HITACHI
Inspire the Next

Pursuing the Ideal Compact Inverter

WJ200 Series

Designed for excellent performance and user friendliness

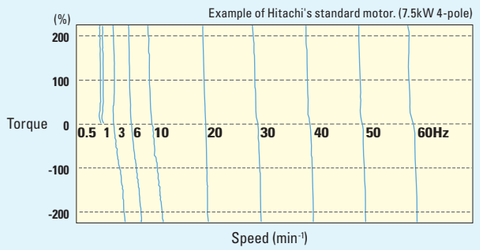
Hitachi Industrial Equipment Systems Co., Ltd.

Industry-leading Levels of Performance

1 High starting torque of 200% or greater achieved by sensorless vector control (when sized for heavy duty).

Integrated auto-tuning function for easy sensorless vector control realizes high torque suitable for applications requiring it such as crane hoists, lifts, elevators, etc.

Example of Torque Characteristics

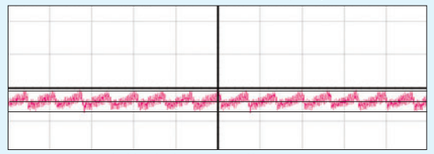


Auto-tuning to perform sensorless vector control can now be easily done.

2 Speed regulation at low-speed is greatly improved. – Fluctuation is 1/2* compared with the previous model. –

Speed regulation at low speed has been drastically improved to enhance process stability and precision.

(Example of WJ200-055LF)



- Frequency commanded by the inverter: 0.5Hz.
- Motor: Hitachi's standard 3-phase 5.5kW 4-pole totally enclosed type motor.

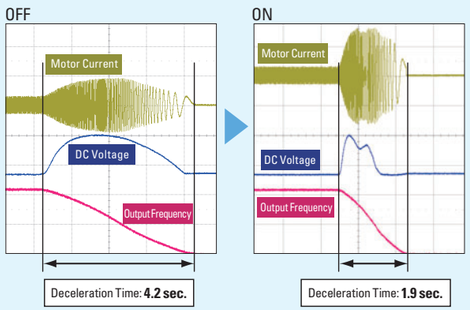
* WJ200: 5min^{-1}, Previous model: 13min^{-1}

3 Trip avoidance functions NEW

Minimum time deceleration function, over-current suppress function and DC bus AVR function are incorporated. The functions reduce nuisance tripping. Improved torque limiting/current limiting function enables a load limit to protect machine and equipment.

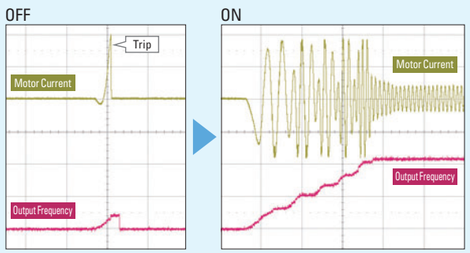
(Example of WJ200-075LF)

Minimum time deceleration Function



2.3 sec. reduction of deceleration time without a braking resistor is achieved when the function is active.

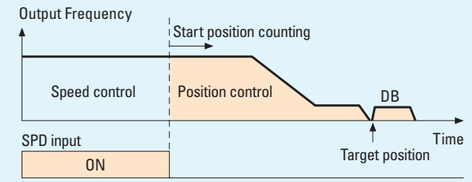
Over-current Suppress Function*



*Turn off this function for lifting equipment.

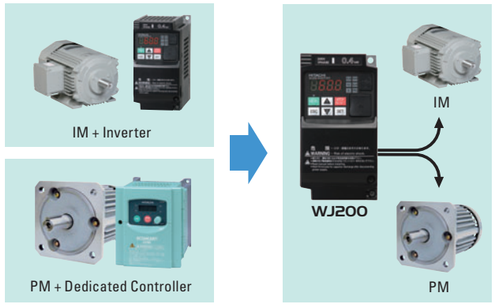
4 Simple positioning control (when feedback signal is used.) NEW

When simple positioning function is activated, speed control operation or positioning control operation is selectable via intellient input. While the [SPD] input is ON, the current position counter is held at 0. When [SPD] is OFF, the inverter enters positioning control operation and the position counter is active.



5 Induction motor & Permanent magnetic motor* control with one inverter (* planned) NEW

The WJ200 inverter can drive both induction motors (IM) and permanent magnetic motors (PM). Energy conservation and miniaturization can be achieved using PM motors. Moreover, one inverter used for two types of motor.



Model Name Indication

WJ200 – 001 L F

- Series Name
- Applied Motor Capacity 001: 0.1kW – 150: 15kW
- Power Source S:1-phase 200V class L:3-phase 200V class H:3-phase 400V class
- with Digital Operator

Model Configuration

Model Name WJ200-xxx	1-phase 200V class		3-phase 200V class		3-phase 400V class	
	VT	CT	VT	CT	VT	CT
001	0.2	0.1	0.2	0.1		
002	0.4	0.2	0.4	0.2		
004	0.55	0.4	0.75	0.4	0.75	0.4
007	1.1	0.75	1.1	0.75	1.5	0.75
015	2.2	1.5	2.2	1.5	2.2	1.5
022	3.0	2.2	3.0	2.2	3.0	2.2
030					4.0	3.0
037			5.5	3.7		
040					5.5	4.0
055			7.5	5.5	7.5	5.5
075			11	7.5	11	7.5
110			15	11	15	11
150			18.5	15	18.5	15

Global standards

1 Conformity to global standards

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

2 Sink / source logic is standard

Logic input and output terminal can be configured for sink or source logic.

3 Wide input power voltage range

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

Index

Pursuing the Ideal Compact Inverter

WJ200

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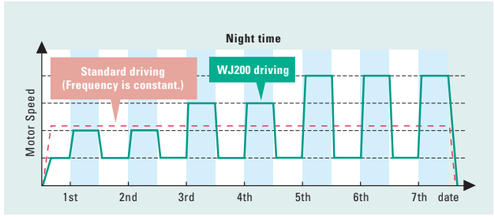
Pursuit of Ease of Use

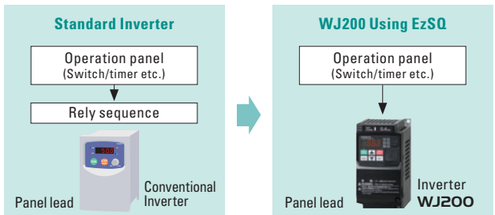
1 Easy sequence [EzSQ] programming function NEW

Sequence operation is realized by downloading to an inverter a program created with Hitachi's EzSQ software. User program can be compiled on EzSQ software on a PC. External components can be simplified or eliminated, resulting in cost-savings.

- EzSQ Example: Energy cost saving by speed reduction.
  - ■Daytime: Motor speed is automatically reduced to reduce demand during peak hours.
  - ■Nighttime: Motor speed is increased to take a advantage of off-peak power rates.

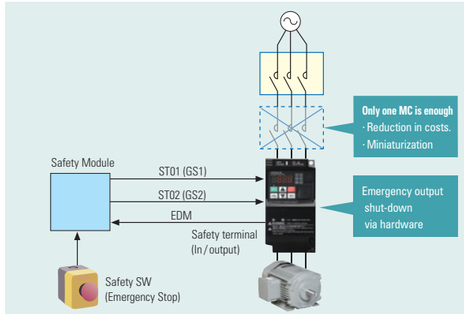
Example of driving program





2 Safe stop function (planning) NEW

WJ200 conforms to the applicable safety standards and corresponds to Machinery Directive of Europe. Shuts down the inverter by hardware, bypassing the CPU, to achieve reliable safe stop function. The safety standard can be met at a low cost.
(ISO13849-1 Category 3 / IEC60204-1 Stop Category 0)

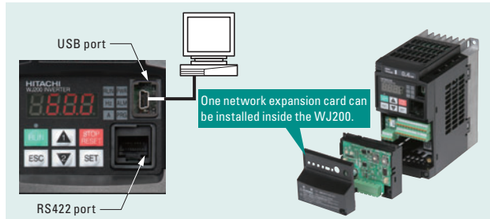


3 Password function NEW

The WJ200 inverter has a password function to prevent changing parameters or to hide some or all parameters.

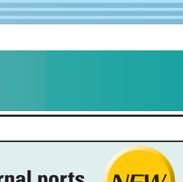
4 Network compatibility & External ports NEW

A serial RS-485 Modbus/RTU port is standard. The WJ200 can communicate via DeviceNet, CompoNet, PROFIBUS and CANopen with optional expansion card (planned). USB (Mini-B connector) port and RS-422 (RJ45 connector) port are standard.



5 Ease of wiring NEW

Screw-less terminals (control circuit terminals) spring-loaded, for use with solid or stranded wire with ferrules.



6 Easy to maintain NEW

Easy selection of displayed parameters

- Data comparison function
  Display parameters changed from default setting.
- Basic display
  Display most frequently used parameters.
- Quick display
  Display 32 user-selected parameters.
- User-changed parameter display
  Store automatically and display the parameters changed by the user (Up to 32 sets); can also be used as change history.
- Active parameter display
  Display those parameters which are enabled.

7 Side-by-side installation

Inverters can be installed with no space between them to save space in the panel.

*Ambient temperature 40°C max., individual mounting.

Ease of Maintenance

1 Long life time components (Design life time 10 years or more*) NEW

Design lifetime 10 Years or more for DC bus capacitors and cooling fan.
Cooling fan ON / OFF control function for longer fan life.

*Ambient temperature : Average 40°C (no corrosive gases, oil mist or dust)
Design lifetime is calculated, and not guaranteed.

2 Life time warning function NEW

WJ200 diagnoses lifetime of DC bus capacitors and cooling fan(s).

3 Easy-removable cooling fan

The cooler fan can be exchanged without special tools.

Top cover can be removed with fingertips.

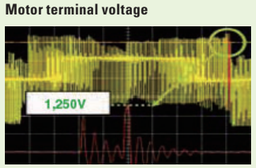
Remove cooling fan after disconnecting power plug.

Environmental Friendliness

1 Micro surge voltage suppress function (Patent registered)

Hitachi original PWM control method limits motor terminal voltage to less than twice inverter DC bus voltage.
Lower than Hitachi motor max. insulation voltage (1,250V)
(During regeneration, the motor terminal voltage may exceed the motor maximum insulation voltage (1,250V))

Motor terminal voltage



E=625V cable:100m

2 EU RoHS compliant

Environment-friendly inverter meets RoHS requirements (ordered items).

3 Improvement of environment

Varnish coating of internal PC board is standard.
(Logic PCB and I / F PCB are excluded.)

Various Versatile Functions

1 Dual rating NEW

WJ200 can be used for both heavy and normal duty. One-frame-size smaller WJ200 can be applicable to certain applications.

2 Watt-hour monitor NEW

Energy consumption is displayed in kwh.

3 Output monitoring (2 terminals) NEW

Two monitor output terminals (Analog 0–10VDC (10-bit), pulse train (0–10VDC, max 32kHz)).

4 Built-in BRD circuit

Built-in BRD circuit for all models (Optional resistor).

5 EzCOM (Peer-to-Peer communication) NEW

WJ200 supports Peer-to-Peer communication between multiple inverters. One administrator inverter is necessary in the network, and the other inverters act as master or slave.

6 Flexible display functions NEW

Automatic return to the initial display: 10 min. after the last key operation, display returns to the initial parameter set.
Display limitation: Show only the contents of display parameter.
Dual monitor: Two arbitrary monitor items can be set. Parameters are switched by up/down keys.

Standard Specifications

1-phase 200V class

Models WJ200-			001SF	002SF	004SF	007SF	015SF	022SF
Applicable motor size *1	kW	VT	0.2	0.4	0.55	1.1	2.2	3.0
		CT	0.1	0.2	0.4	0.75	1.5	2.2
	HP	VT	1/4	1/2	3/4	1.5	3	4
		CT	1/8	1/4	1/2	1	2	3
Rated capacity (kVA)	200V	VT	0.4	0.6	1.2	2.0	3.3	4.1
		CT	0.2	0.5	1.0	1.7	2.7	3.8
	240V	VT	0.4	0.7	1.4	2.4	3.9	4.9
		CT	0.3	0.6	1.2	2.0	3.3	4.5
Input Rating	Rated input voltage (V)		1-phase: 200V-15% to 240V +10%, 50/60Hz ±5%					
	Rated input current (A)	VT	2.0	3.6	7.3	13.8	20.2	24.0
		CT	1.3	3.0	6.3	11.5	16.8	22.0
Output Rating	Rated output voltage (V) *2		3-phase: 200 to 240V (proportional to input voltage)					
	Rated output current (A)	VT	1.2	1.9	3.5	6.0	9.6	12.0
		CT	1.0	1.6	3.0	5.0	8.0	11.0
Minimum value of resistor (Ω)			100	100	100	50	50	35
Weight		kg	1.0	1.0	1.1	1.6	1.8	1.8
		lb	2.2	2.2	2.4	3.5	4.0	4.0

3-phase 200V class

Models WJ200-			001LF	002LF	004LF	007LF	015LF	022LF	037LF	055LF	075LF	110LF	150LF
Applicable motor size *1	kW	VT	0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11	15	18.5
		CT	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
	HP	VT	1/4	1/2	1	1.5	3	4	7.5	10	15	20	25
		CT	1/8	1/4	1/2	1	2	3	5	7.5	10	15	20
Rated capacity (kVA)	200V	VT	0.4	0.6	1.2	2.0	3.3	4.1	6.7	10.3	13.8	19.3	23.9
		CT	0.2	0.5	1.0	1.7	2.7	3.8	6.0	8.6	11.4	16.2	20.7
	240V	VT	0.4	0.7	1.4	2.4	3.9	4.9	8.1	12.4	16.6	23.2	28.6
		CT	0.3	0.6	1.2	2.0	3.3	4.5	7.2	10.3	13.7	19.5	24.9
Input Rating	Rated input voltage (V)		3-phase: 200V-15% to 240V +10%, 50/60Hz ±5%										
	Rated input current (A)	VT	1.2	1.9	3.9	7.2	10.8	13.9	23.0	37.0	48.0	68.0	72.0
		CT	1.0	1.6	3.3	6.0	9.0	12.7	20.5	30.8	39.6	57.1	62.6
Output Rating	Rated output voltage (V) *2		3-phase: 200 to 240V (proportional to input voltage)										
	Rated output current (A)	VT	1.2	1.9	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0
		CT	1.0	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0	47.0	60.0
Minimum value of resistor (Ω)			100	100	100	50	50	35	35	20	17	17	10
Weight		kg	1.0	1.0	1.1	1.2	1.6	1.8	2.0	3.3	3.4	5.1	7.4
		lb	2.2	2.2	2.4	2.6	3.5	4.0	4.4	7.3	7.5	11.2	16.3

3-phase 400V class

Models WJ200-			004HF	007HF	015HF	022HF	030HF	040HF	055HF	075HF	110HF	150HF
Applicable motor size *1	kW	VT	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5
		CT	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15
	HP	VT	1	2	3	4	5	7.5	10	15	20	25
		CT	1/2	1	2	3	4	5	7.5	10	15	20
Rated capacity (kVA)	200V	VT	1.3	2.6	3.5	4.5	5.7	7.3	11.5	15.1	20.4	25.0
		CT	1.1	2.2	3.1	3.6	4.7	6.0	9.7	11.8	15.7	20.4
	240V	VT	1.7	3.4	4.4	5.7	7.3	9.2	14.5	19.1	25.7	31.5
		CT	1.4	2.8	3.9	4.5	5.9	7.6	12.3	14.9	19.9	25.7
Input Rating	Rated input voltage (V)		3-phase: 380V-15% to 480V +10%, 50/60Hz ±5%									
	Rated input current (A)	VT	2.1	4.3	5.9	8.1	9.4	13.3	20.0	24.0	38.0	44.0
		CT	1.8	3.6	5.2	6.5	7.7	11.0	16.9	18.8	29.4	35.9
Output Rating	Rated output voltage (V) *2		3-phase: 380 to 480V (proportional to input voltage)									
	Rated output current (A)	VT	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
		CT	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0
Minimum value of resistor (Ω)			180	180	180	100	100	100	70	70	70	35
Weight		kg	1.5	1.6	1.8	1.9	1.9	2.1	3.5	3.5	4.7	5.2
		lb	3.3	3.5	4.0	4.2	4.2	4.6	7.7	7.7	10.4	11.5

*1: The applicable motor refers to Hitachi standard 3-phase motor (4p). When using other motors, care must be taken to prevent the rated motor current (50/60Hz) from exceeding the rated output current of the inverter.
*2: The output voltage varies as the main supply voltage varies (except when using the AVR function). In any case, the output voltage cannot exceed the input power supply voltage.

