# HITACHI
## Inspire the Next

# SJ700₂ Series Inverter
# Quick Reference Guide

- Three-phase Input   200V Class
- Three-phase Input   400V Class

UL Version Models                CE Version Models



Hitachi Industrial Equipment Systems Co., Ltd.

Manual No. NB2061X • August 2008

> *Caution: Be sure to read the SJ7002 Inverter Manual and follow its Cautions and Warnings for the initial product installation. This Quick Reference Guide is intended for reference use by experienced users in servicing existing installations.*

# UL® Cautions, Warnings, and Instructions
## Wiring Warnings for Electrical Practices and Wire Sizes

The Cautions, Warnings, and instructions in this section summarize the procedures necessary to ensure an inverter installation complies with Underwriters Laboratories® guidelines.

> *Warning: Use 75°C Cu wire only or equivalent.*
>
> *Warning: Inverter models with the suffix "L" (200V class) are suited to circuits that transmit current not exceeding 100,000 rms symmetrical amperes and with 240 V maximum.*
>
> *Warning: Inverter models with the suffix "H" (400V class) are suited to circuits that transmit current not exceeding 100,000 rms symmetrical amperes and with 480 V maximum.*
>
> *Warning: The inverter must be installed in an environment that is rated for at least Pollution Degree 2 or equivalent.*
>
> *Warning: The ambient temperature must not exceed 50°C.*
>
> *Warning: The capacitor discharge time is 10 minutes or more. (Caution: Care must be taken to avoid the risk of electric shock.)*
>
> *Warning: Each model of the inverter has a solid-state overload protection circuit or an equivalent feature for the motor.*

## Terminal Tightening Torque and Wire Size

The wire size range and tightening torque for field wiring terminals are presented in the tables below.

| 200V Models | | | | | |
|---|---|---|---|---|---|
| Motor output | | Inverter Model | Wire Size (AWG) | Torque | |
| kW | HP | | | ft-lbs | (N-m) |
| 5.5 | 7 1/2 | –055LFU2 | 8 | 1.8 | 2.5 |
| 7.5 | 10 | –075LFU2 | 6 | 1.8 | 2.5 |
| 11 | 15 | –110LFU2 | 4 | 3.6 | 4.9 |
| 15 | 20 | –150LFU2 | 2 | 3.6 | 4.9 |

| 200V Models | | | | | |
|---|---|---|---|---|---|
| Motor output | | Inverter Model | Wire Size (AWG) | Torque | |
| kW | HP | | | ft-lbs | (N-m) |
| 18.5 | 25 | –185LFU2 | 1 | 3.6 | 4.9 |
| 22 | 30 | –220LFU2 | 1 or 1/0 | 6.5 | 8.8 |
| 30 | 40 | –300LFU2 | 2/0 ‖ 2/0 or 1/0 ‖ 1/0 | 6.5 | 8.8 |
| 37 | 50 | –370LFU2 | 4/0 ‖ 4/0 or 1/0 ‖ 1/0 | 6.5 | 8.8 |
| 45 | 60 | –450LFU2 | 4/0 ‖ 4/0 or 1/0 ‖ 1/0 | 6.5 | 8.8 |
| 55 | 75 | –550LFU2 | 2/0 ‖ 2/0 | 10.1 | 13.7 |

| 400V Models | | | | | |
|---|---|---|---|---|---|
| Motor output | | Inverter Model | Wire Size (AWG) | Torque | |
| kW | HP | | | ft-lbs | (N-m) |
| 5.5 | 7 1/2 | –055HFU2/HFE2 | 12 | 1.8 | 2.5 |
| 7.5 | 10 | –075HFU2/HFE2 | 10 | 1.8 | 2.5 |
| 11 | 15 | –110HFU2/HFE2 | 8 | 3.6 | 4.9 |
| 15 | 20 | –150HFU2/HFE2 | 6 | 3.6 | 4.9 |
| 18.5 | 25 | –185HFU2/HFE2 | 6 | 3.6 | 4.9 |
| 22 | 30 | –220HFU2/HFE2 | 6 or 4 | 3.6 | 4.9 |
| 30 | 40 | –300HFU2/HFE2 | 3 | 3.6 | 4.9 |
| 37 | 50 | –370HFU2/HFE2 | 1 | 6.5 | 8.8 |
| 45 | 60 | –450HFU2/HFE2 | 1 | 6.5 | 8.8 |
| 55 | 75 | –550HFU2/HFE2 | 2/0 | 6.5 | 8.8 |

### Wire Connectors

⚠️ *Warning: Field wiring connections must be made by a UL Listed and CSA Certified ring lug terminal connector sized for the wire gauge being used. The connector must be fixed using the crimping tool specified by the connector manufacturer.*



Terminal (ring lug)
Cable support
Cable
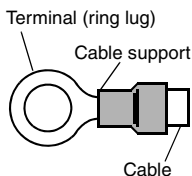
## Fuse and Circuit Breaker Sizes

The inverter's input power wiring must include UL Listed, dual-element, 600V fuses, or UL Listed, inverse-time, 600V circuit breakers.

| 200V Models | | | |
|---|---|---|---|
| Motor output | | Inverter Model | Ampere Rating for Fuse or Breaker |
| kW | HP | | |
| 5.5 | 7 1/2 | –055LFU2 | 30 |
| 7.5 | 10 | –075LFU2 | 40 |
| 11 | 15 | –110LFU2 | 60 |
| 15 | 20 | –150LFU2 | 80 |
| 18.5 | 25 | –185LFU2 | 100 |
| 22 | 30 | –220LFU2 | 125 |
| 30 | 40 | –300LFU2 | 150 |
| 37 | 50 | –370LFU2 | 175 |
| 45 | 60 | –450LFU2 | 225 |
| 55 | 75 | –550LFU2 | 250 |

| 400V Models | | | |
|---|---|---|---|
| Motor output | | Inverter Model | Ampere Rating for Fuse or Breaker |
| kW | HP | | |
| 5.5 | 7 1/2 | –055HFU2/HFE2 | 40 |
| 7.5 | 10 | –075HFU2/HFE2 | 40 |
| 11 | 15 | –110HFU2/HFE2 | 40 |
| 15 | 20 | –150HFU2/HFE2 | 40 |
| 18.5 | 25 | –185HFU2/HFE2 | 50 |
| 22 | 30 | –220HFU2/HFE2 | 60 |
| 30 | 40 | –300HFU2/HFE2 | 70 |
| 37 | 50 | –370HFU2/HFE2 | 90 |
| 45 | 60 | –450HFU2/HFE2 | 125 |
| 55 | 75 | –550HFU2/HFE2 | 125 |

## Motor Overload Protection

Hitachi SJ7002 inverters provide solid state motor overload protection, which depends on the proper setting of the following parameters:

- B012 "electronic overload protection"
- B212 "electronic overload protection, 2nd motor"
- B312 "electronic overload protection, 3rd motor"

Set the rated current [Amperes] of the motor(s) with the above parameters. The setting range is 0.2 * rated current to 1.2 * rated current.

*Warning: When two or more motors are connected to the inverter, they cannot be protected by the electronic overload protection. Install an external thermal relay on each motor.*
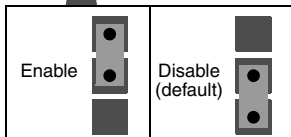
## Power Circuit Terminals
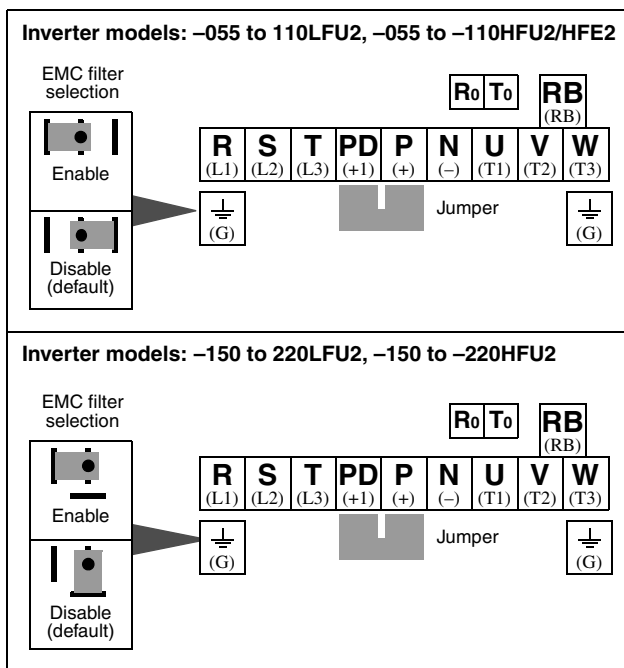
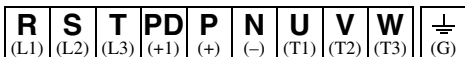**Inverter models: –300 to 370LFU2, –300 to –370HFU2**    $R_0$ $T_0$

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

Jumper

EMC filter selection

Enable    Disable (default)

---

**Inverter models: –450LFU2, –450 to –550HFU2**    $R_0$ $T_0$

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

⏚ (G)    Jumper    ⏚ (G)

EMC filter selection

Enable    Disable (default)

---
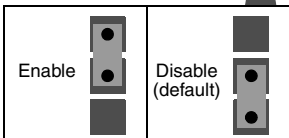
**Inverter models: –550LFU2**    EMC filter selection

