terminal board	

*1: To operate the motor beyond 50/60Hz, please consult with the motor manufacturer about the maximum allowable rotation speed. *2: If the setting of the motor constant is not appropriate, there is a case when the starting torque is not sufficient or unstable. *3: Speed fluctuation will vary depending on your system and the motor of the use environment. Please contact us for more information. *4: Both Input power and the output power are reference (not actual) value. Not suitable for calculations for such as the actual efficiency. *5: IGBT error [E030] also occurs by IGBT damage not only by short-circuit protection. Depending on the operating status of the inverter, Overcurrent error [E001] occurs instead of the IGBT error [E030]. *6: The frequency command is the maximum frequency at 9.8V for input voltage 0 to 10Vdc, or at 19.8 mA for input current 4 to 20 mA. Characteristic change is adjusted by using external start-end function. *7: The analogue voltage and analogue current monitor are estimated outputs of the analogue meter connection. Maximum output value might deviate slightly from 10V or 20 mA by variation of the analogue output circuit. If you want to change the characteristics, adjust the Ao1 and Ao2 adjustment functions. There is monitor data that cannot be part of the output. *8: When the EMC filter is enabled, please connected to the power supply with neutral grounding. Otherwise, it may increase leakage current. *9: Derating is set in accordance to carrier frequency. *10: Storage temperature is the temperature during transport. *11: In accordance with the test methods of JIS C 60068-2-6: 2010 (IEC 60068-2-6:2007). *12: In case of utilization at an altitude of 1000 m or more, take into account that the atmospheric pressure is reduced by 1% for very 100 m up. Please apply a derating of a 1% from the rated current every 100 m. Conduct and evaluation and contact us if you plan on using it above 2500 m. *13: Insulation distance is in accordance with the UL and CE standards.
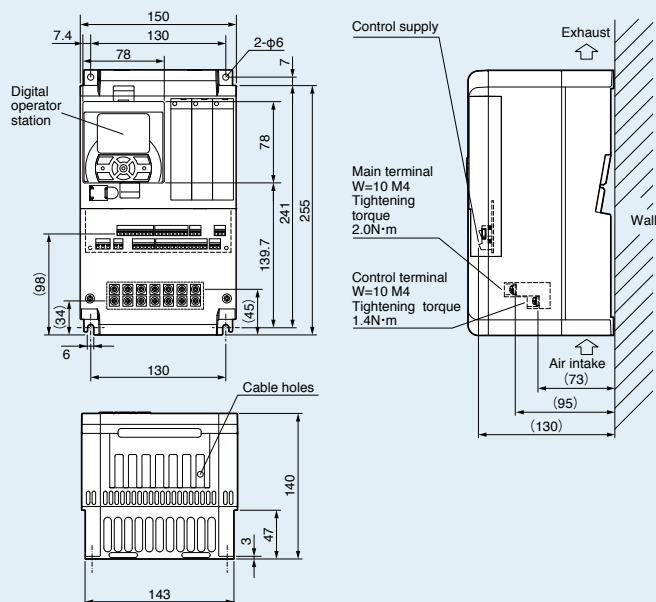
Protective Functions

Name	Cause (s)	Trip code
Over-current	The inverter output was short-circuited, or the motor shaft is locked or has a heavy load. These conditions cause excessive current for the inverter, so the inverter output is turned OFF. The protection circuit operates at approximately 220%(Parameter setting changeable) of the rated output current (ND rated).	E001
Overload protection (*1)	When a motor overload is detected by the electronic thermal function, the inverter trips and turns off its output.	E005
Braking resistor overload protection	When the regenerative braking resistor exceeds the usage time allowance or an over-voltage caused by the stop of the BRD function is detected, the inverter trips and turns off its output.	E006
Over-voltage protection	When the DC bus voltage exceeds a threshold, due to regenerative energy from the motor, the inverter trips and turns off its output.	E007
Memory error (*2)	When the built-in memory element has problems due to noise or excessive temperature, the inverter trips and turns off its output.	E008
Under-voltage error (*3)	A decrease of internal DC bus voltage below a threshold results in a control circuit fault. This condition can also generate excessive motor heat or cause low torque. The inverter trips and turns off its output.	E009
Current transformer error	If a strong source of electrical interference is close to the inverter or abnormal operations occur in the built-in CT, the inverter trips and turns off its output.	E010
CPU error (*4)	When a malfunction in the built-in CPU has occurred, the inverter trips and turns off its output.	E011
External trip	When a signal to an intelligent input terminal configured as EXT has occurred, the inverter trips and turns off its output.	E012
USP error	An error occurs when power is cycled while the inverter is in RUN mode if the Unattended Start Protection (USP) is enabled. The inverter trips and does not go into RUN mode until the error is cleared.	E013
Ground fault(*14)	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.	E014
Input over-voltage protection	When the input voltage is higher than the specified value, it is detected 100 seconds after power-up and the inverter trips and turns of its output. The overvoltage detection voltage is about 390 VDC (200 V class) and 780 VDC (400 V class) between PN. (Parameter changeable).	E015
Instantaneous power failure	When power is cut for more than 15ms, the inverter trips and turns off its output. If power failure continues, the error will be cleared. The inverter restarts if it is in RUN mode when power is cycled.	E016
Temperature detector error	The inverter will display the error code shown on the right if the lowering of cooling-fan speed is detected at the occurrence of the temperature error described below.	E019
Temperature error due to low cooling-fan speed	The inverter will display the error code shown on the right if the lowering of cooling-fan speed is detected at the occurrence of the temperature error described below.	E020
Inverter thermal trip	When the inverter internal temperature is higher than the specified value, the thermal sensor in the inverter module detects the higher temperature of the power devices and trips, turning off the inverter output.	E021
Phase loss input protection (*5)	One of three lines of 3-phase power supply is missing. Decision time is about 1s. (When the input phase loss effective function is enabled.	E024
IGBT error (*6)	When an instantaneous over-current has occurred, the inverter trips and turns off its output to protect main circuit element.	E030
Phase loss output protection (*7)	One of three lines of 3-phase power output is missing. Decision time is about 1s. (When the output phase loss effective function is enabled.	E034
Thermistor error	When the thermistor inside the motor detects temperature higher than the specified value, the inverter trips and turns off its output.	E035
Braking error	The inverter turns off its output when it can not detect whether the braking is ON or OFF within waiting time after it has released the brake. (When braking function is enabled.)	E036
Low-speed overload protection	If overload occurs during the motor operation at a very low speed at 0.2 Hz or less, the electronic thermal protection circuit in the inverter will detect the overload and shut off the inverter output. (Note that a high frequency may be recorded as the error history data.)	E038
Inverter's Overload protection (*1)	When the inverter itself overload is detected by the electronic thermal function, the inverter trips and turns off its output.	E039
Modbus (RS-485) 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.	E041
EzSQ invalid instruction	This trip occurs when an invalid instruction is detected in EzSQ program.	E043
EzSQ Nesting count Error	This trip occurs when number of nesting times is exceeded in EzSQ program.	E044
EzSQ instruction Error	This trip occurs when an can not executed instruction is detected in EzSQ program.	E045
EzSQ User Setting Error 0 to 9	These trips occur when a user specified trip instruction is executed in the program.	E050 to E059
There is an error in the STO path	For more information, please refer to the P1 functional safety guide.	E090 to E093

*1: Reset operation is acceptable 10 seconds after the trip. (Overload protection:E005depends on setting.)   *2: Reset operation by reset terminal or STOP / RESET key is not accepted. Since memory element failure or parameter may not be stored correctly, Please initialize memory after turning on the power supply again. And Please re-setting parameters.   *3 Undervoltage error output may take up to about 1sec.   *4: Reset operation by reset terminal or STOP / RESET key is not accepted. Please turn off the power of the inverter.   *5: When the input power supply waveform is distorted, error detection may not be performed correctly.   *6: This protection does not protect the output short circuit, so there is a risk of IGBT damage.   *7: Depending on the state of the output current, it may not be detected correctly.   *8: Inverter repair is necessary when this error occurs. Please contact your service or sales dept.

Dimensions

·P1-00044-LF□F - 00228-LF□F
·P1-00041-HF□F - 00126-HF□F

Digital operator station

Control supply

Exhaust

Main terminal W=10 M4 Tightening torque 2.0N·m

Control terminal W=10 M4 Tightening torque 1.4N·m

Wall

Air intake

Cable holes

·P1-00330-LF□F - 00460-LF□F
·P1-00175-HF□F - 00250-HF□F

Digital operator station

Control terminal W=9.8 M4

Control supply

Exhaust

Main terminal W=13 M5 Tightening torque 3.0N·m

Wall

Air intake

Cable holes

·P1-00600-LF□F ·P1-00310-HF□F

Digital operator station

Control terminal W=9.8 M4

Control supply

Exhaust

Main terminal W=16.5 M6 Tightening torque 4.0N·m

Wall

Air intake

Cable holes

·P1-00800-LF□F - 01240-LF□F

Digital operator station

Control supply

Exhaust

Control terminal W=9.8 M4

Main terminal W=23 M6 Tightening torque 5.5 - 6.6N·m

Wall

Air intake

Cable holes

[Unit : mm (inch)]
Inches for reference only.
※When using P1-00600-LFF with LD rating / VLD rating and P1-01240-LFF with VLD rating , the dimension D increases by 10 mm.

23

·P1-00400-HF□F - 00620-HF□F

245
229
42 78
2-φ7
Digital operator station
78
376
390
271.7
(150)
(223)
(165)
Control supply
Control terminal W=9.8 M4
Main terminal W=16.5 M6 Tightening torque 4.0N·m
7
229
Cable holes
Exhaust
Wall
Air intake
(130)
(149)
(175)
(180)
190
84
1.5
235

·P1-01530-LF□F   ·P1-00770-HF□F

300
265
14.5 78
2-φ10
15
Digital operator panel
78
392
(342)
510
540
(360)
(101)
10
265
Main terminal
Control power supply terminal W=9.8 M4 Tightening torque 1.2 - 1.4N·m
Control terminal
Cable holes (Both sides) 2-φ20×2
(170)
(180)
40
251.5
Exhaust
Wall
Main terminal
Air intake
(164)
195
2.3
Cable holes 5-φ25

·P1-01850-LF□F, P1-02290-LF□F
·P1-00930-HF□F - P1-01470-HF□F

390
300
2.4
78
2-φ12
Digital operator panel
78
379.7
(330)
520
550
(348)
(101)
12
300
Control power supply terminal W=9.8 M4 Tightening torque 1.2 - 1.4N·m
Control terminal
Cable holes (Both sides) 2-φ20×2
(225)
(235)
40
230
Exhaust
Wall
Air intake
(191)
219
Main terminal W=29 M8 Tightening torque 15N·m
250
2.3
Cable holes 5-φ40

·P1-02950-LF□F

480
380
7.4
78
Digital operator panel
78
453.2
(404)
670
700
(422)
(127)
12
380
Control power supply terminal W=9.8 M4 Tightening torque 1.2 - 1.4N·m
Control terminal
Cable holes (Both sides) 2-φ20×2
(225)
(235)
40
313.5
Exhaust
Wall
Air intake
(199)
Main terminal W=40 M10 Tightening torque 10～12N·m
250
2.3
Cable holes 6-φ40

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

Dimensions

・**P1-01760-HF□F, P1-02130-HF□F**

390
300
2-φ12
700
670
12
270
(2.3)
Wall

・**P1-02520-HF□F, P1-03160-HF□F**

480
380
2-φ12
740
710
12
270
(2.3)
Wall

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

Terminals

Main Circuit Terminals

● Terminal Description

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

● Screw Diameter and Terminal Width
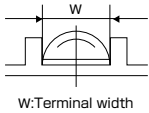
W:Terminal width

Model	Screw diameter	Ground Screw diameter	Terminal width (mm)	Terminal Arrangement
P1-00044-LFF to P1-00228-LFF / P1-00041-HFF to P1-00126-HFF	M4	M4	10	Figure 1
P1-00330-LFF, P1-00460-LFF / P1-00175-HFF, P1-00250-HFF	M5	M5	13	Figure 2
P1-00600-LFF, P1-00310-HFF	M6	M6	16.5	Figure 2
P1-00800-LFF, P1-00930-LFF	M6	M6	23	Figure 3
P1-01240-LFF	M8	M6	23	Figure 3
P1-00400-HFF to P1-00620-HFF	M6	M6	16.5	Figure 4
P1-01530-LFF	M8	M6	22	Figure 5
P1-01850-LFF, P1-02290-LFF	M8	M8	29	Figure 5
P1-02950-LFF	M10	M8	40	Figure 5
P1-00770-HFF	M6	M6	22	Figure 6
P1-00930-HFF to P1-01470-HFF	M8	M8	29	Figure 6

● Terminal Arrangement

Figure 1   P1-00044-LFF to P1-00228-LFF / P1-00041-HFF to P1-00126-HFF

| R/L1 | S/L2 | T/L3 | RB | U/T1 | V/T2 | W/T2 |
| R0 | T0 | G⊕ | PD/+1 | P/+ | N/– | G⊕ |

OFF G   ON
EMC filter enabled
EMC filter disabled
Charge led
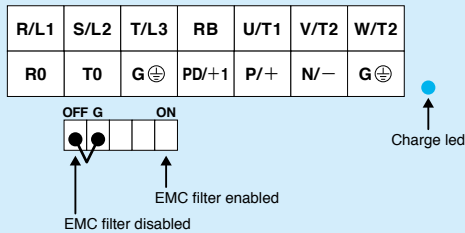
Figure 2   P1-00330-L to P1-00600-L / P1-00175-H to P1-00310-H

R0		T0
R/L1	S/L2	T/L3	U/T1	V/T2	W/T3
G⊕	PD/+1	P/+	N/–	RB	G⊕

OFF G   ON
EMC filter enabled
EMC filter disabled
Charge led
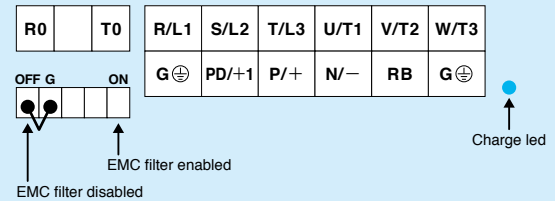
Figure 3   P1-00800-L, P1-01240-L

Charge led

| R0 | | T0 |

| R/L1 | S/L2 | T/L3 |
| PD/+1 | P/+ | N/– |
| G⊕ |

Grounding terminal with a jumper for enabling EMC filter

| RB |
| U/T1 | V/T2 | W/T3 |
| G⊕ |
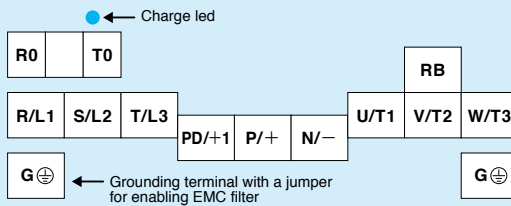
Figure 4   P1-00400-H to P1-00620-H

Charge led

| R0 | | T0 |

| R/L1 | S/L2 | T/L3 | U/T1 | V/T2 | W/T3 |
| G⊕ | PD/+1 | P/+ | N/– | RB | G⊕ |

OFF G   ON
EMC filter enabled
EMC filter disabled
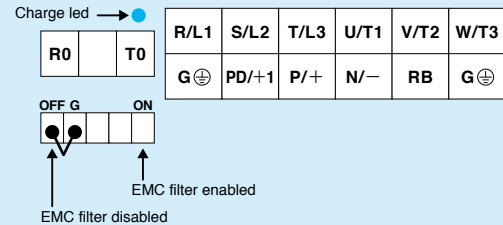
Figure 5   P1-01530-F to P1-02950-L

Charge led

| R0 | | T0 |

| R/L1 | S/L2 | T/L3 | PD/+1 | P/+ | N/– | U/T1 | V/T2 | W/T3 |
| G⊕ | | | | | | | | G⊕ |

Figure 6   P1-00770-H to P1-01470-H

Charge led

| R0 | | T0 |

| R/L1 | S/L2 | T/L3 | PD/+1 | P/+ | N/– | RB | U/T1 | V/T2 | W/T3 |
| G⊕ | | | | | | | | | G⊕ |

Note:For P1-01760-HFF to P1-03160-HFF, Please contact your service or sales dept.

Control Circuit Terminals

● Terminal Arrangement

Ao2 20mA SW4 10V	Ao1 20mA SW3 10V	Ai2 20mA SW2 10V	Ai1 20mA SW1 10V	P.SEL EX SW5 IN	SRC SW6 SINK *2

Analog input/output						External thermistor terminals			Digital output		Modbus					Safety monitoring *1		External 24V terminal	Power supply 24V terminal			Safety terminal *1*2		
Ao2	Ao1	L	L	Ai3	Ai2	Ai1	H	TH+ TH−	FM	CM1	SP	SN	SP	SN	RP	ED+	ED−	P24	P+	P−		ST2	STC	ST1

Alarm relay Output terminal			Relay Output terminal		Output terminals						Input terminals													P24S	STC	CMS
AL2	AL1	AL0	16A	16C	15 [OL]	14 [IRDY]	13 [FA2]	12 [FA1]	11 [RUN]	CM2	B [USP]	A [EXT]	9 [FW]	COM	8 [RV]	7 [CF2]	6 [CF1]	5 [2CH]	COM	4 [FRS]	3 [JG]	2 [SCHG]	1 [RS]	COM		

(*[ ] is factory setting.)

(*2 Please note that the initial state of the P1-*****-**E*(Europe version) is SourceType, so it is different from this figure.)

(*1 Certification in process)

● Configuration of switches

Indication	Name of switch	Description (before shipment: underlined part)
Ai1(SW1)	Analog input 1 change	Change the input specification of Analog input 1 (Ai1 terminal). 10V: Voltage input is available. 20mA: Current input is available.
Ai2(SW2)	Analog input 2 change	Change the input specification of Analog input 2 (Ai2 terminal). 10V: Voltage input is available. 20mA: Current input is available.
Ao1(SW3)	Analog output 1 change	Change the output specification of Analog output 1 (Ao1 terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
Ao2(SW4)	Analog output 2 change	Change the output specification of Analog output 2 (Ao2 terminal). 10V: Voltage output is applied. 20mA: Current output is applied.
P.SEL(SW5)	Change of the power supply method to input terminals	Change the power supply method to input terminals. IN: Activate input terminals by an internal power source. EX: Activate input terminals by inputting an external power source.(For EX, power supply is required between input terminals and COM.)
SRC/SINK(SW6)	Input terminal Sink/Source logic switching	Sink or source logic of the input terminal is switched. This is enabled when SW5 is IN. SINK: Switch to Sink logic. SRC: Switch to Source logic.