General Specifications

Item			General Specifications
Protective housing *3			IP20
Control method			Sinusoidal Pulse Width Modulation (PWM) control
Carrier frequency			2kHz to 15kHz (derating required depending on the model)
Output frequency range *4			0.1 to 400Hz
Frequency accuracy			Digital command: ±0.01% of the maximum frequency Analog command: ±0.2% of the maximum frequency (25°C ±10°C)
Frequency setting resolution			Digital: 0.01Hz; Analog: max. frequency / 1000
Volt. / Freq. characteristic			V/f control (constant torque, reduced torque, free-V/F): base freq. 30Hz – 400Hz adjustable, Sensorless vector control, Closed loop control with motor encoder feedback (only V/f control).
Overload capacity			Dual rating: CT (Heavy duty): 60 sec. @150% VT (Normal duty): 60 sec. @120%
Acceleration / deceleration time			0.01 to 3600 seconds, linear and S-curve accel / decel, second accel / decel setting available
Starting torque			200% @0.5Hz (sensorless vector control)
DC braking			Variable operating frequency, time, and braking force
Input signal	Freq. setting	Operator panel	△▽ keys / Value settings
		External signal *6	0 to 10 VDC (input impedance 10kΩ), 4 to 20mA (input impedance 100Ω), Potentiometer (1k to 2kΩ, 2W)
		Via network	RS485 ModBus RTU, other network option
	FWD / REV run	Operator panel	Run / Stop (Forward / Reverse run change by command)
		External signal *6	Forward run / stop, Reverse run / stop
		Via network	RS485 ModBus RTU, other network option
	Intelligent input terminal 68 functions assignable	Terminals	7 terminals, sink / source changeable by a short bar
		Functions	FW (forward run command), RV (reverse run command), CF1 – CF4 (multi-stage speed setting), JG (jog command), DB (external braking), SET (set second motor), 2CH (2-stage accel. / decel. command), FRS (free run stop command), EXT (external trip), USP (startup function), CS (commercial power switchover), SFT (soft lock), AT (analog input selection), RS (reset), PTC (thermistor thermal protection), STA (start), STP (stop), F/R (forward / reverse), PID (PID disable), PIDC (PID reset), UP (remote control up function), DWN (remote control down function), UDC (remote control data clear), OPE (operator control), SF1 – SF7 (multi-stage speed setting; bit operation), OLR (overload restriction), TL (torque limit enable), TRQ1 (torque limit changeover1), TRQ2 (torque limit changeover2), BOK (Braking confirmation), LAC (LAD cancellation), PCLR (position deviation clear), ADD (add frequency enable), F-TM (force terminal mode), ATR (permission of torque command input), KHC (Cumulative power clear), MI1 – MI7 (general purpose inputs for EzSQ), AHD (analog command hold), CP1 – CP3 (multistage-position switches), ORL (limit signal of zero-return), ORG (trigger signal of zero-return), SPD (speed/position changeover), GS1,GS2 (STO inputs, safety related signals), 485 (Starting communication signal), PRG (executing EzSQ program), HLD (retain output frequency), ROK (permission of run command), EB (rotation direction detection of B-phase), DISP (display limitation), NO (no function)
Output signal	Intelligent output terminal 48 functions assignable	Functions	RUN (run signal), FA1 – FA5 (frequency arrival signal), OL,OL2 (overload advance notice signal), OD (PID deviation error signal), AL (alarm signal), OTQ (over / under torque threshold), UV (under-voltage), TRQ (torque limit signal), RNT (run time expired), ONT (power ON time expired), THM (thermal warning), BRK (brake release), BER (brake error), ZS (0Hz detection), DSE (speed deviation excessive), POK (positioning completion), ODc (analog voltage input disconnection), OIDc (analog current input disconnection), FBV (PID second stage output), NDc (network disconnect detection), LOG1 – LOG3 (Logic output signals), WAC (capacitor life warning), WAF (cooling fan warning), FR (starting contact), OHF (heat sink overheat warning), LOC (Low load), MO1 – MO3 (general outputs for EzSQ), IRDY (inverter ready), FWR (forward operation), RVR (reverse operation), MJA (major failure), WCO (window comparator O), WCOI (window comparator OI), FREF (frequency command source), REF (run command source), SETM (second motor in operation), EDM (STO (safe torque off) performance monitor), OP (option control signal), NO (no function)
	Monitor output (analog)		Output freq., output current, output torque, output voltage, input power, thermal load ratio, LAD freq., heat sink temperature, general output (EzSQ)
	Pulse train output (0 – 10VDC, 32kHz max.)		[PWM output] Output freq., output current, output torque, output voltage, input power, thermal load ratio, LAD freq., heat sink temperature, general output (EzSQ) [Pulse train output] Output frequency, output current, pulse train input monitor
Alarm output contact			ON for inverter alarm (1c contacts, both normally open or closed available.)
Other functions			Free-V/f, manual / automatic torque boost, output voltage gain adjustment, AVR function, reduced voltage start, motor data selection, auto-tuning, motor stabilization control, reverse running protection, simple position control, simple torque control, torque limiting, automatic carrier frequency reduction, energy saving operation, PID function, non-stop operation at instantaneous power failure, brake control, DC injection braking, dynamic braking (BRD), frequency upper and lower limiters, jump frequencies, curve accel and decel (S, U, inversed U,EL-S), 16-stage speed profile, fine adjustment of start frequency, accel and decel stop, process jogging, frequency calculation, frequency addition, 2-stage accel / decel, stop mode selection, start / end freq., analog input filter, window comparators, input terminal response time, output signal delay / hold function, rotation direction restriction, stop key selection, software lock, safe stop function, scaling function, display restriction, password function, user parameter, initialization, initial display selection, cooling fan control, warning, trip retry, frequency pull-in restart, frequency matching, overload restriction, over current restriction, DC bus voltage AVR
Protective function			Over-current, over-voltage, under-voltage, overload, brake resistor overload, CPU error, memory error, external trip, USP error, ground fault detection at power on, temperature error, internal communication error, driver error, thermistor error, brake error, safe stop, overload at low speed, modbus communication error, option error, encoder disconnection, speed excessive, EzSQ command error, EzSQ nesting error, EzSQ execution error, EzSQ user trip
Operating environment		Temperature	Operating (ambient): -10 to 50°C / Storage: -20 to 65°C *7
		Humidity	20 to 90% humidity (non-condensing)
		Vibration *8	5.9m/s^2 (0.6G), 10 to 55 Hz
		Location	Altitude 1,000m or less, indoors (no corrosive gasses or dust)
Coating color			Black
Options			Remote operator unit, cables for the units, braking unit, braking resistor, AC reactor, DC reactor, EMC filter

*3: The protection method conforms to JEM 1030.

*4: To operate the motor beyond 50 / 60Hz, consult the motor manufacturer for the maximum allowable rotation speed.

*5: The braking torque via capacitive feedback is the average deceleration torque at the shortest deceleration (stopping from 50 / 60Hz as indicated). It is not continuous regenerative braking torque. The average deceleration torque varies with motor loss. This value decreases when operating beyond 50Hz. If a large regenerative torque is required, the optional regenerative braking unit and a resistor should be used.

*6: The frequency command is the maximum frequency at 9.8V for input voltage 0 to 10VDC, or at 19.6mA for input current 4 to 20mA. If this characteristic is not satisfactory for your application, contact your Hitachi representative.

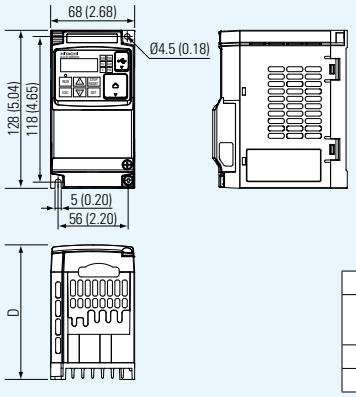
*7: The storage temperature refers to the short-term temperature during transportation.

*8: Conforms to the test method specified in JIS C0040 (1999). For the model types excluded in the standard specifications, contact your Hitachi sales representative.

Dimensions

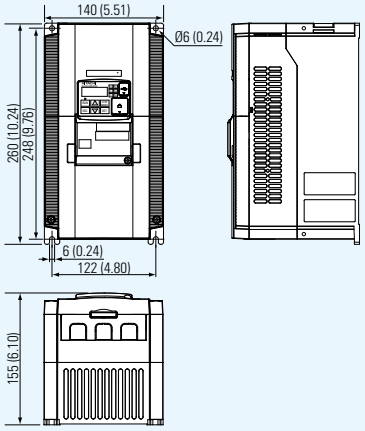
[Unit: mm(inch)]
Inches for reference only

· **WJ200-001LF–007LF**
· **WJ200-001SF–004SF**

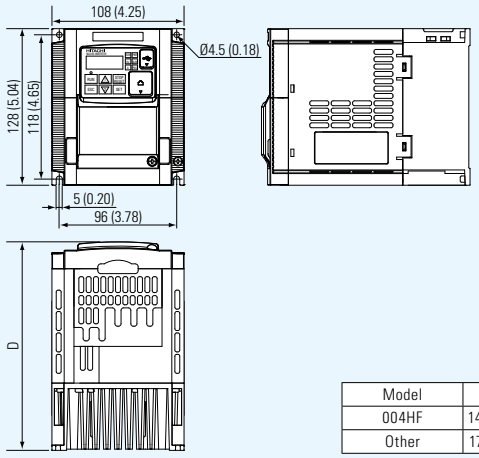


Model	D
001LF, 002LF 001SF, 002SF	109 (4.29)
004LF, 004SF	122.5 (4.82)
007LF	145.5 (5.73)

· **WJ200-055LF**
· **WJ200-075LF**
· **WJ200-055HF**
· **WJ200-075HF**

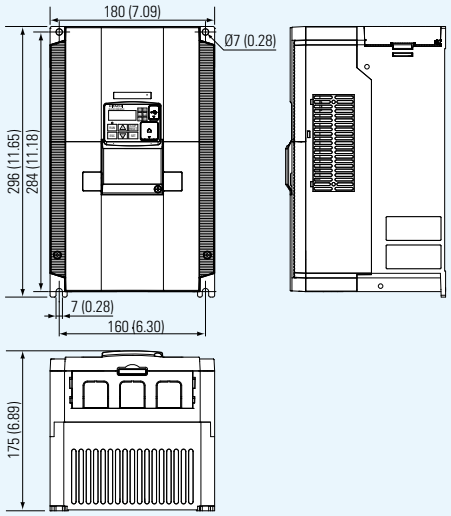


· **WJ200-015LF, 022LF**
· **WJ200-007SF–022SF**
· **WJ200-004HF–030HF**

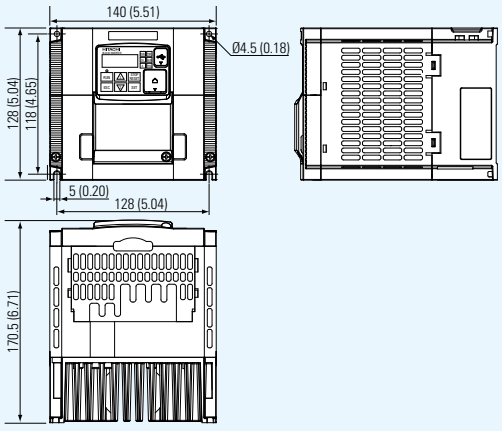


Model	D
004HF	143.5 (5.65)
Other	170.5 (6.71)

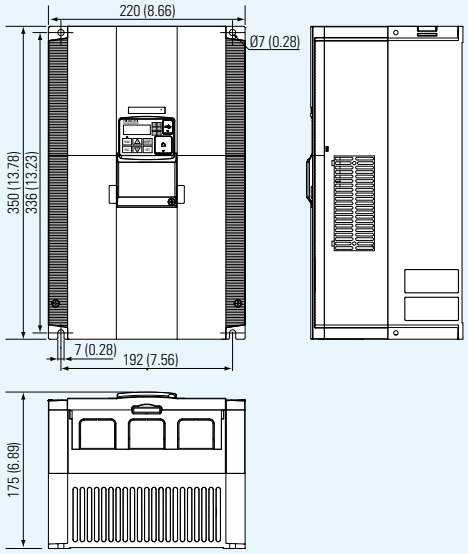
· **WJ200-110LF**
· **WJ200-110HF**
· **WJ200-150HF**



· **WJ200-037LF**
· **WJ200-040HF**



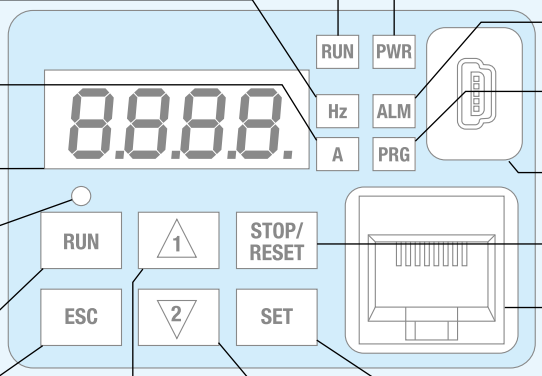
· **WJ200-150LF**



Operation and Programming

Operation Panel

WJ200 Series can be easily operated with the digital operator provided as standard.



(4) Run LED
ON when inverter is in RUN mode.

(5) Monitor LED [Hz]
ON (Green) when the displayed data is frequency related.

(6) Monitor LED [A]
ON (Green) when the displayed data is current related.

(8) 7-segment LED
Shows each parameter, monitors etc.

(7) Run command LED
ON (Green) when the Run command is set to the operator. (Run key is enabled.)

(9) RUN key
Makes inverter run.

(11) Escape key
Go to the top of next function group, when function mode is displayed.

(1) POWER LED
ON (Green) while the inverter is receiving input power.

(2) ALARM LED
ON (Red) when the inverter trips.

(3) Program LED
ON (Green) when the display shows editable parameter.

(15) USB port
USB connector (mini-B) for PC communication.