$R_0$ $T_0$    ⏚ (G)    Enable

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

⏚ (G)    Jumper    ⏚ (G)

Disable (default)
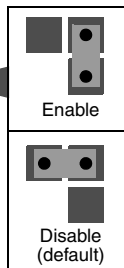
## Control Circuit Terminals
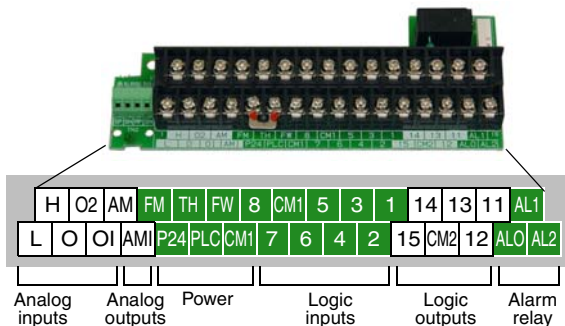


| Terminal Name | Description | Ratings and Notes |
|---|---|---|
| P24 | +24V power for inputs | 24VDC supply, 100 mA max. |
| CM1 | +24V common | Common for 24V supply, FW, TH, inputs 1 to 8, and FM. (Note: Do not ground) |
| PLC | Common for logic inputs | Common for input terminals 1 to 8, jumper to CM1 for sinking, jumper to P24 for sourcing |
| CM2 | Common for logic outputs | Common for output terminals 11 to 15 |
| 1, 2, 3, 4, 5, 6, 7, 8 | Intelligent (programmable) discrete logic inputs | 27VDC max. (use P24 or an external supply referenced to terminal CM1), 4.7kΩ input impedance |
| FW | Forward/stop command | 27VDC max. (use P24 or an external supply referenced to terminal CM1), 4.7kΩ input impedance |
| 11, 12, 13, 14, 15 | Intelligent (programmable) discrete logic outputs | Open collector type, 50mA max. ON state current, 27 VDC maximum Off state voltage |
| TH | Thermistor input | Reference to CM1, min. thermistor power 100mW |

| Terminal Name | Description | Ratings and Notes |
|---|---|---|
| FM | PWM output | 0 to 10VDC, 1.2 mA max., 50% duty cycle |
| AM | Voltage analog output | 0 to 10VDC, 2 mA max. |
| AMI | Current analog output | 4-20 mA, nominal load impedance 250Ω |
| L | Common for analog inputs | Sum of OI, O, and H currents (return) |
| OI | Analog input, current | 4 to 19.6 mA range, 20 mA nominal |
| O | Analog input, voltage | 0 to 9.6 VDC range, 10VDC nominal, 12VDC max., input impedance 10 kΩ |
| O2 | Auxiliary analog input, voltage | 0 to ±10VDC range, ±10VDC nominal, ±12VDC max., input impedance 10 kΩ |
| H | +10V analog reference | 10VDC nominal, 10 mA max. |
| AL0 | Relay common contact | Contacts AL0–AL1, max resistive load = 250VAC 2A; 30VDC 8A; max inductive 250VAC, 0.2A; 30VDC 0.6A |
| AL1 | Relay contact, normally closed during RUN | |
| AL2 | Relay contact, normally open during RUN | Contacts AL0–AL2, max resistive load = 250VAC 1A; 30VDC 1A; max inductive = 250VAC, 0.2A; 30VDC 0.2A Both contact pairs, min. loads = 100VAC 10mA; 5VDC 100mA |

## Serial Port Terminals



SP SN RP SN

Termination resistor (–)
Termination resistor (+)
Send/receive (–) Negative
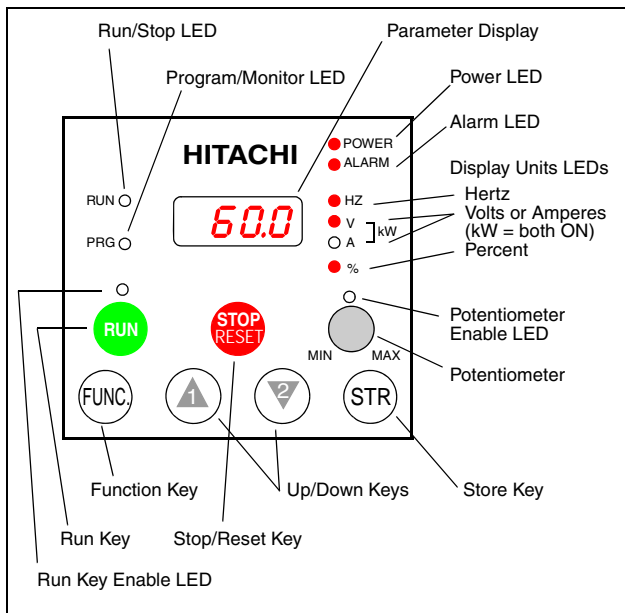Send/receive (+) Positive
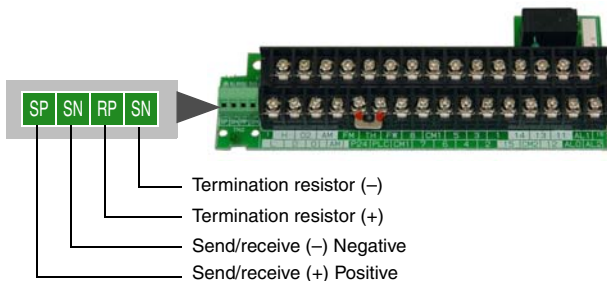
# Basic Wiring Diagram

The following wiring diagram shows the power and motor connections for basic operation. The optional signal input wiring supports external Fwd and Rev Run command, and a speed potentiometer.
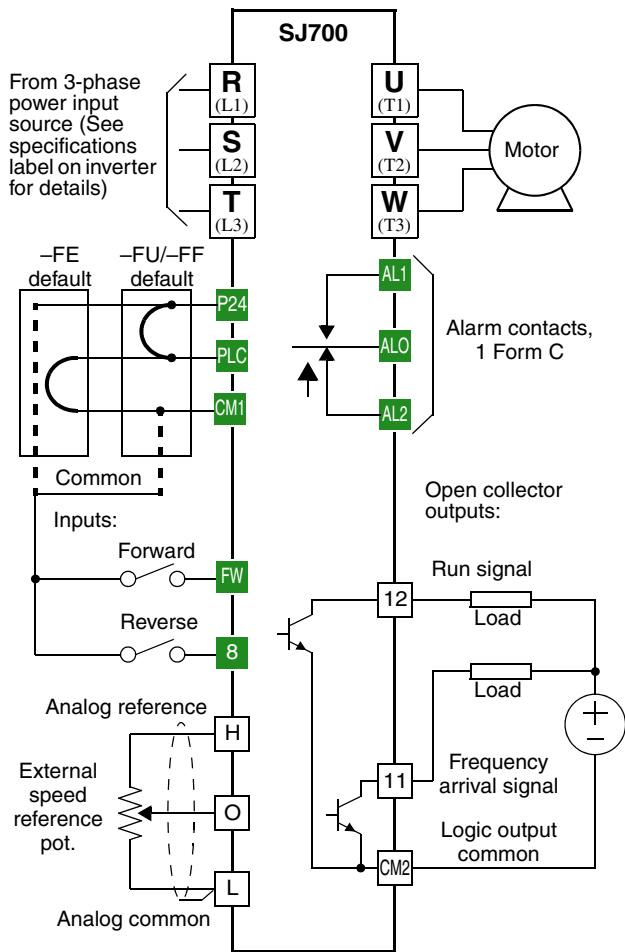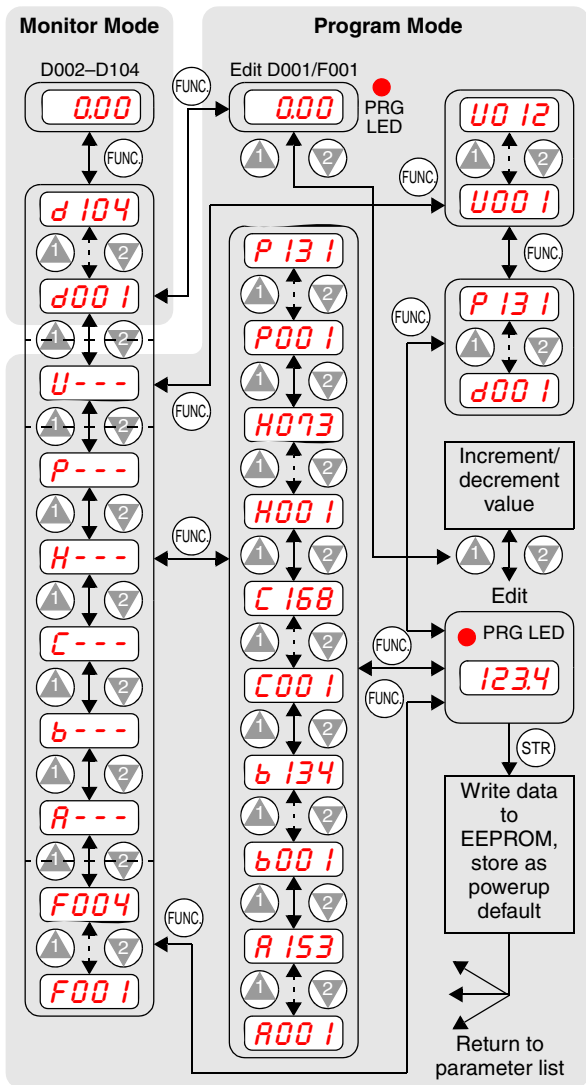
## Inverter Keypad Operation



- **Run/Stop LED** – ON when the inverter output is ON and the motor is developing torque, and OFF when the inverter output is OFF (Stop Mode).
- **Program/Monitor LED** – This LED is ON when the inverter is ready for parameter editing (Program Mode). It is normally OFF when the parameter display is monitoring data (Monitor Mode). However, the PRG LED will be ON whenever you are monitoring the value of parameter D001. (When the keypad is enabled as the frequency source via A001=02, you can edit the inverter frequency directly from D001 monitor display by using the Up/Down keys.)
- **Run Key Enable LED** – ON when the inverter is ready to respond to the Run key, OFF when the Run key is disabled.
- **Run Key** – Press this key to run the motor (the Run Enable LED must be ON first). Parameter F004, Keypad Run Key Routing, determines whether the Run key generates a Run FWD or Run REV command.