● Terminal Description

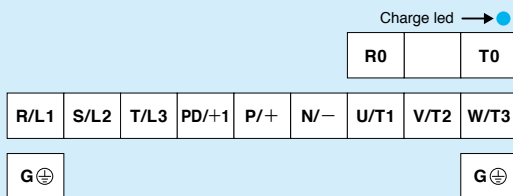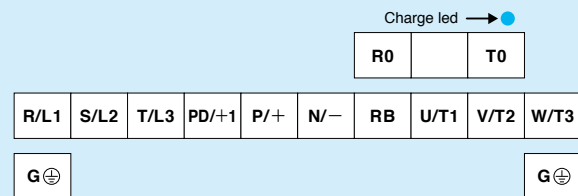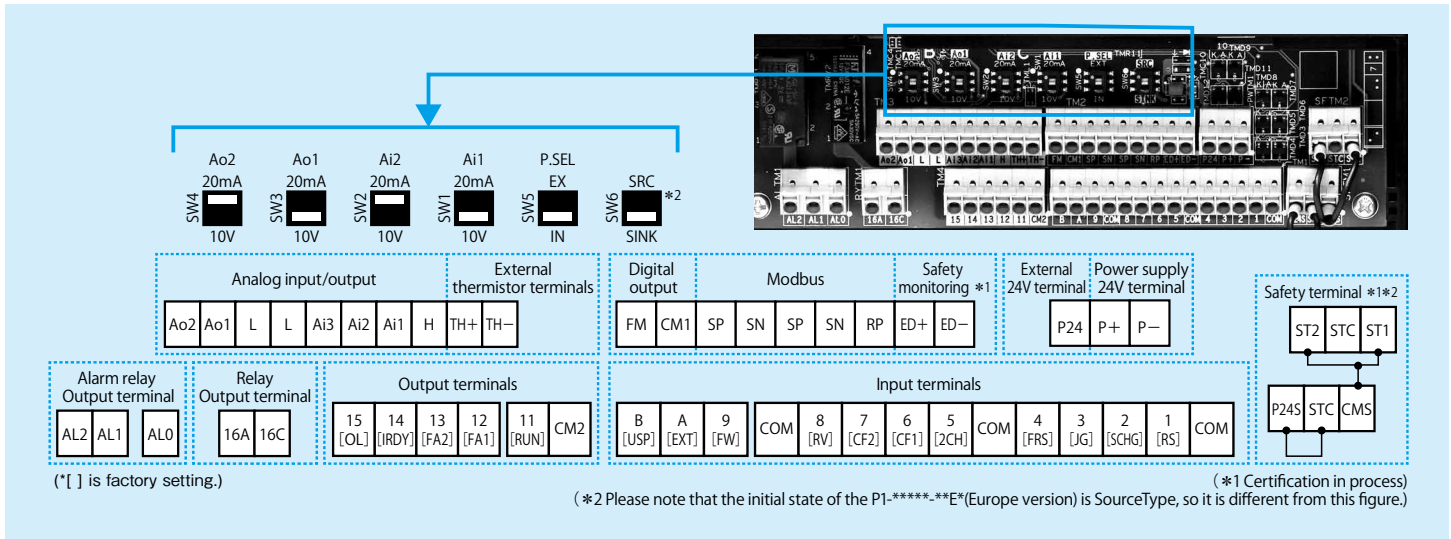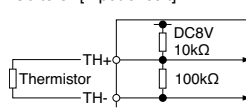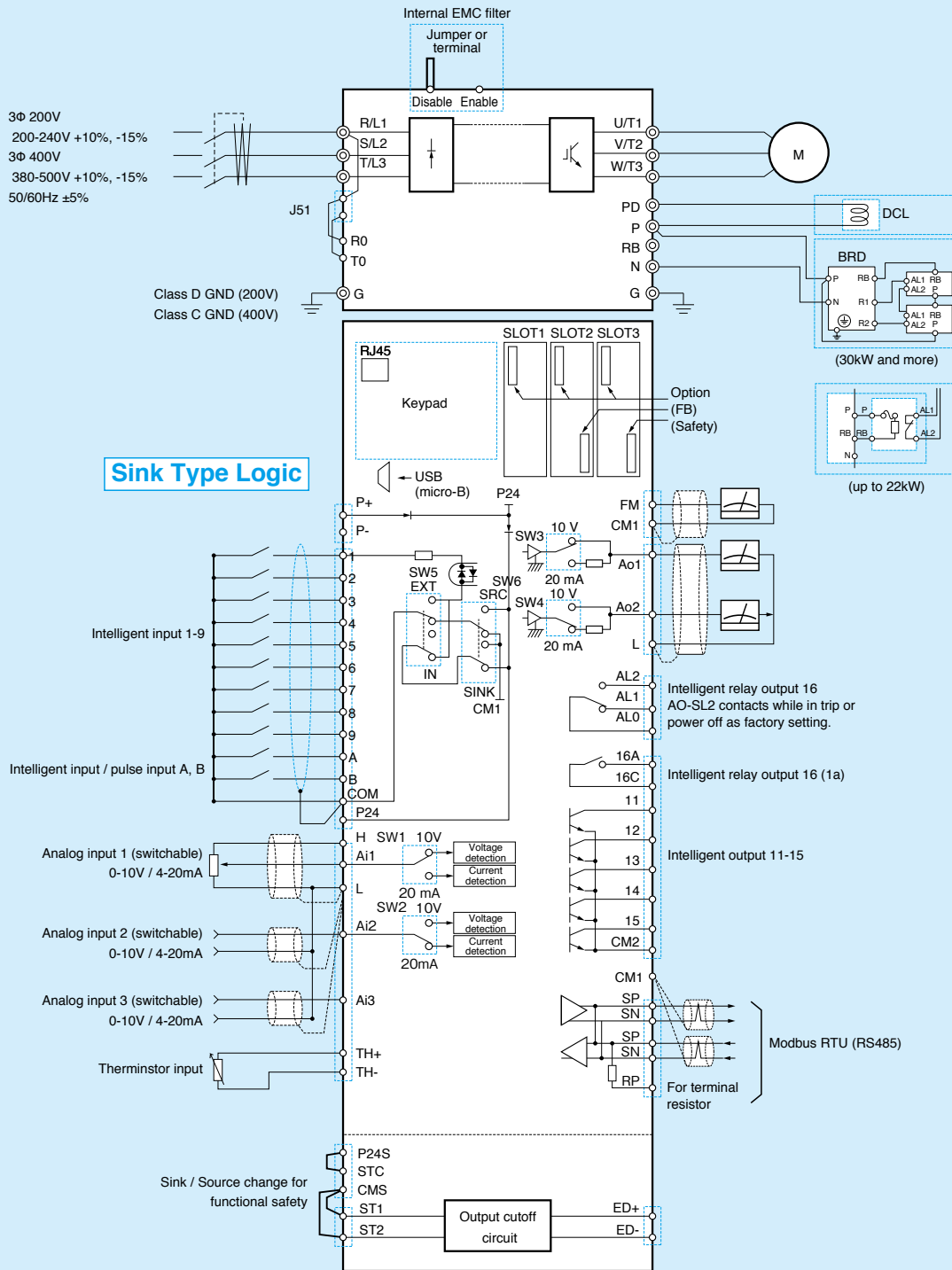|		Symbol	Terminal name	Description	Electric characteristics
Voltage/current switchable analog input/output terminal	Power supply	L	COM for analog power supply	COM terminals for analog input terminals (Ai1,Ai2,Ai3) and analog output terminals (Ao1,Ao2). Two L terminals are available.	−
		H	Speed setting power supply	DC10V power supply. Used for voltage input with analog input terminals (Ai1,Ai2,Ai3) using a variable resister.	Max. allowable input current 20mA
	Analog input	Ai1	Analog input terminal 1 (Voltage/current selector SW1)	Either Ai1 or Ai2 can be used by switching the selector switch to DC0 to 10V voltage input or 0-to 20mA current input. Used as speed input and feedback input.	For voltage input: • Input impedance Approx.10kΩ • Allowable input voltage DC-0.3V to 12V For current input: • Input impedance Approx.100Ω • Max. allowable input current 24mA
		Ai2	Analog input terminal 2 (Voltage/current selector SW2)		
		Ai3	Analog input terminal 3	DC-10 to 10V voltage input is available. Used as speed input and feedback input.	Voltage input only: • Input impedance Approx.10kΩ • Allowable voltage input DC-12V to 12V
	Analog output	Ao1	Analog output terminal 1 (Voltage/current selector SW3)	Either Ao1 or Ao2 can be used as an output for inverter monitoring data by switching the selector switch to DC0 to 10V voltage output or 0 to 20mA current output.	For voltage output: • Max. allowable output current 2mA • Output voltage accuracy ±10%(Ambient temperature: 25±10 degrees C) For current input: • Allowable load impedance 250Ω or less • Output current accuracy ±20%(Ambient temperature: 25±10 degrees C)
		Ao2	Analog output terminal 2 (Voltage/current selector SW4)		
24V power supply	Power input	P24	24V output power source terminal	This terminal supplies DC24V power for contact signals.	Max. output 100mA
		P+	Terminal for external 24V input (24V)	Input external DC24V power supply to the inverter. Inputting 24V power supply can change parameter settings and perform optional communication operations without control power supply.	Allowable input voltage DC24V±10% Max. allowable current 1A
		P-	Terminal for external 24V input (0V)		

			Symbol	Terminal name	Description	Electric characteristics
Intelligent input terminal	Digital input	Contact point	9 8 7 6 5 4 3 2 1	Input terminal	Terminal functions are selectable according to the parameter settings for each terminal. Switching SW6 to SRC or SINK allows you to select SINK or Source logic.	Voltage between each input and COM terminals ・ON voltage Min.DC18V ・OFF voltage Max.DC3V ・Max. allowable voltage DC27V ・Load current 5.6mA(at DC27V)
		Pulse	A	Pulse input-A	This is a terminal for pulse input. A and B terminals can be used also as an input terminal. Terminal functions are selectable according to the parameter settings for each terminal. The maximum input pulse rate is 32kpps.	Voltage between an input and COM terminals ・ON voltage Min.DC18V ・OFF voltage Max.DC3V ・Max. allowable voltage DC27V ・Load current 5.6mA(at DC27V) ・Max input pulse rate 32kpps
			B	Pulse input-B		
		Common	COM	Input (common)	This is a common terminal for digital input terminals (1,2,3,4,5,6,7,8,9,A and B). Three COM terminals are available.	
Intelligent output terminals	Digital output	Open collector	15 14 13 12 11	Output terminal	Terminal functions are selectable according to the parameter settings for each terminal.This is available for both SINK and Source logics.	Open collector output Between each terminal and CM2 ・Voltage drop when turned on:4V or less ・Max. allowable voltage 27V ・Max. allowable current 50mA
			CM2	Output (common)	This is a common terminal for output terminals 11 to 15.	
		Relay	16A 16C	1a relay terminal	Relays for A contact output	Maximum contact capacity ・AC250V, 2A(resistance) ・AC250V, 1A(inductive load) 　(Minimum contact capacity) ・DC1V, 1mA
			AL0 AL1 AL2	1c relay terminal	Relays for C contact output	Maximum contact capacity AL1/AL0: ・AC250V, 2A(resistance) ・AC250V, 0.2A(inductive load) AL2/AL0: ・AC250V, 1A(resistance) ・AC250V, 0.2A(inductive load) 　Minimum contact capacity (common) ・AC100V, 10mA ・DC5V, 100mA
FM output terminal	FM output	Monitor output	FM	Digital monitor (voltage)	Digital monitor output is selectable from PWM output with 6.4ms cycle or pulse output with a variable duty cycle of approx. 50%.	Pulse train output DC0 to 10V ・Max. allowable output current 1.2mA ・Maximum frequency 3.60kHz
			CM1	COM for digital monitor	This is a common terminal for digital monitor.This is also used as 0V reference potential for P24.	
Thermistor terminal	Analog input		TH+	External thermistor input	Connect to an external thermistor to make the inverter trip if an abnormal temperature is detected. Connect the thermistor to TH+ and TH-. The impedance to detect temperature errors can be adjusted within the range 0Ω to 9,999Ω. [Recommended thermistor properties] Allowable rated power: 100 mW or more Impedance at temperature error: 3kΩ	DC0 to 5V[Input circuit]
			TH-	Common terminal for external thermistor input		
RS485 communication	Serial communication		SP SN RP (CM1)	MODBUS terminal (RS-485)	SP terminal :　RS-485 differential(+) signal SN terminal :　RS-485 differential(-) signal RP terminal :　Connect to SP through a termination resistor CM1 terminal : Connect to the signal ground of external cmmunication devices. 　　　　There are two SP and two SN terminals, which are connected internally. 　　　　The maximum baud rate is 115.2kbps.	Termination resistor (120Ω) integrated Enabled: RP-SN shorted Disabled: RP-SN opened
Safety terminals	Power supply for Safety		P24S	24V output power source terminal	DC24V power supply for ST1/ST2 terminals. Using in source logic, this terminal becomes input COM.	Max. allowable output current 20mA.
			CMS	COM terminal for functional safety	COM terminal for ST1/ST2 terminals. Using in sink logic, this terminal becomes input COM.	
			STC	Logic switching terminal	Using ST1/ST2 in source logic, connect STC and CMS. Using ST1/ST2 in sink logic, connect STC and P24S. Using external power supply, connect external circuit to STC.	
	Input	STO functions	ST1	STO input1	Redundancy input terminals of the STO. For STO function, input to both terminals.	Voltage between each input and P24S or between each input and CMS. ・ON voltage Min.DC18V ・OFF voltage Max.DC3V ・Max. allowable voltage DC27V ・Load current 5.6mA(at DC27V)
			ST2	STO input2		
	Monitoring	Open collector	ED+	Output terminal for monitoring	Monitoring terminals for STO operation. This terminal can not be used for safety function operation.	Open collector output between ED+ and ED-. ・Voltage drop when turned on:4V or less ・Max. allowable voltage 27V ・Max. allowable current 50mA
			ED-	Output COM terminal for monitoring		

Note1: Common to each terminal varies.
Note2: Disconnect J51 when to supply R0-T0 separately. UV error is issued when main supply is off while in operation.

Connecting to PLC

● Connection with Input Terminals

1. Using Internal Power Supply of The Inverter
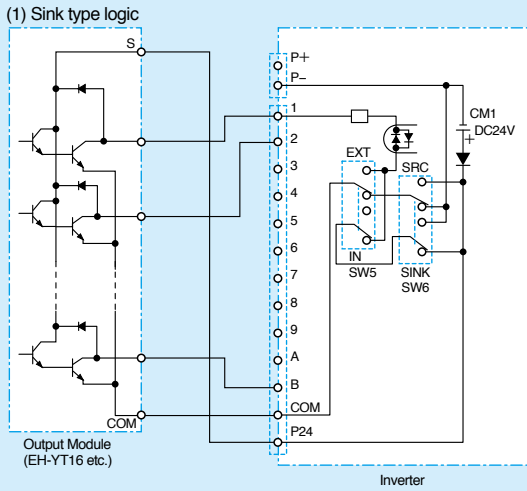
(1) Sink type logic

Output Module
(EH-YT16 etc.)

Inverter

- When using internal power supply of the inverter, the SW5 to "IN".
- When connecting sink type module, the SW6 to "SINK".

(2) Source type logic

Output Module
(EH-YTP16 etc.)
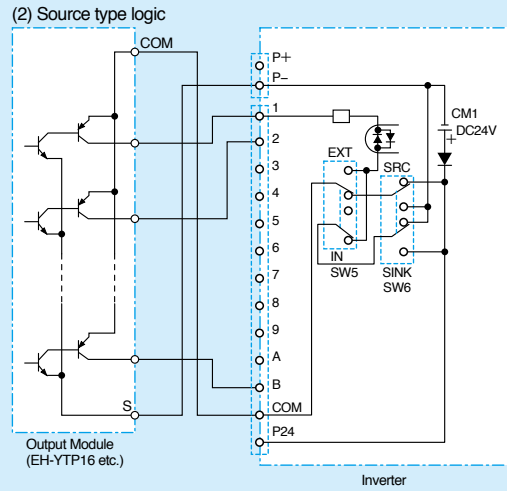
Inverter

- When using internal power supply of the inverter, the SW5 to "IN".
- When connecting source type module, the SW6 to "SRC".

2.Using External Power Supply
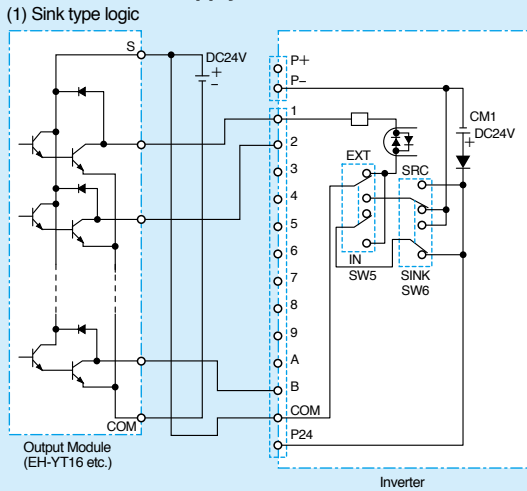
(1) Sink type logic

Output Module
(EH-YT16 etc.)

Inverter

- When using external power supply, the SW5 to "EXT".
- When connecting sink type module, the SW6 to "SINK"

(2) Source type logic

Output Module
(EH-YTP16 etc.)
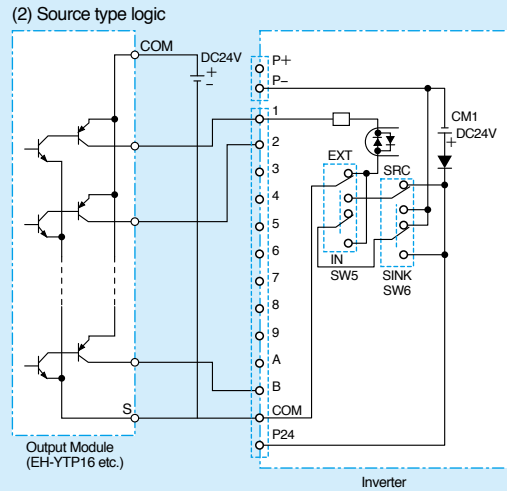
Inverter

- When using external power supply, the SW5 to "EXT".
- When connecting source type module, the SW6 to "SRC".

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

● Connection with Output Terminals

(1) Sink type logic

Inverter

Input Module
(EH-XD etc.)

(2) Source type logic

Inverter

Input Module
(EH-XD etc.)
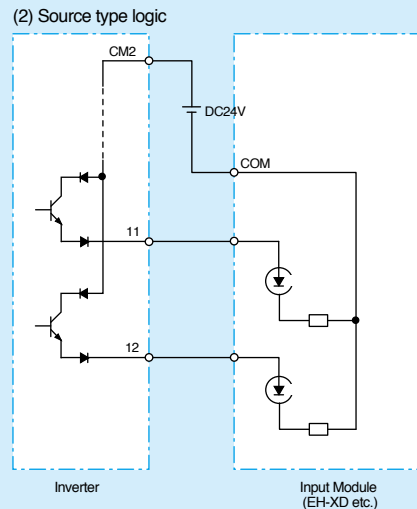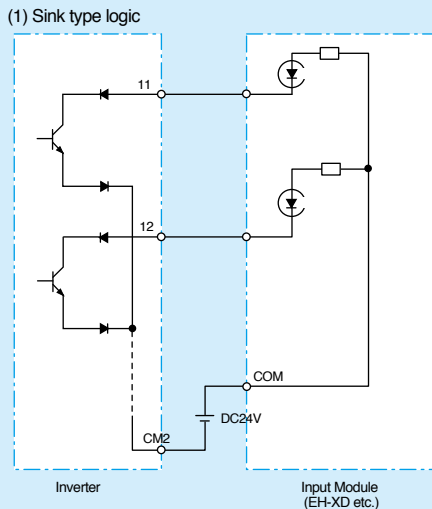
Function List

■Monitor mode List

Code No.	Parameter Meaning	Selectable User Setting
dA-01	Output frequency monitor	0.00 to 590.00(Hz)<current outout frequency>
dA-02	Output current monitor	0.00 to 655.35(A)
dA-03	Rotation direction monitor	F (Forward RUN) /r (Reverse RUN) /d (Zero-speed Out) /o (Stop)
dA-04	Frequency reference monitor(After calculation)	−590.00 to 590.00(Hz)<target value>
dA-06	Output frequency scale conversion monitor	0.00 to 59000.00(Hz)
dA-08	Detect speed monitor	−590.00 to 590.00(Hz)<monitor feedback is required>
dA-12	Output Frequency Monitor (signed)	−590.00 to 590.00(Hz)
dA-14	Frequency upper limit monitor	0.00 to 590.00(Hz)
dA-15	Torque reference monitor(After calculation)	−1000.0 to 1000.0(%)<Torque control mode required>
dA-16	Torque limit monitor	0.0 to 500.0(%)
dA-17	Output Torque monitor	−1000.0 to 1000.0(%)
dA-18	Output Voltage monitor	0.0 to 800.0(V)
dA-20	Current position monitor	when [AA123]≠03 −268435455 to +268435455(pulse)/ when [AA123]=03 −1073741823 to +1073741823(pulse)
dA-26	Pulse train position deviation monitor	−2147483647 to +2147483647(pulse)
dA-28	Pulse count monitor	0 to 2147483647(pulse)
dA-30	Input power monitor	0.00 to 600.00(kW)
dA-32	Accumulation input power monitor	0.0 to 1000000.0(kWh)
dA-34	Output power monitor	0.00 to 600.00(kW)
dA-36	Accumulation output power monitor	0.0 to 1000000.0(kWh)
dA-38	Motor temperature monitor	−20.0 to 200.0(°C)
dA-40	DC-bus voltage monitor	0.0 to 1000.0(Vdc)
dA-41	BRD Load rating monitor	
dA-42	Electronic thermal Load rating monitor (MTR)	0.00 to 100.00(%)
dA-43	Electronic thermal Load rating monitor (CTL)	
dA-45	Safety STO monitor	00 (no) /01 (P-1A) /02 (P-2A) /03 (P-1b) /04 (P-2b) /05 (P-1C) /06 (P-2C) /07 (STO)
dA-46	Safety option hardware monitor	Refer to guidebook for option
dA-47	Safety option monitor	
dA-50	Control terminal status	00 (Standard) /02 (P1-TM2) /15 (Not connect)
dA-51	Input terminal monitor	LLLLLLLLLLL to HHHHHHHHHHH [L:OFF/H:ON] [left](B)(A)(9)(8)(7)(6) (5)(4)(3)(2)(1)[right]
dA-54	Output terminal monitor	LLLLLLL to HHHHHHH [L:OFF/H:ON] [left](AL)(16c)(15)(14)(13) (12)(11)[right]
dA-60	Analog input/output status monitor	AAAAAAAA to VVVVVVVV [A:current/V:voltage] [left](Ao4)(Ao3)(EAi2)(EAi1) (Ao2)(Ao1)(Ai2)(Ai1)[right]
dA-61	Analog input [Ai1] monitor	0.00 to 100.00(%)
dA-62	Analog input [Ai2] monitor	
dA-63	Analog input [Ai3] monitor	−100.00 to 100.00(%)
dA-64	Extension Analog input [Ai4] monitor	0.0 to 100.00(%)
dA-65	Extension Analog input [Ai5] monitor	
dA-66	Extension Analog input [Ai6] monitor	−100.00 to 100.00(%)
dA-70	Pulse train input monitor (internal)	−100.00 to 100.00(%)
dA-71	Pulse train input monitor (Option)	−100.00 to 100.00(%)
dA-81	Option slot-1 status	00:(no) /01:(P1-EN) /02:(P1-ECT) /03:(P1-PN) /06:(P1-PB) /08:(P1-CO) /18:(P1-AG)
dA-82	Option slot-2 status	<dA-82 only>33:(P1-FB)
dA-83	Option slot-3 status	<dA-83 only>48:(P1-FS)
db-01	Program download monitor	00 (Program is not installed) /01 (Program is installed)
db-02	Program No. monitor	0000 to 9999
db-03	Program counter (Task-1)	
db-04	Program counter (Task-2)	
db-05	Program counter (Task-3)	1 to 1024
db-06	Program counter (Task-4)	
db-07	Program counter (Task-5)	
db-08	User monitor-0	
db-10	User monitor-1	
db-12	User monitor-2	−2147483647 to +2147483647
db-14	User monitor-3	
db-16	User monitor-4	
db-18	Analog output monitor YA0	
db-19	Analog output monitor YA1	
db-20	Analog output monitor YA2	0 to 10000
db-21	Analog output monitor YA3	
db-22	Analog output monitor YA4	
db-23	Analog output monitor YA5	
db-30	PID1 Feedback value 1 monitor	
db-32	PID1 Feedback value 2 monitor	0.00 to 100.00(%)(adjustable with [AH-04][AH-05][AH-06])
db-34	PID1 Feedback value 3 monitor	
db-36	PID2 Feedback value monitor	0.00 to 100.00(%)(adjustable with [AJ-04][AJ-05][AJ-06])
db-38	PID3 Feedback value monitor	0.00 to 100.00(%)(adjustable with [AJ-24][AJ-25][AJ-26])
db-40	PID4 Feedback value monitor	0.00 to 100.00(%)(adjustable with [AJ-44][AJ-45][AJ-46])
db-42	PID1 target value monitor	0.00 to 100.00(%)(adjustable with [AH-04][AH-05][AH-06])
db-44	PID1 feedback value monitor	
db-50	PID1 Output monitor	
db-51	PID1 Deviation monitor	
db-52	PID1 Deviation 1 monitor	−100.00 to +100.00(%)
db-53	PID1 Deviation 2 monitor	
db-54	PID1 Deviation 3 monitor	