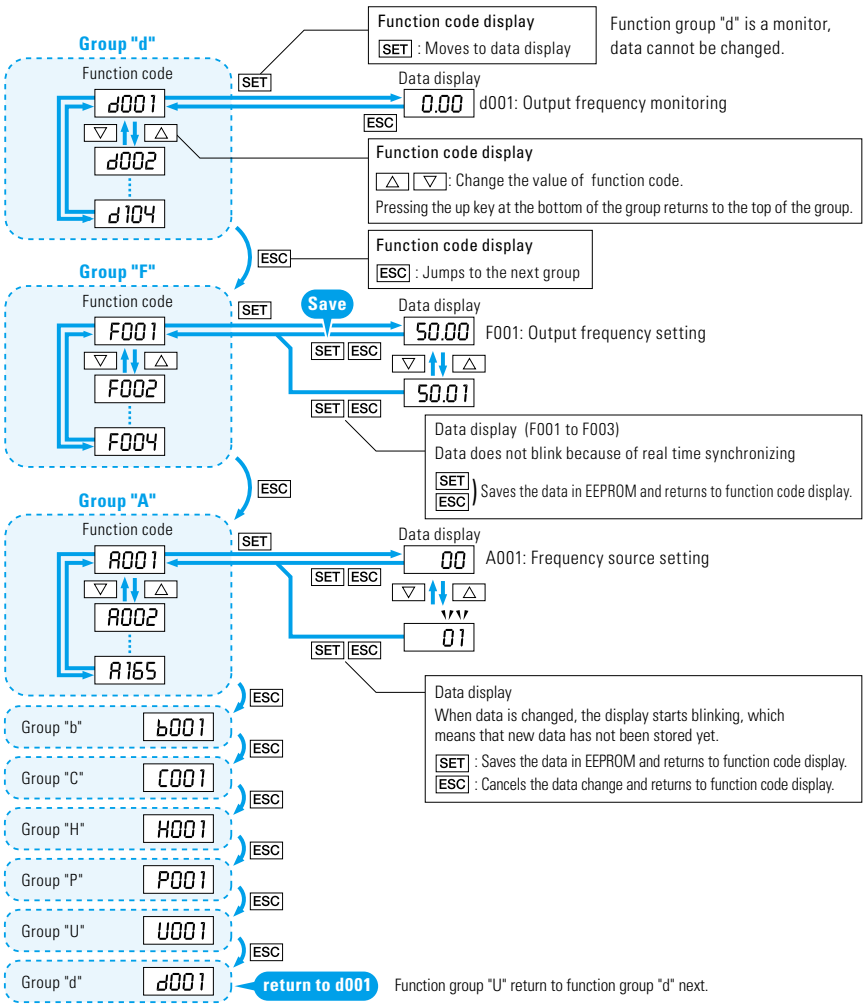
(10) Stop / reset key
Makes inverter stop.

(16) RS-422 port
RJ45 jack for remote operator.

(14) Set key
Function code: Moves to the data display.
Data code: Press to write the new value to EEPROM.

(12) Up key (13) Down key
Press up or down to sequence through parameters and functions shown on the display, and increment/decrement values.

Keypad Navigation Map



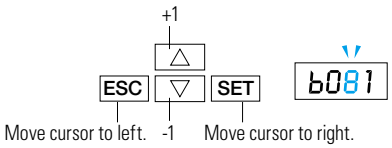
Single-Digit Edit Mode

If a target function code or data is far from current position, using the single-digit edit mode makes it quicker to navigate there. Pressing the up key and down key at the same time brings you into the digit-by-digit navigation mode.

Step1: Press both up key and down key at the same.

1st digit will be blinking.

Step2: The blinking digit is moved by the ESC and SET key right and left. Use up/down keys to change the value of the digit.



Step3: When the least significant digit is blinking, the SET key selects that parameter.

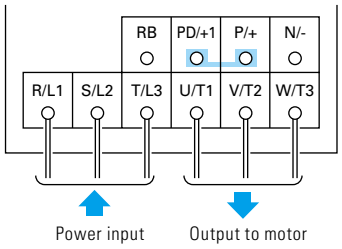
Terminal (Arrangements / Functions)

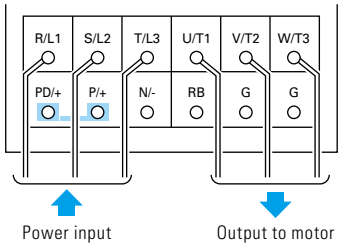
Terminal Description

Symbol	Terminal Name
R/L1, S/L2, T/L3	Main power supply input terminals
U/T1, V/T2, W/T3	Inverter output terminals
PD/+1, P/+	DC reactor connection terminals

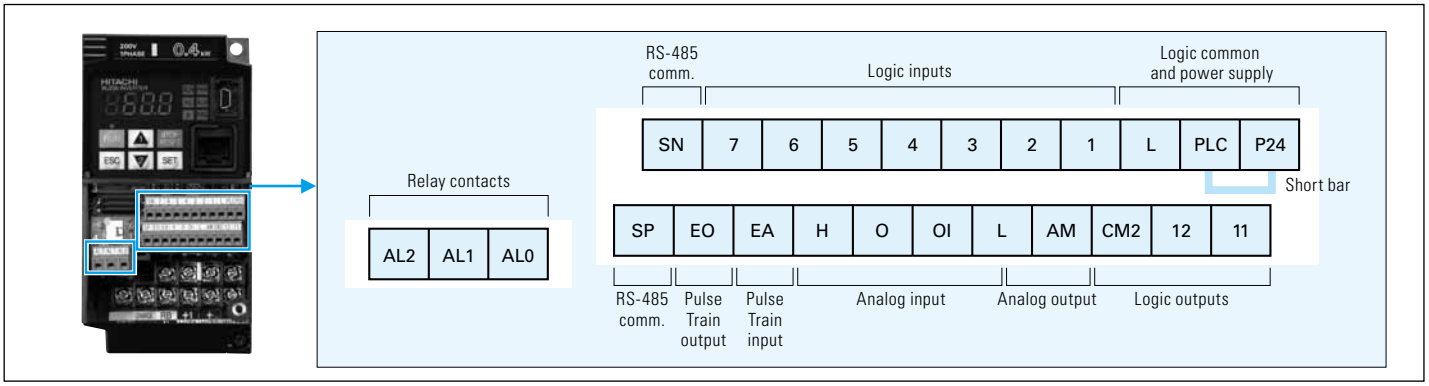
Symbol	Terminal Name
P/+, RB	External braking resistor connection terminals
P/+, N/-	External braking unit connection terminals
G	Ground connection terminal

Terminal Arrangement and Screw Diameter

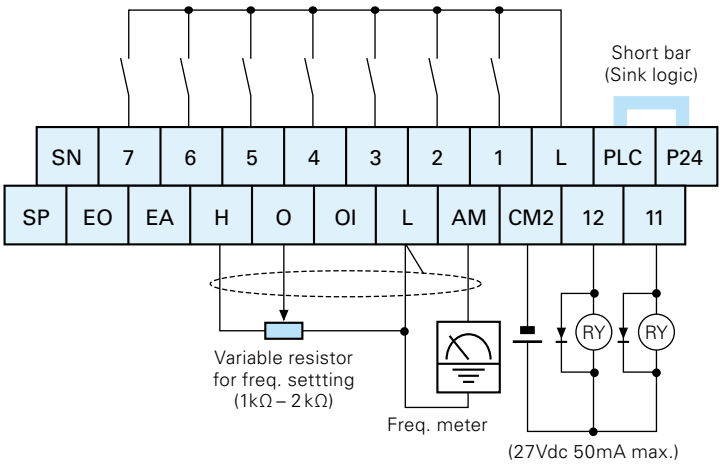
Terminal	Model	Screw Diameter
	001 – 007LF 001 – 004SF	M3.5
	015 – 037LF 007 – 022SF 004 – 040HF	M4

Terminal	Model	Screw Diameter
	055 – 075LF 055 – 075HF	M5
	110LF 110 – 150HF	M6
	150LF	M8

Terminal Arrangement of Control Circuit Terminals



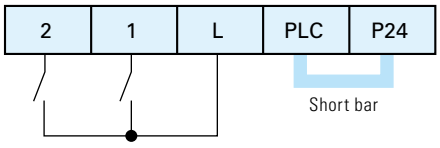
Wiring sample of control logic terminal (Sink logic)



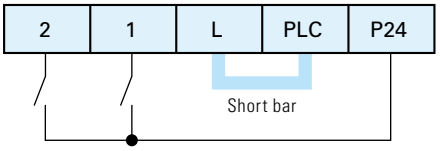
Sink / source logic of intelligent input terminals

Sink or source logic is switched by a short bar as below.

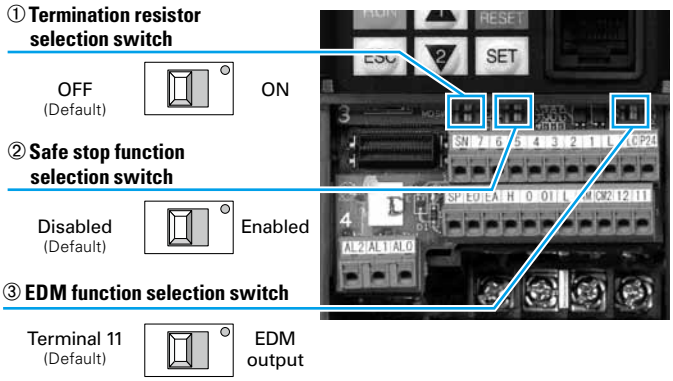
Sink logic



Source logic



Hardware Switches



Switch Name	Switch Name Description
① Termination resistor selection switch	Termination resistor for the RS-485 communication port. WJ200 has a built-in 200Ω resistor activated by a DIP switch.
② Safe stop function selection switch	To enable the Safe stop function, set the DIP switch ON. Before operating switch, make sure that the input power supply is off.
③ EDM function selection switch	To enable the EDM function, set the DIP switch ON. Before operating switch, make sure that the input power supply is off.

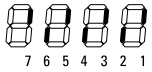
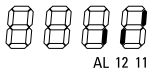
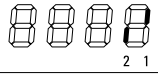
Terminal Functions

			Symbol	Terminal Name	Description / Ratings
Analog	Power supply		L	GND for analog signals	Sum of [OI], [O], and [H] currents (return)
			H	+10V analog reference	10VDC nominal, 10mA max.
	Frequency setting		O	Analog voltage input	0 to 9.8 VDC range, 10 VDC nominal,input impedance 10 kΩ
			OI	Analog current input	4 to 19.6 mA range, 20 mA nominal, input impedance 100 Ω
	Sensor input		5/PTC	Motor thermistor input	Connect motor thermistor between PTC and L terminal to detect the motor temperature. Set 19 in C005
	Monitor Output		AM	Analog voltage output	0 to 10VDC 2mA max.
Digital	Power supply		L	GND for logic inputs	Sum of input [1] – [7] currents (return)
			P24	+24V for logic inputs	24VDC, 30mA. (do not short to terminal L)
			PLC	Intelligent input common	Source type (connecting [P24] to [1] – [7] turns each input ON). Sink type (connecting [L] to [1] – [7] makes each input ON.)
	Input	Contact	7 6 5 4 3 2 1	Discrete logic inputs (Terminal [3],[4],[5] and [7] have dual function. See following description and related pages for the details.)	[Input ON condition] Voltage between each terminal and PLC: 18VDC min. [Input OFF condition] Voltage between each terminal and PLC: 3VDC max. Allowable voltage between each terminal and PLC: 27VDC max. (use PLC or an external supply referenced to terminal L)
			3/GS1	Safe stop input GS1	Functionality is based on ISO13849-1 See appendix for the details.
			4/GS2	Safe stop input GS2	
		Pulse	EA	Pulse train input A	32kHz max. Common is [L]
			7/EB	Pulse train input B	2kHz max. Common is [PLC]
	Output	Open collector	11/EDM	Discrete logic outputs [11] (Terminal [11] has dual function. See following description and related pages for the details.)	50mA max. ON state current, 27 VDC max. OFF state voltage Common is CM2 In case the EDM is selected, the functionality is based on ISO13849-1 4VDC max. ON state voltage depression
			11 12	Discrete logic outputs [12]	50mA max. ON state current, 27 VDC max. OFF state voltage Common is CM2.
			CM2	GND for logic output	100 mA: [11], [12] current return
		Relay	AL0	Relay common contact	Maximum capacity of relays AL1 – AL0: 250VAC, 2A (R load)/ 0.2A (L load) 30VDC, 3A (R load)/ 0.6A (L load) AL2 – AL0: 250VAC, 1A (R load)/ 0.2A (L load) 30VDC, 1A (R load)/ 0.2A (L load) Minimum capacity of relays AL1 – AL0, AL2 – AL0: 100VAC, 10mA / 5VDC, 100mA
			AL1	Relay contact, normally open	
			AL2	Relay contact, normally closed	
		Pulse	EO	Pulse train output	10VDC 2mA max. 32kHz max.
Serial communication port			SP, SN	Serial communication terminal	For RS485 Modbus communication.

Function List

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

[○ = Allowed × = Not parmitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Monitor mode	d001	Output frequency monitoring	0.00 to 99.99 / 100.0 to 400.0 [Hz]	○	○	—
	d002	Output current monitoring	0.0 to 655.3 [A]	—	—	—
	d003	Rotation direction minitoring	F (Forward) / o (Stop) / r (Reverce)	—	—	—
	d004	Process variable (PV), PID feedback monitoring	0.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. / 1000 to 9999 (10000 to 99990) / Γ100 to Γ999 (100000 to 999000)	—	—	—
	d005	Intelligent input terminal status	(Example) 7, 5, 3, 1 : ON 6, 4, 2 : OFF  ON OFF	—	—	—
	d006	Intelligent output terminal status	(Example) 11 : ON AL, 12 : OFF  ON OFF	—	—	—
	d007	Scaled output frequency monitoring	0.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. / 1000 to 3999	○	○	—
	d008	Actual-frequency monitoring	-400. to -100. / -99.9 to -10.0 / -9.99 to -0.00 / 0.00 to 99.99 / 100.0 to 400.0 [Hz]	—	—	—
	d009	Torque command monitoring	-200 to +200 [%]	—	—	—
	d010	Torque bias monitoring	-200 to +200 [%]	—	—	—
	d012	Torque monitoring	-200 to +200 [%]	—	—	—
	d013	Output voltage monitoring	0.0 to 600.0 [V]	—	—	—
	d014	Power monitoring	0.0 to 999.9 [kW]	—	—	—
	d015	Cumulative power monitoring	0.0 to 999.9 / 1000. to 9999. / 1000 to 9999 (10000 to 99990) / Γ100 to Γ999 (100000 to 999000)	—	—	—
	d016	Cumulative operation RUN time monitoring	0. to 9999. / 1000 to 9999 (10000 to 99990) / Γ100 to Γ999 (100000 to 999000) [hr]	—	—	—
	d017	Cumulative power-on time monitoring	0. to 9999. / 1000 to 9999 (10000 to 99990) / Γ100 to Γ999 (100000 to 999000) [hr]	—	—	—
	d018	Heat sink temperature monitoring	-20.0 to 150.0 [°C]	—	—	—
	d022	Life-check monitoring	1: Capacitor on main circuit board 2: cooling-fan  Lifetime expired Normal	—	—	—
	d023	EzSQ program counter	0 to 1024	—	—	—
	d024	EzSQ program number	0000 to 9999	—	—	—
	d025	User monitor 1	-2147483647 to 2147483647	—	—	—
	d026	User monitor 2	-2147483647 to 2147483647	—	—	—
	d027	User monitor 3	-2147483647 to 2147483647	—	—	—
	d029	Position setting monitor	-268435455 to 268435455	—	—	—
	d030	Position feedback monitor	-268435455 to 268435455	—	—	—
	d050	Dual monitor	Displays two different data configured in b160 and b161.	—	—	—
	d060	Inverter mode monitor	Displays currently selected inverter mode : I-C / I-V	—	—	—
	d080	Trip Counter	0 to 65535	—	—	—
	d081 I d086	Trip info. 1–6 (factor)	Factor code	—	—	—
	d090	Warning monitor	Warning code	—	—	—
	d102	DC voltage monitoring (across P and N)	0.0 to 999.9 / 1000. [V]	—	—	—
	d103	BRD load factor monitoring	0.0 to 100.0 [%]	—	—	—
	d104	Electronic thermal overload monitoring	0.0 to 100.0 [%]	—	—	—
Setting mode	F001	Output frequency setting	0 / "start frequency" to "maximum frequency" [Hz]	○	○	0.00
	F002	Acceleration (1) time setting	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	F202	Acceleration (1) time setting, 2nd motor	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	F003	Deceleration (1) time setting	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	F203	Deceleration (1) time setting, 2nd motor	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	F004	Keypad Run key routing	00 (Foward) / 01 (Reverce)	×	×	00
Basic settings	A001	Frequency source setting	00 (keypad potentiometer) / 01 (control circuit terminal block) / 02 (digital operator) / 03 (Modbus) / 04 (option) / 06 (pulse train input) / 07 (easy sequence) / 10 (operation function result)	×	×	02
	A201	Frequency source setting, 2nd motor		×	×	02
	A002	Run command source setting	01 (control circuit terminal block) / 02 (digital operator) / 03 (Modbus) / 04 (option)	×	×	02
	A202	Run command source setting, 2nd motor		×	×	02
	A003	Base frequency setting	30.0 to "maximum frequency (1st)" [Hz]	×	×	60
	A203	Base frequency setting, 2nd motor	30.0 to "maximum frequency (2nd)" [Hz]	×	×	60
	A004	Maximum frequency setting	"Base frequency (1st)" to 400.0 [Hz]	×	×	60
	A204	Maximum frequency setting, 2nd motor		×	×	60
Analog input setting	A005	[AT] selection	00 (switching between O and OI terminals) / 02 (switching between O terminal and keypad potentiometer) / 03 (switching between OI terminal and keypad potentiometer)	×	×	00
	A011	Pot./O-L input active range start frequency	0.00 to 99.99/100.0 to 400.0 [Hz]	×	○	0.00
	A012	Pot./O-L input active range end frequency	0.00 to 99.99/100.0 to 400.0 [Hz]	×	○	0.00
	A013	Pot./O-L input active range start voltage	0 to 100 [%]	×	○	0
	A014	Pot./O-L input active range end voltage	0 to 100 [%]	×	○	100
	A015	Pot./O-L input start frequency enable	00 (A011) / 01 (0Hz)	×	○	01
	A016	External frequency filter time constant	1 to 30 / 31	×	○	8
	A017	Easy sequence function selection	00 (disabled) / 01 (PRG terminal) / 02 (Always)	○	○	00