(continued, next page...)

9

- **Stop/Reset Key** – Press this key to stop the motor when it is running (uses the programmed deceleration rate). This key will also reset an alarm which has tripped.

- **Potentiometer (OPE–SRE only)** – Allows an operator to directly set the motor speed when the potentiometer is enabled for output frequency control.

- **Potentiometer Enable LED** – ON when the potentiometer is enabled for value entry.

- **Parameter Display** – A 4-digit, 7-segment display for parameters and function codes.

- **Display Units: Hertz/Volts/Amperes/kW/%** – These LEDs indicate the units associated with the parameter display. When the display is monitoring a parameter, the appropriate LED is ON. In the case of kW units, both Volts and Amperes LEDs will be ON. An easy way to remember this is that kW = (V x A)/1000.

- **Power LED** – ON when the power input to the inverter is ON.

- **Alarm LED** – ON when an alarm condition has tripped the inverter. Clearing the alarm will turn this LED OFF again. See page 13 for details on clearing alarms.

- **Function Key** – This key is used to navigate through the lists of parameters and functions for setting and monitoring parameter values.

- **Up/Down Keys** – Use these keys alternately to move up or down the lists of parameter and functions shown in the display, and to increment/decrement values.

- **Store Key** – When the unit is in Program Mode and the operator has edited a parameter value, press the Store key to write the new value to the EEPROM. This parameter is then displayed at powerup by default. If you want to change the powerup default, navigate to a new parameter value and press the Store key.

# Keypad Navigation Map

# Powerup Test

The Powerup Test procedure uses minimal parameter settings to run the motor. The procedure describes two alternative methods for commanding the inverter: *via the inverter keypad*, or *via the logic terminals*.

- Check power input and motor output wiring (see page 8 diagram).
- If using logic terminals for testing, verify correct wiring on [FW], [CM1], [H], [O], and [L] per the diagram on page 8.
- Reverse [RV] input wiring (defaults to terminal [8]) is optional.

| Step | Description | Via Keypad | Via Logic Terminals |
|------|-------------|------------|---------------------|
| 1 | Set speed command source setting | A001 = 00 (keypad pot.) | A001 = 01, [H–O–L] input |
| 2 | Set Run FW command source | A002 = 02 (Run key) | A002 = 01, [FW] input |
|   | Set Run REV command source | — | C008 = 01, [RV] input |
| 3 | Set motor base freq. | A003 = 60 | |
| 4 | Set motor poles (2 / 4 / 6 / 8) | H004 = 4 (default), change only if your motor is different | |
| 5 | Set keypad display to monitor freq. | Access D001, press Func key, display will show $0.00$ | |
| 6 | Perform safety check | Disconnect load from motor | |
|   |   | Turn keypad pot. to MIN position | Ensure voltage on [O]—[L] terminals= 0V |
| 7 | Run Forward command | Press Run key | Turn ON the [FW] terminal |
| 8 | Increase speed | Rotate keypad pot. CW dir. | Increase voltage at [O] |
| 9 | Decrease speed | Rotate keypad pot. CCW dir. | Decrease voltage at [O] |
| 10 | Stop motor | Press Stop key | Turn OFF the [FW] terminal |
| 11 | Run Reverse command (optional) | — | Turn ON the [RV] terminal |
| 12 | Stop motor | — | Turn OFF the [RV] terminal |

# Error Codes

The SJ700₂ series inverters will trip on over-current, over-voltage, and under-voltage to protect the inverter. The motor output turns OFF, allowing the motor to free-run to a stop. Press the Stop/Reset key to reset the inverter and clear the error.

## Basic Error Codes

| Error Code | Name | Probable Cause(s) |
|---|---|---|
| *E01.-* | Over current event while at constant speed | • Inverter output was short-circuited<br>• Motor shaft is locked<br>• Load is too heavy<br>• A dual-voltage motor is wired incorrectly<br>Note: The inverter will over current trip at nominally 200% of rated current |
| *E02.-* | Over current event during deceleration | |
| *E03.-* | Over current event during acceleration | |
| *E04.-* | Over current event for other conditions | • DC braking power(A054) set too high<br>• Current transformer / noise error |
| *E05.-* | Overload protection | • Motor overload is detected by the electronic thermal function |
| *E06.-* | Braking resistor overload | • Regenerative braking resistor exceeds the usage time or usage ratio |
| *E07.-* | Over voltage protection | • DC bus voltage exceeds a threshold, due to regenerative energy from motor |
| *E08.-* | EEPROM error | • Built-in EEPROM memory experienced noise, high temperature, etc. |
| *E09.-* | Under-voltage error | • DC bus voltage decreased enough to cause a control circuit fault |
| *E10.-* | CT error (current transformer) | • High electrical noise near inverter<br>• A fault occurred in the built-in CT |
| *E11.-* | CPU error | • Built-in CPU had internal error |
| *E12.-* | External trip | • [EXT] input signal detected |
| *E13.-* | USP (Unattended Start Protection) | • When (USP) was enabled, an error occurred when power was applied while a Run signal was present |
| *E14.-* | Ground fault | • A ground fault was detected between the inverter output and the motor. This feature protects the inverter, and does not protect humans. |
| *E15.-* | Input over-voltage | • Input voltage was higher than the specified value, 60 sec. after powerup |
| *E16.-* | Instantaneous power failure | • Input power removal > 15ms  or<br>> B002... inverter restarts on Run cmd |

| Error Code | Name | Probable Cause(s) |
|---|---|---|
| *E20.-* | Temperature error due to cooling fan speed low | • The cooling fan speed was low when inverter thermal trip occurred (E21) |
| *E21.-* | Inverter thermal trip | • Inverter internal temperature is above the threshold |
| *E23.-* | Gate array error | • An internal inverter error has occurred (CPU / gate array IC) |
| *E24.-* | Phase failure detection | • One of three lines of the 3-phase power is missing |
| *E30.-* | IGBT error | • Instantaneous over-current on any IGBT (output transistor) device |
| *E35.-* | Thermistor | • Thermistor input, [TH] and [CM1], is over the temp. threshold |
| *E36.-* | Brake error | • The state of the external brake was not detected within the waiting time (set by parameter B024) |
| *E37.-* | Emergency stop | • Emergency stop signal arrived (and switch SW1 was set to ON) |
| *E38.-* | Low-speed overload protection | • Overload occurred when the motor speed was 0.2 Hz or less |
| *E41.-* | ModBus communication error | • Communication timeout occurred; inverter action is according to C076 |
| *- - - -* | Under-voltage (brown-out) with output shutoff | • Low input voltage caused the inverter to turn OFF the motor output and try to restart. If unsuccessful, a trip occurs. |
| *E43.-* | Easy Sequence program command error | • Easy Sequence protective function indicates an error occurred |
| *E44.-* | Easy Sequence program NST error | • Easy Sequence protective function indicates an error occurred |
| *E45.-* | Easy Sequence program ERR1 error | • Easy Sequence protective function indicates an error occurred |
| *o o o o* | Automatic restart and phase loss | • Inverter is restarting, due to an over-current, over-voltage, under-voltage, or a phase loss event. |
| *E6 -.-* | Expansion card #1 error | • An error has occurred in an expansion card or at its connecting termi- |
| *E7 -.-* | Expansion card #2 error | nals. Please refer to the manual for the expansion card for additional details. |

## Error Status Codes and Error Trip Conditions

The digit to the right of the decimal point in the error code (such as $E01.4$) indicates inverter status at the moment the error occurred. Use the Up and Down arrow keys to scroll through the trip condition parameters.