Code No.	Parameter Meaning	Selectable User Setting
db-55	PID2 Output monitor	
db-56	PID2 Deviation monitor	
db-57	PID3 Output monitor	
db-58	PID3 Deviation monitor	−100.00 to +100.00(%)
db-59	PID4 Output monitor	
db-60	PID4 Deviation monitor	
db-61	Current PID P-Gain monitor	0.0 to 100.0
db-62	Current PID I-Gain monitor	0.0 to 3600.0(s)
db-63	Current PID D-Gain monitor	0.00 to 100.00(s)
db-64	PID FeedForward monitor	
dC-01	Inverter Load type status	00 (VLD) /01 (LD) /02 (ND)
dC-02	Rated current monitor	0.0 to 6553.5(A)
dC-07	Main speed input source monitor	
dC-08	Sub speed input source monitor	Displayed on operator panel. Refer to user's guide for detail.
dC-10	RUN command input source monitor	
dC-15	Cooling-fin temperature monitor	−20.0 to 200.0(°C)
dC-16	Life assessment monitor	LL to HH[L:normal/H:Fatigued] [left](FAN lifetime)(Capacitor on board lifetime)[right]
dC-20	Accumulation Start number monitor	
dC-21	Accumlation Power-on number monitor	1 to 65535(times)
dC-22	Accumulated time monitor in RUN status monitor	
dC-24	Accumulation power-on time monitor	0 to 1000000(hour)
dC-26	Accumulation cooling fan running time monitor	
dC-37	Icon 2 LIM monitor	00:-- /01(OC suppress) /02 (OL restriction) /03 (OV suppress) /04 (TRQ Limit) /05 (Freq Limit) /06 (Min.Freq)
dC-38	Icons2 ALT monitor	00 (--) /01(Over Load) /02 (Thermal(Motor)) /03 (Thermal(CTR)) /04 (Over Heat(MTR))
dC-39	Icons2 RETRY detail monitor	00(--) / 01(waiting to retry) /02 (waiting to restart)
dC-40	Icons2 NRDY detail monitor	00 (--) /01(Trip) /02 (Power failure) /03 (Reset) /04 (STO) /05 (Wait) /06 (Warning) /07 (Sequence Error) /08 (Freerun) /09 (interrupted)
dC-45	IM/SM monitor	00 (IM) /01 (SM)
dC-50	Firmware Ver. Monitor	00.00 to 99.255
dC-53	Firmware Gr. Monitor	00(Standard)
dE-50	Warnning monitor	Refer to user's guide

■Variable mode monitor (F code)

Code No.	Parameter Meaning	Selectable User Setting
FA-01	Main Speed reference monitor	0.00 to 590.00(Hz)
FA-02	Sub Speed reference monitor	−590.00 to 590.00(Hz) when configured with parameter, 0.00 to 590.00(Hz)
FA-10	Acceleration time monitor	0.00 to 3600.00(s)
FA-12	Deceleration time monitor	
FA-15	Torque reference monitor	−500.0 to 500.0(%)
FA-16	Torque bias monitor	−500.0 to 500.0(%)
FA-20	Position reference monitor	when [AA123]≠0 −268435455 to +268435455(pulse)/ when [AA123]=03 −1073741823 to +1073741823(pulse)
FA-30	PID1 Set Value 1 monitor	
FA-32	PID1 Set Value 2 monitor	0.00 to 100.00(%)(adjustable with [AH-04][AH-05][AH-06])
FA-34	PID1 Set Value 3 monitor	
FA-36	PID2 Set Value monitor	0.00 to 100.00(%)(adjustable with [AJ-04][AJ-05][AJ-06])
FA-38	PID3 Set Value monitor	0.00 to 100.00(%)(adjustable with [AJ-24][AJ-25][AJ-26])
FA-40	PID4 Set Value monitor	0.00 to 100.00(%)(adjustable with [AJ-44][AJ-45][AJ-46])

● Parameter mode List

■Parameter naming (Nomenclature)

*By default the motor 1 us enabled in the case that 08:[SET] is not assigned in the intelligent Input terminals [CA-01] to [CA-11].

AA 1 01

- ■Internal number in the group
- ■ -:Common for 1st and 2nd motor
  1:1st motor enabled if function [SET] is OFF
  2:2nd motor enabled if function [SET] is ON
- ■Parameter group

■Parameter mode (A code)

Code No.	Parameter Meaning	Selectable User Setting
AA101	Main speed input source selection, 1st-motor	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function) /16 (Volume on keypad)
AA102	Sub frequency input source selection, 1st-motor	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function) /16 (Volume on keypad)
AA104	Sub speed setting, 1st-motor	0.00 to 590.00(Hz)
AA105	Calculation symbol selection for Speed reference, 1st-motor	00 (Disable) /01 (Addition(ADD)) /02 (Subtraction(SUB)) /03 (Multiplication(MUL))
AA106	Add frequency setting, 1st-motor	−590.00 to +590.00(Hz)
AA111	Run-command input source selection, 1st-motor	00 (Terminal [FW]/[RV]) /01 (3-wire) /02 (RUN key on keypad) /03 (Setting by RS485) /04 (Option-1) /05 (Option-2) /06 (Option-3)
AA-12	RUN-key of keypad Rotation Direction, 1st-motor	00 (Forward) /01 (Reverse)
AA-13	STOP-key enable at RUN-command from terminal, 1st-motor	00 (Disable) /01 (Enable) /02 (Enable at only trip reset)
AA114	RUN-direction restriction, 1st-motor	00 (Disable) /01 (Enable only Forward rotation) /02 (Enable only Reverse rotation)
AA115	STOP mode selection, 1st-motor	00 (Deceleration until stop) /01 (Free-run stop)
AA121	Control mode selection, 1st-motor	IM control: 00 (VF control (Constant torque)) /01 (VF control (Reduced torque)) /02 (VF control (Free-V/f)) /03 (Constant torque with Automatic- trq boost)) /04 (VF control with encoder (Constant torque)) /05 (VF control with encoder (Reduced torque)) /06 (VF control with encoder (Free-V/f)) /07 (VF control with PG (Constant torque with Automatc-trq boost)) /08 (Sensorless vector control) /09 (0Hz Sensorless vector control) /10 (Vector control with encoder) SM/PMM control: 11 (Synchronous start up for smart sensorless vector control) /12 (IVMS start up for smart sensorless vector control)
AA123	Vector control mode selection, 1st-motor	00 (Speed/Torque control mode) /01 (Pulse train position control) /02 (Position control) /03 (High-resolution position control)
AA201	Main speed input source selection, 2nd-motor	same to AA101
AA202	Sub speed input source selection, 2nd-motor	same to AA102
AA204	Sub speed setting, 2nd-motor	same to AA104
AA205	Calculation symbol selection for Speed reference, 2nd-motor	same to AA105
AA206	Add frequency setting, 2nd-motor	same to AA106
AA211	Run-command input source selection, 2nd-motor	same to AA111
AA214	RUN-direction restriction, 1st-motor	same to AA114
AA215	STOP mode selection, 1st-motor	same to AA115
AA221	Control mode selection, 2nd-motor	Same as AA121, except 12
AA223	Vector control mode selection, 2nd-motor	same to AA123
Ab-01	Frequency conversion gain	0.01 to 100.00
Ab-03	Multispeed operation selection	00 (Binary (16-speeds)) /01 (Bit (8-speeds))
Ab110	Multispeed-0 setting, 1st-motor	0.00 to 590.00(Hz)
Ab-11	Multispeed-1 setting	
Ab-12	Multispeed-2 setting	
Ab-13	Multispeed-3 setting	
Ab-14	Multispeed-4 setting	
Ab-15	Multispeed-5 setting	
Ab-16	Multispeed-6 setting	
Ab-17	Multispeed-7 setting	
Ab-18	Multispeed-8 setting	
Ab-19	Multispeed-9 setting	
Ab-20	Multispeed-10 setting	
Ab-21	Multispeed-11 setting	
Ab-22	Multispeed-12 setting	
Ab-23	Multispeed-13 setting	
Ab-24	Multispeed-14 setting	
Ab-25	Multispeed-15 setting	
Ab210	Multispeed-0 setting, 2nd-motor	Same as Ab110
AC-01	Acceleration/ Deceleration time input selection	00 (Setting by parameter) /01 (Setting from Option-1) /02 (Setting from Option-2) /02 (Setting from Option-3) /04 (Setting by programing function)
AC-02	Acceleration/ Deceleration selection	00 (Common setting) /01 (Multi stage Acceleration/ Deceleration)

Code No.	Parameter Meaning	Selectable User Setting
AC-03	Acceleration curve selection	00 (Liner Acceleration) /01 (S-curve Acceleration) /02 (U-curve Acceleration) /03 (Reverse U-curve Acceleration) /04 (Eleveter S-curve Acceleration)
AC-04	Deceleration curve selection	
AC-05	Acceleration curve constant setting	1 to 10
AC-06	Deceleration curve constant setting	
AC-08	EL-S-curve ratio @start of acceleration	0 to 100
AC-09	EL-S-curve ratio @end of acceleration	
AC-10	EL-S-curve ratio @start of deceleration	
AC-11	EL-S-curve ratio @end of deceleration	
AC115	Select method to switch to Accel2/ Decel2 Profile, 1st-motor	00 (Switching by [2CH] terminal) /01 (Switching by setting) /02 (Switching only when rotation is reversed)
AC116	Accel1 to Accel2 Frequency transition point, 1st-motor	0.00 to 590.00(Hz)
AC117	Decel1 to Decel2 Frequency transition point, 1st-motor	
AC120	Acceleration time setting 1, 1st-motor	0.00 to 3600.00(s)
AC122	Deceleration time setting 1, 1st-motor	
AC124	Acceleration time setting 2, 1st-motor	
AC126	Deceleration time setting 2, 1st-motor	
AC-30	Acceleration time setting for Multispeed-1	
AC-32	Deceleration time setting for Multispeed-1	
AC-34	Acceleration time setting for Multispeed-2	
AC-36	Deceleration time setting for Multispeed-2	
AC-38	Acceleration time setting for Multispeed-3	
AC-40	Deceleration time setting for Multispeed-3	
AC-42	Acceleration time setting for Multispeed-4	
AC-44	Deceleration time setting for Multispeed-4	
AC-46	Acceleration time setting for Multispeed-5	
AC-48	Deceleration time setting for Multispeed-5	
AC-50	Acceleration time setting for Multispeed-6	
AC-52	Deceleration time setting for Multispeed-6	
AC-54	Acceleration time setting for Multispeed-7	
AC-56	Deceleration time setting for Multispeed-7	
AC-58	Acceleration time setting for Multispeed-8	
AC-60	Deceleration time setting for Multispeed-8	
AC-62	Acceleration time setting for Multispeed-9	
AC-64	Deceleration time setting for Multispeed-9	
AC-66	Acceleration time setting for Multispeed-10	
AC-68	Deceleration time setting for Multispeed-10	
AC-70	Acceleration time setting for Multispeed-11	
AC-72	Deceleration time setting for Multispeed-11	
AC-74	Acceleration time setting for Multispeed-12	
AC-76	Deceleration time setting for Multispeed-12	
AC-78	Acceleration time setting for Multispeed-13	
AC-80	Deceleration time setting for Multispeed-13	
AC-82	Acceleration time setting for Multispeed-14	
AC-84	Deceleration time setting for Multispeed-14	
AC-86	Acceleration time setting for Multispeed-15	
AC-88	Deceleration time setting for Multispeed-15	
AC215	Select method to switch to Accel2/ Decel2 Profile, 2nd-motor	same to AC115
AC216	Accel1 to Accel2 Frequency transition point, 2nd-motor	same to AC116
AC217	Decel1 to Decel2 Frequency transition point, 2nd-motor	same to AC117
AC220	Acceleration time setting 1, 2nd-motor	same to AC120
AC222	Deceleration time setting 1, 2nd-motor	same to AC122
AC224	Acceleration time setting 1, 2nd-motor	same to AC124

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Code No.	Parameter Meaning	Selectable User Setting
AC226	Deceleration time setting 1, 2nd-motor	same to AC126
Ad-01	Torque reference input source selection	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function)
Ad-02	Torque reference value setting	−500.0 to 500.0(%)
Ad-03	Polarity selection for torque reference	00 (As indication by the sign) /01 (Depending on the operation direction)
Ad-04	Switching time of Speed contorl to Torque control	0 to 1000(ms)
Ad-11	Torque bias input source selection	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /15 (PID function)
Ad-12	Torque bias value setting	−500.0 to 500.0(%)
Ad-13	Polarity selection for torque bias	00 (As indication by the sign) /01 (Depending on the operation direction)
Ad-14	Terminal [TBS] active	00 (Disable) /01 (Enable)
Ad-40	Input selection for speed limit at torque control	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
Ad-41	Speed limit at torque control (at Forward rotation)	0.00 to 590.00(Hz)
Ad-42	Speed limit at torque control (at Reverse rotation)	
AE-01	Electronic gear setting point selection	00 (Feedback side) /01 (Reference side)
AE-02	Electronic gear ratio numerator	1 to 10000
AE-03	Electronic gear ratio denominator	1 to 10000
AE-04	Positioning complete range setting	0 to 10000(Pulse)
AE-05	Positioning complete delay time setting	0.00 to 10.00(s)
AE-06	Position feed-forward gain setting	0 to 655.35
AE-07	Position loop gain setting	0.00 to 100.00
AE-08	Position bias setting	−2048 to 2048(Pulse)
AE-10	Stop position selection of Home search function	00 (Setting by parameter) /01 (Option-1) /02 (Option-2) /03 (Option-3)
AE-11	Stop position of Home search function	0 to 4095
AE-12	Speed reference of Home search function	0.00 to 120.00(Hz)
AE-13	Direction of Home search function	00 (forward) /01 (reverse)
AE-20	Position reference 0 setting	
AE-22	Position reference 1 setting	
AE-24	Position reference 2 setting	
AE-26	Position reference 3 setting	
AE-28	Position reference 4 setting	
AE-30	Position reference 5 setting	
AE-32	Position reference 6 setting	
AE-34	Position reference 7 setting	when [AA123]≠03, −268435455 to +268435455(pulse) when [AA123]=03, −1073741823 to +1073741823(pulse)
AE-36	Position reference 8 setting	
AE-38	Position reference 9 setting	
AE-40	Position reference 10 setting	
AE-42	Position reference 11 setting	
AE-44	Position reference 12 setting	
AE-46	Position reference 13 setting	
AE-48	Position reference 14 setting	
AE-50	Position reference 15 setting	
AE-52	Position control range setting(forward)	when [AA123]≠03, 0 to +268435455(pulse) when [AA123]=03, 0 to +107374182(pulse)
AE-54	Position control range setting(reverse)	when [AA123]≠03, −268435455 to +268435455(pulse) when [AA123]=03, −1073741823 to +1073741823(pulse)
AE-56	Position control mode selection	00 (Enabling Position control range) /01 (Disabling Position control range)
AE-60	Teach-in function target selection	00 to 15(X00 to X15)
AE-61	Current position saving at power-off	00(disabled)/01(enabled)
AE-62	Preset position data	when [AA123]≠03, −268435455 to +268435455(pulse) when [AA123]=03, −1073741823 to +1073741823(pulse)
AE-64	Deceleration stop distance calculation Gain	50.00 to 200.00(%)
AE-65	Deceleration stop distance calculation Bias	0.00 to 655.35(%)
AE-66	Speed Limit in APR control	0.00 to 100.00(%)
AE-67	APR start speed	0.00 to 100.00(%)
AE-70	Homing function selection	00 (Low speed homing) /01 (High speed homing 1) /01 (High speed homing 2)
AE-71	Direction of Homing function	00(Foward)/01(Reverse)
AE-72	Low-speed of homing function	0.00 to 10.00(Hz)
AE-73	High-Speed of homing function	0.00 to 590.00(Hz)
AF101	DC braking selection, 1st-motor	00 (Disable) /01 (Enable) /02 (Enable (Activate only by a speed reference))
AF102	Braking type selection, 1st-motor	00 (DC braking) /01 (Speed servo lock) /02 (Position servo lock)
AF103	DC braking frequency, 1st-motor	0.00 to 590.00(Hz)
AF104	DC braking delay time, 1st-motor	0.00 to 5.00(s)
AF105	DC braking force setting, 1st-motor	0 to 100(%)
AF106	DC braking active time at stop, 1st-motor	0.00 to 60.00(s)