[○ = Allowed × = Not permitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Multispeed and Jogging frequency setting	A019	Multi-speed operation selection	00 (Binary mode) / 01 (Bit mode)	×	×	00
	A020	Multi-speed 0 setting	0.00 / "start frequency" to "maximum frequency (1st)" [Hz]	○	○	0.00
	A220	Multi-speed 0 setting, 2nd motor	0.00 / "start frequency" to "maximum frequency (2nd)" [Hz]	○	○	0.00
	A021 I A035	Multi-speed 1 – 15 setting	0.00 / "start frequency" to "maximum frequency" [Hz]	○	○	0.00
	A038	Jog frequency setting	"start frequency" to 9.99 [Hz]	○	○	6.00
	A039	Jog stop mode	00 (Free-run stop [invalid during run]) / 01 (Controlled deceleration [invalid during run]) / 02 (DC braking to stop [invalid during run]) / 03 (Free-run stop [valid during run]) 04 (Controlled deceleration [valid during run]) 05 (DC braking to stop [valid during run])	×	○	04
V/f Characteristic	A041	Torque boost select	00 (manual torque boost) / 01 (automatic torque boost)	×	×	00
	A241	Torque boost select, 2nd motor		×	×	00
	A042	Manual torque boost value	0.0 to 20.0 [%]	○	○	1.0
	A242	Manual torque boost value, 2nd motor	0.0 to 20.0 [%]	○	○	1.0
	A043	Manual torque boost frequency adjustment	0.0 to 50.0 [%]	○	○	5.0
	A243	Manual torque boost frequency adjustment, 2nd motor	0.0 to 50.0 [%]	○	○	5.0
	A044	V/f characteristic curve selection	00 (VC) / 01 (VP) / 02 (free V/f) / 03 (SLV)	×	×	00
	A244	V/f characteristic curve selection, 2nd motor	00 (VC) / 01 (VP) / 02 (free V/f) / 03 (SLV)	×	×	00
	A045	V/f gain setting	20 to 100 [%]	○	○	100
	A245	V/f gain setting, 2nd motor	20 to 100 [%]	○	○	100
	A046	Voltage compensation gain for automatic torque boost	0 to 255	○	○	100
	A246	Voltage compensation gain for automatic torque boost, 2nd motor	0 to 255	○	○	100
	A047	Slip compensation gain for automatic torque boost	0 to 255	○	○	100
	A247	Slip compensation gain for automatic torque boost, 2nd motor	0 to 255	○	○	100
DC braking	A051	DC braking enable	00 (disabled) / 01 (enabled) / 02 (output freq < [A052])	×	○	00
	A052	DC braking frequency setting	0.00 to 60.00 [Hz]	×	○	0.50
	A053	DC braking wait time	0.0 to 5.0 [s]	×	○	0.0
	A054	DC braking force for deceleration	0 to 100 / 70 [%] (CT / VT)	×	○	50
	A055	DC braking time for deceleration	0.0 to 60.0 [s]	×	○	0.5
	A056	DC braking / edge or level detection for [DB] input	00 (edge operation) / 01 (level operation)	×	○	01
	A057	DC braking force at start	0 to 100 / 70 [%] (CT / VT)	×	○	0
	A058	DC braking time at start	0.0 to 60.0 [s]	×	○	0.0
	A059	Carrier frequency during DC braking	2.0 to 15.0 / 10.0 [kHz] (CT / VT)	×	○	5.0
Frequency upper/lower limit and Jump frequency	A061	Frequency upper limit setting	0.00 / A062 to A004 [Hz]	×	○	0.00
	A261	Frequency upper limit setting, 2nd motor	0.00 / A262 to A204 [Hz]	×	○	0.00
	A062	Frequency lower limit setting	0.00 / b082 to A061 [Hz]	×	○	0.00
	A262	Frequency lower limit setting, 2nd motor	0.00 / b082 to A261 [Hz]	×	○	0.00
	A063	Jump (center) frequency setting 1	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A064	Jump (hysteresis) frequency width setting 1	0.00 to 10.00 [Hz]	×	○	0.50
	A065	Jump (center) frequency setting 2	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A066	Jump (hysteresis) frequency width setting 2	0.00 to 10.00 [Hz]	×	○	0.50
	A067	Jump (center) frequency setting 3	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A068	Jump (hysteresis) frequency width setting 3	0.00 to 10.00 [Hz]	×	○	0.50
	A069	Acceleration stop frequency setting	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A070	Acceleration stop time setting	0.0 to 60.0 [s]	×	○	0.0
PID control	A071	PID enable	00 (disabled) / 01 (enabled) / 02 (enabled inverted-data output)	×	○	00
	A072	PID proportional gain	0.00 to 25.00	○	○	1.00
	A073	PID integral time constant	0.0 to 999.9 / 1000. to 3600. [s]	○	○	1.0
	A074	PID derivative time constant	0.00 to 99.99 / 100.0 [s]	○	○	0.00
	A075	PV scale conversion	0.01 to 99.99	×	○	1.00
	A076	PV source setting	00 (input via OI) / 01 (input via O) / 02 (external communication) / 03 (pulse train frequency input) / 10 (operation result output)	×	○	00
	A077	Reverse PID action	00 (OFF) / 01 (ON)	×	○	00
	A078	PID output limit	0.0 to 100.0 [%]	×	○	0.0
	A079	PID feed forward selection	00 (disabled) / 01 (O input) / 02 (OI input)	×	○	00
AVR function	A081	AVR function select	00 (always on) / 01 (always off) / 02 (off during deceleration)	×	×	02
	A281	AVR function select, 2nd motor	00 (always on) / 01 (always off) / 02 (off during deceleration)	×	×	02
	A082	AVR voltage select	200 V class : 200 / 215 / 220 / 230 / 240 (V) 400 V class : 380 / 400 / 415 / 440 / 460 / 480 (V)	×	×	200 / 400
	A282	AVR voltage select, 2nd motor	200 V class : 200 / 215 / 220 / 230 / 240 (V) 400 V class : 380 / 400 / 415 / 440 / 460 / 480 (V)	×	×	200 / 400
	A083	AVR filter time constant	0.000 to 9.999 / 10.00 [s]	×	○	0.300
	A084	AVR deceleration gain	50 to 200 [%]	×	○	100

Function List

[○ = Allowed × = Not parmitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Operation mode and Accel. / Decel. function	A085	Operation mode selection	00 (normal operation), / 01 (energy-saving operation)	×	×	00
	A086	Energy saving mode tuning	0.0 to 100.0 [%]	○	○	50.0
	A092	Acceleration (2) time setting	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	A292	Acceleration (2) time setting, 2nd motor	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	A093	Deceleration (2) time setting	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	A293	Deceleration (2) time setting, 2nd motor	0.01 to 99.99 / 100.0 to 999.9 / 1000. to 3600. [s]	○	○	10.00
	A094	Select method to switch to Acc2 / Dec2 profile	00 (switching by 2CH terminal) / 01 (switching by setting) / 02 (Forward and reverse)	×	×	00
	A294	Select method to switch to Acc2 / Dec2 profile, 2nd motor		×	×	00
	A095	Acc1 to Acc2 frequency transition point	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	×	0.00
	A295	Acc1 to Acc2 frequency transition point, 2nd motor	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	×	0.00
	A096	Dec1 to Dec2 frequency transition point	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	×	0.00
	A296	Dec1 to Dec2 frequency transition point, 2nd motor	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	×	0.00
	A097	Acceleration curve selection	00 (linear) / 01 (S curve) / 02 (U curve) / 03 (inverted-U curve) / 04 (EL-S curve)	×	×	01
	A098	Deceleration curve selection		×	×	01
External frequency tuning	A101	[OI]-[L] input active range start frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A102	[OI]-[L] input active range end frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A103	[OI]-[L] input active range start current	0 to 100 [%]	×	○	20
	A104	[OI]-[L] input active range end voltage	0 to 100 [%]	×	○	100
	A105	[OI]-[L] input start frequency enable	00 (A101) / 01 (0Hz)	×	○	00
Accel./ Decel. curve	A131	Acceleration curve constant setting (for S, U, Inverse U)	01 to 10	×	○	02
	A132	Deceleration curve constant setting (for S, U, Inverse U)	01 to 10	×	○	02
Operation target frequency	A141	A input select for calculate function	00 (digital operator) / 01 (keypad potentiometer) / 02 (input via O) / 03 (input via OI) / 04 (external communication) / 05 (option) / 07 (pulse train frequency input)	×	○	02
	A142	B input select for calculate function		×	○	03
	A143	Calculation symbol	00 (A141 + A142) / 01 (A141 - A142) / 02 (A141 × A142)	×	○	00
	A145	ADD frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A146	ADD direction select	00 (frequency command + A145) / 01 (frequency command - A145)	×	○	00
Acceleration and deceleration	A150	Curvature of EL-S-curve at the start of acceleration	0 to 50 [%]	×	×	10
	A151	Curvature of EL-S-curve at the end of acceleration	0 to 50 [%]	×	×	10
	A152	Curvature of EL-S-curve at the start of deceleration	0 to 50 [%]	×	×	10
	A153	Curvature of EL-S-curve at the end of deceleration	0 to 50 [%]	×	×	10
Others	A154	Deceleration stop frequency setting	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A155	Deceleration stop time setting	0.0 to 60.0 [s]	×	○	0.0
PID control	A156	PID sleep function action threshold	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A157	PID sleep function action delay time	0.0 to 25.5 [s]	×	○	0.0
Frequency trimming	A161	[VR] input active range start frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A162	[VR] input active range end frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	A163	[VR] input active range start current	0 to 100 [%]	×	○	0
	A164	[VR] input active range end voltage	0 to 100 [%]	×	○	100
	A165	[VR] input start frequency enable	00 (A161) / 01 (0Hz)	×	○	01
Restart after instantaneous power failure	b001	Selection of automatic restart mode	00 (tripping) / 01 (starting with 0 Hz) / 02 (starting with matching frequency) / 03 (tripping after deceleration and stopping with matching frequency) / 04 (restarting with active matching frequency)	×	○	00
	b002	Allowable under-voltage power failure time	0.3 to 25.0 [s]	×	○	1.0
	b003	Retry wait time before motor restart	0.3 to 100.0 [s]	×	○	1.0
	b004	Instantaneous power failure / under-voltage trip alarm enable	00 (disabled) / 01 (enabled) / 02 (disabled during stopping and decelerating to stop)	×	○	00
	b005	Number of restarts on power failure / under-voltage trip events	00 (16 times) / 01 (unlimited)	×	○	00
	b007	Restart frequency threshold	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	b008	Selection of retry after tripping	00 (tripping) / 01 (starting with 0 Hz) / 02 (starting with matching frequency) / 03 (tripping after deceleration and stopping with matching frequency) / 04 (restarting with active matching frequency)	×	○	00
	b010	Selection of retry count after undervoltage	1 to 3 [times]	×	○	3
	b011	Start freq. to be used in case of freq. matching restart	0.3 to 100.0 [s]	×	○	1.0
Electronic Thermal	b012	Level of electronic thermal setting	Set a level between 20% and 100% for the rated inverter current [A]	×	○	Rated current of inverter
	b212	Level of electronic thermal setting, 2nd motor	Set a level between 20% and 100% for the rated inverter current [A]	×	○	Rated current of inverter
	b013	Electronic thermal characteristic	00 (reduced-torque characteristic) / 01 (constant-torque characteristic) / 02 (free setting)	×	○	01
	b213	Electronic thermal characteristic, 2nd motor		×	○	01
	b015	Free setting, electronic thermal frequency (1)	0 to "electronic thermal frequency (2)" [Hz]	×	○	0
	b016	Free setting, electronic thermal current (1)	Range is 0 to inverter rated current Amps [A]	×	○	0.00
	b017	Free setting, electronic thermal frequency (2)	"electronic thermal frequency (1)" to "electronic thermal frequency (3)" [Hz]	×	○	0
	b018	Free setting, electronic thermal current (2)	Range is 0 to inverter rated current Amps [A]	×	○	0.00
	b019	Free setting, electronic thermal frequency (3)	"electronic thermal frequency (2)" to 400 [Hz]	×	○	0
	b020	Free setting, electronic thermal current (3)	Range is 0 to inverter rated current Amps [A]	×	○	0.00