| Status Code | Inverter Status | Status Code | Inverter Status | Trip Conditions |
|---|---|---|---|---|
| - - -.0 | Reset | - - -.5 | f0 stop | ↑ Error code |
| - - -.1 | Stop | - - -.6 | Starting | Output frequency |
| - - -.2 | Deceleration | - - -.7 | DC braking | Motor current |
| - - -.3 | Constant speed | - - -.8 | Overload restriction | DC bus voltage |
| - - -.4 | Acceleration | - - -.9 | SON or FOC operation in progress | Cumulative op. time  Cumulative ON time ↓ |
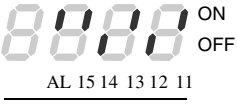
## Restoring Factory Default Settings

| Action | Display | Function/Parameter |
|---|---|---|
| Press the (FUNC), (▲) or (▼) keys as needed. | *b - - -* | "B" Group selected |
| Press the (FUNC) key. | *b001* | First "B" Group parameter |
| Press/hold (▲) until... | *b085* | Country code for initialization selected |
| Press the (FUNC) key. If setting is correct, then skip next step. | *02* | 00 = Japan<br>01 = Europe<br>02 = United States |
| To change country code, press (▲) or (▼) key to set; (STR) to store. | | |
| Press the (FUNC) key. | *b085* | Country code for initialization selected |
| Press the (▼) key. | *b084* | Initialization function selected |
| Press the (FUNC) key. | *00* | 0 = disable initialization, clear trip history only |
| Press the (▲) key. | *01* | 1 = enable initialization |
| Press the (STR) key. | *b084* | Initialization now enabled to restore all defaults |
| Press/hold the (▼) and (FUNC) keys. Do not release yet. | *b084* | First part of key sequence, the "B" is flashing |
| Press and hold the STOP RESET (STOP) key. | *b084* | Entire "B084" display will begin flashing |
| After the display begins flashing, then release the STOP RESET (STOP) key. | *0 EU*<br>*0USA* | Default parameter country code shown during initialization process |
| Release the (▼) and (FUNC) keys together. | *d001* | Final part of key sequence, function code for output frequency monitor shown after initialization is complete |

# Parameter Tables

## "D" Group: Monitoring Functions

### Parameter Monitoring

| Func. Code | Name / Description | Units |
|---|---|---|
| D001 | Output frequency monitor | Hz |
| D002 | Output current monitor | A |
| D003 | Rotation direction monitor  Forward    Stop    Reverse — Direction | — |
| D004 | Process variable (PV), PID feedback monitor | % |
| D005 | Intelligent input terminal status  ON OFF — 8 7 6 5 4 3 2 1 — FW — Terminal Numbers | — |
| D006 | Intelligent output terminal status  ON OFF — AL 15 14 13 12 11 — Terminal Numbers | — |
| D007 | Scaled output frequency monitor (output frequency x B086 scale factor) | User-defined |
| D008 | Actual frequency monitor | Hz |
| D009 | Torque command monitor | % |
| D010 | Torque bias monitor | % |
| D012 | Torque monitor | % |
| D013 | Output voltage monitor | 000.0 |

| Func. Code | Name / Description | Units |
|---|---|---|
| D014 | Power monitor | kW |
| D015 | Cumulative power monitor | kWh |
| D016 | Cumulative operation RUN time monitor | hours |
| D017 | Cumulative power-on time monitor | hours |
| D018 | Heat sink temperature monitor | °C |
| D019 | Motor temperature monitor | °C |
| D022 | Component life monitor  ON 1: Capacitor on main circuit board OFF 2: Cooling fan (slow speed) 2  1 | — |
| D023 | Program counter | Pgms |
| D024 | Program number monitor | Pgm |
| D025 | User monitor 0 | — |
| D026 | User monitor 1 | — |
| D027 | User monitor 2 | — |
| D028 | Pulse counter | Pulses |
| D029 | Position setting monitor | Pulses |
| D030 | Position feedback monitor | Pulses |
| D102 | DC voltage monitoring | V |
| D103 | BRD load factor monitoring | % |
| D104 | Electronic thermal overload monitoring | % |

## Trip History and Programming Error Monitoring

| Func. Code | Name / Description | Units |
|---|---|---|
| D080 | Trip count – cumulative number of trip events | Events |
| D081 | Trip history – event 1 (newest) — see map below | — |
| D082 | Trip history – event 2 (2nd newest) — see map below | — |
| D083 | Trip history – event 3 (3rd newest) — see map below | — |
| D084 | Trip history – event 4 (4th newest) — see map below | — |
| D085 | Trip history – event 5 (5th newest) — see map below | — |
| D086 | Trip history – event 6 (6th newest) — see map below | — |
| D090 | Programming error monitor, code displayed (see page 50 for an error code listing) | — |
| D102 | DC voltage monitor | V |
| D103 | BRD load factor monitor | % |
| D104 | Electronic thermal overload monitor | % |

## Trip History Navigation Map



**Monitor Mode**

Display data

Error exists?

No → No error

- - - -

Yes

Error code

Output frequency at trip point

Motor current at trip point

DC bus voltage at trip point

Cumulative inverter operation time at trip point

Cumulative power-ON time at trip point
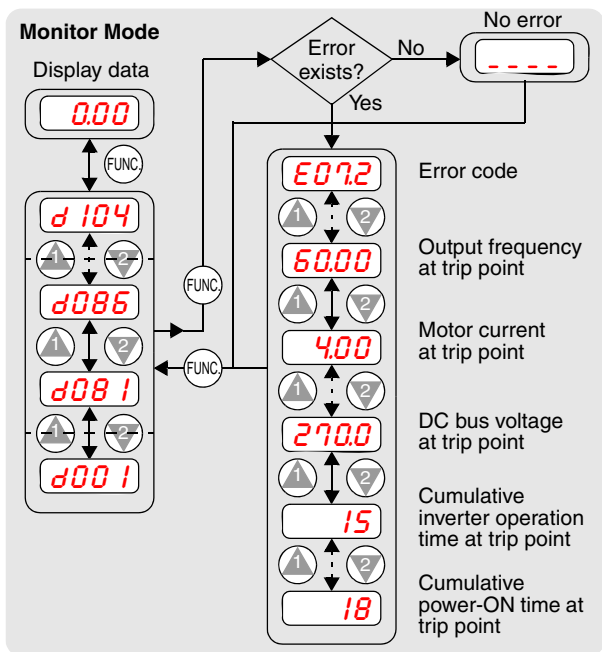
Parameter tables for user-settable functions follow these conventions:

- Some parameters have 2nd and 3rd motor equivalents, indicated by the x2xx and x3xx parameter codes in the left-most column.

- Some parameters specify an option code. Where applicable, the options codes will be in a bulleted list in the Name/Description column.

- The default values apply to all models unless otherwise noted for each parameter... –FE (Europe) / – FU (U.S.) / –FR (Japan).

- Some parameters cannot be edited during Run Mode, and certain Software Lock settings (B031) can prohibit all edits. If in doubt, place the inverter in Stop Mode or consult the inverter manual for details.

## "F" Group: Main Profile Parameters

| Func. Code | Name / Description | Default Value | Set Value |
|---|---|---|---|
| F001 | Output frequency setting | 0.00 | |
| F002 | Acceleration (1) time setting | 30.0 | |
| F202 | Acceleration (1) time setting, 2nd motor | 30.0 | |
| F302 | Acceleration (1) time setting, 3rd motor | 30.0 | |
| F003 | Deceleration (1) time setting | 30.0 | |
| F203 | Deceleration (1) time setting, 2nd motor | 30.0 | |
| F303 | Deceleration (1) time setting, 3rd motor | 30.0 | |
| F004 | Keypad Run key routing<br>• 00 Forward • 01 Reverse | 00 | |