Code No.	Parameter Meaning	Selectable User Setting
AF107	DC braking operation method selection, 1st-motor	00(Edge)/01(Level)
AF108	DC braking force at start, 1st-motor	0 to 100(%)
AF109	DC braking active time at start, 1st-motor	0.00 to 60.00(s)
AF120	Contactor Control Enable, 1st-motor	00 (Disable) /01 (Enable(Power side)) /02 (Enable(Motor side))
AF121	Run delay time, 1st-motor	0.00 to 2.00(s)
AF122	Contactor off delay time, 1st-motor	
AF123	Contactor answer back check time, 1st-motor	0.00 to 5.00(s)
AF130	Brake Control Enable, 1st-motor	00 (Disable) /01 (Brake control 1 enable) /02 (Brake control 1 enable (FWD/REV separate setting)) /03 (Brake control 2 enable)
AF131	Brake Wait Time for Release, 1st-motor (Forward side)	0.00 to 5.00(s)
AF132	Brake Wait Time for Accel. , 1st-motor (Forward side)	
AF133	Brake Wait Time for Stopping, 1st-motor (Forward side)	
AF134	Brake Wait Time for Confirmation, 1st-motor (Forward side)	
AF135	Brake Release Frequency Setting, 1st-motor (Forward side)	0.00 to 590.00(Hz)
AF136	Brake Release Current Setting, 1st-motor (Forward side)	INV rated current ×(0.00 to 2.00)
AF137	Braking Frequency, 1st-motor (Forward side)	0.00 to 590.00(Hz)
AF138	Brake Wait Time for Release, 1st-motor (Reverse side)	0.00 to 5.00(s)
AF139	Brake Wait Time for Accel. , 1st-motor (Reverse side)	
AF140	Brake Wait Time for Stopping, 1st-motor (Reverse side)	
AF141	Brake Wait Time for Confirmation, 1st-motor (Reverse side)	
AF142	Brake Release Frequency Setting, 1st-motor (Reverse side)	0.00 to 590.00(Hz)
AF143	Brake Release Current Setting, 1st-motor (Reverse side)	INV rated current ×(0.00 to 2.00)
AF144	Braking Frequency, 1st-motor (Reverse side)	0.00 to 590.00(Hz)
AF150	Brake open delay time, 1st-motor	0.00 to 2.00(s)
AF151	Brake close delay time, 1st-motor	
AF152	Brake answer back check time, 1st-motor	0.00 to 5.00(s)
AF153	Servo lock/ DC injection time at start, 1st-motor	0.00 to 10.00(s)
AF154	Servo lock/ DC injection time at stop, 1st-motor	
AF201	DC braking selection, 2nd-motor	same to AF101
AF202	Braking type selection, 2nd-motor	same to AF102
AF203	DC braking frequency, 2nd-motor	same to AF103
AF204	DC braking delay time, 2nd-motor	same to AF104
AF205	DC braking force setting, 2nd-motor	same to AF105
AF206	DC braking active time at stop, 2nd-motor	same to AF106
AF207	DC braking operation method selection, 2nd-motor	same to AF107
AF208	DC braking force at start, 2nd-motor	same to AF108
AF209	DC braking active time at start, 2nd-motor	same to AF109
AF220	ContactorControl Enable, 2nd-motor	same to AF120
AF221	Run delay time, 2nd-motor	same to AF121
AF222	Contactor off delay time, 2nd-motor	same to AF122
AF223	Contactor answer back check time, 2nd-motor	same to AF123
AF230	Brake Control Enable, 2nd-motor	same to AF130
AF231	Brake Wait Time for Release, 2nd-motor (Forward side)	same to AF131
AF232	Brake Wait Time for Accel. , 2nd-motor (Forward side)	same to AF132
AF233	Brake Wait Time for Stopping, 2nd-motor (Forward side)	same to AF133
AF234	Brake Wait Time for Confirmation, 2nd-motor (Forward side)	same to AF134
AF235	Brake Release Frequency Setting, 2nd-motor (Forward side)	same to AF135
AF236	Brake Release Current Setting, 2nd-motor (Forward side)	same to AF136
AF237	Braking Frequency, 2nd-motor (Forward side)	same to AF137
AF238	Brake Wait Time for Release, 2nd-motor (Reverse side)	same to AF138
AF239	Brake Wait Time for Accel. , 2nd-motor (Reverse side)	same to AF139
AF240	Brake Wait Time for Stopping, 2nd-motor (Reverse side)	same to AF140
AF241	Brake Wait Time for Confirmation, 2nd-motor (Reverse side)	same to AF141
AF242	Brake Release Frequency Setting, 2nd-motor (Reverse side)	same to AF142
AF243	Brake Release Current Setting, 2nd-motor (Reverse side)	same to AF143
AF244	Braking Frequency, 2nd-motor (Reverse side)	same to AF144
AF250	Brake open delay time, 2nd-motor	same to AF150
AF251	Brake close delay time, 2nd-motor	same to AF151

Code No.	Parameter Meaning	Selectable User Setting
AF252	Brake answer back check time, 2nd-motor	same to AF152
AF253	Servo lock/ DC injection time at start, 2nd-motor	same to AF153
AF254	Servo lock/ DC injection time at stop, 2nd-motor	same to AF154
AG101	Jump frequency 1, 1st-motor	0.00 to 590.00(Hz)
AG102	Jump frequency width 1, 1st-motor	0.00 to 10.00(Hz)
AG103	Jump frequency 2, 1st-motor	0.00 to 590.00(Hz)
AG104	Jump frequency width 2, 1st-motor	0.00 to 10.00(Hz)
AG105	Jump frequency 3, 1st-motor	0.00 to 590.00(Hz)
AG106	Jump frequency width 3, 1st-motor	0.00 to 10.00(Hz)
AG110	Acceleration stop frequency setting, 1st-motor	0.00 to 590.00(Hz)
AG111	Acceleration stop time setting, 1st-motor	0.00 to 60.00(s)
AG112	Deceleration stop frequency setting, 1st-motor	0.00 to 590.00(Hz)
AG113	Acceleration stop time setting, 1st-motor	0.00 to 60.00(s)
AG-20	Jogging frequency	0.00 to 10.00(Hz)
AG-21	Jogging stop mode selection	00 (Free run at Jogging stop (Disable at run) /01 (Deceleration stop at Jogging stop (Disable at run)) /02 (Dynamic brake at Jogging stop (Disable at run)) /03 (Free run at Jogging stop (Enable at run)) /04 (Deceleration stop at Jogging stop (Enable at run)) /05 (Dynamic brake at Jogging stop (Enable at run))
AG201	Jump frequency 1, 2nd-motor	same to AG101
AG202	Jump frequency width 1, 2nd-motor	same to AG102
AG203	Jump frequency 2, 2nd-motor	same to AG103
AG204	Jump frequency width 2, 2nd-motor	same to AG104
AG205	Jump frequency 3, 2nd-motor	same to AG105
AG206	Jump frequency width 3, 2nd-motor	same to AG106
AG210	Acceleration stop frequency setting, 2nd-motor	same to AG110
AG211	Acceleration stop time setting, 2nd-motor	same to AG111
AG212	Deceleration stop frequency setting, 2nd-motor	same to AG112
AG213	Acceleration stop time setting, 2nd-motor	same to AG113
AH-01	PID1 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))
AH-02	PID1 deviation inverse	00(Disable)/01(Enable)
AH-03	Unit selection for PID1	refer to the table for unit
AH-04	PID1 scale adjustment(at 0%)	−10000 to 10000
AH-05	PID1 scale adjustment(at 100%)	
AH-06	PID1 scale adjustment(point position)	0 to 4
AH-07	Input source selection of Set-point for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))"
AH-10	Set-point-1 setting for PID1	0.00 to 100.00(%) Display range can be changed with [AH-04], [AH-05], [AH-06]
AH-12 to 40	PID1 Multi stage set-point 1 to 15 setting	
AH-42	Input source selection of Set-point 2 for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AH-44	Set-point 2 setting for PID1	0.00 to 100.00(%) Display range can be changed with [AH-04], [AH-05], [AH-06]
AH-46	Input source selection of Set-point 3 for PID1	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AH-48	Set-point 2 setting for PID1	0.00 to 100.00(%) Display range can be changed with [AH-04], [AH-05], [AH-06]
AH-50	Calculation symbol selection of Set-point 1 for PID1	01 (Addition) /02 (Subtraction) /03 (Multiplication) /04 (Division) /05 (Minimum deviation) /06 (Maximum deviation)
AH-51	Input source selection of Process data 1 for PID1	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AH-52	Input source selection of Process data 2 for PID1	
AH-53	Input source selection of Process data 3 for PID1	
AH-54	Calculation symbol selection of Process data for PID1	01 (Addition) /02 (Subtraction) /03 (Multiplication) /04 (Division) /05 (Square root of FB1) /06 (Square root of FB2) /07 (Square root of (FB1-FB2) /08 (Average of PV-1 to PV-3) /09 (Minimum data of PV-1 to PV-3) /10 (Maximum data of PV-1 to PV-3)
AH-60	PID1 gain change method selection	00 (Using gain-1 only) /01 (Changed by Terminal[PRO])
AH-61	PID1 proportional gain 1	0.0 to 100.0
AH-62	PID1 integral time constant 1	0.0 to 3600.0(s)
AH-63	PID1 derivative gain 1	0.00 to 100.00(s)
AH-64	PID1 proportional gain 2	0.0 to 100.0
AH-65	PID1 integral time constant 2	0.0 to 3600.0(s)
AH-66	PID1 derivative gain 2	0.00 to 100.00(s)
AH-67	PID1 gain change time	0 to 10000(ms)
AH-70	PID feed-forward selection	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6])
AH-71	PID1 output variable	
AH-72	PID1 Deviation over level	0.00 to 100.00(%)
AH-73	PID1 Feedback compare signal turn-off level	

Code No.	Parameter Meaning	Selectable User Setting
AH-74	PID1 Feedback compare signal turn-on level	0.00 to 100.00(%)
AH-75	PID soft start function enable	00 (Disable) /01 (Enable)
AH-76	PID soft start target level	0.00 to 100.00(%)
AH-78	Acceleration time setting for PID soft start function	0.00 to 3600.00(s)
AH-80	PID soft start time	0.00 to 100.00(s)
AH-81	PID soft start error detection enable	00 (Disable) /01 (Enable(Error output)) /02 (Enable(Warning output))
AH-82	PID soft start error detection level	0.00 to 100.00(%)
AH-85	PID sleep trigger selection	00 (Disable) /01 (Low output) /02 (Terminal [SLEP] input)
AH-86	PID sleep start level	0.00 to 590.00(Hz)
AH-87	PID sleep active time	0.0 to 100.0(s)
AH-88	Setpoint boost before PID sleep enable	00 (Disable) /01 (Enable)
AH-89	Setpoint boost time	0.00 to 100.00(s)
AH-90	Setpoint boost value	
AH-91	Minimum RUN time befor PID sleep	0.00 to 100.00(s)
AH-92	Minimum active time of PID sleep	
AH-93	PID sleep trigger selection	01 (Deviation value) /02 (Low feedback) /03 (Terminal [WAKE] input)
AH-94	PID wake start level	0.00 to 100.00(%)
AH-95	PID wake start time	0.00 to 100.00(s)
AH-96	PID wake start deviation value	0.00 to 100.00(%)
AJ-01	PID2 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))
AJ-02	PID2 deviation inverse	00 (Disable) /01 (Enable)
AJ-03	PID2 unit selection	refer to the separated list for unit
AJ-04	PID2 scale adjustment(at 0%)	−10000 to 10000
AJ-05	PID2 scale adjustment(at 100%)	
AJ-06	PID2 scale adjustment(point position)	0 to 4
AJ-07	Input source selection of Set-point for PID2	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) 09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /15 (PID function)
AJ-10	Set-point setting for PID2	0.00 to 100.00(%) Display range can be changed with [AJ-04], [AJ-05], [AJ-06]
AJ-12	Input source selection of Process data for PID2	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AJ-13	PID2 proportional gain	0.0 to 100.0
AJ-14	PID2 integral time constant	0.0 to 3600.0(s)
AJ-15	PID2 derivative gain	0.00 to 100.00(s)
AJ-16	PID2 output variable	
AJ-17	PID2 Deviation over level	0.00 to 100.00(%)
AJ-18	PID2 Feedback compare signal turn-off level	
AJ-19	PID2 Feedback compare signal turn-on level	
AJ-21	PID3 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))
AJ-22	PID3 deviation inverse	00 (Disable) /01 (Enable)
AJ-23	PID3 unit selection	refer to the separated list for unit
AJ-24	PID3 scale adjustment(at 0%)	−10000 to 10000
AJ-25	PID3 scale adjustment(at 100%)	−10000 to 10000
AJ-26	PID3 scale adjustment(point position)	0 to 4
AJ-27	Input source selection of Set-point for PID3	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AJ-30	Set-point setting for PID3	0.00 to 100.00(%) Display range can be changed with [AJ-24], [AJ-25], [AJ-26]
AJ-32	Input source selection of Process data for PID3	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AJ-33	PID3 proportional gain	0.0 to 100.0
AJ-34	PID3 integral time constant	0.0 to 3600.0(s)
AJ-35	PID3 derivative gain	0.00 to 100.00(s)
AJ-36	PID3 output variable	
AJ-37	PID3 Deviation over level	0.00 to 100.00(%)
AJ-38	PID3 Feedback compare signal turn-off level	
AJ-39	PID3 Feedback compare signal turn-on level	
AJ-41	PID4 enable	00 (Disable) /01 (Enable) /02 (Enable (with reverse output))
AJ-42	PID4 deviation inverse	00 (Disable) /01 (Enable)
AJ-43	PID4 unit selection	refer to the separated list for unit
AJ-44	PID4 scale adjustment(at 0%)	−10000 to 10000
AJ-45	PID4 scale adjustment(at 100%)	
AJ-46	PID4 scale adjustment(point position)	0 to 4
AJ-47	Input source selection of Set-point for PID4	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))

Code No.	Parameter Meaning	Selectable User Setting
AJ-50	Set-point setting for PID4	0.00 to 100.00(%) Display range can be changed with [AJ-44], [AJ-45], [AJ-46]
AJ-52	Input source selection of Process data for PID4	00 (Not use) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option))
AJ-53	PID4 proportional gain	0.0 to 100.0
AJ-54	PID4 integral time constant	0.0 to 3600.0(s)
AJ-55	PID4 derivative gain	0.00 to 100.00(s)
AJ-56	PID4 output variable	0.00 to 100.00(%)
AJ-57	PID4 Deviation over level	0.00 to 100.00(%)
AJ-58	PID4 Feedback compare signal turn-off level	0.00 to 100.00(%)
AJ-59	PID4 Feedback compare signal turn-on level	0.00 to 100.00(%)

■Parameter mode (B code)

Code No.	Parameter Meaning	Selectable User Setting
bA101	Frequency limit selection, 1st-motor	00 (Disable) 01 (Setting by Terminal [Ai1]) 02 (Setting by Terminal [Ai2]) 03 (Setting by Terminal [Ai3]) 04 (Setting by Terminal [Ai4]) 05 (Setting by Terminal [Ai5]) 06 (Setting by Terminal [Ai6]) 07 (Setting by parameter) 08 (Setting by RS485) 09 (Option-1) 10 (Option-2) 11 (Option-3) 12 (Pulse train input(internal)) 13 (Pulse train input(Option))
bA102	Upper Frequency limit, 1st-motor	0.00 to 590.00(Hz)
bA103	Lower Frequency limit , 1st-motor	0.00 to 590.00(Hz)
bA110	Torque limit selection, 1st-motor	00 (Disable) /01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3)
bA111	Torque limit parameter mode selection, 1st-motor	00 (Quadrant-specific setting) /01 (Switching by terminal [TRQ])
bA112	Torque limit 1 (Forward driving), 1st-motor	0.0 to 500.0(%)
bA113	Torque limit 2 (Reverse regenerative), 1st-motor	0.0 to 500.0(%)
bA114	Torque limit 3 (Reverse driving), 1st-motor	0.0 to 500.0(%)
bA115	Torque limit 4 (Forward regenerative), 1st-motor	0.0 to 500.0(%)
bA116	Torque limit LADSTOP selection, 1st-motor	00 (Disable) / 01 (Enable)
bA120	Over current suppress enable, 1st-motor	00 (Disable) / 01 (Enable)
bA121	Over current suppress Level, 1st-motor	INV rated current ×(0.00 to 2.00)
bA122	Overload restriction 1 mode selection, 1st-motor	00 (Disable) /01 (Enable during accel. and constant speed) /02 (Enable during constant speed) /03 (Enable during accel. and constant speed (Accel. during regeneration))
bA123	Overload restriction 1 active level, 1st-motor	INV rated current ×(0.00 to 2.00)
bA124	Overload restriction 1 active level, 1st-motor	11 (Option-3)
bA126	Overload restriction 2 mode selection, 1st-motor	00 (Disable) /01 (Enable during accel. and constant speed) /02 (Enable during constant speed) /03 (Enable during accel. and constant speed (Accel. during regeneration))
bA127	Overload restriction 2 active level, 1st-motor	INV rated current ×(0.00 to 2.00)
bA128	Overload restriction 2 active level, 1st-motor	0.10 to 3600.00(s)
bA-30	Deceleration-stop at power failure	00 (Disable) /01 (Deceleration stop) /02 (Deceleration-stop at power failure (with resume)) /03 (Deceleration-stop at power failure (without resume)
bA-31	Decel.-stop at power failure starting voltage	(200V class) 0.0 to 410.0(Vdc)
bA-32	Decel-stop at power failure control target level	(400V class) 0.0 to 820.0(Vdc)
bA-34	Decel-stop at power failure control target level	0.01 to 3600.00(s)
bA-36	Decel-stop at power failure freq. width at deceleration start	0.00 to 10.00(Hz)
bA-37	Decel-stop at power failure DC-bus voltage constant control P-gain	0.00 to 5.00
bA-38	Decel-stop at power failure DC-bus voltage constant control I-gain	0.00 to 150.00(s)
bA140	Over-voltage suppression enable, 1st-motor	00:Disable /01:DC bus constant control (deceleration stop) /02:Enable acceleration /03:Enable acceleration (at constant speed and deceleration)
bA141	Over-voltage suppression active level, 1st-motor	(200V class) 330.0 to 400.0(Vdc) (400V class) 660.0 to 800.0(Vdc)
bA142	Over-voltage suppression active level, 1st-motor	0.00 to 3600.00(s)
bA144	DC bus constant control proportional gain, 1st-motor	0.00 to 5.00
bA145	DC bus constant control integral gain, 1st-motor	0.00 to 150.00(s)
bA146	Over magnetization function selection, 1st-motor	00 (Disable), 01 (Always enable) 02 (At deceleration only) 03 (Operation at setting level) 04 (Operation at setting level at deceleration only)
bA147	Over magnetization output filter time constant, 1st-motor	0.00 to 1.00(s)
bA148	Over magnetization voltage gain, 1st-motor	50 to 400(%)
bA149	Over magnetization level setting, 1st-motor	(200V class) 330.0 to 400.0(Vdc) (400V class) 660.0 to 800.0(Vdc)

Code No.	Parameter Meaning	Selectable User Setting
bA-60	Dynamic brake usage rate	0.0 to 10.0×[bA-63]/(minimum resistance)(%)
bA-61	Dynamic brake selection	00:Disable /01 (Enable (Disabling at stop)) /02 (Enable (Enabling at stop))
bA-62	Dynamic brake active level	(200V class) 330.0 to 400.0(V) (400V class) 660.0 to 800.0(V)
bA-63	Dynamic brake resister value	minimum resitance to 600(Ω)
bA-70	Cooling FAN control method selection	00 (Usualy active) /01 (Active during driving) /02 (Tempareture matter)
bA-71	Cooling fan accumulation running time monitor clearance selection	00 (Disable) /01 (Clear)
bA201	Frequency limit selection, 2nd motor	same as bA101
bA202	Upper frequency limit, 2nd motor	same as bA102
bA203	Lower frequency limit, 2nd motor	same as bA103
bA210	Torque limit selection, 2nd-motor	same as bA110
bA211	Torque limit parameter mode selection, 2nd-motor	same as bA111
bA212	Torque limit 1 (Forward driving), 2nd-motor	same as bA112
bA213	Torque limit 2 (Reverse regenerative), 2nd-motor	same as bA113
bA214	Torque limit 3 (Reverse driving), 2nd-motor	same as bA114
bA215	Torque limit 4 (Forward regenerative), 2nd motor	same as bA115
bA216	Torque limit LADSTOP selection, 2nd-motor	same as bA116
bA220	Over current suppress enable, 2nd-motor	same as bA120
bA221	Over current suppress Level, 2nd-motor	same as bA121
bA222	Overload restriction 1 mode selection, 2nd-motor	same as bA122
bA223	Overload restriction 1 active level, 2nd-motor	same as bA123
bA224	Overload restriction 1 active level, 2nd-motor	same as bA124
bA226	Overload restriction 2 mode selection, 2nd-motor	same as bA126
bA227	Overload restriction 2 active level, 2nd-motor	same as bA127
bA228	Overload restriction 2 active level, 2nd-motor	same as bA128
bA240	Over-voltage suppression enable, 2nd-motor	same as bA140
bA241	Over-voltage suppression active level, 2nd-motor	same as bA141
bA242	Over-voltage suppression active level, 2nd-motor	same as bA142
bA244	DC bus constant control proportional gain, 2nd-motor	same as bA144
bA245	DC bus constant control integral gain, 2nd-motor	same as bA145
bA246	Over magnetization function selection, 2nd-motor	same as bA146
bA247	Over magnetization output filter time constant, 2nd-motor	same as bA147
bA248	Over magnetization voltage gain, 2nd-motor	same as bA148
bA249	Over magnetization level setting, 2nd-motor	same as bA149
bb101	Carrier frequency setting, 1st-motor	[Ub-03]=02 : Normal Duty 0.5 to 16.0(kHz) [Ub-03]=01 : Light Duty 0.5 to 12.0(kHz) [Ub-03]=00 : Very Light Duty 0.5 to 10.0(kHz) P1-01760-H(P1-750H) to P1-03160-H(P1-1320H) are as follows [Ub-03]=02 : 0.5 to 10.0(kHz) [Ub-03]=00 or 01 : 0.5 to 8.0(kHz)
bb102	Sprinkle carrier pattern selection, 1st-motor	00 (Disable) /01 (Enable Pattern-1) /02 (Enable Pattern-2) /03 (Enable Pattern-3)
bb103	Automatic-carrier reduction selection, 1st-motor	00 (Disable) /01 (Enable(Current)) /02 (Enable(Temperature))
bb-10	Automatic error reset selection	00 (Disable) /01 (Effective by Run command is turn-off) /02 (effective after set time) /03 (Emergency force drive)
bb-11	Alarm signal selection at Automatic error reset is active	00 (Output) /01 (No output)
bb-12	Automatic error reset wait time	0 to 600(s)
bb-13	Automatic error reset number	0 to 10(times)
bb-20	The number of retries after instantaneous power failure	0 to 16,255
bb-21	The number of retries after under voltage	0 to 16,255
bb-22	The number of retries after over current	0 to 5
bb-23	The number of retries after over voltage	0 to 5
bb-24	Selection of restart mode at Instantaneous power failure/ under-voltage trip	00 (Start with 0Hz) 01 (Start with frequency matching) 02 (Start with Active frequency matching) 03 (Detect speed) 04 (Trip after Deceleration stop)
bb-25	Allowable under-voltage power failure time	0.3 to 25.0(s)
bb-26	Retry wait time before motor restart	0.3 to 100.0(s)
bb-27	Instantaneous power failure/under-voltage trip alarm enable	00 (Disable) /01 (Enable) /02 (Disable at during stop & during deceleration stop)
bb-28	Selection of restart mode at over-current	00 (Start with 0Hz) 01 (Start with frequency matching) 02 (Start with Active frequency matching) 03 (Detect speed) 04 (Trip after Deceleration stop)
bb-29	Wait time of restart at over-current	0.3 to 100.0(s)