[○ = Allowed × = Not permitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Overload restriction	b021	Overload restriction operation mode	00 (disabled) / 01 (enabled during acceleration and constant-speed operation) / 02 (enabled during constant-speed operation) / 03 (enabled during acceleration and constant-speed operation [speed increase at regeneration])	×	○	01
	b221	Overload restriction operation mode, 2nd motor		×	○	01
	b022	Overload restriction level setting	Set a level between 20% and 200% / 150% for the rated inverter current [A] (CT / VT)	×	○	150% of Rated current
	b222	Overload restriction level setting, 2nd motor		×	○	
	b023	Deceleration rate at overload restriction	0.1 to 999.9 / 1000. to 3000. [s]	×	○	1.0
	b223	Overload restriction operation mode, 2nd motor	0.1 to 999.9 / 1000. to 3000. [s]	×	○	1.0
	b024	Overload restriction operation mode 2	00 (disabled) / 01 (enabled during acceleration and constant-speed operation)/ 02 (enabled during constant-speed operation) / 03 (enabled during acceleration and constant-speed operation [speed increase at regeneration])	×	○	01
	b025	Overload restriction level 2 setting	Set a level between 20% and 200% / 150% for the rated inverter current [A] (CT / VT)	×	○	150% of Rated current
	b026	Deceleration rate 2 at overload restriction	0.1 to 999.9 / 1000. to 3000. [s]	×	○	1.0
	b027	OC suppression selection	00 (disabled) / 01 (enabled)	×	○	01
	b028	Current level of active freq. matching restart setting	Set a level between 20% and 200% / 150% for the rated inverter current [A] (CT / VT)	×	○	Rated current of inverter
	b029	Deceleration rate of frequency matching restart setting	0.1 to 999.9 / 1000. to 3000. [s]	×	○	0.5
	b030	Start freq. to be used in case of active freq. Matching restart	00 (frequency at the last shutoff) / 01 (maximum frequency) / 02 (set frequency)	×	○	00
Lock	b031	Software lock mode selection	00 (all parameters except b031 are locked when [SFT] terminal is ON) / 01 (all parameters except b031 and output frequency F001 are locked when [SFT] terminal is ON) / 02 (all parameters except b031 are locked) / 03 (all parameters except b031 and output frequency F001 are locked) / 10 (High level access including b031)	×	○	01
Others	b033	Motor cable length parameter	5 to 20	○	○	10
	b034	Run / power ON warning time	0 to 9999. (0 to 99990 [hr]) / 1000 to 6553 (100000 to 655350 [hr])	×	○	0
	b035	Rotation direction restriction	00 (Enable for both dir) / 01 (Enable for forward only) / 02 (Enable for reverse only)	×	×	00
	b036	Reduced voltage start selection	0 (minimum reduced voltage start time) to 255 (maximum reduced voltage start time)	×	○	2
	b037	Function code display restriction	0 (full display) / 1 (function-specific display) / 2 (user setting) / 3 (data comparison display) / 4 (basic display) / 5 (monitor display)	×	○	04
	b038	Initial-screen selection	000 (Func. code that SET key pressed last displayed) / 001 to 060 (d001 to d060) / 201 (F001) / 202 (Screen displayed when the STR key was pressed last)	×	○	001
	b039	Automatic user parameter setting	00 (disabled) / 01 (enabled)	×	○	00
Torque limit	b040	Torque limit selection	00 (quadrant-specific setting) / 01 (switching by terminal) / 02 (O input)	×	○	00
	b041 to b044	Torque limit (1) – (4)	0 to 200 [%] / no	×	○	200
	b045	Torque LAD STOP selection	00 (disabled) / 01 (enabled)	×	○	00
	b046	Reverse run protection	00 (disabled) / 01 (enabled)	×	○	01
Others	b049	Dual Rating Selection	00 (CT mode) / 01 (VT mode)	×	×	00
Nonstop operation at momentary power failure	b050	Selection of the nonstop operation	00 (disabled) / 01 (enabled) / 02 (nonstop operation at momentary power failure [no restoration]) / 03 (nonstop operation at momentary power failure [restoration to be done])	×	×	00
	b051	Nonstop operation start voltage setting	0.0 to 999.9 / 1000. [V]	×	×	220 / 440
	b052	OV-LAD Stop level of nonstop operation setting	0.0 to 999.9 / 1000. [V]	×	×	360 / 720
	b053	Deceleration time of nonstop operation setting	0.1 to 999.9 / 1000. to 3600. [s]	×	×	1.00
	b054	Frequency width of quick deceleration setting	0.00 to 10.00 [Hz]	×	×	0.00
Window comparator	b060	Maximum-limit level of window comparators O	0 to 100 [%]	○	○	100
	b061	Minimum-limit level of window comparators O	0 to 100 [%]	○	○	0
	b062	Hysteresis width of window comparators O	0 to 10 [%]	○	○	0
	b063	Maximum-limit level of window comparators OI	0 to 100 [%]	○	○	100
	b064	Minimum-limit level of window comparators OI	0 to 100 [%]	○	○	0
	b065	Hysteresis width of window comparator (OI)	0 to 10 [%]	○	○	0
Others	b070	Operation level at O disconnection	0 to 100 [%] / no	×	○	no
	b071	Operation level at OI disconnection	0 to 100 [%] / no	×	○	no
	b075	Ambient temperature	-10 to 50 [°C]	○	○	40
	b078	Watt-hour reset	00 (OFF) / 01 (ON)	○	○	00
	b079	Watt-hour display gain setting	1 to 1000	○	○	1
	b082	Start frequency adjustment	0.10 to 9.99 [Hz] (to 200Hz)	×	○	0.50
	b083	Carrier frequency setting	2.0 to 15.0 [kHz]	×	○	2.0
	b084	Initialization mode (parameters or trip history)	00 (disabled) / 01 (clearing the trip history) / 02 (initializing the data) / 03 (clearing the trip history and initializing the data) / 04 (clearing the trip history and initializing the data and EzSQ program)	×	×	00
	b085	Country for initialization	00 / 01	×	×	00
	b086	Frequency scaling conversion factor	0.01 to 99.99	○	○	1.00
	b087	STOP key enable	00 (enabled) / 01 (disabled) / 02 (disabled only stop)	×	○	00

Function List

[○ = Allowed × = Not parmitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Others	b088	Restart mode after FRS	00 (starting with 0 Hz) / 01 (starting with matching frequency) / 02 (starting with active matching frequency)	×	○	00
	b089	Automatic carrier frequency reduction	00 (disabled) / 01 (enabled [output current controlled]) / 02 (enabled [fin temperature controlled])	×	×	01
	b090	Dynamic braking usage ratio	0.0 to 100.0 [%]	×	○	0.0
	b091	Stop mode selection	00 (deceleration until stop) / 01 (free-run stop)	×	○	00
	b092	Cooling fan control	00 (fan always ON) / 01 (ON fan only during inverter operation [including 5 minutes after power-on and power-off]) / 02 (fin temperature controlled)	×	○	01
	b093	Accumulated time clear of the cooling fan	00 (count) / 01 (clear)	×	×	00
	b094	Initialization target data setting	00 (All parameters) / 01 (All parameters except in/output terminals and communication) / 02 (Uxxx) / 03 (expect Uxxx)	×	×	00
	b095	Dynamic braking control (BRD) selection	00 (disabled) / 01 (enabled [disabled while the inverter is stopped]) / 02 (enabled [enabled also while the inverter is stopped])	×	○	01
	b096	BRD activation level	330 to 380 / 660 to 760 [V]	×	○	360 / 720
Free-setting V/f pattern	b100	Free-setting V/F freq. (1)	0. to b102 [Hz]	×	×	0.
	b101	Free-setting V/F volt. (1)	0.0 to 800.0 [V]	×	×	0.0
	b102	Free-setting V/F freq. (2)	0. to b104 [Hz]	×	×	0.
	b103	Free-setting V/F volt. (2)	0.0 to 800.0 [V]	×	×	0.0
	b104	Free-setting V/F freq. (3)	0. to b106 [Hz]	×	×	0.
	b105	Free-setting V/F volt. (3)	0.0 to 800.0 [V]	×	×	0.0
	b106	Free-setting V/F freq. (4)	0. to b108 [Hz]	×	×	0.
	b107	Free-setting V/F volt. (4)	0.0 to 800.0 [V]	×	×	0.0
	b108	Free-setting V/F freq. (5)	0. to b110 [Hz]	×	×	0.
	b109	Free-setting V/F volt. (5)	0.0 to 800.0 [V]	×	×	0.0
	b110	Free-setting V/F freq. (6)	0. to b112 [Hz]	×	×	0.
	b111	Free-setting V/F volt. (6)	0.0 to 800.0 [V]	×	×	0.0
	b112	Free-setting V/F freq. (7)	0. to 400 (to 1000) [Hz]	×	×	0.
	b113	Free-setting V/F volt. (7)	0.0 to 800.0 [V]	×	×	0.0
Others	b120	Brake control enable	00 (disabled) / 01 (enabled)	×	○	00
	b121	Brake Wait Time for Release	0.00 to 5.00 [s]	×	○	0.00
	b122	Brake Wait Time for Acceleration	0.00 to 5.00 [s]	×	○	0.00
	b123	Brake Wait Time for Stopping	0.00 to 5.00 [s]	×	○	0.00
	b124	Brake Wait Time for Confirmation	0.00 to 5.00 [s]	×	○	0.00
	b125	Brake release freq. setting	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	b126	Brake release current setting	Set range: 0 to 200% of inverter rated current [A]	×	○	Rated current of inverter
	b127	Braking frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	b130	Over-voltage LADSTOP enable	00 (disabled) / 01 (enabled) / 02 (enabled with acceleration)	×	○	00
	b131	Over-voltage LADSTOP level	330 to 395 / 660 to 790 [V]	×	○	380 / 760
	b132	DC bus AVR constant setting	0.10 to 30.00 (s)	×	○	1.00
	b133	DC bus AVR for decel. Proportional-gain	0.00 to 5.00	○	○	0.20
	b134	DC bus AVR for decel. Integral-time	0.0 to 150.0 [s]	○	○	1.0
	b145	GS input performance selection	00 (non Trip) / 01 (Trip)	×	○	00
	b150	Panel Display selection	d001 to d060	○	○	001
	b160	1st parameter of Double Monitor	d001 to d030	○	○	001
	b161	2nd parameter of Double Monitor	d001 to d030	○	○	002
	b163	Data change mode selection of d001 and d007	00 (disabled) / 01 (enabled)	○	○	00
	b164	Automatic return to the initial display	00 (disabled) / 01 (enabled)	○	○	00
	b165	Action selection in case of external operator disconnection	00 (tripping) / 01 (tripping after decelerating and stopping the motor) / 02 (ignoring errors) / 03 (stopping the motor after free-running) / 04 (decelerating and stopping the motor)	○	○	02
	b171	Inverter mode selection	00 (disabled) / 01 (IM enabled)	×	×	00
	b180	Initialization trigger	00 (disabled) / 01 (enabled)	×	×	00
Password	b190	Password A setting	0 (disabled) / 0001 to FFFF (enabled)	×	×	0000
	b191	Password A for authentication	0000 to FFFF	×	×	0000
	b192	Password B setting	0 (disabled) / 0001 to FFFF (enabled)	×	×	0000
	b193	Password B for authentication	0000 to FFFF	×	×	0000

[○ = Allowed × = Not permitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Intelligent input terminal setting	C001	Terminal [1] function	00 (FW: Forward Run) / 01 (RV: Reverse RUN) / 02 (CF1: Multispeed 1setting) / 03 (CF2: Multispeed 2 setting) / 04 (CF3: Multispeed 3 setting) / 05 (CF4: Multispeed 4 setting) / 06 (JG: Jogging) / 07 (DB: external DC braking) / 08 (SET: Set 2nd motor data) / 09 (2CH: 2-stage acceleration/deceleration) / 11 (FRS: free-run stop) / 12 (EXT: external trip) / 13 (USP: unattended startprotection) / 14 (CS: commercial power source enable) / 15 (SFT: software lock) / 16 (AT: analoginput voltage/current select) / 18 (RS: reset) / 19 (PTC (only C005): Thermistor input) / 20 (STA: starting by 3-wire input) / 21 (STP: stopping by 3-wire input) / 22 (F/R: forward/reverse switching by 3-wire input) / 23 (PID: PID disable) / 24 (PIDC: PID reset) / 27 (UP: remote control UP function) / 28 (DWN: remote control DOWN function) / 29 (UDC: remote control data clearing) / 31 (OPE: forcible operation) / 32 (SF1: multispeed bit 1) / 33 (SF2: multispeed bit 2) / 34 (SF3: multispeed bit 3) / 35 (SF4: multispeed bit 4) / 36 (SF5: multispeed bit 5) / 37 (SF6: multispeed bit 6) / 38 (SF7: multispeed bit 7) / 39 (OLR: overload restriction selection) / 40 (TL:torque limit enable) / 41 (TRQ1: torque limit selectionbit 1) / 42 (TRQ2: torque limit selection bit 2) / 44 (BOK: braking confirmation) / 46 (LAC: LAD cancellation) / 47 (PCLR: clearance of position deviation) / 50 (ADD: trigger for frequency addition[A145]) / 51 (F-TM: forcible-terminal operation) / 52 (ATR: permission of torque command input) / 53 (KHC: cumulative power clearance) / 56 (MI1: general-purpose input 1) / 57 (MI2: general-purpose input 2) / 58 (MI3: general-purpose input 3) / 59 (MI4: general-purpose input 4) / 60 (MI5: general-purpose input 5) / 61 (MI6: general-purpose input 6) / 62 (MI7: general-purpose input 7) / 65 (AHD: analog command holding) / 66 (CP1: multistage position settings selection 1) / 67 (CP2: multistage position settings selection 2) / 68 (CP3: multistage position settings selection 3) / 69 (ORL: Zero-return limit function) / 70 (ORG: Zero-return trigger function) / 73 (SPD: speed / position switching) / 77 (GS1: safety input 1) / 78 (GS2: safety input 2) / 81 (485: EzCOM) / 82 (PRG: executing EzSQ program) / 83 (HLD: retain output frequency) / 84 (ROK: permission of run command) / 85 (EB: Rotation direction detection for V/f with ENC) / 86 (DISP: Display limitation) / 255 (no: no assignment)	×	○	00 (FW)
	C002	Terminal [2] function		×	○	01 (RV)
	C003	Terminal [3] function		×	○	02 (CF1)
	C004	Terminal [4] function		×	○	03 (CF2)
	C005	Terminal [5] function		×	○	09 (2CH)
	C006	Terminal [6] function		×	○	18 (RS)
	C007	Terminal [7] function		×	○	13 (USP)
	C011 I C017	Terminal [1] – [7] active state	00 (NO) / 01 (NC)	×	○	00
Intelligent outputterminal setting	C021	Terminal [11] function	00 (RUN: running) / 01 (FA1: constant-speed reached) / 02 (FA2: set frequency overreached) / 03 (OL: overload notice advance signal [1]) / 04 (OD: output deviation for PID control) / 05 (AL: alarm signal) / 06 (FA3: set frequency reached) / 07 (OTQ: over-torque) / 09 (UV: undervoltage) / 10 (TRQ: torque limited) / 11 (RNT: operation time over) / 12 (ONT: plug-in time over) / 13 (THM: thermal alarm signal) / 19 (BRK: brake release) / 20 (BER: braking error) / 21 (ZS: 0 Hz detection signal) / 22 (DSE: speed deviation maximum) / 23 (POK: positioning completed) / 24 (FA4: set frequency overreached 2) / 25 (FA5: set frequency reached 2) / 26 (OL2: overload notice advance signal [2]) / 27 (ODC: analog O input disconnection) / 28 (OIDC: analog OI input disconnection) / 31 (FBV: PID feedback comparison) / 32 (NDc:communication line disconnection) / 33 (LOG1: logicaloperation result 1) / 34 (LOG2: logical operation result 2) / 35 (LOG3: logical operation result 3) / 39 (WAC: capacitor life warning) / 40 (WAF: cooling-fan) / 41 (FR: starting contact signal) / 42 (OHF: heat sink overheat warning) / 43 (LOC: low-current indication signal) / 44 (M01:general-purpose output 1) / 45 (M02: general-purpose output 2) / 46 (M03: general-purpose output 3) / 50 (IRDY: inverter ready) / 51 (FWR: forward rotation) / 52 (RVR: reverse rotation) / 53 (MJA: major failur) / 54 (WCO: window comparator O) / 55 (WCOI: window comparator OI) / 58 (FREF) / 59 (REF) / 60 (SETM) / 62 (EDM) / 63 (OPO: Option) / 255 (no: no assignment)	×	○	01 (FA1)
	C022	Terminal [12] function		×	○	00 (RUN)
	C026	Alarm relay terminal function		×	○	05 (AL)
Analog monitorring	C027	EO signal selection (Pulse / PWM output)	00 (output frequency) / 01 (output current) / 02 (output torque) / 03 (digital output frequency) / 04 (output voltage) / 05 (input power) / 06 (electronic thermal overload) / 07 (LAD frequency) / 08 (digital current monitoring) / 10 (heat sink temperature) / 12 (general-purpose output YA0) / 15 (Pulse train input monitor) / 16 (option)	×	○	07
	C028	[AM] signal selection	00 (output frequency) / 01 (output current) / 02 (output torque) / 04 (output voltage) / 05 (input power) / 06 (electronic thermal overload) / 07 (LAD frequency) / 10 (heat sink temperature) / 11 (output torque [signed value]) / 13 (general-purpose output YA1) / 16 (option)	×	○	07
	C030	Digital current monitor reference value	Set a level between 20% and 200% for the rated inverter current [A]	○	○	Rated current of inverter
Intelligent output terminal setting	C031	Terminal [11] active state	00 (NO) / 01 (NC)	×	○	00
	C032	Terminal [12] active state	00 (NO) / 01 (NC)	×	○	00
	C036	Alarm relay active state	00 (NO) / 01 (NC)	×	○	01