## "A" Group: Standard Functions

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| A001 | Frequency source setting<br>• 00 Keypad potentiometer<br>• 01 Control terminal<br>• 02 Function F001 setting<br>• 03 RS485 serial command<br>• 04 Expansion board 1<br>• 05 Expansion board 2<br>• 06 Pulse train input<br>• 07 Easy sequence<br>• 10 Calculate function input | 01 / 01 | |
| A002 | Run command source setting<br>• 01 Input terminal FW or RV (assignable)<br>• 02 Run key on keypad, or digital operator<br>• 03 RS485 serial command<br>• 04 Start/Stop, expansion card #1<br>• 05 Start/Stop, expansion card #2 | 01 / 01 | |
| A003/<br>A203/<br>A303 | Base frequency setting | 50. / 60. | |
| A004/<br>A204/<br>A304 | Maximum frequency setting | 50. / 60. | |
| A005 | [AT] selection<br>• 00 Select between [O] and [OI] at [AT]<br>• 01 Select between [O] and [O2] at [AT]<br>• 02 Select between [O] and keypad pot.<br>• 03 Select between [OI] and keypad pot.<br>• 04 Select between [O2] and keypad pot. | 00 | |
| A006 | [O2] selection<br>• 00 No summing, [O2] and [OI]<br>• 01 Sum of [O2] and [OI], negative sum (reverse speed reference) inhibited<br>• 02 Sum of [O2] and [OI], negative sum (reverse speed reference) allowed<br>• 03 Disable [O2] input | 00 | |
| A011 | [O]–[L] input active range start frequency | 0.00 | |
| A012 | [O]–[L] input active range end frequency | 0.00 | |
| A013 | [O]–[L] input active range start voltage | 0. | |
| A014 | [O]–[L] input active range end voltage | 100. | |
| A015 | [O]–[L] input start frequency enable<br>• 00 Use A011 start value<br>• 01 Use 0 Hz | 01 | |
| A016 | External frequency filter time constant | 8. | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| A017 | Easy sequence function enable<br>• 00 Disable • 01 Enable | 00 | |
| A019 | Multi-speed operation selection<br>• 00 Binary; up to 16-stage speed using 4 intelligent terminals<br>• 01 Single-bit; up to 8-stage speed using 7 intelligent terminals | 00 | |
| A020/<br>A220/<br>A320 | Multi-speed frequency setting | 0.00 | |
| A021<br>to<br>A035 | Multi-speed frequency settings<br>(for both motors) | 0.00 | |
| A038 | Jog frequency setting | 1.00 | |
| A039 | Jog stop mode<br>• 00 Free-run stop, jogging disabled during motor run<br>• 01 Controlled deceleration, jogging disabled during motor run<br>• 02 DC braking to stop, jogging disabled during motor run<br>• 03 Free-run stop, jogging always enabled<br>• 04 Controlled deceleration, jogging always enabled<br>• 05 DC braking to stop, jogging always enabled | 00 | |
| A041/<br>A241 | Torque boost method selection<br>• 00 Manual torque boost<br>• 01 Automatic torque boost | 00 | |
| A042/<br>A242/<br>A342 | Manual torque boost value | 1.0 | |
| A043/<br>A243/<br>A343 | Manual torque boost frequency adjustment | 5.0 | |
| A044/<br>A244/<br>A344 | V/f characteristic curve selection<br>• 00 V/f constant torque<br>• 01 V/f variable torque<br>• 02 V/f free-setting curve<br>• 03 Sensorless vector SLV<br>• 04 0Hz domain SLV<br>• 05 Vector control with encoder feedback | 00 | |
| A045 | V/f gain setting | 100. | |
| A046/<br>A246 | Automatic torque boost voltage gain | 100. | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| A047/ A247 | Automatic torque boost slip gain | 100. | |
| A051 | DC braking enable<br>• 00 Disable      • 01 Enable | 00 | |
| A052 | DC braking frequency setting | 0.50 | |
| A053 | DC braking wait time | 0.0 | |
| A054 | DC braking force during deceleration | 0. | |
| A055 | DC braking time for deceleration | 0.0 | |
| A056 | DC braking / edge or level detection for [DB] input | 01 | |
| A057 | DC braking force for starting | 0. | |
| A058 | DC braking time for starting | 0.0 | |
| A059 | DC braking carrier frequency setting | 3.0 | |
| A061/ A261 | Frequency upper limit setting | 0.00 | |
| A062/ A262 | Frequency lower limit setting | 0.00 | |
| A063 A065 A067 | Jump (center) frequency setting | 0.00 | |
| A064 A066 A068 | Jump (hysteresis) frequency width setting | 0.50 | |
| A069 | Acceleration pause frequency setting | 0.00 | |
| A070 | Acceleration pause time setting | 0.0 | |
| A071 | PID Enable<br>• 00 PID operation OFF<br>• 01 PID operation ON<br>• 02 PID operation ON with inverted output | 00 | |
| A072 | PID proportional gain | 1.0 | |
| A073 | PID integral time constant | 1.0 | |
| A074 | PID derivative time constant | 0.0 | |
| A075 | PV scale conversion | 1.00 | |
| A076 | PV source setting:<br>• 00 [OI] terminal (current input)<br>• 01 [O] terminal (voltage input)<br>• 02 Communication input<br>• 03 Pulse train frequency input<br>• 04 CALCULATE function output | 00 | |

| Func.<br>Code | Name / Description | Default<br>Value<br>–FE2/–FU2 | Set<br>Value |
|---|---|---|---|
| A077 | Reverse PID action<br>• 00 PID input = SP – PV<br>• 01 PID input = –(SP – PV) | 00 | |
| A078 | PID output limit | 0.00 | |
| A079 | PID feed forward select<br>• 00 Disable    • 01 [O] terminal<br>• 02 [OI] terminal  • 03 [O2] terminal | 00 | |
| A081 | AVR function select<br>• 00 AVR enabled    • 01 AVR disabled<br>• 02 AVR enabled except during decel | 00 | |
| A082 | AVR voltage select | 230 / 230<br>400 / 460 | |
| A085 | Operation mode selection<br>• 00 Normal operation<br>• 01 Energy-saver operation<br>• 02 Optimal accel/decel operation | 00 | |
| A086 | Energy saving mode tuning | 50.0 | |
| A092/<br>A292/<br>A392 | Acceleration (2) time setting | 15.0 | |
| A093/<br>A293/<br>A393 | Deceleration (2) time setting | 15.0 | |
| A094/<br>A294 | Select method to switch to Acc2/Dec2 profile<br>• 00 2CH input from terminal<br>• 01 Transition frequency<br>• 02 Motor rotation is reversed | 00 | |
| A095/<br>A295 | Acc1 to Acc2 frequency transition point | 0.0 | |
| A096/<br>A296 | Dec1 to Dec2 frequency transition point | 0.0 | |
| A097 | Acceleration curve selection<br>• 00 Linear    • 01 S-curve<br>• 02 U-shape  • 03 Reverse U-shape<br>• 02 EL-S curve | 00 | |
| A098 | Deceleration curve selection<br>• 00 Linear    • 01 S-curve<br>• 02 U-shape  • 03 Reverse U-shape<br>• EL-S curve | 00 | |
| A101 | [OI]–[L] input active range start frequency | 00.0 | |
| A102 | [OI]–[L] input active range end frequency | 00.0 | |
| A103 | [OI]–[L] input active range start current | 20. | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| A104 | [OI]–[L] input active range end current | 100. | |
| A105 | [OI]–[L] input start frequency enable<br>• 00 Use A101 start value • 01 Use 0Hz | 01 | |
| A111 | [O2]–[L] input active range start frequency | 0.00 | |
| A112 | [O2]–[L] input active range end frequency | 0.00 | |
| A113 | [O2]–[L] input active range start voltage | –100. | |
| A114 | [O2]–[L] input active range end voltage | 100. | |
| A131 | Acceleration curve constants setting | 02 | |
| A132 | Deceleration curve constants setting | 02 | |
| A141 | A input select for calculate function<br>• 00 Digital operator<br>• 01 Keypad potentiometer<br>• 02 [O] input<br>• 03 [OI] input<br>• 04 Comm. port<br>• 05 Expansion card 1<br>• 06 Expansion card 2<br>• 07 Pulse train frequency input | 02 | |
| A142 | B input select for calculate function<br>• 00 Digital operator<br>• 01 Keypad potentiometer<br>• 02 [O] input<br>• 03 [OI] input<br>• 04 Comm. port<br>• 05 Expansion card 1<br>• 06 Expansion card 2<br>• 07 Pulse train frequency input | 03 | |
| A143 | Calculation symbol<br>• 00 ADD (A input + B input)<br>• 00 SUB (A input – B input)<br>• 00 MUL (A input x B input) | 00 | |
| A145 | ADD frequency | 0.00 | |
| A146 | ADD direction select<br>• 00 Plus (adds A145 value to output frequency)<br>• 00 Minus (subtracts A145 value from output frequency) | 00 | |
| A150 | EL-S curve acceleration ratio 1 | 25. | |
| A151 | EL-S curve acceleration ratio 2 | 25. | |
| A152 | EL-S curve deceleration ratio 1 | 25. | |
| A153 | EL-S curve deceleration ratio 2 | 25. | |