Code No.	Parameter Meaning	Selectable User Setting
bb-30	Selection of restart mode at over-voltage	00 (Start with 0Hz) 01 (Start with frequency matching) 02 (Start with Active frequency matching) 03 (Detect speed) 04 (Trip after Deceleration stop)
bb-31	Wait time of restart at over-voltage	0.3 to 100.0(s)
bb-40	Restart mode after FRS release	00 (Start with 0Hz) /01 (Start with frequency matching) /02 (Start with Active frequency matching) /03 (Detect speed)
bb-41	Restart mode after RS release	
bb-42	Restart frequency threshold	0.00 to 590.00(Hz)
bb-43	Restart level of Active frequency matching	INV rated current×(0.20 to 2.00)
bb-44	Restart constant(speed) of Active Frequency matching	0.10 to 30.00(s)
bb-45	Restart constant(Voltage) of Active Frequency matching	
bb-46	OC-supress level of Active frequency matching	INV rated current×(0.20 to 2.00)
bb-47	Restart speed selection of Active frequency matching	00 (Output frequency at shut down) /01 (Maximum frequency) /02 (Setting frequency)
bb160	Over current detection level, 1st-motor	INV rated current×(0.20 to 2.20)
bb-61	Power supply over voltage selection	00 (warning) /01 (error)
bb-62	Power supply over voltage level setting	(200V class) 300.0 to 410.0(V) (400V class) 600.0 to 820.0(V)
bb-64	Ground fault selection	
bb-65	Input phase loss enable	00 (Disable) /01 (Enable)
bb-66	Output phase loss enable	
bb-67	Output phase loss detection sensitivity	1 to 100(%)
bb-70	Thermistor error level	0 to 10000(Ω)
bb-80	Over speed detection level	0.0 to 150.0(%)
bb-81	Over speed detection time	0.0 to 5.0(s)
bb-82	Speed deviation error mode selection	00 (warning) /01 (error)
bb-83	Speed deviation error detection level	0.0 to 100.0(%)
bb-84	Speed deviation error detection time	0.0 to 5.0(s)
bb-85	Position deviation error mode selection	00 (warning) /01 (error)
bb-86	Position deviation error detection level	0 to 65535(×100pulse)
bb-87	Position deviation error detection time	0.0 to 5.0(s)
bb201	Carrier frequency setting, 2nd-motor	same as bb101
bb202	Sprinkle carrier pattern selection, 2nd-motor	same as bb102
bb203	Automatic-carrier reduction selection, 2nd-motor	same as bb103
bb260	Over current detection level, 2nd-motor	same as bb160
bC110	Electronic thermal level setting, 1st-motor	INV rated current×(0.20 to 3.00)
bC111	Electronic thermal characteristic selection, 1st-motor	00 (Reduced torque characteristic(VT)) /01 (Constant torque characteristic(CT)) /02 (Free setting(FREE))
bC112	Electronic thermal Subtraction function enable, 1st-motor	00 (Disable) /01 (Enable)
bC113	Electronic thermal Subtraction time, 1st-motor	1 to 1000(s)
bC-14	Electronic thermal counter memory selection at Power-off	00 (Disable) /01 (Enable)
bC120	Free electronic thermal frequency-3, 1st-motor	0.00 to bC122(Hz)
bC121	Free electronic thermal current-1, 1st-motor	INV rated current×(0.20 to 3.00)
bC122	Free electronic thermal frequency-2, 1st-motor	bC120 to bC124(Hz)
bC123	Free electronic thermal current-2, 1st-motor	INV rated current×(0.20 to 3.00)
bC124	Free electronic thermal frequency-3, 1st-motor	bC122 to 590.00(Hz)
bC125	Free electronic thermal current-3, 1st-motor	INV rated current×(0.20 to 3.00)
bC210	Electronic thermal level setting, 2nd-motor	same as bC110
bC211	Electronic thermal characteristic selection, 2nd-motor	same as bC111
bC212	Electronic thermal Subtraction function enable, 2nd-motor	same as bC112
bC213	Electronic thermal Subtraction time, 2nd-motor	same as bC113
bC220	Free electronic thermal frequency-1, 2nd-motor	0.00 to bC222
bC221	Free electronic thermal current-1, 2nd-motor	same as bC121
bC222	Free electronic thermal frequency-2, 2nd-motor	bC220 to bC224
bC223	Free electronic thermal current-2, 2nd-motor	same as bC123
bC224	Free electronic thermal frequency-3, 2nd-motor	bC222 to 590.00(Hz)
bC225	Free electronic thermal current-3, 2nd-motor	same as bC125
bd-01	STO input display selection	00 (Warning(with display)) /01 (Warning(without display)) /02 (Trip)
bd-02	STO input change time	0.00 to 60.00(s)
bd-03	Display selection at STO input change time	00 (Warning(with display)) /01 (Warning(without display))
bd-04	Action selection after STO input change time	00 (only condition is hold) /01 (Disable) /02 (TRIP)

■Parameter mode (C code)

Code No.	Parameter Meaning	Selectable User Setting
CA-01 to 11	Input terminal [1] to [9],[A],[B] function	refer to "input terminal functions list"
CA-21 to 31	Input terminal [1] to [9],[A],[B] active state	00 (Normal open)/ 01 (Normal close)
CA-41 to 51	Input terminal [1] to [9],[A],[B] response time	0 to 400(ms)
CA-55	Multistage input determination time	0 to 2000(ms)
CA-60	FUP/FDN overwrite target selection	00 (Speed Reference)/01 (PID1 Setpoint)
CA-61	FUP/FDN data save enable	00 (Not save)/01 (Save)
CA-62	FUP/FDN UDC selection	00 (0Hz)/ 01 (save data)
CA-64	Acceleration time setting for FUP/FDN function	0.00 to 3600.00(s)
CA-66	Deceleration time setting for FUP/FDN function	
CA-70	Speed command selection when [F-OP] active	01 (Setting by Terminal [Ai1]) /02 (Setting by Terminal [Ai2]) /03 (Setting by Terminal [Ai3]) /04 (Setting by Terminal [Ai4]) /05 (Setting by Terminal [Ai5]) /06 (Setting by Terminal [Ai6]) /07 (Setting by parameter) /08 (Setting by RS485) /09 (Option-1) /10 (Option-2) /11 (Option-3) /12 (Pulse train input(internal)) /13 (Pulse train input(Option)) /14 (Setting by EzSQ) /15 (PID function) /16 (Volume on keypad)
CA-71	RUN command source selection at [F-OP] is active	00 (Terminal [FW]/[RV]) /01 (3-wire) /02 (RUN key on keypad) /03 (Setting by RS485) /04 (Option-1) /05 (Option-2) /06 (Option-3)
CA-72	Reset mode selection	00 (Trip release at turn-on) /01 (Trip release at turn-off) /02 (Effective only in trip ON condition) /03 (Effective only in trip OFF condition)
CA-81	Encoder constant setting	32 to 65535(Pls)
CA-82	Encoder position selection	00 (Phase-A Lead) /01 (Phase-B Lead)
CA-83	Motor gear ratio Numerator	1 to 10000
CA-84	Motor gear ratio Denominator	1 to 10000
CA-90	Pulse train detection object selection	00 (Disable) /01 (reference) /02 (Speed feedback) /03 (Pulse count)
CA-91	Mode selection of pulse train input	00 (90°shift pulse train) /01 (Forward/ Reverse pulse train and direction signal) /02 (Forward pulse train and Reverse pulse train)
CA-92	Pulse train frequency Scale	0.05 to 32.0(kHz)
CA-93	Pulse train frequency Filter time constant	0.01 to 2.00(s)
CA-94	Pulse train frequency Bias value	−100.0 to 100.0(%)
CA-95	Pulse train frequency High Limit	0.0 to 100.0(%)
CA-96	Pulse train frequency detection low level	
CA-97	Comparing match output ON-level for Pulse count	0 to 65535
CA-98	Comparing match output OFF-level for Pulse count	
CA-99	Comparing match output Maximum value for Pulse count	
Cb-01	Filter time constant of Terminal [Ai1]	1 to 500(ms)
Cb-03	Start value of Terminal [Ai1]	0.00 to 100.00(%)
Cb-04	End value of Terminal [Ai1]	
Cb-05	Start rate of Terminal [Ai1]	0.0 to [Cb-06](%)
Cb-06	End rate of Terminal [Ai1]	[Cb-05] to 100.0(%)
Cb-07	Start point selection of Terminal [Ai1]	00 (Start value) /01 (0%)
Cb-11	Filter time constant of Terminal [Ai2]	1 to 500(ms)
Cb-13	Start value of Terminal [Ai2]	0.00 to 100.00(%)
Cb-14	End value of Terminal [Ai2]	
Cb-15	Start rate of Terminal [Ai2]	0.0 to [Cb-16](%)
Cb-16	End rate of Terminal [Ai2]	[Cb-15] to 100.0(%)
Cb-17	Start point selection of Terminal [Ai2]	00 (Start value) /01 (0%)
Cb-21	Filter time constant of Terminal [Ai3]	1 to 500(ms)
Cb-22	Terminal [Ai3] selection	00 (single) /01 (added to Ai1/Ai2 : forward and reverse) /02 (added to Ai1/Ai2 : forward only)
Cb-23	Start value of Terminal [Ai3]	−100.0 to 100.00(%)
Cb-24	End value of Terminal [Ai3]	
Cb-25	Start rate of Terminal [Ai3]	−100.0 to [Cb-26]
Cb-26	End rate of Terminal [Ai3]	[Cb-25] to 100.0
Cb-30	[Ai1] Voltage/Current zero-bias adjustment	−100.00 to 100.00(%)
Cb-31	[Ai1] Voltage/Current gain adjustment	0.00 to 200.00(%)
Cb-32	[Ai2] Voltage/Current zero-bias adjustment	−100.00 to 100.00(%)
Cb-33	[Ai2] Voltage/Current gain adjustment	0.00 to 200.00(%)
Cb-34	[Ai3] Voltage -10V-bias adjustment	−100.00 to 100.00(%)
Cb-35	[Ai3] Voltage gain adjustment	0.00 to 200.00(%)
Cb-40	Thermistor type selection	00 (Disable) /01 (PTC) /02 (NTC)
Cb-41	Thermistor gain adjustment	0.0 to 1000.0
Cb-51	Filter time constant of Volume on QOP	1 to 500(ms)
Cb-53	Start value of Volume on QOP	0.00 to 100.00(%)
Cb-54	End value of Volume on QOP	
Cb-55	Start rate of Volume on QOP	0.0 to [Cb-56](%)
Cb-56	End rate of Volume on QOP	[Cb-55] to 100.0(%)
Cb-57	Start point selection of Volume on QOP	00 ([Cb-53]) /01 (0%)
CC-01 to 05	Output terminal [11] to [15] function	refer to "output terminal functions list"
CC-06	Relay output terminal [16] function	
CC-07	Relay output terminal [AL] function	
CC-11 to 16	Output terminal [11] to [16] active state	00 (Normal open) /01 (Normal close)
CC-17	Relay output terminal [AL] active state	

Code No.	Parameter Meaning	Selectable User Setting
CC-20	Output terminal [11] on-delay time	
CC-21	Output terminal [11] off-delay time	
CC-22	Output terminal [12] on-delay time	
CC-23	Output terminal [12] off-delay time	
CC-24	Output terminal [13] on-delay time	
CC-25	Output terminal [13] off-delay time	
CC-26	Output terminal [14] on-delay time	0.00 to 100.00(s)
CC-27	Output terminal [14] off-delay time	
CC-28	Output terminal [15] on-delay time	
CC-29	Output terminal [15] off-delay time	
CC-30	Output relay [16] on-delay time	
CC-31	Relay output terminal [16] off-delay time	
CC-32	Relay output terminal [AL] on-delay time	
CC-33	Relay output terminal [AL] off-delay time	
CC-40	Logical calculation target 1 selection of LOG1	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-41	Logical calculation target 2 selection of LOG1	
CC-42	Logical calculation symbol selection of LOG1	00 (AND) /01 (OR) /02 (XOR)
CC-43	Logical calculation target 1 selection of LOG2	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-44	Logical calculation target 2 selection of LOG2	
CC-45	Logical calculation symbol selection of LOG2	00 (AND) /01 (OR) /02 (XOR)
CC-46	Logical calculation target 1 selection of LOG3	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-47	Logical calculation target 2 selection of LOG3	
CC-48	Logical calculation symbol selection of LOG3	00 (AND) /01 (OR) /02 (XOR)
CC-49	Logical calculation target 1 selection of LOG4	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-50	Logical calculation target 2 selection of LOG4	
CC-51	Logical calculation symbol selection of LOG4	00 (AND) /01 (OR) /02 (XOR)
CC-52	Logical calculation target 1 selection of LOG5	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-53	Logical calculation target 2 selection of LOG5	
CC-54	Logical calculation symbol selection of LOG5	00 (AND) /01 (OR) /02 (XOR)
CC-55	Logical calculation target 1 selection of LOG6	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-56	Logical calculation target 2 selection of LOG6	
CC-57	Logical calculation symbol selection of LOG6	00 (AND) /01 (OR) /02 (XOR)
CC-58	Logical calculation target 1 selection of LOG7	< output terminal functions list > 062 : LOG1 to 068 : LOG7 cannot be selected
CC-59	Logical calculation target 2 selection of LOG7	
CC-60	Logical calculation symbol selection of LOG7	00 (AND) /01 (OR) /02 (XOR)
Cd-01	[FM] monitor output wave form selection	00 (PWM output (Duty)) /01 (Frequency output)
Cd-02	[FM] monitor output base frequency (at PWM output)	0 to 3600(Hz)
Cd-03	[FM] monitor output selection	
Cd-04	[Ao1] monitor output selection	Monitor code to be selected.
Cd-05	[Ao2] monitor output selection	
Cd-10	Analog monitor adjust mode enable	00 (Disable) /01 (Enable)
Cd-11	Filter time constant of [FM]monitor	1 to 500(ms)
Cd-12	[FM] Data type selection	00 (Absolute data) /01 (Signed data)
Cd-13	[FM] monitor bias adjustment	−100.0 to 100.0(%)
Cd-14	[FM] monitor gain adjustment	−1000.0 to 1000.0(%)
Cd-15	Output level setting at [FM] monitor adjust mode	−100.0 to 100.0(%)
Cd-21	Filter time constant of [Ao1] monitor	1 to 500(ms)
Cd-22	[Ao1] Data type selection	00 (Absolute data) /01 (Signed data)
Cd-23	[Ao1] monitor bias adjustment	−100.0 to 100.0(%)
Cd-24	[Ao1] monitor gain adjustment	−1000.0 to 1000.0(%)
Cd-25	Output level setting at [Ao1] monitor adjust mode	−100.0 to 100.0(%)
Cd-31	Filter time constant of [Ao2] monitor	1 to 500(ms)
Cd-32	[Ao2] Data type selection	00 (Absolute data) /01 (Signed data)
Cd-33	[Ao2] monitor bias adjustment	−100.0 to 100.0(%)
Cd-34	[Ao2] monitor gain adjustment	−1000.0 to 1000.0(%)
Cd-35	Output level setting at [Ao2] monitor adjust mode	−100.0 to 100.0(%)
CE101	Low current signal output mode selection, 1st motor	00 (During Accel./Decel. and constant speed) /01 (During constant speed only)
CE102	Low current detection level 1, 1st motor	INV rated current ×(0.00 to 2.00)
CE103	Low current detection level 2, 1st motor	
CE105	Over load signal output mode selection, 1st motor	00 (During Accel./Decel. and constant speed) /01 (During constant speed only)

Code No.	Parameter Meaning	Selectable User Setting
CE106	Over load detection level 1, 1st motor	INV rated current ×(0.00 to 2.00)
CE107	Over load detection level 2, 1st motor	
CE-10	Arrival frequency setting during acceleration 1	
CE-11	Arrival frequency setting during deceleration 1	0.00 to 590.00(Hz)
CE-12	Arrival frequency setting during acceleration 2	
CE-13	Arrival frequency setting during deceleration 2	
CE120	Over torque level (Forward driving), 1st motor	
CE121	Over torque level (Reverse regenerative), 1st motor	0.0 to 500.0(%)
CE122	Over torque level (Reverse driving), 1st motor	
CE123	Over torque level (Forward regenerative), 1st motor	
CE-30	Electronic thermal warning level (MTR)	0.00 to 100.00(%)
CE-31	Electronic thermal warning level (CTL)	
CE-33	Zero speed detection level	0.00 to 100.00(Hz)
CE-34	Cooling FAN over-heat warnning level	0 to 200(°C)
CE-36	Accum.RUN(RNT)/Accum.Power-on(ONT) time setting	0 to 100000(hour)
CE-40	Window compareter for [Ai1] higher level	0 to 100(%)
CE-41	Window compareter for [Ai1] lower level	
CE-42	Window compareter for [Ai1] hysterisis width	0 to 10(%)
CE-43	Window compareter for [Ai2] higher level	0 to 100(%)
CE-44	Window compareter for [Ai2] lower level	
CE-45	Window compareter for [Ai2] hysterisis width	0 to 10(%)
CE-46	Window compareter for [Ai3] higher level	−100 to 100(%)
CE-47	Window compareter for [Ai3] lower level	
CE-48	Window compareter for [Ai3] hysterisis width	0 to 10(%)
CE-50	Operation level at [Ai1] disconnection	0 to 100(%)
CE-51	Operation level selection at [Ai1] disconnection	00 (Disable) /01 (Enable(at WC* active) /02 (Enable(at WC* de-active)
CE-52	Operation level at [Ai2] disconnection	0 to 100(%)
CE-53	Operation level selection at [Ai2] disconnection	00 (Disable) /01 (Enable(at WC* active) /02 (Enable(at WC* de-active)
CE-54	Operation level at [Ai3] disconnection	−100 to 100(%)
CE-55	Operation level selection at [Ai3] disconnection	00 (Disable) /01 (Enable(at WC* active) /02 (Enable(at WC* de-active)
CE201	Low current signal output mode selection, 2nd-motor	Same as CE101
CE202	Low current detection level 1, 2nd-motor	Same as CE102
CE203	Low current detection level 2, 2nd-motor	Same as CE103
CE205	Over load signal output mode selection, 2nd-motor	Same as CE105
CE206	Over load detection level 1, 2nd-motor	Same as CE106
CE207	Over load detection level 2, 2nd-motor	Same as CE107
CE220	Over torque level (Forward driving), 2nd-motor	Same as CE120
CE221	Over torque level (Reverse regenerative), 2nd-motor	Same as CE121
CE222	Over torque level (Reverse driving), 2nd-motor	Same as CE122
CE223	Over torque level (Forward regenerative), 2nd motor	Same as CE123
CF-01	RS485 communication baud rate selection	03 (2400bps) /04 (4800bps) /05 (9600bps) /06 (19.2kbps) /07 (38.4kbps) /08 (57.6kbps) /09 (76.8kbps) /10 (115.2kbps)
CF-02	RS485 communication Node allocation	1 to 247
CF-03	RS485 communication parity selection	00 (No parity) /01 (Even parity) /02 (Odd parity)
CF-04	RS485 communication stop-bit selection	01 (1bit) /02 (2bit)
CF-05	RS485 communication error selection	00 (Error) /01 (Error output after Deceleration stop) /02 (Ignore) /03 (Free run stop) /04 (Deceralation stop)
CF-06	RS485 communication timeout setting	0.00 to 100.00(s)
CF-07	RS485 communication wait time setting	0 to 1000(ms)
CF-08	RS485 communication mode selection	01 (Modbus-RTU) /02 (Communication between inverters (EzCOM)) /03 (Communication between inverters (EzCOM Administrator))
CF-11	RS485 registor data selection	00 (A,V) /01(%)
CF-20	EzCOM Start node No.	01 to 08
CF-21	EzCOM End node No.	01 to 08
CF-22	EzCOM Start method selection	00 (Terminal [ECOM]) /01 (Always comm.)
CF-23	EzCOM data size	01 to 05