Function List

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Levels and output terminal status	C038	Output mode of low load detection signal	00 (output during acceleration/deceleration and constant-speed operation) / 01 (output only during constant-speed operation)	×	○	01
	C039	Low load detection level	Set range: 0 to 200% of inverter rated current [A]	○	○	Rated current of inverter
	C040	Output mode of overload warning	00 (output during acceleration / deceleration and constant-speed operation) / 01 (output only during constant-speed operation)	×	○	01
	C041	Overload level setting	Set range: 0 to 200% of inverter rated current [A]	○	○	115% of Rated current
	C241	Overload level setting, 2nd motor	Set range: 0 to 200% of inverter rated current [A]	○	○	115% of Rated current
	C042	Frequency arrival setting for acceleration	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	C043	Frequency arrival setting for deceleration	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	C044	PID deviation level setting	0.0 to 100.0 [%]	×	○	3.0
	C045	Frequency arrival signal for acceleration (2)	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	C046	Frequency arrival signal for deceleration (2)	0.00 to 99.99 / 100.0 to 400.0 [Hz]	×	○	0.00
	C047	Pulse train input scale conversion for EO output	0.01 to 99.99	○	○	1.00
	C052	PID FBV function high limit	0.0 to 100.0 [%]	×	○	100.0
	C053	PID FBV function variable low limit	0.0 to 100.0 [%]	×	○	0.0
	C054	Over-torque / under-torque selection	00 (Over torque) / 01 (under torque)	×	○	00
	C055	Over / under-torque level (Forward powering mode)	0 to 200 [%]	×	○	100
	C056	Over / under-torque (Reverse regen. mode)	0 to 200 [%]	×	○	100
	C057	Over / under-torque (Reverse powering mode)	0 to 200 [%]	×	○	100
	C058	Over / under-torque level (Forward regen. mode)	0 to 200 [%]	×	○	100
	C059	Signal output mode of Over / under torque	00 (output during acceleration / deceleration and constant-speed operation) / 01 (output only during constant-speed operation)	×	○	01
	C061	Electronic thermal warning level setting	0 to 100 [%]	×	○	90
	C063	Zero speed detection level setting	0.00 to 99.99 / 100.0 [Hz]	×	○	0.00
	C064	Heat sink overheat warning	0. to 110. [°C]	×	○	100
Communication function	C071	Communication speed selection	03 (2400bps) / 04 (4800bps) / 05 (9600bps) / 06 (19200bps) / 07 (38400bps) / 08 (57600bps) / 09 (76800bps) / 10 (115200bps)	×	○	05
	C072	Node allocation	1 to 247	×	○	1
	C074	Communication parity selection	00 (no parity) / 01 (even parity) / 02 (odd parity)	×	○	00
	C075	Communication stop bit selection	1 (1bit) / 2 (2bit)	×	○	1
	C076	Communication error select	00 (tripping) / 01 (tripping after decelerating and stopping the motor) / 02 (ignoring errors) / 03 (stopping the motor after free-running) / 04 (decelerating and stopping the motor)	×	○	02
	C077	Communication error time-out	0.00 to 99.99 [s]	×	○	0.00
	C078	Communication wait time	0 to 1000 [ms]	×	○	0
Adjustment	C081	O input span calibration	0. to 200.0 [%]	○	○	100.0
	C082	OI input span calibration	0. to 200.0 [%]	○	○	100.0
	C085	Thermistor input (PTC) span calibration	0. to 200.0 [%]	○	○	100.0
	C091	00 (Disable) / 01 (Enable)	00	○	○	00
Communication function	C096	Communication selection	00 (Modbus-RTU) / 01 (EzCOM) / 02 (EzCOM [administrator])	×	×	00
	C098	EzCOM start adr. of master	01 to 08	×	×	01
	C099	EzCOM end adr. of master	01 to 08	×	×	01
	C100	EzCOM starting trigger	00 (Input terminal) / 01 (Always)	×	×	00
Others	C101	UP / DWN memory mode selection	00 (not storing the frequency data) / 01 (storing the frequency data)	×	○	00
	C102	Reset selection	00 (resetting the trip when RS is on) / 01 (resetting the trip when RS is off) / 02 (enabled resetting only upon tripping [resetting when RS is on]) / 03 (resetting only trip)	○	○	00
	C103	Restart mode after reset	00 (starting with 0 Hz) / 01 (starting with matching frequency) / 02 (restarting with active matching frequency)	×	○	00
	C104	UP / DWN clear: terminal input mode selection	00 (0Hz) / 01 (EEPROM data when power supply is turned on)	×	○	00
	C105	EO gain adjustment	50 to 200 [%]	○	○	100
	C106	AM gain adjustment	50 to 200 [%]	○	○	100
	C109	AM bias adjustment	0 to 100 [%]	○	○	0
	C111	Overload setting (2)	Set range: 0 to 200% of inverter rated current [A]	○	○	115% of Rated current

[○ = Allowed × = Not permitted]

Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Input / Output terminal operation function	C130	Output 11 on-delay time	0.0 to 100.0 [s]	×	○	0.0
	C131	Output 11 off-delay time	0.0 to 100.0 [s]	×	○	0.0
	C132	Output 12 on-delay time	0.0 to 100.0 [s]	×	○	0.0
	C133	Output 12 off-delay time	0.0 to 100.0 [s]	×	○	0.0
	C140	Output RY on-delay time	0.0 to 100.0 [s]	×	○	0.0
	C141	Output RY off-delay time	0.0 to 100.0 [s]	×	○	0.0
	C142	Logical output signal 1 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG3 & OPO, no)	×	○	00
	C143	Logical output signal 1 selection 2		×	○	00
	C144	Logical output signal 1 operator selection	00 (AND) / 01 (OR) / 02 (XOR)	×	○	00
	C145	Logical output signal 2 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG3 & OPO, no)	×	○	00
	C146	Logical output signal 2 selection 2		×	○	00
	C147	Logical output signal 2 operator selection	00 (AND) / 01 (OR) / 02 (XOR)	×	○	00
	C148	Logical output signal 3 selection 1	Same as the settings of C021 to C026 (except those of LOG1 to LOG3 & OPO, no)	×	○	00
	C149	Logical output signal 3 selection 2		×	○	00
	C150	Logical output signal 3 operator selection	00 (AND) / 01 (OR) / 02 (XOR)	×	○	00
	C160 I C166	Response time of intelligent input terminal 1 – 7	0 to 200 (× 2ms)	×	○	1.
	C169	Multistage speed / position determination time	0. to 200. (× 10ms)	×	○	0.
Motor Constants and Gain Setting	H001	Auto-tuning Setting	00 (disabled auto-tuning) / 01 (auto-tuning without rotation) / 02 (auto-tuning with rotation)	×	×	00
	H002	Motor data selection	00 (Hitachi standard data) / 02 (auto-tuned data)	×	×	00
	H202	Motor data selection, 2nd motor		×	×	00
	H003	Motor capacity	0.1 / 0.2 / 0.4 / 0.55 / 0.75 / 1.1 / 1.5 / 2.2 / 3.0 / 3.7 / 4.0 / 5.5 / 7.5 / 11.0 / 15.0 / 18.5 [kW]	×	×	Factory set
	H203	Motor capacity, 2nd motor		×	×	Factory set
	H004	Motor poles setting	2 / 4 / 6 / 8 / 10 [pole]	×	×	4
	H204	Motor poles settingg, 2nd motor		×	×	4
	H005	Motor speed response constant	1 to 1000	○	○	100.
	H205	Motor speed response constant, 2nd motor	1 to 1000	○	○	100.
	H006	Motor stabilization constant	0 to 255	○	○	100.
	H206	Motor stabilization constant, 2nd motor	0 to 255	○	○	100.
	H020	Motor constant R1	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	Depending on motor capacity
	H220	Motor constant R1, 2nd motor	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H021	Motor constant R2	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H221	Motor constant R2, 2nd motor	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H022	Motor constant L	0.01 to 99.99 / 100.0 to 655.3 [mH]	×	×	
	H222	Motor constant L, 2nd motor	0.01 to 99.99 / 100.0 to 655.3 [mH]	×	×	
	H023	Motor constant I0	0.01 to 99.99 / 100.0 to 655.3 [A]	×	×	
	H223	Motor constant I0, 2nd motor	0.01 to 99.99 / 100.0 to 655.3 [A]	×	×	
	H024	Motor constant J	0.001 to 9.999 / 10.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. [kgm^2]	×	×	
	H224	Motor constant J, 2nd motor	0.001 to 9.999 / 10.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. [kgm^2]	×	×	
	H030	Auto constant R1	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H230	Auto constant R1, 2nd motor	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H031	Auto constant R2	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H231	Auto constant R2, 2nd motor	0.001 to 9.999 / 10.00 to 65.53 [Ω]	×	×	
	H032	Auto constant R1	0.01 to 99.99 / 100.0 to 655.3 [mH]	×	×	
	H232	Auto constant R1, 2nd motor	0.01 to 99.99 / 100.0 to 655.3 [mH]	×	×	
	H033	Auto constant R1	0.01 to 99.99 / 100.0 to 655.3 [A]	×	×	
	H233	Auto constant R1, 2nd motor	0.01 to 99.99 / 100.0 to 655.3 [A]	×	×	
	H034	Auto constant R1	0.001 to 9.999 / 10.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. [kgm^2]	×	×	
	H234	Auto constant R1, 2nd motor	0.001 to 9.999 / 10.00 to 99.99 / 100.0 to 999.9 / 1000. to 9999. [kgm^2]	×	×	
	H050	ASR P-Gain for FB control	0.00 to 10.00	○	○	0.20
	H051	ASR I-Gain for FB control	0 to 1000	○	○	2
Others	P001	Operation mode on expansion card 1 error	00 (tripping) / 01 (continuing operation)	×	○	00
	P003	Pulse train input terminal [EA] mode determination	00 (Speed reference, incl. PID) / 01 (control for encoder feedback [1st only]) / 02 (Extended terminal for EzSQ)	×	×	00
Control with FB	P004	Pulse train input mode selection for simple Positioning	00 (Single-phase pulse input) / 01 (2-phase pulse [90° difference] input 1 with EB input) / 02 (2-phase pulse [90° difference] input 2 with EB input) / 03 (Single-phase pulse and direction signal with EB input)	×	×	00
	P011	Encoder pulse-per-revolution (PPR) setting	32 to 1024 [pulse]	×	×	512
	P012	Control pulse setting	00 (simple positioning deactivated) / 02 (simple positioning activated)	×	×	00
	P015	Creep speed setting	"start frequency" to 10.00Hz	×	○	5.00
	P026	Over-speed error detection level setting	0.0 to 150.0 [%]	×	○	115.0
	P027	Speed deviation error detection level setting	0.00 to 99.99 / 100.0 to 120.0 [Hz]	×	○	10.00
Others	P031	Accel / decel time input selection	00 (digital operator) / 03 (easy sequence)	×	×	00

Function List

[○= Allowed ×= Not parmitted]

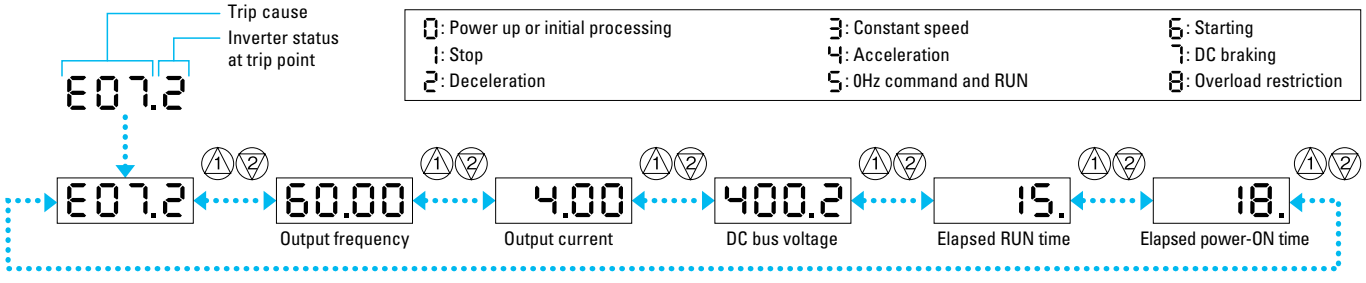
Code		Function Name	Setting Range	Setting During Operation (allowed or not)	Change During Operation (allowed or not)	Default Setting
Torque control	P033	Torque command input selection	00 (O terminal) / 01 (OI terminal) / 03 (digital operator) / 06 (Option)	×	×	00
	P034	Torque command setting	0 to 200 [%]	○	○	0
	P036	Torque bias mode	00 (disabled the mode) / 01 (digital operator) / 05 (Option)	×	×	00
	P037	Torque bias value	-200 to 200 [%]	○	○	0
	P038	Torque bias polarity selection	00 (as indicated by the sign) / 01 (depending on the operation direction)	×	×	00
	P039	Speed limit for torque-controlled operation (forward rotation)	0.00 to 99.99 / 100.0 to 120.0 [Hz]	×	×	0.00
	P040	Speed limit for torque-controlled operation (reverse rotation)	0.00 to 99.99 / 100.0 to 120.0 [Hz]	×	×	0.00
	P041	Speed / torque change time	0. to 1000. [ms]	×	×	0.
Option	P044	Network comm. Watchdog timer	0.00 to 99.99 [s]	×	×	1.00
Communication option setting	P045	Inverter action on network comm error	00 (tripping) / 01 (tripping after decelerating and stopping the motor) / 02 (ignoring errors) / 03 (stopping the motor after free-running) / 04 (decelerating and stopping the motor)	×	×	01
	P046	Polled I/O output instance number	00 to 20	×	×	00
	P048	Inverter action on network idle mode	00 (tripping) / 01 (tripping after decelerating and stopping the motor) / 02 (ignoring errors) / 03 (stopping the motor after free-running) / 04 (decelerating and stopping the motor)	×	×	01
	P049	Network motor poles setting for RPM	0 / 2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 20 / 22 / 24 / 26 / 28 / 30 / 32 / 34 / 36 / 38	×	×	0
Pulse train input	P055	Pulse train frequency scale	1.0 to 32.0 [kHz]	×	○	25.0
	P056	Time constant of pulse train frequency filter	0.01 to 2.00 [s]	×	○	0.10
	P057	Pulse train frequency bias	-100 to 100 [%]	×	○	0
	P058	Pulse train frequency limit	0 to 100 [%]	×	○	100
Simple positional control	P060 I P067	Multistage position setting 0 – 7	"Position range specification (reverse)" to "Position range specification (forward)"	○	○	0
	P068	Zero-return mode selection	00 (Low) / 01 (High)	○	○	00
	P069	Zero-return direction selection	00 (FW) / 01 (RV)	○	○	01
	P070	Low-speed zero-return frequency	0.00 to 10.00 [Hz]	○	○	5.00
	P071	High-speed zero-return frequency	0.00 to 99.99 / 100.0 to 400.0 [Hz]	○	○	5.00
	P072	Position range specification (forward)	0 to +268435455	○	○	268435455
	P073	Position range specification (reverse)	-268435455 to 0	○	○	-268435455
	P075	Positioning mode selection	00 (With limitation) / 01 (No limitation)	×	×	00
	P077	Encoder disconnection timeout	0.0 to 10.0 [s]	○	○	1.0
Easy sequence programming function	P100 I P131	Easy sequence user parameter U (00) – (31)	0. to 9999. / 1000 to 6553 (10000 to 65535)	○	○	0.
Peer-to-Peer communication	P140	EzCOM number of data	1 to 5	○	○	5
	P141	EzCOM destination 1 address	1 to 247	○	○	1
	P142	EzCOM destination 1 register	0000h to FFFFh	○	○	0000
	P143	EzCOM source 1 register	0000h to FFFFh	○	○	0000
	P144	EzCOM destination 2 address	1 to 247	○	○	2
	P145	EzCOM destination 2 register	0000h to FFFFh	○	○	0000
	P146	EzCOM source 2 register	0000h to FFFFh	○	○	0000
	P147	EzCOM destination 3 address	1 to 247	○	○	3
	P148	EzCOM destination 3 register	0000h to FFFFh	○	○	0000
	P149	EzCOM source 3 register	0000h to FFFFh	○	○	0000
	P150	EzCOM destination 4 address	1 to 247	○	○	4
	P151	EzCOM destination 4 register	0000h to FFFFh	○	○	0000
	P152	EzCOM source 4 register	0000h to FFFFh	○	○	0000
	P153	EzCOM destination 5 address	1 to 247	○	○	5
	P154	EzCOM destination 5 register	0000h to FFFFh	○	○	0000
	P155	EzCOM source 5 register	0000h to FFFFh	○	○	0000
Communication option setting	P160 I P169	Option I / F command register to write 1 – 10	0000h to FFFFh	○	○	0000
	P170 I P179	Option I / F command register to read 1 – 10	0000h to FFFFh	○	○	0000
	P180	Profibus Node address	0 to 125	×	×	0.
	P181	Profibus Clear Node address	00 (clear) / 01 (not clear)	×	×	00
	P182	Profibus Map selection	00 (PPO) / 01 (Comvertional)	×	×	00
	P185	CANOpen Node address	0 to 127	×	×	0
	P186	CANOpen speed selection	00 to 08	×	×	06
User parameter	U001 I U032	User-selected function 1 – 32	no / d001 to P186	○	○	no