## "B" Group: Fine-tuning Functions

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B001 | Selection of automatic restart mode<br>• 00 Alarm output after trip, automatic restart disabled<br>• 01 Restart at 0Hz<br>• 02 Resume operation after frequency matching<br>• 03 Resume previous freq. after freq. matching, then decelerate to stop and display trip info<br>• 04 Restart with active matching frequency | 00 | |
| B002 | Allowable under-voltage power failure time | 1.0 | |
| B003 | Retry wait time before motor restart | 1.0 | |
| B004 | Instantaneous power failure / under-voltage trip alarm enable<br>• 00 Disable          • 01 Enable<br>• 02 Disable during stop and ramp to stop | 00 | |
| B005 | Number of restarts on power failure / under-voltage trip events<br>• 00 Restart 16 times  • 01 Always restart | 00 | |
| B006 | Phase loss detection enable<br>• 00 Disable – no trip on phase loss<br>• 01 Enable – trip on phase loss | 0.00 | |
| B007 | Restart frequency threshold | 1.0 | |
| B008 | Retry after trip select<br>• 00 Always retry after trip<br>• 01 Start with 0 Hz<br>• 02 Start with frequency matching<br>• 03 Retry after deceleration and stop with matching frequency<br>• 04 Start with active matching frequency | 00 | |
| B009 | Retry after undervoltage select<br>• 00 16 times          • 01 Unlimited | 00 | |
| B010 | Retry count select after overvoltage or overcurrent | 3 | |
| B011 | Retry wait time after trip | 1.0 | |
| B012/<br>B212/<br>B312 | Level of electronic thermal setting | Rated current of each inverter | |
| B013/<br>B213/<br>B313 | Electronic thermal characteristic<br>• 00 Reduced torque  • 01 Const. torque<br>• 02 V/f free-setting | 01 / 01 | |
| B015 | Free setting, electronic thermal freq. (1) | 0. | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B016 | Free setting, electronic thermal current (1) | 0.0 | |
| B017 | Free setting, electronic thermal freq. (2) | 0. | |
| B018 | Free setting, electronic thermal current (2) | 0.0 | |
| B019 | Free setting, electronic thermal freq. (3) | 0. | |
| B020 | Free setting, electronic thermal current (3) | 0.0 | |
| B021 | Overload restriction operation mode<br>• 00 Disable<br>• 01 Enable for accel and constant speed<br>• 02 Enable for constant speed only<br>• 03 Enable for accel, decel, constant speed | 01 | |
| B022 | Overload restriction setting | Rated current x 1.50 | |
| B023 | Deceleration rate at overload restriction | 1.00 | |
| B024 | Overload restriction operation mode (2)<br>• 00 Disable<br>• 01 Enable for accel and constant speed<br>• 02 Enable for constant speed only<br>• 03 Enable for accel, decel, constant speed | 01 | |
| B025 | Overload restriction setting (2) | Rated current x 1.50 | |
| B026 | Deceleration rate at overload restriction (2) | 1.00 | |
| B027 | Overcurrent suppression enable<br>• 00 Disable     • 01 Enable | 01 | |
| B028 | Current limit for active frequency-matching restart | Rated current x 1.0 | |
| B029 | Scan time constant for active freq. matching | 0.50 | |
| B030 | Restart freq. select for active freq. matching | 00 | |
| B031 | Software lock mode selection<br>• 00 Low-level access, [SFT] blocks edits<br>• 01 Low-level access, [SFT] blocks edits (except F001 and Multi-speed parameters)<br>• 02 No access to edits<br>• 03 No access to edits except F001 and Multi-speed parameters<br>• 10 High-level access, including B031 | 01 | |
| B034 | Run/power on warning time | 0. | |
| B035 | Rotational direction restriction<br>• 00 Enable for both directions<br>• 01 Enable for forward only<br>• 02 Enable for reverse only | 00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B036 | Reduced voltage start selection<br>• 00 Short<br>• 01, 02, 03, 04, 05 (middle)<br>• 06 Long | 06 | |
| B037 | Function code display restriction<br>• 00 Display all<br>• 01 Display only utilized functions<br>• 02 Display user-selected functions only (configure with U01 to U12)<br>• 03 Data comparison display<br>• 04 Basic display | 00 | |
| B038 | Initial display selection<br>• 00 Last value when STR key was pressed<br>• 01 D001　　• 02 D002<br>• 03 D003　　• 04 D007<br>• 05 F001 | 01 | |
| B039 | Automatic user parameter function enable<br>• 00 Disabled　　• 01 Enabled | 00 | |
| B040 | Torque limit selection<br>• 00 4-quadrant mode<br>• 01 Selected by two input terminals<br>• 02 From analog O2 input (0 to 200%)<br>• 03 From expansion card 1<br>• 04 From expansion card 2 | 00 | |
| B041 | Torque limit (1) (forward-driving in 4-quadrant mode) | 150. | |
| B042 | Torque limit (2) (reverse-regenerating in 4-quadrant mode) | 150. | |
| B043 | Torque limit (3) (reverse-driving in 4-quadrant mode) | 150. | |
| B044 | Torque limit (4) (forward-regenerating in 4-quadrant mode) | 150. | |
| B045 | Torque limit LADSTOP enable<br>• 00 Disable　　• 01 Enable | 00 | |
| B046 | Reverse Run protection enable<br>• 00 Disable　　• 01 Enable | 00 | |
| B050 | Controlled deceleration and stop on power loss<br>• 00 Disable　　• 01 Constant decel, stop<br>• 02 Constant DC voltage control with resume<br>• 03 Constant DC voltage control | 00 | |
| B051 | DC bus voltage trigger level during power loss | 0.0 | |
| B052 | Over-voltage threshold during power loss | 0.0 | |
| B053 | Deceleration time setting during power loss | 1.00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B054 | Initial output frequency decrease during power loss | 0.00 | |
| B055 | Proportional gain setting for non-stop operation at power loss | 0.20 | |
| B056 | Integral time setting for non-stop operation at power loss | 0.100 | |
| B060 | [O] input maximum limit level of window comparator | 100 | |
| B061 | [O] input minimum limit level of window comparator | 0 | |
| B062 | [O] input hysteresis width of window comparator | 0 | |
| B063 | [OI] input maximum limit level of window comparator | 100 | |
| B064 | [OI] input minimum limit level of window comparator | 0 | |
| B065 | [OI] input hysteresis width of window comparator | 0 | |
| B066 | [O2] input maximum limit level of window comparator | 100 | |
| B067 | [O2] input minimum limit level of window comparator | –100 | |
| B068 | [O2] input hysteresis width of window comparator | 0 | |
| B070 | [O] input disconnect threshold | 255(no) | |
| B071 | [OI] input disconnect threshold | 255(no) | |
| B072 | [O2] input disconnect threshold | 127(no) | |
| B078 | Clear cumulative input power data | 00 | |
| B079 | Cumulative input power display gain setting | 1. | |
| B082 | Start frequency adjustment | 0.50 | |
| B083 | Carrier frequency setting | 5.0 | |
| B084 | Initialization mode (parameters or trip history)<br>• 00 Trip history clear<br>• 01 Parameter initialization<br>• 02 Trip history clear and parameter initialization | 00 | |
| B085 | Country code for initialization<br>• 00 Japan version   • 01 Europe version<br>• 02 US version     • 03 (reserved) | 01 / 02 | |
| B086 | Frequency scaling conversion factor | 1.0 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B087 | STOP key enable<br>• 00 Enable • 01 Disable<br>• 02 Disable only the STOP function | 00 | |
| B088 | Restart mode after FRS<br>• 00 Restart from 0Hz<br>• 01 Restart from frequency detected from actual speed of motor<br>• 02 Restart from active matching frequency | 00 | |
| B089 | Automatic carrier frequency reduction<br>• 00 Disable • 01 Enable | 00 | |
| B090 | Dynamic braking usage ratio | 00 | |
| B091 | Stop mode selection | 00 | |
| B092 | Cooling fan control<br>• 00 Fan always ON<br>• 01 Fan ON during Run, OFF during Stop | 00 | |
| B095 | Dynamic braking control<br>• 00 Disable<br>• 01 Enable during RUN only<br>• 02 Enable always | 00 | |
| B096 | Dynamic braking activation level | 360/720 | |
| B098 | • Thermistor for thermal protection control<br>• 00 Disable<br>• 01 Enable – PTC thermistor<br>• 02 Enable – NTC thermistor | 00 | |
| B099 | Thermal protection level setting | 3000 | |
| B100 | Free-setting V/f frequency (1) | 0. | |
| B101 | Free-setting V/f voltage (1) | 0.0 | |
| B102 | Free-setting V/f frequency (2) | 0. | |
| B103 | Free-setting V/f voltage (2) | 0.0 | |
| B104 | Free-setting V/f frequency (3) | 0. | |
| B105 | Free-setting V/f voltage (3) | 0.0 | |
| B106 | Free-setting V/f frequency (4) | 0. | |
| B107 | Free-setting V/f voltage (4) | 0.0 | |
| B108 | Free-setting V/f frequency (5) | 0. | |
| B109 | Free-setting V/f voltage (5) | 0.0 | |
| B110 | Free-setting V/f frequency (6) | 0. | |
| B111 | Free-setting V/f voltage (6) | 0.0 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| B112 | Free-setting V/f frequency (7) | 0. | |
| B113 | Free-setting V/f voltage (7) | 0.0 | |
| B120 | Brake Control Enable<br>• 00 Disable • 01 Enable | 00 | |
| B121 | Brake Wait Time for Release | 0.00 | |
| B122 | Brake Wait Time for Acceleration | 0.00 | |
| B123 | Brake Wait Time for Stopping | 0.00 | |
| B124 | Brake Wait Time for Confirmation | 0.00 | |
| B125 | Brake Release Frequency Setting | 0.00 | |
| B126 | Brake Release Current Setting | Rated current of each inverter | |
| B127 | Braking frequency | 0.00 | |
| B130 | Over-voltage LADSTOP enable<br>• 00 Disable<br>• 01 Enable during deceleration and constant speed<br>• 02 Enable during acceleration | 00 | |
| B131 | Over-voltage LADSTOP level | 380/380/380<br>760/760/760 | |
| B132 | Acceleration and deceleration rate at overvoltage suppression | 1.0 | |
| B133 | Overvoltage suppression proportional gain | 0.50 | |
| B134 | Overvoltage suppression integral time | 0.060 | |