Code No.	Parameter Meaning	Selectable User Setting
CF-24	EzCOM destination address 1	1 to 247
CF-25	EzCOM destination resister 1	0000 to FFFF
CF-26	EzCOM source resister 1	
CF-27	EzCOM destination address 2	1 to 247
CF-28	EzCOM destination resister 2	0000 to FFFF
CF-29	EzCOM source resister 2	
CF-30	EzCOM destination address 3	1 to 247
CF-31	EzCOM destination resister 3	0000 to FFFF
CF-32	EzCOM source resister 3	
CF-33	EzCOM destination address 4	1 to 247
CF-34	EzCOM destination resister 4	0000 to FFFF
CF-35	EzCOM source resister 4	
CF-36	EzCOM destination address 5	1 to 247
CF-37	EzCOM destination resister 5	0000 to FFFF
CF-38	EzCOM source resister 5	
CF-50	USB communication Node allocation	1 to 247

■Parameter mode (H code)

Code No.	Parameter Meaning	Selectable User Setting
HA-01	Auto-tuning selection	00 (Disable) /01 (Not rotation) /02 (Rotation) /03 (IVMS)
HA-02	RUN command selaction at Auto-tuning	00 (Force "RUN" key) /01 (Setting by AA111/AA211)
HA-03	Online auto-tuning selection	00 (Disable) /01 (Enable)
HA110	Stabilization constant, 1st-motor	0 to 1000(%)
HA115	Speed response, 1st-motor	
HA120	ASR gain switching mode selection, 1st-motor	00 (Switching by Terminal [CAS]) /01 (Switching by parameter)
HA121	ASR gain switching time setting, 1st-motor	0 to 10000(ms)
HA122	ASR gain mapping intermidiate speed 1, 1st-motor	0.00 to 590.00(Hz)
HA123	ASR gain mapping intermidiate speed 2, 1st-motor	
HA124	ASR gain mapping Maximum speed, 1st-motor	
HA125	ASR gain mapping P-gain 1, 1st-motor	0.0 to 1000.0(%)
HA126	ASR gain mapping I-gain 1, 1st-motor	
HA127	ASR gain mapping P-gain 1 at P-control, 1st-motor	0.00 to 10.00
HA128	ASR gain mapping P-gain 2, 1st-motor	0.0 to 1000.0(%)
HA129	ASR gain mapping I-gain 2, 1st-motor	
HA130	ASR gain mapping P-gain 2 at P-control, 1st-motor	0.00 to 10.00
HA131	ASR gain mapping P-gain 3, 1st-motor	0.0 to 1000.0(%)
HA132	ASR gain mapping I-gain 3, 1st-motor	
HA133	ASR gain mapping P-gain 4, 1st-motor	
HA134	ASR gain mapping I-gain 4, 1st-motor	
HA210	Stabilization constant, 2nd-motor	same as HA110
HA215	Speed response, 2nd-motor	same as HA115
HA220	ASR gain switching mode selection, 2nd-motor	same as HA120
HA221	ASR gain switching time setting, 2nd-motor	same as HA121
HA222	ASR gain mapping intermidiate speed 1, 2nd-motor	same as HA122
HA223	ASR gain mapping intermidiate speed 2, 2nd-motor	same as HA123
HA224	ASR gain mapping Maximum speed, 2nd-motor	same as HA124
HA225	ASR gain mapping P-gain 1, 2nd-motor	same as HA125
HA226	ASR gain mapping I-gain 1, 2nd-motor	same as HA126
HA227	ASR gain mapping P-gain 1 at P-control, 2nd-motor	same as HA127
HA228	ASR gain mapping P-gain 2, 2nd-motor	same as HA128
HA229	ASR gain mapping I-gain 2, 2nd-motor	same as HA129
HA230	ASR gain mapping P-gain 2 at P-control, 2nd-motor	same as HA130
HA231	ASR gain mapping P-gain 3, 2nd-motor	same as HA131
HA232	ASR gain mapping I-gain 3, 2nd-motor	same as HA132
HA233	ASR gain mapping P-gain 4, 2nd-motor	same as HA133
HA234	ASR gain mapping I-gain 4, 2nd-motor	same as HA134
Hb102	Async.Motor capacity setting, 1st-motor	0.01 to 630.00(kW)
Hb103	Async.Motor poles setting, 1st-motor	2 to 48(Pole)
Hb104	Async.Motor Base frequency setting, 1st-motor	10.00 to 590.00(Hz)
Hb105	Async.Motor Maximum frequency setting, 1st-motor	10.00 to 590.00(Hz)

Code No.	Parameter Meaning	Selectable User Setting
Hb106	Async.Motor rated voltage, 1st-motor	1 to 1000(V)
Hb108	Async.Motor rated current, 1st-motor	0.01 to 10000.00(A)
Hb110	Async.Motor constant R1, 1st-motor	0.000001 to 1000.000000(Ω)
Hb112	Async.Motor constant R2, 1st-motor	0.000001 to 1000.000000(Ω)
Hb114	Async.Motor constant L, 1st-motor	0.000001 to 1000.000000(mH)
Hb116	Async.Motor constant Io, 1st-motor	0.01 to 1000.00(A)
Hb118	Async.Motor constant J, 1st-motor	0.00001 to 10000.00000(kgm^2)
Hb130	Minimum frequency adjustment, 1st-motor	0.00 to 10.00(Hz)
Hb131	Reduced voltage start time setting, 1st-motor	0 to 2000(ms)
Hb140	Manual torque boost operational mode selection, 1st-motor	00 (Disabled) /01 (Enabled) /02 (Only forward) /03 (Only reverse)
Hb141	Manual torque boost value, 1st-motor	0.0 to 20.0(%)
Hb142	Manual torque boost Peak speed, 1st-motor	0.0 to 50.0(%)
Hb145	Eco drive enable, 1st-motor	00 (Disable) /01 (Enable)
Hb146	Eco drive response adjustment, 1st-motor	0 to 100(%)
Hb150	Free-V/f frequency 1 setting, 1st-motor	0.00 to [Hb152](Hz)
Hb151	Free-V/f Voltage 1 setting, 1st-motor	0.0 to 1000.0(V)
Hb152	Free-V/f frequency 2 setting, 1st-motor	[Hb150] to [Hb154](Hz)
Hb153	Free-V/f Voltage 2 setting, 1st-motor	0.0 to 1000.0(V)
Hb154	Free-V/f frequency 3 setting, 1st-motor	[Hb152] to [Hb156](Hz)
Hb155	Free-V/f Voltage 3 setting, 1st-motor	0.0 to 1000.0(V)
Hb156	Free-V/f frequency 4 setting, 1st-motor	[Hb154] to [Hb158](Hz)
Hb157	Free-V/f Voltage 4 setting, 1st-motor	0.0 to 1000.0(V)
Hb158	Free-V/f frequency 5 setting, 1st-motor	[Hb156] to [Hb160](Hz)
Hb159	Free-V/f Voltage 5 setting, 1st-motor	0.0 to 1000.0(V)
Hb160	Free-V/f frequency 6 setting, 1st-motor	[Hb158] to [Hb162](Hz)
Hb161	Free-V/f Voltage 6 setting, 1st-motor	0.0 to 1000.0(V)
Hb162	Free-V/f frequency 7 setting, 1st-motor	[Hb160] to [Hb105](Hz)
Hb163	Free-V/f Voltage 7 setting, 1st-motor	0.0 to 1000.0(V)
Hb170	Slip Compensation P-gain witn encoder, 1st-motor	0 to 1000(%)
Hb171	Slip Compensation I-gain witn encoder, 1st-motor	0 to 1000(%)
Hb180	Output voltage gain, 1st-motor	0 to 255(%)
Hb202	Async.Motor capacity setting, 2nd-motor	Same as Hb102
Hb203	Async.Motor poles setting, 2nd-motor	Same as Hb103
Hb204	Async.Motor Base frequency setting, 2nd-motor	Same as Hb104
Hb205	Async.Motor Maximum frequency setting, 2nd-motor	Same as Hb105
Hb206	Async.Motor rated voltage, 2nd-motor	Same as Hb106
Hb208	Async.Motor rated current, 2nd-motor	Same as Hb108
Hb210	Async.Motor constant R1, 2nd-motor	Same as Hb110
Hb212	Async.Motor constant R2, 2nd-motor	Same as Hb112
Hb214	Async.Motor constant L, 2nd-motor	Same as Hb114
Hb216	Async.Motor constant Io, 2nd-motor	Same as Hb116
Hb218	Async.Motor constant J, 2nd-motor	Same as Hb118
Hb230	Minimum frequency ajustment, 2nd-motor	Same as Hb130
Hb231	Reduced voltage start time setting, 2nd-motor	Same as Hb131
Hb240	Manual torque boost operational mode selection, 2nd-motor	Same as Hb140
Hb241	Manual torque boost value, 2nd-motor	Same as Hb141
Hb242	Manual torque boost Peak speed, 2nd-motor	Same as Hb142
Hb245	Eco drive enable, 2nd-motor	Same as Hb145
Hb246	Eco drive response adjustment, 2nd-motor	Same as Hb146
Hb250	Free-V/f frequency 1 setting, 2nd-motor	Same as Hb150
Hb251	Free-V/f Voltage 1 setting, 2nd-motor	Same as Hb151
Hb252	Free-V/f frequency 2 setting, 2nd-motor	Same as Hb152
Hb253	Free-V/f Voltage 2 setting, 2nd-motor	Same as Hb153
Hb254	Free-V/f frequency 3 setting, 2nd-motor	Same as Hb154
Hb255	Free-V/f Voltage 3 setting, 2nd-motor	Same as Hb155
Hb256	Free-V/f frequency 4 setting, 2nd-motor	Same as Hb156
Hb257	Free-V/f Voltage 4 setting, 2nd-motor	Same as Hb157
Hb258	Free-V/f frequency 5 setting, 2nd-motor	Same as Hb158
Hb259	Free-V/f Voltage 5 setting, 2nd-motor	Same as Hb159
Hb260	Free-V/f frequency 6 setting, 2nd-motor	Same as Hb160

Code No.	Parameter Meaning	Selectable User Setting
Hb261	Free-V/f Voltage 6 setting, 2nd-motor	Same as Hb161
Hb262	Free-V/f frequency 7 setting, 2nd-motor	Same as Hb162
Hb263	Free-V/f Voltage 7 setting, 2nd-motor	Same as Hb163
Hb270	Slip Compensation P-gain witn encoder, 2nd-motor	Same as Hb170
Hb271	Slip Compensation I-gain witn encoder, 2nd-motor	Same as Hb171
Hb280	Output voltage gain, 2nd-motor	Same as Hb180
HC101	Automatic torque boost voltage compensation gain, 1st-motor	0 to 255(%)
HC102	Automatic torque boost slip compensation gain, 1st-motor	0 to 255(%)
HC110	Zero speed area limit, 1st-motor	0 to 100(%)
HC111	Boost value at start, 1st-motor (IM-SLV,IM-CLV)	0 to 50(%)
HC112	Boost value at start, 1st-motor (IM-0Hz-SLV)	0 to 50(%)
HC113	Secondary resistance correction, 1st-motor	00 (Disable) /01 (Enable)
HC114	Reverse direcion run protection selection, 1st-motor	00 (Disable) /01 (Enable)
HC120	Torque current reference filter time constant, 1st-motor	0 to 100(ms)
HC121	Speed feedforward compensation gain, 1st-motor	0 to 1000(%)
HC201	Automatic torque boost voltage compensation gain, 2nd-motor	same as HC101
HC202	Automatic torque boost slip compensation gain, 2nd-motor	same as HC102
HC210	Zero speed area limit, 2nd-motor	same as HC110
HC211	Boost value at start, 2nd-motor (IM-SLV,IM-CLV)	same as HC111
HC212	Boost value at start, 2nd-motor (IM-0Hz-SLV)	same as HC112
HC213	Secondary resistance correction, 2nd-motor	same as HC113
HC214	Counter direcion run protection selection, 2nd-motor	same as HC114
HC220	Torque current reference filter time constant, 2nd-motor	same as HC120
HC221	Speed feedforward compensation gain, 2nd-motor	same as HC121
Hd102	Sync.Motor capacity setting, 1st-motor	0.01 to 630.00(kW)
Hd103	Sync.Motor Poles setting, 1st-motor	2 to 48(Pole)
Hd104	Sync.Base frequency setting, 1st-motor	10.00 to 590.00(Hz)
Hd105	Sync.Maximum frequency setting, 1st-motor	
Hd106	Sync.Motor rated voltage, 1st-motor	1 to 1000(V)
Hd108	Sync.Motor rated current, 1st-motor	0.01 to 10000.00(A)
Hd110	Sync.Motor constant R, 1st-motor	0.000001 to 1000.000000(Ω)
Hd112	Sync.Motor constant Ld, 1st-motor	0.000001 to 1000.000000(mH)
Hd114	Sync.Motor constant Lq, 1st-motor	
Hd116	Sync.Motor constant Ke, 1st-motor	0.1 to 100000.0(mVs/rad)
Hd118	Sync.Motor constant J, 1st-motor	0.00001 to 10000.00000(kgm²)
Hd130	Minimum Frequency for Sync.M, 1st-motor	0 to 50(%)
Hd131	No-Load current for Sync.M, 1st-motor	0 to 100(%)
Hd132	Starting Method for Sync.M, 1st-motor	00 (Synchronous) /01 (Initial position estimate)
Hd133	IMPE 0V wait number for Sync.M, 1st-motor	0 to 255
Hd134	IMPE detect wait number for Sync.M, 1st-motor	
Hd135	IMPE detect number for Sync.M, 1st-motor	
Hd136	IMPE voltage gain for Sync.M, 1st-motor	0 to 200(%)
Hd137	IMPE Mg-pole position offset, 1st-motor	0 to 359(°)
Hd-41	Carrier frequency at IVMS	0.5 to 16.0(kHz)
Hd-42	Filter gain of current detection at IVMS	0 to 1000
Hd-43	Open phase voltage detection gain	00, 01, 02, 03
Hd-44	Open phase switching threshold compensation	00 (Disable) /01 (Enable)
Hd-45	P-Gain for speed control, SM(PMM)-IVMS	0 to 1000
Hd-46	I-Gain for speed control, SM(PMM)-IVMS	0 to 10000
Hd-47	Wait time for open phase switching, SM(PMM)-IVMS	0 to 1000
Hd-48	Limitation of decision about the drive direction, SM(PMM)-IVMS	00 (Disable) /01 (Enable)
Hd-49	Open phase voltage detection timing adjustment, SM(PMM)-IVMS	0 to 1000
Hd-50	Minimum pulse width adjustment, SM(PMM)-IVMS	
Hd-51	IVMS threshold current limit	0 to 255
Hd-52	IVMS threshold gain	
Hd202	Sync.Motor capacity setting, 2nd-motor	same as Hd102

Code No.	Parameter Meaning	Selectable User Setting
Hd203	Sync.Motor poles setting, 2nd-motor	same as Hd103
Hd204	Sync.Base frequency setting, 2nd-motor	same as Hd104
Hd205	Sync.Maximum frequency setting, 2nd-motor	same as Hd105
Hd206	Sync.Motor rated voltage, 2nd-motor	same as Hd106
Hd208	Sync.Motor rated current, 2nd-motor	same as Hd108
Hd210	Sync.Motor constant R, 2nd-motor	same as Hd110
Hd212	Sync.Motor constant Ld, 2nd-motor	same as Hd112
Hd214	Sync.Motor constant Lq, 2nd-motor	same as Hd114
Hd216	Sync.Motor constant Ke, 2nd-motor	same as Hd116
Hd218	Sync.Motor constant J, 2nd-motor	same as Hd118
Hd230	Minimum Frequency for Sync.M, 2nd-motor	same as Hd130
Hd231	No-Load current for Sync.M, 2nd-motor	same as Hd131
Hd232	Starting Method for Sync.M, 2nd-motor	same as Hd132
Hd233	IMPE 0V wait number for Sync.M, 2nd-motor	same as Hd133
Hd234	IMPE detect wait number for Sync.M, 2nd-motor	same as Hd134
Hd235	IMPE detect number for Sync.M, 2nd-motor	same as Hd135
Hd236	IMPE voltage gain for Sync.M, 2nd-motor	same as Hd136
Hd237	IMPE Mg-pole position offset, 2nd-motor	same as Hd137

■Parameter mode (O code)

Code No.	Parameter Meaning	Selectable User Setting
oA-10	Operation mode on option card error (SLOT-1)	00 (Error) /01 (Ignor error (keep running))
oA-11	Communication Watch Dog Timer (SLOT-1)	0.00 to 100.00(s)
oA-12	Action selection at communication error (SLOT-1)	00 (Error) /01 (Trip after Deceleration stop) /02 (Ignore) /03 (Free run stop) /04 (Deceleration stop)
oA-13	Run command selection at start up (SLOT-1)	00 (run command disabled) /01 (run command enabled)
oA-20	Operation mode on option card error (SLOT-2)	00 (Error) /01 (Ignor error (keep running))
oA-21	Communication Watch Dog Timer (SLOT-2)	0.00 to 100.00(s)
oA-22	Action selection at communication error (SLOT-2)	00 (Error) /01 (Trip after Deceleration stop) /02 (Ignore) /03 (Free run stop) /04 (Deceleration stop)
oA-23	Run command selection at start up (SLOT-2)	00 (run command disabled) /01 (run command enabled)
oA-30	Operation mode on option card error (SLOT-3)	00 (Error) /01 (Ignor error (keep running))
oA-31	Communication Watch Dog Timer (SLOT-3)	0.00 to 100.00(s)
oA-32	Action selection at communication error (SLOT-3)	00 (Error) /01 (Trip after Deceleration stop) /02 (Ignore) /03 (Free run stop) /04 (Deceleration stop)
oA-33	Run command selection at start up (SLOT-3)	00 (run command disabled) /01 (run command enabled)
ob-01	Encoder constant setting	32 to 65535(Pls)
ob-02	Encoder position selection	00 (Phase-A Lead) /01 (Phase-B Lead)
ob-03	Motor gear ratio Numerator	1 to 10000
ob-04	Motor gear ratio Denominator	1 to 10000
ob-10	Pulse train detection object selection (option)	00 (reference) /01 (Pulse train position reference)
ob-11	Mode selection of pulse train input (option)	00 (90°shift pulse train) /01 (Forward/ Reverse pulse train and direction signal) /02 (Forward pulse train and Reverse pulse train)
ob-12	Pulse train frequency Scale (option)	0.05 to 200.00(kHz)
ob-13	Pulse train frequency Filter time constant (option)	0.01 to 2.00(s)
ob-14	Pulse train frequency Bias value (option)	−100.0 to 100.0(%)
ob-15	Pulse train frequency High Limit (option)	0.0 to 100.0(%)
ob-16	Pulse train frequency detection low level (option)	
oC-01	Safety opution input display selection	00 (Warning(with display)) /01 (Warning(without display))
oC-10	Safety opution input display selection	0.00 to 3600.00(s)
oC-12	SS1-A deceleration time setting	
oC-14	SLS-A Speed upper limit(Forward)	0.00 to 590.00(Hz)
oC-15	SLS-A Speed upper limit(Reverse)	
oC-16	SLS-A Speed upper limit(Reverse)	0.00 to 3600.00(s)
oC-18	SDI-A limited direction	00 (limit) /01 (invert)
oC-20	SDI-A limited direction	0.00 to 3600.00(s)
oC-22	SS1-B deceleration time setting	
oC-24	SLS-B Speed upper limit(Forward)	0.00 to 590.00(Hz)
oC-25	SLS-B Speed upper limit(Reverse)	
oC-26	SLS-B Speed upper limit(Reverse)	0.00 to 3600.00(s)
oC-28	SDI-B limited direction	00 (limit) /01 (invert)
oE-01	Filter time constant of Terminal [Ai4]	1 to 500(ms)
oE-03	Start value of Terminal [Ai4]	0.00 to 100.00(%)
oE-04	End value of Terminal [Ai4]	0.00 to 100.00(%)
oE-05	Start rate of Terminal [Ai4]	0.0 to [oE-06] (%)
oE-06	End rate of Terminal [Ai4]	[oE-05] to 100.0(%)
oE-07	Start point selection of Terminal [Ai4]	00 (Start value[oE-03]) /01 (0%)
oE-11	Filter time constant of Terminal [Ai5]	1 to 500(ms)
oE-13	Start value of Terminal [Ai5]	0.00 to 100.00(%)
oE-14	End value of Terminal [Ai5]	