Protective Functions

Name	Cause(s)	Error Code
Over-current event while at constant speed	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 dual-voltage motor is wired incorrectly.	E01.
Over-current event during deceleration		E02.
Over-current event during acceleration		E03.
Over-current event during other conditions		E04.
Overload protection *1	When a motor overload is detected by the electronic thermal function, the inverter trips and turns OFF its output.	E05.
Braking resistor overload protection	When the BRD operation rate exceeds the setting of "b090", this protective function shuts off the inverter output and displays the error code.	E06.
Over-voltage protection	When the DC bus voltage exceeds a threshold, due to regenerative energy from the motor.	E07.
EEPROM error *2	When the built-in EEPROM memory has problems due to noise or excessive temperature, the inverter trips and turns OFF its output to the motor.	E08.
Under-voltage error	A decrease of internal DC bus voltage below a threshold results in a control circuit fault. This condition can also generate excessive motor heat or cause low torque. The inverter trips and turns OFF its output.	E09.
Current detection error	If an error occurs in the internal current detection system, the inverter will shut off its output and display the error code.	E10.
CPU error *2	A malfunction in the built-in CPU has occurred, so the inverter trips and turns OFF its output to the motor.	E11.
External trip	A signal on an intelligent input terminal configured as EXT has occurred. The inverter trips and turns OFF the output to the motor.	E12.
USP	When the Unattended Start Protection (USP) is enabled, an error occurred when power is applied while a Run signal is present. The inverter trips and does not go into Run Mode until the error is cleared.	E13.
Ground fault *2	The inverter is protected by the detection of ground faults between the inverter output and the motor upon during powerup tests. This feature protects the inverter, and does not protect humans.	E14.
Input over-voltage	The inverter tests for input over-voltage after the inverter has been in Stop Mode for 100 seconds. If an over-voltage condition exists, the inverter enters a fault state. After the fault is cleared, the inverter can enter Run Mode again.	E15.
Inverter thermal trip	When the inverter internal temperature is above the threshold, the thermal sensor in the inverter module detects the excessive temperature of the power devices and trips, turning the inverter output OFF.	E21.
CPU communication error	When communication between two CPU fails, inverter trips and displays the error code.	E22.
Main circuit error *3	The inverter will trip if the power supply establishment is not recognized because of a malfunction due to noise or damage to the main circuit element.	E25.
Driver error *2	An internal inverter error has occurred at the safety protection circuit between the CPU and main driver unit. Excessive electrical noise may be the cause. The inverter has turned OFF the IGBT module output.	E30.
Thermistor	When a thermistor is connected to terminals [5] and [L] and the inverter has sensed the temperature is too high, the inverter trips and turns OFF the output.	E35.
Braking error	When "01" has been specified for the Brake Control Enable (b120), the inverter will trip if it cannot receive the braking confirmation signal within the Brake Wait Time for Confirmation (b124) after the output of the brake release signal.	E36.
Safe stop	Safe stop signal is given.	E37.
Low-speed overload protection	If overload occurs during the motor operation at a very low speed, the inverter will detect the overload and shut off the inverter output.	E38.
Operator connection	When the connection between inverter and operator keypad failed, inverter trips and displays the error code.	E40.
Modbus communication error	When "trip" is selected (C076=00) as a behavior in case of communication error, inverter trips when timeout happens.	E41.
EzSQ invalid instruction	The program stored in inverter memory has been destroyed, or the PRG terminal was turned on without a program downloaded to the inverter.	E43.
EzSQ nesting count error	Subroutines, if-statement, or for-next loop are nested in more than eight layers	E44.
EzSQ instruction error	Inverter found the command which cannot be executed.	E45.
EzSQ user trip (0 to 9)	When user –defined trip happens, inverter trips and displays the error code.	E50. to E59.
Option error	The inverter detects errors in the option board mounted in the optional slot. For details, refer to the instruction manual for the mounted option board.	E60. to E69.
Encoder disconnection	If the encoder wiring is disconnected, an encoder connection error is detected, the encoder fails, or an encoder that does not support line driver output is used, the inverter will shut off its output and display the error code shown on the right.	E80.
Excessive speed	If the motor speed rises to "maximum frequency (A004) x over-speed error detection level (P026)" or more, the inverter will shut off its output and display the error code shown on the right.	E81.
Positioning range error	If current position exceeds the position range (P072-P073), the inverter will shut off its output and display the error code.	E83.

*1: Reset operations acceptable 10 seconds after the trip.
*2: The inverter will not accept any reset command after an EEPROM error (E08), CPU error (E11), Ground fault (E14) or Driver error (E30) occurs with error code displayed. Turn off the inverter power once. If error is displayed when the inverter power is turned on subsequently, the internal memory device may have failed or parameters may have not been stored correctly. In such cases, initialize the inverter, and then re-set the parameters.
*3: Reset cannot be released with the STOP/RESET key. Please reset it with the inverter power or reset terminal (18:RS).

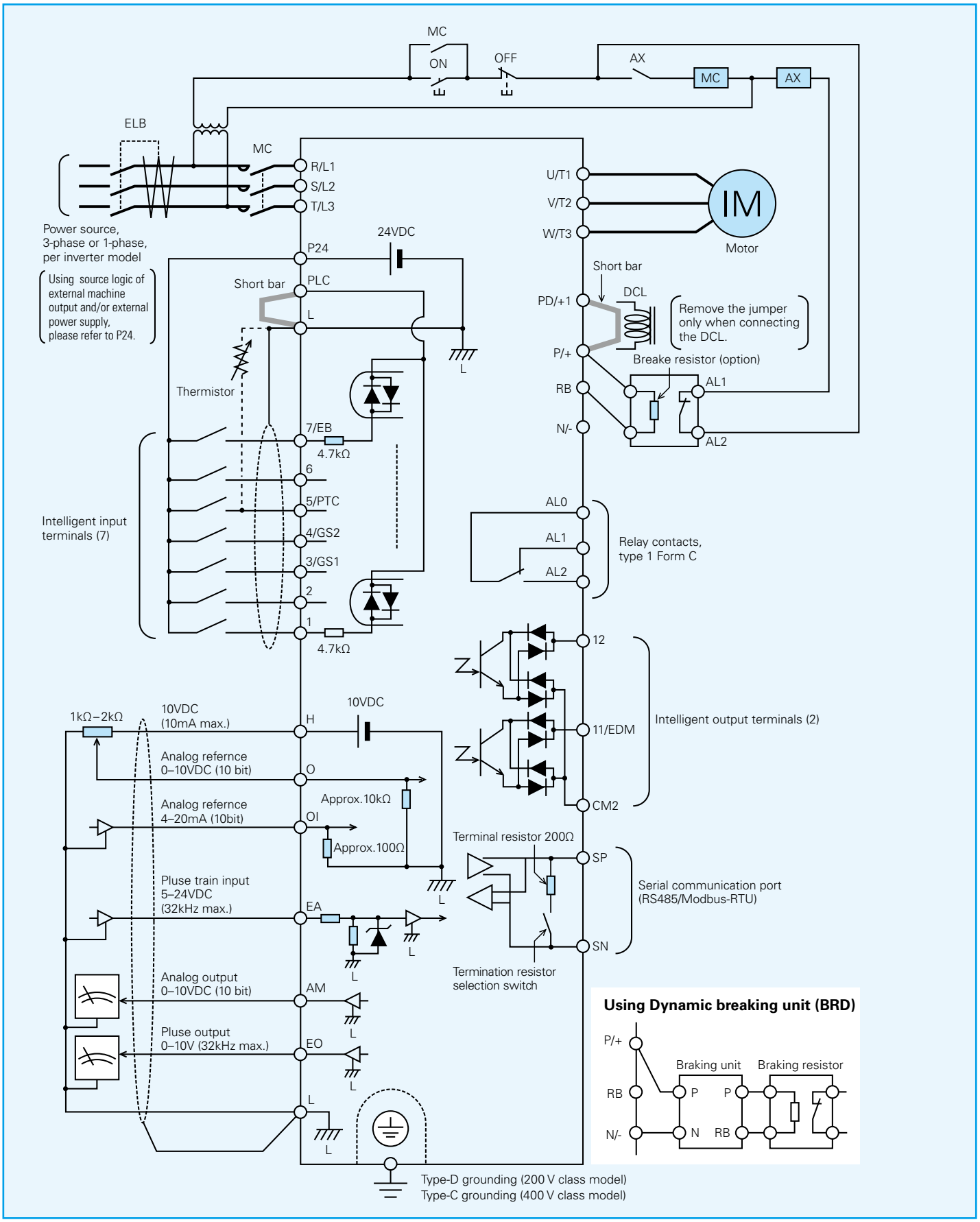
How to access the details about the present fault



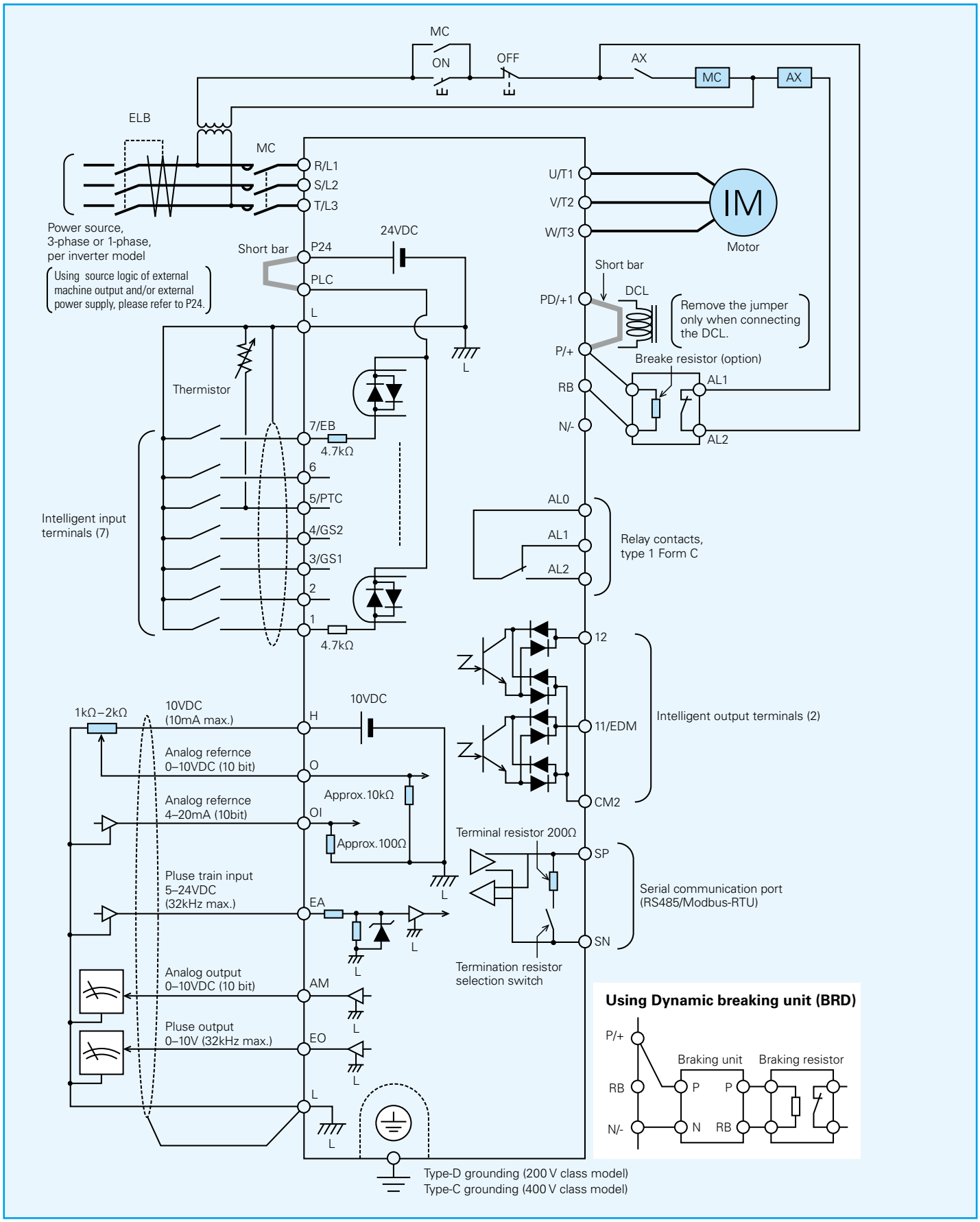
Note: Indicated inverter status could be different from actual inverter behavior. (e.g. When PID operation or frequency given by analog signal, although it seems constant speed, acceleration and deceleration could be repeated in very short cycle.)