## "C" Group: Intelligent Terminal Functions

| Func. Code | Name / Description | | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|---|
| C001 | Terminal [1] function | 63 option codes available (see page 43) | 18 | |
| C002 | Terminal [2] function | | 16 | |
| C003 | Terminal [3] function | | 06 | |
| C004 | Terminal [4] function | | 11 | |
| C005 | Terminal [5] function | | 09 | |
| C006 | Terminal [6] function | | 03 / 13 | |
| C007 | Terminal [7] function | | 02 | |
| C008 | Terminal [8] function | | 01 | |
| C011 | Terminal [1] active state | • 00 Normally open [NO] • 01 Normally closed [NC] | 00 | |
| C012 | Terminal [2] active state | | 00 | |
| C013 | Terminal [3] active state | | 00 | |
| C014 | Terminal [4] active state | | 00 | |
| C015 | Terminal [5] active state | | 00 | |
| C016 | Terminal [6] active state | | 00 / 01 | |
| C017 | Terminal [7] active state | | 00 | |
| C018 | Terminal [8] active state | | 00 | |
| C019 | Terminal [FW] active state | | 00 | |
| C021 | Terminal [11] function | 51 option codes available (see page 45) | 01 | |
| C022 | Terminal [12] function | | 00 | |
| C023 | Terminal [13] function | | 03 | |
| C024 | Terminal [14] function | | 07 | |
| C025 | Terminal [15] function | | 08 | |
| C026 | Alarm relay terminal function | | 05 | |
| C027 | [FM] signal selection | 12 option codes available (see page 48) | 00 | |
| C028 | [AM] signal selection | | 00 | |
| C029 | [AMI] signal selection | | 00 | |
| C030 | Digital current monitor reference value | | Rated current x 1.0 | |

| Func. Code | Name / Description | | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|---|
| C031 | Terminal [11] active state | • 00 Normally open (NO)<br>• 01 Normally closed (NC) | 00 | |
| C032 | Terminal [12] active state | | 00 | |
| C033 | Terminal [13] active state | | 00 | |
| C034 | Terminal [14] active state | | 00 | |
| C035 | Terminal [15] active state | | 00 | |
| C036 | Alarm relay terminal active state | | 01 | |
| C038 | Low current indication output mode select<br>• 00 Output during acceleration/deceleration and constant speed operation<br>• 01 Output only during constant speed | | 01 | |
| C039 | Low current indication detection level | | Rated current x 1.0 | |
| C040 | Overload signal output mode<br>• 00 During accel/decel<br>• 01 During constant speed | | 01 | |
| C041 | Overload level setting | | Rated current of each inverter | |
| C042 | Frequency arrival setting for accel | | 0.00 | |
| C043 | Arrival frequency setting for decel | | 0.00 | |
| C044 | PID deviation level setting | | 3.0 | |
| C045 | Frequency arrival setting for accel (2) | | 0.00 | |
| C046 | Frequency arrival setting for decel (2) | | 0.00 | |
| C052 | Maximum PID feedback (PV) data | | 0.00 | |
| C053 | Minimum PID feedback (PV) data | | 100.0 | |
| C055 | Over-torque (forward-driving) level setting | | 100. | |
| C056 | Over-torque (reverse regenerating) level | | 100. | |
| C057 | Over-torque (reverse driving) level | | 100. | |
| C058 | Over-torque (forward regenerating) level | | 100. | |
| C061 | Electronic thermal warning level | | 80. | |
| C062 | Alarm code output<br>• 00 Disable     • 01 Enable, 3-bit code<br>• 02 Enable, 4-bit code | | 00 | |
| C063 | Zero speed detection level | | 0.00 | |
| C064 | Heatsink overheat warning level | | 120 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| C070 | Data command method<br>• 02 Digital operator  • 03 RS485<br>• 04 Expansion card 1• 05 Expansion card 2 | 02 | |
| C071 | Communication speed selection<br>• 02 (Test)           • 03 2400bps<br>• 04 4800bps         • 05 9600bps<br>• 06 19200bps | 04 | |
| C072 | Node allocation | 1. | |
| C073 | Communication data length selection<br>• 07 7-bit data      • 08 8-bit data | 7 | |
| C074 | Communication parity selection<br>• 00 No parity       • 01 Even parity<br>• 02 Odd parity | 00 | |
| C075 | Communication stop bit selection<br>• 01 1 stop bit      • 02 2 stop bits | 1 | |
| C076 | Action upon communication error selection<br>• 00 Trip<br>• 01 Trip after deceleration and stop<br>• 02 No action (ignore errors)<br>• 03 Free-run stop<br>• 04 Decelerate and stop | 02 | |
| C077 | Communication timeout before trip | 0.00 | |
| C078 | Communication wait time | 0. | |
| C079 | Communication protocol select<br>• 00 ASCII           • 01 ModBus RTU | 00 | |
| C081 | [O] input span calibration | Factory calibrated | |
| C082 | [OI] input span calibration | | |
| C083 | [O2] input span calibration | | |
| C085 | Thermistor input tuning | 105.0 | |
| C086 | [AM] terminal offset tuning | 0.0 | |
| C087 | [AMI] terminal meter tuning | 80. | |
| C088 | [AMI] terminal offset tuning | Factory calibrated | |
| C091 | Debug mode enable<br>• 00 Display          • 01 No display | 00 | |
| C101 | Up/Down memory mode selection<br>• 00 Clear last frequency (return to F001)<br>• 01 Keep last freq. adjusted by UP/DWN | 00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| C102 | Reset mode selection<br>• 00 Cancel trip state, stop inverter output, reset CPU; clear position counter at ON transition<br>• 01 Cancel trip state, stop inverter output, reset CPU; clear position counter at OFF transition<br>• 02 Cancel trip state and clear position counter; no effect if a trip does not exist<br>• 03 Cancel trip state but does not clear position counter; no effect if a trip does not exist | 00 | |
| C103 | Restart mode after reset<br>• 00 Restart at 0 Hz<br>• 01 Resume after frequency matching<br>• 02 Restart with active matching frequency | 00 | |
| C105 | FM gain adjustment | 100. | |
| C106 | AM gain adjustment | 100. | |
| C107 | AMI gain adjustment | 100. | |
| C109 | AM bias adjustment | 0. | |
| C110 | AMI bias adjustment | 20. | |
| C111 | Overload setting (2) | Rated current of each inverter | |
| C121 | [O] input zero calibration | Factory calibrated | |
| C122 | [OI] input zero calibration | 0.0 | |
| C123 | [O2] input zero calibration | 0.0 | |
| C130 | Terminal [11] ON-delay time | 0.0 | |
| C131 | Terminal [11] OFF-delay time | 0.0 | |
| C132 | Terminal [12] ON-delay time | 0.0 | |
| C133 | Terminal [12] OFF-delay time | 0.0 | |
| C134 | Terminal [13] ON-delay time | 0.0 | |
| C135 | Terminal [13] OFF-delay time | 0.0 | |
| C136 | Terminal [14] ON-delay time | 0.0 | |
| C137 | Terminal [14] OFF-delay time | 0.0 | |
| C138 | Terminal [15] ON-delay time | 0.0 | |
| C139 | Terminal [15] OFF-delay time | 0.0 | |
| C140 | Relay output ON-delay time | 0.0 | |
| C141 | Relay output OFF-delay time | 0.0 | |

| Func. Code | Name / Description | | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|---|
| C142 | Logic output 1 function A | 22 option codes (see page 45) | 00 | |
| C143 | Logic output 1 function B | | 00 | |
| C144 | Logic output 1 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C145 | Logic output 2 function A | 22 option codes (see page 45) | 00 | |
| C146 | Logic output 2 function B | | 00 | |
| C147 | Logic output 2 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C148 | Logic output 3 function A | 22 option codes (see page 45) | 00 | |
| C149 | Logic output 3 function B | | 00 | |
| C150 | Logic output 3 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C151 | Logic output 4 function A | 22 option codes (see page 45) | 00 | |
| C152 | Logic output 4 function B | | 00 | |
| C153 | Logic output 4 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C154 | Logic output 5 function A | 22 option codes (see page 45) | 00 | |
| C155 | Logic output 5 function B | | 00 | |
| C156 | Logic output 5 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C157 | Logic output 6 function A | 22 option codes (see page 45) | 00 | |
| C158 | Logic output 6 function B | | 00 | |
| C159 | Logic output 6 operator • 00 AND • 01 OR • 02 XOR (exclusive OR) | | 00 | |
| C160 | Terminal [1] input response time setting | | 1 | |
| C161 | Terminal [2] input response time setting | | 1 | |
| C162 | Terminal [3] input response time setting | | 1 | |
| C163 | Terminal [4] input response time setting | | 1 | |
| C164 | Terminal [5] input response time setting | | 1 | |
| C165 | Terminal [6] input response time setting | | 1 | |
| C166 | Terminal [7] input response time setting | | 1 | |
| C167 | Terminal [8] input response time setting | | 1 | |
| C168 | Terminal [FW] input response time setting | | 1 | |
| C169 | Multi-speed position determination time | | 0 | |

## "H" Group: Motor Constants Functions

| Func. Code | Name / Description | Default Value −FE2/−FU2 | Set Value |
|---|---|---|---|
| H001 | Auto-tuning Setting<br>• 00 Auto-tuning OFF<br>• 01 Auto-tune (measure motor resistance and inductance, without rotating)<br>• 02 Auto-tune (rotate motor) | 00 | |
| H002/<br>H202 | Motor data selection<br>• 00 Standard motor data<br>• 01 Auto-tuning data<br>• 02 Adaptive tuning data | 00 | |
| H003/<br>H203 | Motor capacity | Factory set | |
| H004/<br>H204 | Motor poles setting<br>• 2 poles     • 4 poles<br>• 6 poles     • 8 poles<br>• 10 poles | 4 | |
| H005/<br>H205 | Motor speed constant | 1.590 | |
| H006/<br>H206/<br>H306 | Motor stabilization constant | 100. | |
| H020/<br>H220 | Motor constant R1 | Inverter rating | |
| H021/<br>H221 | Motor constant R2 | Inverter rating | |
| H022/<br>H222 | Motor constant L | Inverter rating | |
| H023/<br>H223 | Motor constant $I_0$ | Inverter rating | |
| H024/<br>H224 | Motor Constant J | Inverter rating | |
| H030/<br>H230 | Auto-tuned motor constant R1 | Inverter rating | |
| H031/<br>H231 | Auto-tuned motor constant R2 | Inverter rating | |
| H032/<br>H232 | Auto-tuned motor constant L | Inverter rating | |
| H033/<br>H233 | Auto-tuned motor constant $I_0$ | Inverter rating | |
| H034/<br>H234 | Auto-tuned motor constant J | Inverter rating | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| H050/ H250 | PI proportional gain | 100 | |
| H051/ H251 | PI integral gain | 100 | |
| H052/ H252 | P proportional gain setting | 1.00 | |
| H060/ H260 | 0Hz SLV limit | 1.00 | |
| H061/ H261 | Zero LV starting boost current | 50. | |
| H070 | Terminal selection PI proportional gain setting | 100.0 | |
| H071 | Terminal selection PI integral gain setting | 100.0 | |
| H072 | Terminal selection P proportional gain setting | 1.00 | |
| H073 | Gain switching time | 100. | |