Code No.	Parameter Meaning	Selectable User Setting
oE-15	Start rate of Terminal [Ai5]	0.0 to [oE-16] (%)
oE-16	End rate of Terminal [Ai5]	[oE-15] to 100.0(%)
oE-17	Start point selection of Terminal [Ai5]	00 (Start value[oE-03]) /01 (0%)
oE-21	Filter time constant of Terminal [Ai6]	1 to 500(ms)
oE-23	Start value of Terminal [Ai6]	–100.00 to 100.00(%)
oE-24	End value of Terminal [Ai6]	
oE-25	Start rate of Terminal [Ai6]	–100.0 to [oE-26] (%)
oE-26	End rate of Terminal [Ai6]	[oE-25] to 100.0(%)
oE-28	[Ai4] Voltage/Current zero-bias adjustment	–100.00 to 100.00(%)
oE-29	[Ai4] Voltage/Current gain adjustment	0.00 to 200.00(%)
oE-30	[Ai5] Voltage/Current zero-bias adjustment	–100.00 to 100.00(%)
oE-31	[Ai5] Voltage/Current gain adjustment	0.00 to 200.00(%)
oE-32	[Ai6] Voltage zero-bias adjustment	–100.00 to 100.00(%)
oE-33	[Ai6] Voltage gain adjustment	0.00 to 200.00(%)
oE-35	Window compareter for [Ai4] higher level	0 to 100(%)
oE-36	Window compareter for [Ai4] lower level	
oE-37	Window compareter for [Ai4] hysterisis width	0 to 10(%)
oE-38	Window compareter for [Ai5] higher level	0 to 100(%)
oE-39	Window compareter for [Ai5] lower level	
oE-40	Window compareter for [Ai5] hysterisis width	0 to 10(%)
oE-41	Window compareter for [Ai6] higher level	–100 to 100(%)
oE-42	Window compareter for [Ai6] lower level	
oE-43	Window compareter for [Ai6] hysterisis width	0 to 10(%)
oE-44	Operation level at [AI4] disconnection	0 to 100(%)
oE-45	Operation level selection at [Ai4] disconnection	00 (Disable) /01 (Enable: At WC* is active) /02 (Enable: At WC* is not active)
oE-46	Operation level at [Ai5] disconnection	0 to 100(%)
oE-47	Operation level selection at [Ai5] disconnection	00 (Disable) /01 (Enable: At WC* is active) /02 (Enable: At WC* is not active)
oE-48	Operation level at [Ai6] disconnection	–100 to 100(%)
oE-49	Operation level selection at [Ai6] disconnection	00 (Disable) /01 (Enable: At WC* is active) /02 (Enable: At WC* is not active)
oE-50	[Ao3] monitor output selection	
oE-51	[Ao4] monitor output selection	Monitor Code to be specified
oE-52	[Ao5] monitor output selection	
oE-56	Filter time constant of [Ao3] monitor	1 to 500(ms)
oE-57	[Ao3] Data type selection	00 (Absolute data) /01 (Signed data)
oE-58	[Ao3] monitor bias adjustment	–100.0 to 100.0(%)
oE-59	[Ao3] monitor gain adjustment	–1000.0 to 1000.0(%)
oE-60	Output level setting at [Ao3] monitor adjust mode	–100.0 to 100.0(%)
oE-61	Filter time constant of [Ao4] monitor	1 to 500(ms)
oE-62	[Ao4] Data type selection	00 (Absolute data) /01 (Signed data)
oE-63	[Ao4] monitor bias adjustment	–100.0 to 100.0(%)
oE-64	[Ao4] monitor gain adjustment	–1000.0 to 1000.0(%)
oE-65	Output level setting at [Ao4] monitor adjust mode	–100.0 to 100.0(%)
oE-66	Filter time constant of [Ao5] monitor	1 to 500(ms)
oE-67	[Ao5] Data type selection	00 (Absolute data) /01 (Signed data)
oE-68	[Ao5] monitor bias adjustment	–100.0 to 100.0(%)
oE-69	[Ao5] monitor gain adjustment	–1000.0 to 1000.0(%)
oE-70	Output level setting at [Ao5] monitor adjust mode	–100.0 to 100.0(%)
oH-01	IP-Address selection	00 (Gr.1) /01 (Gr.2)
oH-02	Communication speed (port-1)	00 (Auto Negotiation) /01 (100M/Full-duplex) /02 (100M/Haif-duplex) /03 (10M/Full-duplex) /04 (10M/Haif-duplex)
oH-03	Communication speed (port-2)	
oH-04	Ethernet communication timeout	1 to 65535(×10ms)
oH-05	Modbus TCP Port No.(IPv4)	502,1024 to 65535
oH-06	Modbus TCP Port No.(IPv6)	502,1024 to 65535
oH-20	Profibus Node address	0 to 125
oH-21	Profibus clear mode selection	00 (Clear) /01 (Keep last value)
oH-22	Profibus Map selection	00 (PPO) /01 (Comvertional) /02 (FlexibleMode)
oH-23	Setting enable from Profi master	00 (Enable) /01 (Disable)
oH-24	Setpoint telegram/Actual value telegram Gr. Selection	00 (Gr.A) /01 (Gr.B) /02 (Gr.C)
oH-30	IP-Address selection	00 (Gr.1) /01 (Gr.2)
oH-31	Communication speed (port-1)	00 (Auto Negotiation) /01 (100M/Full-duplex) /02 (100M/Haif-duplex) /03 (10M/Full-duplex) /04 (10M/Haif-duplex)
oH-32	Communication speed (port-2)	
oH-33	Ethernet communication timeout	1 to 65535(×10ms)
oH-34	Setpoint telegram/Actual value telegram Gr. Selection	00 (Gr.A) /01 (Gr.B) /02 (Gr.C)

Code No.	Parameter Meaning	Selectable User Setting
oJ-01 to 10	Flexible command registration writing register 1 to 10, Gr.A	0000 to FFFF
oJ-11 to 20	Flexible command registration Reading register 1 to 10, Gr.A	
oJ-21 to 30	Flexible command registration writing register 1 to 10, Gr.B	
oJ-31 to 40	Flexible command registration Reading register 1 to 10, Gr.B	
oJ-41 to 50	Flexible command registration writing register 1 to 10, Gr.C	
oJ-51 to 60	Flexible command registration Reading register 1 to 10, Gr.C	
oL-01 to 04	IPv4 IP address (1) to (4), Gr.1	0 to 255
oL-05 to 08	IPv4 Sub-net mask (1) to (4), Gr.1	
oL-09 to 12	IPv4 Default gateway (1) to (4), Gr.1	
oL-20 to 27	IPv6 IP address (1) to (8), Gr.1	0000 to FFFF
oL-28	IPv6 Prefix of Sub-net, Gr.1	0 to 127
oL-29 to 36	IPv6 Default gateway (1) to (8), Gr.1	0000 to FFFF
oL-40 to 43	IPv4 IP address (1) to (4), Gr.2	0 to 255
oL-44 to 47	IPv4 Sub-net mask (1) to (4), Gr.2	
oL-48 to 51	IPv4 Default gateway (1) to (4), Gr.2	
oL-60 to 67	IPv6 IP address (1) to (8), Gr.2	0000 to FFFF
oL-68	IPv6 Prefix of Sub-net, Gr.2	0 to 127
oL-69 to 76	IPv6 Default gateway (1) to (8), Gr.2	0000 to FFFF

■Parameter mode (P code)

Code No.	Parameter Meaning	Selectable User Setting
PA-01	Mode selection for Emergency-force drive	00 (Disable) /01 (Enable)
PA-02	Frequency reference setting at Emergency-force drive	0.00 to 590.00(Hz)
PA-03	Direction command at Emergency-force drive	00 (Forward Rotation) /01 (Reverse Rotation)
PA-04	Commercial power supply bypass function selection	00 (Disable) /01 (Enable)
PA-05	Delay time of Bypass function	0.0 to 1000.0(s)
PA-20	Simulation mode enable	00 (Disable) /01 (Enable)
PA-21	Error code selection for Alarm test	000 to 255
PA-22	Output current monitor optional output enable	00 (Disable) /01 (Setting by Keypad) /02 (Setting by Terminal[Ai1]) /03 (Setting by Terminal[Ai2]) /04 (Setting by Terminal[Ai3]) /05 (Setting by Terminal[Ai4]) /06 (Setting by Terminal[Ai5]) /07 (Setting by Terminal[Ai6])
PA-23	Output current monitor optional output value setting	INV rated current ×(0.00 to 3.00)
PA-24	DC-bus voltage monitor optional output enable	00 (Disable) /01 (Setting by Keypad) /02 (Setting by Terminal[Ai1]) /03 (Setting by Terminal[Ai2]) /04 (Setting by Terminal[Ai3]) /05 (Setting by Terminal[Ai4]) /06 (Setting by Terminal[Ai5]) /07 (Setting by Terminal[Ai6])
PA-25	DC-bus voltage monitor optional value output	(200V class) 0.0 to 450.0Vdc (400V class) 0.0 to 900.0Vdc
PA-26	Output voltage monitor optional output enable	00 (Disable) /01 (Setting by Keypad) /02 (Setting by Terminal[Ai1]) /03 (Setting by Terminal[Ai2]) /04 (Setting by Terminal[Ai3]) /05 (Setting by Terminal[Ai4]) /06 (Setting by Terminal[Ai5]) /07 (Setting by Terminal[Ai6])
PA-27	Output voltage monitor optional output value setting	(200V class) 0.0 to 300.0(V) (400V class) 0.0 to 600.0(V)
PA-28	Output torque monitor optional output enable	00 (Disable) /01 (Setting by Keypad) /02 (Setting by Terminal[Ai1]) /03 (Setting by Terminal[Ai2]) /04 (Setting by Terminal[Ai3]) /05 (Setting by Terminal[Ai4]) /06 (Setting by Terminal[Ai5]) /07 (Setting by Terminal[Ai6])
PA-29	Output torque monitor optional output value setting	–500.0 to 500.0(%)
PA-30	Start with frequency matching optional Setting enable	00 (Disable) /01 (Setting by Keypad) /02 (Setting by Terminal[Ai1]) /03 (Setting by Terminal[Ai2]) /04 (Setting by Terminal[Ai3]) /05 (Setting by Terminal[Ai4]) /06 (Setting by Terminal[Ai5]) /07 (Setting by Terminal[Ai6])
PA-31	Start with frequency matching optional value setting	0.00 to 590.00(Hz)

■Parameter mode (U code)

Code No.	Parameter Meaning	Selectable User Setting
UA-01	Password for Display	0000 to FFFF
UA-02	Password for SoftLock	
UA-10	Display restriction selection	00 (Full display) /01 (Function-specific display) /02 (User setting display) /03 (Data comparison display) /04 (Monitor only)
UA-12	Accumulation input power monitor clear	00 (Disable) /01 (Clear)
UA-13	Display gain for Accumulation input power monitor	1 to 1000
UA-14	Accumulation output power monitor clear	00 (Disable) /01 (Clear)
UA-15	Display gain for Accumulation output power monitor	1 to 1000
UA-16	Soft Lock selection	00 (Teminal [SFT]) /01(Always effective)
UA-17	Soft Lock target selection	00 (All the data change is impossible) /01 (Data change is impossible except setting Speed)
UA-18	Data R/W selection	00 (Enabling R/W by operator) /01 (Disabling R/W by operator)
UA-19	Low battery warning enable	00 (Disable) /01 (Warnning) /02 (Error)
UA-20	Action selection at keypad disconnection	00 (Error) /01 (Error output after Deceleration stop) /02 (Ignore) /03 (Free run stop) /04 (Deceleration stop)
UA-21	2nd-motor parameter display selection	00 (Hidden) /01 (Display)
UA-22	Option parameter display selection	
UA-30	User parameter auto setting function enable	00 (Disable) /01 (Enable)
UA-31 to 62	User parameter 1 to 32 selection	no/dA-01 to UF-32 (except UA-31 to UA-62)
UA-90	QOP indication off waiting time	0 to 60(min)
UA-91	Initial Disply selection	(to be selectro from d, F parameters)
UA-92	Auto-return to Initial display enable	00 (Disable) /01 (Enable)
UA-93	Setting enable at Monitor display	
UA-94	Multispeed change on the frequency reference monitor display	
Ub-01	Initialize Mode selection	00 (Disable) /01 (Error history clear) /02 (Data initialize) /03 (Error history clear & Data initialize) /04 (Error history clear & Data initialize & EzSQ clear) /05 (he parameter related to the terminal is excluded) /06 (The parameter related to the comm. is excluded) /07 (The parameter related to the terminal and comm. is excluded) /08 (EzSQ only) /09 (Trace Data only)
Ub-02	Initialize Data selection	00 (MODE0) /01 (MODE1) /02 (MODE2) /03 (MODE3)
Ub-03	Load type selection	00 (VLD) /01 (LD) /02 (ND)
Ub-05	Initialize Enable	00 (Disable) /01 (Initialaize start)
UC-01	Debug mode enable	(Please don't change.)
Ud-01	Trace function enable	00 (Disable) /01 (Enable)
Ud-02	Trace start	00 (Stop) /01 (Start)
Ud-03	Trace data number setting	0 to 8
Ud-04	Trace signal number setting	
Ud-10 to 17	Trace data 0 to 7 selection	(to be selectro from d, F parameters)
Ud-20	Trace signal 0 Input/Output selection	00 (Input : [Ud-21]) /01 (Output : [Ud-22])
Ud-21	Trace signal 0 Input Terminal selection	same as [CA-01]
Ud-22	Trace signal 0 Output Terminal selection	same as [CC-01]
Ud-23	Trace signal 1 Input/Output selection	00 (Input : [Ud-24]) /01 (Output : [Ud-25])
Ud-24	Trace signal 1 Input Terminal selection	same as [CA-01]
Ud-25	Trace signal 1 Output Terminal selection	same as [CC-01]
Ud-26	Trace signal 2 Input/Output selection	00 (Input : [Ud-27]) /01 (Output : [Ud-28])
Ud-27	Trace signal 2 Input Terminal selection	same as [CA-01]
Ud-28	Trace signal 2 Output Terminal selection	same as [CC-01]
Ud-29	Trace signal 3 Input/Output selection	00 (Input : [Ud-30]) /01 (Output : [Ud-31])
Ud-30	Trace signal 3 Input Terminal selection	same as [CA-01]
Ud-31	Trace signal 3 Output Terminal selection	same as [CC-01]
Ud-32	Trace signal 4 Input/Output selection	00 (Input : [Ud-33]) /01 (Output : [Ud-34])
Ud-33	Trace signal 4 Input Terminal selection	same as [CA-01]
Ud-34	Trace signal 4 Output Terminal selection	same as [CC-01]
Ud-35	Trace signal 5 Input/Output selection	00 (Input : [Ud-36]) /01 (Output : [Ud-37])
Ud-36	Trace signal 5 Input Terminal selection	same as [CA-01]
Ud-37	Trace signal 5 Output Terminal selection	same as [CC-01]
Ud-38	Trace signal 6 Input/Output selection	00 (Input : [Ud-39]) /01 (Output : [Ud-40])
Ud-39	Trace signal 6 Input Terminal selection	same as [CA-01]
Ud-40	Trace signal 6 Output Terminal selection	same as [CC-01]
Ud-41	Trace signal 7 Input/Output selection	00 (Input : [Ud-42]) /01 (Output : [Ud-43])
Ud-42	Trace signal 7 Input Terminal selection	same as [CA-01]
Ud-43	Trace signal 7 Output Terminal selection	same as [CC-01]
Ud-50	Trace trigger 1 selection	00 (Trip) /01 (Trace data 0) /02 (Trace data 1) /03 (Trace data 2) /04 (Trace data 3) /05 (Trace data 4) /06 (Trace data 5) /07 (Trace data 6) /08 (Trace data 7) /09 (Trace signal 0) /10 (Trace signal 1) /11 (Trace signal 2) /12 (Trace signal 3) /13 (Trace signal 4) /14 (Trace signal 5) /15 (Trace signal 6) /16 (Trace signal 7)
Ud-51	Trigger 1 action selection at trace data trigger	00 (Action at exceeded trigger level) /02 (Action at fall trigger level)

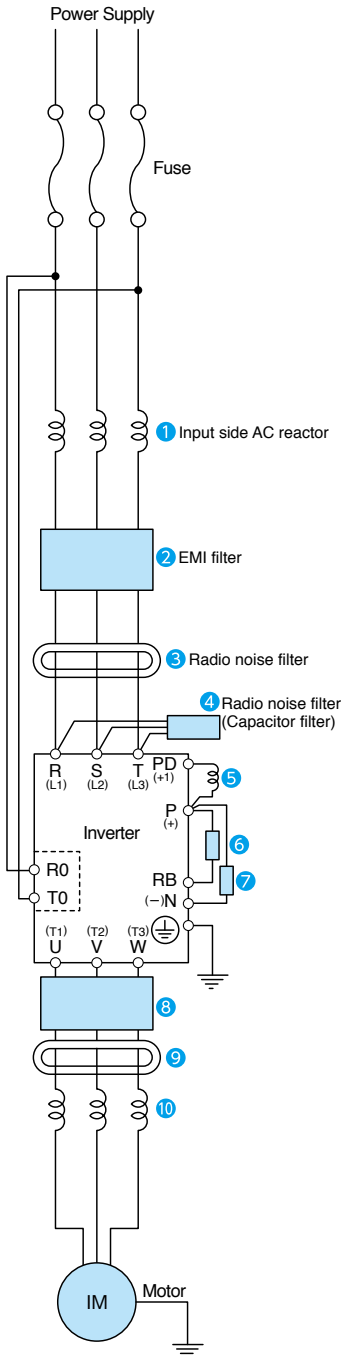| Code No.	Parameter Meaning	Selectable User Setting
Ud-52	Trigger 1 level setting at trace data trigger	0 to 100(%)
Ud-53	Trigger 1 action selection at trace signal trigger	00 (Action by signal on) /01 (Action by signal off)
Ud-54	Trace trigger 2 selection	00 (Trip) /01 (Trace data 0) /02 (Trace data 1) /03 (Trace data 2) /04 (Trace data 3) /05 (Trace data 4) /06 (Trace data 5) /07 (Trace data 6) /08 (Trace data 7) /09 (Trace signal 0) /10 (Trace signal 1) /11 (Trace signal 2) /12 (Trace signal 3) /13 (Trace signal 4) /14 (Trace signal 5) /15 (Trace signal 6) /16 (Trace signal 7)
Ud-55	Trigger 2 action selection at trace data trigger	00 (Action at exceeded trigger 2 level) /02 (Action at fall trigger 2 level)
Ud-56	Trigger 2 level setting at trace data trigger	0 to 100(%)
Ud-57	Trigger 2 action selection at trace signal trigger	00 (Action by signal on) /01 (Action by signal off)
Ud-58	Trigger condition selection	00 (At trace trigger 1 formation) /01 (At trace trigger 2 formation) /02 (At OR condition formation of Trigger-1 and Trigger-2) /03 (At AND condition formation of Trigger-1 and Trigger-2)
Ud-59	Trigger point setting	0 to 100(%)
Ud-60	Sampling time selection	01 (0.2ms) /02 (0.5ms) /03 (1ms) /04 (2ms) /05 (5ms) /06 (10ms) /07 (50ms) /08 (100ms) /09 (500ms) /10 (1000ms)
UE-01	EzSQ operation cycle	00 (1ms) /01 (2ms : same as SJ700/L700)
UE-02	EzSQ function enable	00 (Disable) /01 (Terminal [PRG]) /02 (Always active)
UE-10 to 73	EzSQ User parameter U(00) to (63)	0 to 65535
UF-02 to 32	EzSQ User parameter UL(00) to (14)	−2147483647 to 2147483647