Connecting Diagram

Source Type Logic

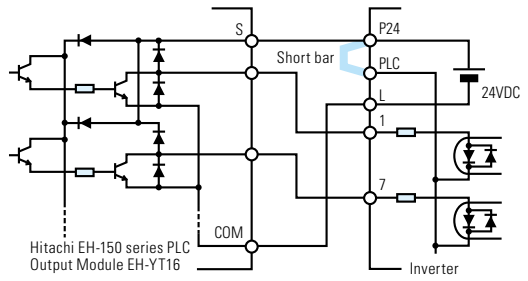
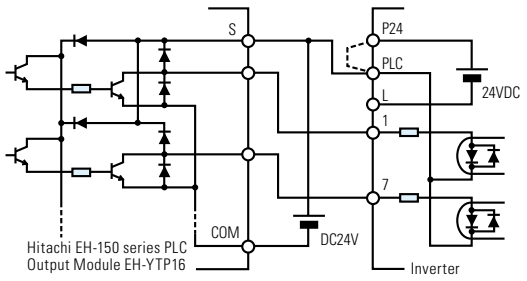
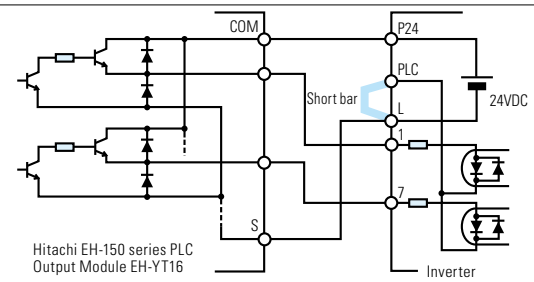
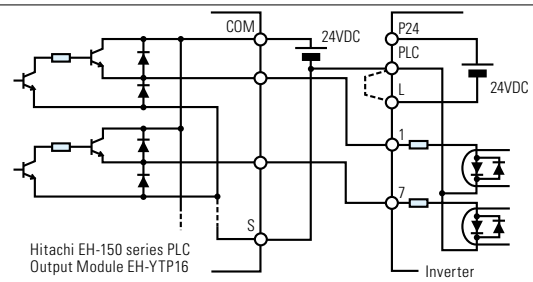
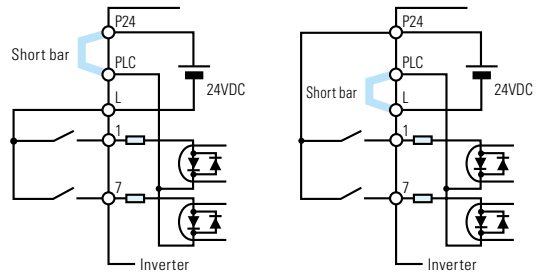
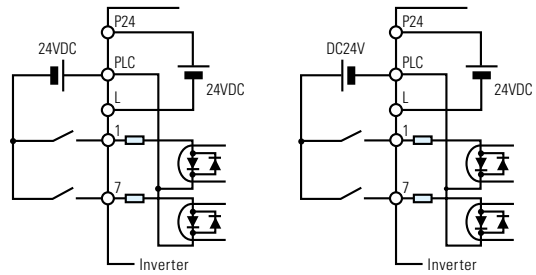


Sink Type Logic

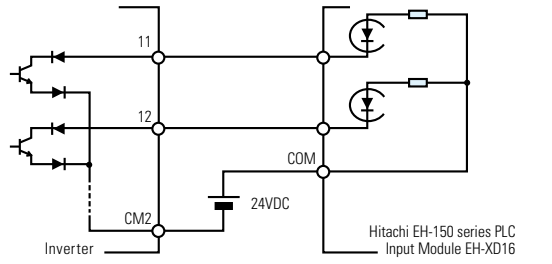
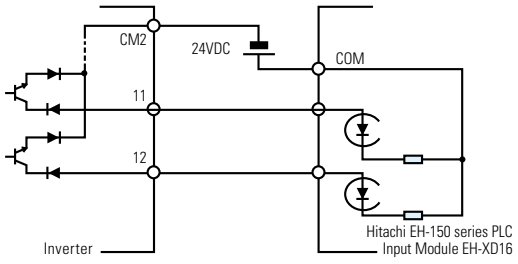


Connecting to PLC

Connection with Input Terminals

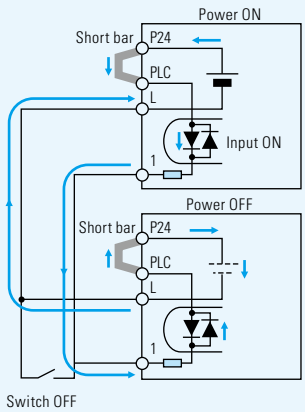
	Using Internal Power Supply of the Inverter	Using External Power Supply (Please remove the short bar.)
Sink type logic		
Source type logic		
Non-voltage switch		

Connection with Output Terminals

Sink type logic		
Source type logic		

Attention when inverter plurals is used

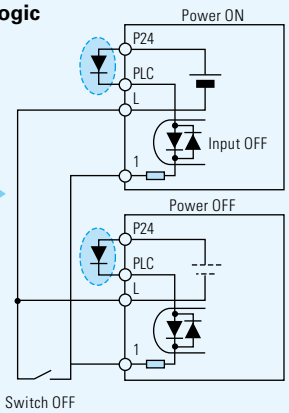
When two or more inverters connected to common I/O wiring as shown in the figure at the right are turned on at a different timing, unwanted current flows, establishing a closed circuit, and the inverter is judged to be ON, even though its switch is set to OFF.
To prevent the unwanted current flow, install diodes rated at 50 V/0.1 A at the specified locations.



Example of sink logic

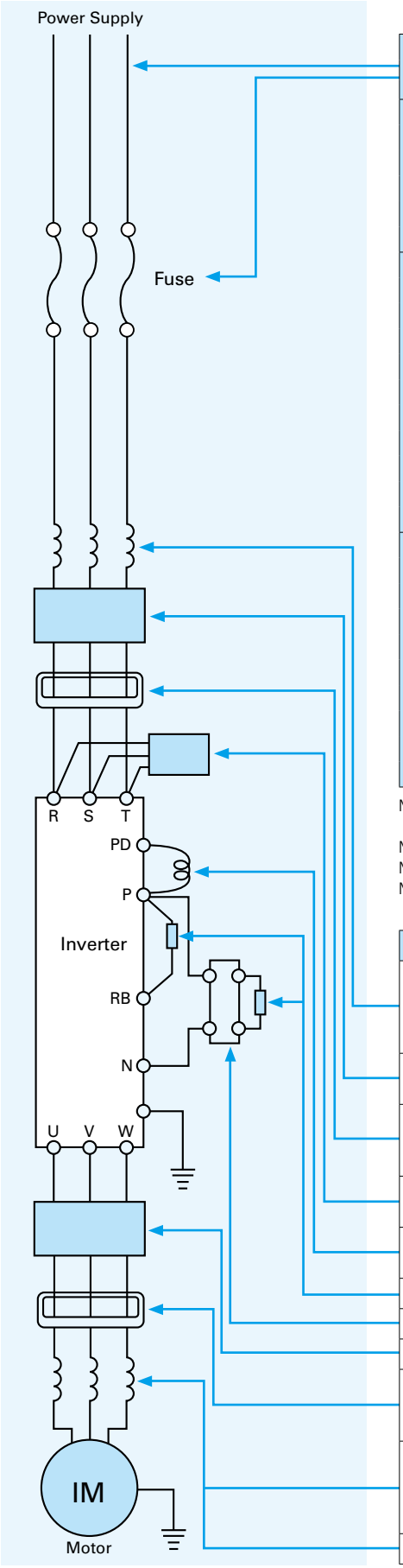
Add diode

Without a diode, unwanted current flows, turning the input on even when the switch is set to off.



Install a diode instead of a short bar to prevent the unwanted current flow.

Wiring and Accessories



Input Voltage	Motor Output kW VT	Motor Output kW CT	Motor Output HP VT	Motor Output HP CT	Inverter Model	Wiring: Power Lines	Wiring: Signal Lines	Fuse (UL-rated, class J, 600V)
1-phase 200V	0.2	0.1	1/4	1/8	WJ200-001SF	AWG16 / 1.3mm² (75°C only)	18 to 28 AWG / 0.14 to 0.75 mm² shielded wire (see Note 4)	10A
	0.4	0.2	1/2	1/4	WJ200-002SF			
	0.55	0.4	3/4	1/2	WJ200-004SF			
	1.1	0.75	1.5	1	WJ200-007SF	AWG12 / 3.3mm² (75°C only)		20A
	2.2	1.5	3	2	WJ200-015SF	AWG10 / 5.3mm²		30A
	3.0	2.2	4	3	WJ200-022SF			
3-phase 200V	0.2	0.1	1/4	1/8	WJ200-001LF	AWG16 / 1.3mm²		10A
	0.4	0.2	1/2	1/4	WJ200-002LF			
	0.75	0.4	1	1/2	WJ200-004LF			
	1.1	0.75	1.5	1	WJ200-007LF			15A
	2.2	1.5	3	2	WJ200-015LF	AWG14 / 2.1mm² (75°C only)		
	3.0	2.2	4	3	WJ200-022LF	AWG12 / 3.3mm² (75°C only)		20A
	5.5	3.7	7.5	5	WJ200-037LF	AWG10 / 5.3mm² (75°C only)		30A
	7.5	5.5	10	7.5	WJ200-055LF	AWG6 / 13mm² (75°C only)		60A
	11	7.5	15	10	WJ200-075LF			
	15	11	20	15	WJ200-110LF	AWG4 / 21mm² (75°C only)		80A
	18.5	15	25	20	WJ200-150LF	AWG2 / 34mm² (75°C only)		
3-phase 400V	0.75	0.4	1	1/2	WJ200-004HF	AWG16 / 1.3mm²		10A
	1.5	0.75	2	1	WJ200-007HF			
	2.2	1.5	3	2	WJ200-015HF			
	3.0	2.2	4	3	WJ200-022HF	AWG14 / 2.1mm²		15A
	4.0	3.0	5	4	WJ200-030HF			
	5.5	4.0	7.5	5	WJ200-040HF	AWG12 / 3.3mm² (75°C only)		
	7.5	5.5	10	7.5	WJ200-055HF	AWG10 / 5.3mm² (75°C only)		30A
	11	7.5	15	10	WJ200-075HF			
	15	11	20	15	WJ200-110HF	AWG6 / 13mm² (75°C only)		50A
	18.5	15	25	20	WJ200-150HF	AWG6 / 13mm² (75°C only)		

Note 1: Field wiring must be made by a UL-Listed and CSA-certified closed-loop terminal connector sized for the wire gauge involved. Connector must be fixed by using the crimping tool specified by the connector manufacturer.
Note 2: Be sure to consider the capacity of the circuit breaker to be used.
Note 3: Be sure to use a larger wire gauge if power line length exceeds 66ft. (20 m).
Note 4: Use 18 AWG / 0.75mm² wire for the alarm signal wire ([AL0], [AL1], [AL2] terminals).

Name	Function
Input-side AC Reactor	This is useful in suppressing harmonics induced on the power supply lines and for improving the power factor. WARNING: Some applications must use an input-side AC Reactor to prevent inverter damage. See Warning on next page.
EMC filter (for CE applications, see Appendix D)	Reduces the conducted noise on the power supply wiring between the inverter and the power distribution system. Connect to the inverter primary (input) side.
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).
Radio noise filter (use in non-CE applications)	This capacitive filter reduces radiated noise from the main power wires in the inverter (input) side.
DC link choke	Suppress harmonics generated by the inverter. However, it will not protect the input diode bridge rectifier.
Braking register	This is useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capability.
Braking unit	
Output side nose filter	Reduces radiated noise from wiring in the inverter output side.
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).
Output-side AC Reactor	This reactor reduces the vibration in the motor caused by the inverter's switching waveforms, by smoothing the waveform to approximate commercial power quality. It is also useful to reduce harmonics when wiring from the inverter to the motor is more than 10 m in length.
LCR filter	Sine wave shaping filter for output side.

For Correct Operation

Precaution for Correct Usage

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

Application to Motors

[Application to general-purpose motors]

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

[Application to special motors]

Gear motor	The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly in case of oil lubrication, pay attention to the low frequency range.)
Brake-equipped motor	For use of a brake-equipped motor, be sure to connect the braking power supply from the primary side of the inverter.
Pole-change motor	There are different kinds of pole-change motors (constant output characteristic type, constant torque characteristic type, etc.), with different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor. Also see: Application to the 400V-class motor.
Submersible motor	The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor.
Explosion-proof motor	Inverter drive is not suitable for a safety-enhanced explosion-proof type motor. The inverter should be used in combination with a pressure-proof explosion-proof type of motor. *Explosion-proof verification is not available for WJ200 Series.
Synchronous (MS) motor High-speed (HFM) motor	In most cases, the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. As to proper inverter selection, consult the manufacturer.
Single-phase motor	A single-phase motor is not suitable for variable-speed operation by an inverter drive. Therefore, use a three-phase motor.

[Application to the 400V-class motor]

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

Notes on Use

[Drive]

Run / Stop	Run or stop of the inverter must be done with the keys on the operator panel or through the control circuit terminals. Do not operate by installing a electromagnetic contactor (Mg) in the main circuit.
Emergency motor stop	When the protective function is operating or the power supply stops, the motor enters the free run stop state. When an emergency stop is required or when the motor should be kept stopped, use of a mechanical brake should be considered.
High-frequency run	A max. 400 Hz can be selected on the WJ200 Series. However, a two-pole motor can attain up to approx. 24,000 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor above 60 Hz. A full line of high-speed motors is available from Hitachi.

[Installation location and operating environment]

Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily collect, as well as areas that are dusty, subject to corrosive gasses, mist of liquid for grinding, or salt. Install the inverter away from direct sunlight in a well-ventilated room that is free of vibration. The inverter can be operated in the ambient temperature range from –10 to 50°C. (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) Unbalance factor of voltage = $\frac{\text{Max. line voltage (min.)} - \text{Mean line voltage}}{\text{Mean line voltage}} \times 100$ $= \frac{V_{RS} - (V_{RS} + V_{ST} + V_{TR})/3}{(V_{RS} + V_{ST} + V_{TR})/3} \times 100 = \frac{205 - 202}{202} \times 100 = 1.5\ (\%)$
Using a private power generator	An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform of the generator. Generally, the generator capacity should be five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system.

Notes on Peripheral Equipment Selection

Wiring connections		(1) Be sure to connect main power wires with R (L1), S (L2), and T (L3) terminals (input) and motor wires to U (T1), V (T2), and W (T3) terminals (output). (Incorrect connection will cause an immediate failure.) (2) Be sure to provide a grounding connection with the ground terminal (⏚).
Wiring between inverter and motor	Electro-magnetic 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 WJ200 Series does not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used: • during continuous running outside a range of 30 to 60 Hz. • for motors exceeding the range of electronic thermal adjustment (rated current). • when several motors are driven by the same inverter; install a thermal relay for each motor. • The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10 m or more, the thermal relay tends to turn off readily. In this case, provide an AC reactor on the output side or use a current sensor.
Installing a circuit breaker		Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. Choose an inverter-compatible circuit breaker. The conventional type may malfunction due to harmonics from the inverter. For more information, consult the circuit breaker manufacturer.
Wiring distance		The wiring distance between the inverter and the remote operator panel should be 20 meters or less. When this distance is exceeded, use CVD-E (current-voltage converter) or RCD-E (remote control device). Shielded cable should be used on the wiring. Beware of voltage drops on main circuit wires. (A large voltage drop reduces torque.)
Earth leakage relay		If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter).
Phase advance capacitor		Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor.

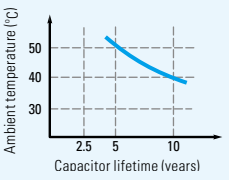
High-frequency Noise and Leakage Current

(1) High-frequency components are included in the input / output of the inverter main circuit, and they may cause interference in a transmitter, radio, or sensor if used near the inverter. The interference can be minimized by attaching noise filters (option) in the inverter circuitry.

(2) The switching action of an inverter causes an increase in leakage current. Be sure to ground the inverter and the motor.

Lifetime of Primary Parts

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



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THE PUMP, MOTOR & DRIVES SPECIALIST

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