■Input terminal function list

Function code	Symbol	Function name
0	no	Not use
1	FW	Forward rotation
2	RV	Reverse rotation
3 to 6	CF1 to 4	Multi speed selection 1 to 4
7 to 13	SF1 to 7	Multi speed Bit-1 to 7
14	ADD	Trigger for frequency addition[Ab105]
15	SCHG	Speed reference change
16	STA	3-wire Start
17	STP	3-wire Stop
18	FR	Forward Over Travel
19	AHD	analog command holding
20	FUP	Remote control Speed-UP function
21	FDN	Remote control Speed-DOWN function
22	UDC	Remote control data clearing
23	F-OP	Force operation
24	SET	2nd-motor control
28	RS	Reset
29	JG	Jogging
30	DB	External Dynamic brake
31	2CH	2-step Acceleration/Deceleration
32	FRS	Free run stop
33	EXT	External fault
34	USP	unattended start protection
35	CS	Commercial Supply change
36	SFT	Soft-Lock
37	BOK	Answer back from Brake
38	OLR	Overload restriction selection
39	KHC	Accumulation input power clearance
40	OKHC	Accumulation output power clearance
41	PID	Disable PID1
42	PIDC	PID1 integration reset
43	PID2	Disable PID2
44	PIDC2	PID2 integration reset
45	PID3	Disable PID3
46	PIDC3	PID3 integration reset
47	PID4	Disable PID4
48	PIDC4	PID4 integration reset
51 to 54	SVC1 to 4	Multi set-point selection 1 to 4
55	PRO	PID gain change
56	PIO1	PID output switching 1
57	PIO2	PID output switching 2
58	SLEP	SLEEP condition ativation
59	WAKE	WAKE condition ativation
60	TL	Torque limit enable
61	TRQ1	Torque limit selection bit 1
62	TRQ2	Torque limit selection bit 2
63	PPI	P/PI control mode selection
64	CAS	Control gain change
65	SON	Servo-on
66	FOC	Forcing
67	ATR	Permission of torque control
68	TBS	Torque Bias enable
69	ORT	Home search function
71	LAC	Acceleration/Deceleration cancellation
72	PCLR	Clearance of position deviation
73	STAT	pulse train position command input enable
74	PUP	Position bias (ADD)
75	PDN	Position bias (SUB)
76 to 79	CP1 to 4	Multistage position settings selection 1 to 4
80	ORL	Limit signal of Homing function
81	ORG	Start signal of Homing function
82	FOT	Forward Over Travel
83	ROT	Reserve Over Travel
84	SPD	speed / position switching
85	PSET	Position data presetting
86 to 96	MI1 to 11	General-purpose input 1 to 11
97	PCC	Pulse counter clearing
98	ECOM	EzCOM activation
99	PRG	Program RUN
100	HLD	Acceleration/Deceleration disable
101	REN	RUN enable
102	DISP	Display lock
103	PLA	Pulse count A
104	PLB	Pulse count B
105	EMF	Emergency-Force Drive activation
107	COK	Contactor check signal
108	DTR	Data trace start
109	PLZ	Pulse train input Z
110	TCT	Teach-in signal

■Intelligent output terminal function list

Function code	Symbol	Function name
0	no	Not use
1	RUN	Running
2	FA1	Constant-speed reached
3	FA2	Set speed overreached
4	FA3	Set frequency reached
5	FA4	Set speed overreached 2
6	FA5	Set speed reached
7	IRDY	inverter ready
8	FWR	Forward rotation
9	RVR	Reverse rotation
10	FREF	Speed referenc = Keypad is selected
11	REF	Run command = Keypad is selected
12	SETM	2nd control is selcted
16	OPO	Option output
17	AL	Alarm
18	MJA	Major failure
19	OTQ	Over-torque
20	IP	Instantaneous power failure
21	UV	Undervoltage
22	TRQ	Torque limited
23	IPS	IP-Non stop function is active
24	RNT	Accumulated operation time over
25	ONT	Accumulated power-on time over
26	THM	Electronic thermal alarm signal(MTR)
27	THC	Electronic thermal alarm signal(CTL)
29	WAC	Capacitor life warning
30	WAF	Cooling-fan speed drop
31	FR	Starting contact signal
32	OHF	Heat sink overheat warning
33	LOC	Low-current indication signal
34	LOC2	Low-current indication signal 2
35	OL	Overload notice advance signal (1)
36	OL2	Overload notice advance signal (2)
37	BRK	Brake release
38	BER	Brake error
39	CON	Contactor control
40	ZS	Zero speed detection
41	DSE	Speed deviation over
42	PDD	Position deviation over
43	POK	Positioning completed
44	PCMP	Pulse count compare match output
45	OD	Deviation over for PID control
46	FBV	PID1 feedback comparison
47	OD2	OD:Deviation over for PID2 control
48	FBV2	PID2 feedback comparison
49	NDc	Communication line disconnection
50	Ai1Dc	Analog [Ai1] disconnection detection
51	Ai2Dc	Analog [Ai2] disconnection detection
52	Ai3Dc	Analog [Ai3] disconnection detection
53	Ai4Dc	Analog [Ai4] disconnection detection
54	Ai5Dc	Analog [Ai5] disconnection detection
55	Ai6Dc	Analog [Ai6] disconnection detection
56 to 61	WCAi1 to 6	Window comparator Ai1 to 6
62 to 68	LOG1 to 7	Logical operation result 1 to 7
69 to 75	MO1 to 7	General-purpose output 1 to 7
76	EMFC	Bypass mode indicator
77	EMBP	Speed deviation over
78	WFT	Trace function waiting for triger
79	TRA	Trace function data logging
80	LBK	Low-battery of keypad
81	OVS	Over-Voltage power Supply
84 to 87	AC0 to 3	Alarm code bit-0 to 3
89	OD3	Deviation over for PID control
90	FBV3	PID3 feedback comparison
91	OD4	Deviation over for PID4 control
92	FBV4	PID4 feedback comparison
93	SSE	PID soft start error

Power Supply

Fuse

① Input side AC reactor

② EMI filter

③ Radio noise filter

④ Radio noise filter (Capacitor filter)

R (L1)　S (L2)　T (L3)　PD (+1)

⑤

P (+)

⑥

Inverter

R0　RB (−)N

T0

⑦

U (T1)　V (T2)　W (T3)

⑧

⑨

⑩

IM　Motor

Input Voltage	Motor Output (kW(HP))	Model	Rating	Power line cable AWG(mm2) R,S,T,U,V,W,P,PD,N	Grounding cable AWG(mm2)	External braking resistor between P and RB AWG(mm2)	Power line cable Terminal screw size	Crimp terminal	Tightening torque N·m	Fuse (Class J)
200V	0.4(1/2)	P1-00044-L	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	5
	0.75(1)	P1-00080-L	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	10
	1.5(2)	P1-00104-L	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	15
	2.2(3)	P1-00156-L	ND	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	20
			LD,VLD	10(5.3)	10(5.3)	10(5.3)		5.5-4		
	3.7(5)	P1-00228-L	ND,LD,VLD	10(5.3)	10(5.3)	10(5.3)	M4	5.5-4	1.4	30
	5.5(7.5)	P1-00330-L	ND,LD,VLD	8(8.4)	8(8.4)	8(8.4)	M5	8-5	3.0	30
	7.5(10)	P1-00460-L	ND	8(8.4)	8(8.4)	8(8.4)	M5	8-5	3.0	40
			LD	6(13.3)		6(13.3)		14-5		
			VLD	4(21.2)		4(21.2)		22-5		
	11(15)	P1-00600-L	ND	6(13.3)	6(13.3)	6(13.3)	M6	14-6	4.0	60
			LD,VLD	4(21.2)		4(21.2)		22-6		
	15(20)	P1-00800-L	ND	4(21.2)	6(13.3)	4(21.2)	M6	22-6	2.5 or 3.0	80
			LD,VLD	2(33.6)		2(33.6)		38-6		
	18.5(25)	P1-00930-L	ND	2(33.6)	6(13.3)	2(33.6)	M8	38-8	5.5 to 6.6	100
			LD	1(42.4)		1(42.4)		60-8		
			VLD	1/0(53.5)		1/0(53.5)				
	22(30)	P1-01240-L	ND,LD	1/0(53.5)	6(13.3)	1/0(53.5)	M8	60-8	5.5 to 6.6	125
			VLD	2/0(67.4)		2/0(67.4)		70-8		
	30(40)	P1-01530-L	ND	2/0(67.4)	4(21.2)	–	M8	70-8	6.0	150
			LD,VLD	1/0x2(53.5x2)				60-8		
	37(50)	P1-01850-L	ND	4/0(107.2)	4(21.2)	–	M8	100-8	15.0	175
			LD,VLD	1/0x2(53.5x2)				60-8		
	45(60)	P1-02290-L	ND,LD	1/0x2(53.5x2)	4(21.2)	–	M8	60-8	6.0 to 10.0	225
			VLD	2/0x2(67.4x2)				70-8		
	55(75)	P1-02950-L	ND	350kc(177)	3(26.7)	–	M10	180-8	19.6	250
			LD,VLD	3/0x2(85.0x2)				80-8		
400V	0.75(1)	P1-00041-H	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	5
	1.5(2)	P1-00054-H	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	10
	2.2(3)	P1-00083-H	ND,LD,VLD	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	10
	3.7(5)	P1-00126-H	ND	14(2.1)	14(2.1)	14(2.1)	M4	2-4	1.4	15
			LD,VLD	12(3.3)		12(3.3)		5.5-4		
	5.5(7.5)	P1-00175-H	ND	12(3.3)	12(3.3)	12(3.3)	M5	5.5-5	3.0	15
			LD,VLD	10(5.3)		10(5.3)				
	7.5(10)	P1-00250-H	ND	10(5.3)	10(5.3)	10(5.3)	M5	5.5-5	3.0	15
			LD,VLD	8(8.4)		8(8.4)		8-5		
	11(15)	P1-00310-L	ND,LD,VLD	8(8.4)	8(8.4)	8(8.4)	M6	8-6	4.0	20
	15(20)	P1-00400-H	ND,LD,VLD	6(13.3)	8(8.4)	6(13.3)	M6	14-6	4.0	30
	18.5(25)	P1-00470-H	ND,LD,VLD	6(13.3)	8(8.4)	6(13.3)	M6	14-6	4.0	40
	22(30)	P1-00620-H	ND	6(13.3)	8(8.4)	6(13.3)	M6	14-6	4.0	50
			LD,VLD	3(26.7)		3(26.7)		38-6		
	30(40)	P1-00770-L	ND	3(26.7)	6(13.3)	–	M8	38-8	6.0	50
			LD	2(33.6)						
			VLD	1(42.4)				60-8		
	37(50)	P1-00930-H	ND,LD,VLD	1(42.4)	6(13.3)	–	M8	60-8	15.0	60
	45(60)	P1-01160-H	ND	1(42.4)	6(13.3)	–	M8	60-8	6.0 to 10.0	70
			LD	1/0(53.5)						
			VLD	2/0(67.4)				70-8		
	55(75)	P1-01800-H	ND	2/0(67.4)	4(21.2)	–	M8	70-8	6.0 to 10.0	90
			LD,VLD	1/0x2(53.5x2)				60-8		

Note1: Field wiring connection must be made by a UL and c-UL listed closed-loop terminal connector sized for the wire gauge involved.
　　　Connector must be fixed using the crimping tool specified by the connector manufacture.
Note2: Be sure to use large wire gauges for power wiring if the distance exceeds 20m (66ft).
Note3: Please contact us for 400V 75kW to 132kW

	Name	Function
①	Input side AC reactor	This is useful in suppressing harmonics induced on the power supply lines, or when the main power voltage imbalance exceeds 3% (and power source capacity is more than 500kVA), or to smooth out line fluctuations. It also improves the power factor.
②	EMI filter	Reduces the conducted noise on the power supply wiring generated by the inverter. Connect to the inverter input side.
③	Radio noise filter	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).
④	Radio noise filter (Capacitor filter)	This capacitor filter reduces radiated noise from the main power wires in the inverter input side.
⑤	DC link choke	Suppresses harmonics generated by the inverter.
⑥	Braking resistor	This is useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capability.
⑦	Braking unit	
⑧	Output side noise filter	Reduces radiated noise from wiring in the inverter output side.
⑨	Radio noise filter	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).
⑩	AC reactor	This reactor reduces the vibration in the motor caused by the inver-ter's switching waveforms, by smoothing the waveforms to approxi-mate 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.

Note: An EMI filter is required for European EMC directive and C-Tick, but the others are not for this purpose.

Items		SJ700/SJ700D series	SJ series P1
Control system	IM	V/f control. Sensorless vector control. 0Hz sensorless vector control. Sensorless vector control with encoder.	V/f control. V/f control with encoder.(Note1) Sensorless vector control. 0Hz sensorless vector control. Sensorless vector control with encoder.(Note1)
	SM/PMM	None	Methods of synchronous startup for vectorless smart control. Methods of IVMS startup for vectorless smart control.(Note1)
Panel	Display	4digits 7segLED(Can't use P1 panel)	Color TFT LCD panel(Can't use OPE-SBK/WOP for SJ700)
	Copy function	None	Available
	Multi language	–	English/Japanese
	RTC function	None	Available (Required a battery by user prepared)
Rated input voltage (V)	200V	200 to 240V−15%/ to 10%	200 to 240V−15%/ to 10%
	400V	380 to 480V−15%/ to 10%	380 to 500V−15%/ to 10%
Multi rating		SJ700D:Dual Rating / SJ700:None	Triple rating
Mounting dimensions		Compatible with 0.4 to 132 kW	
Max frequency	V/f	400Hz	590Hz
	Sensorless(IM)	120Hz	400Hz
	Sensorless(PM)	–	400Hz
Option	Number of slots	2 slots	3 slots
	Compatibility	None	

Main Circuit Terminals

Screw diameter: Ground terminal screw diameter of P1-00600-L and P1-00310-H(200/400V 11kW,ND) is M5. It is M6 in SJ700-110H/L.

Position (mm)(Note2):

SJ700/SJ700D series

ND rating code	004	007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	1100	1320
200V Upper	60	60	60	60	60	60	60	60	109	109	109	143	71	71	106	/	/	/	/
200V Lower	43	43	43	43	43	–	–	–	–	–	–	–	–	–	–	/	/	/	/
400V Upper		60	60	60	60	60	60	60	109	109	109	143	71	71	71	70	70	82	82
400V Lower		45	45	45	45	–	–	–	–	–	–	–	–	–	–	–	–	–	–

SJ series P1

ND rating code	004	007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	1100	1320
200V Upper	45	45	45	45	45	67	67	66	80	80	80	101	101	101	127	/	/	/	/
200V Lower	34	34	34	34	34	50	50	44	–	–	–	–	–	–	–	/	/	/	/
400V Upper	45	45	45	45	67	67	66	165	165	165	101	101	101	101	Please contact us.				
400V Lower	34	34	34	34	50	50	44	142	142	142	–	–	–	–					

Control Circuit Terminals

		SJ700/SJ700D series	SJ series P1
	Screw	M3 screw	Screw less terminal
	Input terminal	FW+8terminals	11terminals
	Relay	1contact(1c)	2contacts(1a,1c)
	Frequency setting	3terminals O(Voltage)+OI(Current)+O2(Voltage)	3terminals Ai1/Ai2(Voltage/Current switching)+Ai3(Voltage)
	Monitor output	3terminals AM(Voltage)+AMI(Current)+FM(Pulse)	3terminals Ao1/Ao2(Voltage/Current switching)+FM(Pulse)

Position (mm)(Note2):

SJ700/SJ700D series

ND rating code	004	007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	1100	1320
200V	100.9	100.9	100.9	100.9	100.9	105.9	105.9	105.9	210.3	210.3	210.3	312.9	221.9	221.9	296.9	/	/	/	/
400V	98	98	98	98	98	100	100	100	223	223	223	342	330	330	404	301.9	301.9	424.9	424.9

SJ series P1

ND rating code	004	007	015	022	037	055	075	110	150	185	220	300	370	450	550	750	900	1100	1320
200V		100.9	100.9	100.9	100.9	105.9	105.9	105.9	210.3	210.3	210.3	312.9	221.9	221.9	221.9	Please contact us.			
400V		98	98	98	98	100	100	100	223	223	223	342	330	330	330				

Items		SJ700/SJ700D series	SJ series P1
USB connector		None	Micro-B(For ProDriveNext)
Functional safety		None	IEC61508,IEC/EN/UL61800-5-2,IEC/EN62061 SIL3 STO
Communication	Standard	SJ700D:ASCII/Modbus-RTU Max115.2kbps SJ700:ASCII/Modbus-RTU Max19.2kbps	Modbus-RTU Max115.2kbps
	Terminal resistor	100Ω	120Ω
	Simultaneous usage	No.One of ASCII/Modbus-RTU or option slot communication.	Yes.Modbus-RTU and one of option slot communication are can be used.
	Supported protocols	DeviceNet,CC-Link(Inverter itelf is order item for cclink) PROFIBUS-DP	Ethernet(Modbus-TCP),EtherCAT,PROFIBUS-DP PROFINET(Available soon)
Record Number of Trip history		6 times.	10 times
External 24VDC control power supply		None.	Available
Simulation mode function		None.	Available
EzCOM(Communication between INVs)		None.	Available
Pulse train input		Available, but feedback option is required.	Available as standard
Gain mapping function		None.	Available
PID function		1 PID control	4 PID controls /Soft start function/Sleep function
Multi-stage acceleration/deceleration		None	Available.
Number of trip retries		3 times	5 times
Number of EzSQ tasks		SJ700D:5 tasks / SJ700:1 task	5 Tasks

Note1: It can be used Ver.2 or later inverter.
Note2: This is the dimension from the bottom of the inverter body to the center of the terminal screw.

For Correct Operation

Application to Motors
Application to general-purpose motors

Operating frequency	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 audible 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 tireshaped 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 60Hz, confirm the machine's ability to withstand the centrifugal force generated.

Application to special motors

Gear motor	The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly in case of oil lubrication, pay attention to the low frequency range.)
Brake-equipped motor	For use of a brake-equipped motor, be sure to connect the braking power supply from the primary side of the inverter.
Pole-change motor	There are different kinds of pole-change motors (constant output characteristic type, constant torque characteristic type, etc.), with different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor. Also see: Application to the 400V-class motor.
Submersible motor	The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor.
Explosion-proof motor	Inverter drive is not suitable for a safety-enhanced explosion-proof type motor. The inverter should be used in combination with a pressure-proof explosion-proof type of motor. *Explosion-proof verification is not available for SJ700/SJ700D/SJ700B Series.
Synchronous (MS) motor High-speed (HFM) motor	In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to proper inverter selection, consult the manufacturer.
Single-phase motor	A single-phase motor is not suitable for variable-speed operation by an inverter drive. Therefore, use a three-phase motor.
Permanent magnet motor	Voltage is induced at the motor power terminal during motor rotation even if the inverter power supply is cut off. Therefore, please do not touch the terminals of the motor and inverter.PM motor can not be operated with commercial power supply. In addition, PM motor and inverter are ""one to one"" combination.

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 any of 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 a 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 SJ Series P1. 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 60Hz. A full line of high-speed motors is available from Hitachi.

Repetitive operation on starting or plugging

About frequent repetition use (crane, elevator, press, washing machine) , a power semiconductor (IGBT, a rectification diode, thyristor) in the inverter may come to remarkably have a short life by thermal fatigue.
The life can be prolonged by lower a load electric current. Lengthen acceleration / deceleration time. Lower carrier frequency. or increasing capacity of the inverter.

Operation use in highlands beyond 1,000m above sea level

Due to the air density decreasing, whenever standard inverters are used for altitudes above 1000m, the following conditions are additionally required for proper operation. In application for operation over 2500m, kindly contact your nearest sales office for assistance.
1. Reduction of inverter rated current
　Current rating has to be reduced 1% for every 100m that exceeds from an altitude of 1000m.
　For example, for inverters placed at an altitude of 2000m, the rated current has to be reduced 10% (Rated current x0.9) from its original amount.
　{(2000m-1000m)/100m*-1%=-10%}
2. Reduction of breakdown voltage
　Whenever an inverter is used at altitudes beyond 1000m, the breakdown voltage decreases as follows:
　1000m or less: 1.00 / 1500m: 0.92 / 2000m: 0.90 / 2500m: 0.85. As mentioned in the instruction manual, please avoid any pressure test.

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 SJ700/SJ700D (CT): -10 to 50˚C, SJ700D (VT): -10 to 40˚C, SJ700B: -10 to 45˚C. (Carrier frequency and output current must be reduced in the range of 40 to 50˚C.)

Main power supply

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

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 SJ700/SJ700D/SJ700B 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. If 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 thewiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.)
Earth leakage relay		If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter).
Phase advance capacitor		Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor.

High-frequency Noise and Leakage Current

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

Lifetime of Primary Parts

Because a DC bus capacitor deteriorates as it undergoes internal chemical reaction, it should normally be replaced every 10 years. 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 approximate lifetime of the capacitor is as shown in the figure at the right when it is used 24 hours daily (80% load). JEMA standard is the 5 years at ambient temperature 40ºC used in 12 hours daily.(According to the " Instructions for Periodic Inspection of General-Purpose Inverter " (JEMA).) Also, such moving parts as a cooling fan should be replaced. Maintenance inspection and parts replacement must beperformed by only specified trained personnel. Please plan to replace new inverter depends on the load, ambient condition in advance.
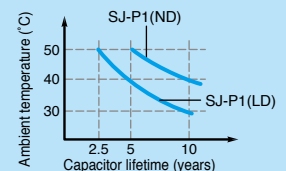
Precaution for Correct Usage

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