## "P" Group: Expansion Card Functions

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| P001 | Operation mode on expansion card #1 error<br>• 00 Trip (stop motor)<br>• 01 Continuous operation | 00 | |
| P002 | Operation mode on expansion card #2 error<br>• 00 Trip (stop motor)<br>• 01 Continuous operation | 00 | |
| P011 | Encoder pulse-per-revolution (PPR) setting | 1024 | |
| P012 | Control pulse setting<br>• 00 ASR mode    • 01 APR mode<br>• 02 APR2    • 03 HAPR | 00 | |
| P013 | Pulse input mode setting<br>• 00 Quadrature    • 01 Count and direction<br>• 02 Separate Fwd & Rev pulse trains | 00 | |
| P014 | Home search stop position setting | 0. | |
| P015 | Home search speed setting | 5.00 | |
| P016 | Home search direction setting<br>• 00 Forward    • 01 Reverse | 00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| P017 | Home search completion range setting | 5 | |
| P018 | Home search completion delay time setting | 0.00 | |
| P019 | Electronic gear set position selection<br>• 00 Position feedback side<br>• 01 Position command side | 00 | |
| P020 | Electronic gear ratio numerator setting | 1. | |
| P021 | Electronic gear ratio denominator setting | 1. | |
| P022 | Feed-forward gain setting | 0.00 | |
| P023 | Position loop gain setting | 0.50 | |
| P024 | Position bias setting | 0. | |
| P025 | Temp. compensation thermistor enable<br>• 00 Disable  • 01 Enable | 00 | |
| P026 | Over-speed error detection level setting | 135.0 | |
| P027 | Speed deviation error detection level setting | 7.50 | |
| P028 | Numerator of motor gear ratio | 1. | |
| P029 | Denominator of motor gear ratio | 1. | |
| P031 | Accel/decel time input selection<br>• 00 Inverter  • 01 Expansion card 1<br>• 02 Expansion card 2• 03 Easy sequence | 00 | |
| P032 | Positioning command input selection<br>• 00 Inverter  • 01 Expansion card 1<br>• 02 Expansion card 2 | 00 | |
| P033 | Torque command input selection<br>• 00 [O] terminal  • 01 [OI] terminal<br>• 02 [O2] terminal  • 03 Keypad (P034) | 00 | |
| P034 | Torque command setting | 0. | |
| P035 | Torque command polarity select<br>• 00 Use signal polarity at terminal [O2]<br>• 01 Use motor rotation direction | 00 | |
| P036 | Torque bias mode<br>• 00 Disabled  • 01 Keypad (P037)<br>• 02 [O2] terminal | 00 | |
| P037 | Torque bias value | 0. | |
| P038 | Torque bias polarity selection<br>• 00 Use signal polarity at terminal [O2]<br>• 01 Use motor rottion direction | 00 | |
| P039 | Forward maximum speed for torque-controlled operation | 0.00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| P040 | Reverse maximum speed for torque-controlled operation | 0.00 | |
| P044 | DeviceNet comm watchdog timer | 1.00 | |
| P045 | Inverter action on DeviceNet comm error<br>• 00 Trip<br>• 01 Decelerate and trip<br>• 02 Hold last speed<br>• 03 Free run stop<br>• 04 Decelerate and stop | 01 | |
| P046 | DeviceNet polled I/O: Output instance number | 21 | |
| P047 | DeviceNet polled I/O: Input instance number | 71 | |
| P048 | Inverter action on DeviceNet idle mode<br>• 00 Trip<br>• 01 Decelerate and trip<br>• 02 Hold last speed<br>• 03 Free run stop<br>• 04 Decelerate and stop | 01 | |
| P049 | DeviceNet motor poles setting for RPM | 0 | |
| P055 | Pulse train frequency span | 25.0 | |
| P056 | Pulse train frequency time constant | 0.10 | |
| P057 | Pulse train frequency bias | 0. | |
| P058 | Pulse train frequency limit | 100. | |
| P060 to P067 | Multi-stage position settings 0 to 7 | 0 | |
| P068 | Home position mode selection<br>• 00 Low speed • 01 High speed 1<br>• 02 High speed 2 | 00 | |
| P069 | Home position direction selection<br>• 00 Forward • 01 Reverse | 00 | |
| P070 | Low speed homing frequency | 0.00 | |
| P071 | High speed homing frequency | 0.00 | |
| P072 | Forward position range setting | 268435455 | |
| P073 | Reverse position range setting | –268435455 | |
| P074 | Position teaching selection<br>• 00 X00 • 01 X01<br>• 02 X02 • 03 X03<br>• 04 X04 • 05 X05<br>• 06 X06 • 07 X07 | 00 | |

| Func. Code | Name / Description | Default Value –FE2/–FU2 | Set Value |
|---|---|---|---|
| P100 to P131 | Easy sequence user parameters, U(00) to U(31) | 0. | |

## "U" Group: User-selectable Menu Functions

| Func. Code | Name / Description | Default Value | Set Value |
|---|---|---|---|
| U001 | User-selected function, D001 to P131 | no | |
| U002 | User-selected function, D001 to P131 | no | |
| U003 | User-selected function, D001 to P131 | no | |
| U004 | User-selected function, D001 to P131 | no | |
| U005 | User-selected function, D001 to P131 | no | |
| U006 | User-selected function, D001 to P131 | no | |
| U007 | User-selected function, D001 to P131 | no | |
| U008 | User-selected function, D001 to P131 | no | |
| U009 | User-selected function, D001 to P131 | no | |
| U010 | User-selected function, D001 to P131 | no | |
| U011 | User-selected function, D001 to P131 | no | |
| U012 | User-selected function, D001 to P131 | no | |

## Intelligent Input Terminal Listing

| Symbol | Code | Input Terminal Name |
|--------|------|---------------------|
| RV | 01 | Reverse Run/Stop |
| CF1 | 02 | Multi-speed select, Bit 0 (LSB) |
| CF2 | 03 | Multi-speed select, Bit 1 |
| CF3 | 04 | Multi-speed select, Bit 2 |
| CF4 | 05 | Multi-speed select, Bit 3 (LSB) |
| JG | 06 | Jogging |
| DB | 07 | External DC injection braking signal |
| SET | 08 | Set (select) second motor data |
| 2CH | 09 | 2-stage accel and decel |
| FRS | 11 | Free-run stop |
| EXT | 12 | External trip |
| USP | 13 | Unattended start protection |
| CS | 14 | Commercial power source |
| SFT | 15 | Software lock |
| AT | 16 | Analog input voltage/current sel. |
| SET3 | 17 | Set (select) 3rd motor data |
| RS | 18 | Reset inverter |
| STA | 20 | Start (3-wire interface) |
| STP | 21 | Stop (3-wire interface) |
| F/R | 22 | FW, RV (3-wire interface) |
| PID | 23 | PID ON/OFF |
| PIDC | 24 | PID Reset |
| CAS | 26 | Control gain setting |
| UP | 27 | Remote control Up func. |
| DWN | 28 | Remote control Down func. |
| UDC | 29 | Remote control data clearing |
| OPE | 31 | Operator control |
| SF1–SF7 | 32–38 | Multi-speed bits 1 to 7 |
| OLR | 39 | Overload restriction |
| TL | 40 | Torque limit enable |
| TRQ1 | 41 | Torque limit select, bit 1 (LSB) |
| TRQ2 | 42 | Torque limit select, bit 2 (MSB) |

| Symbol | Code | Input Terminal Name |
|--------|------|---------------------|
| PPI | 43 | P / PI mode selection |
| BOK | 44 | Brake confirmation signal |
| ORT | 45 | Orientation (home search) |
| LAC | 46 | LAC: LAD cancel |
| PCLR | 47 | Position deviation reset |
| STAT | 48 | Pulse train position command enable |
| ADD | 50 | Add frequency enable |
| F-TM | 51 | Force Terminal Mode |
| ATR | 52 | Torque control enable |
| KHC | 53 | Clear cumulative power value |
| SON | 54 | Speed servo ON |
| FOC | 55 | Current forcing |
| MI1 | 56 | General-purpose input 1 |
| MI2 | 57 | General-purpose input 2 |
| MI3 | 58 | General-purpose input 3 |
| MI4 | 59 | General-purpose input 4 |
| MI5 | 60 | General-purpose input 5 |
| MI6 | 61 | General-purpose input 6 |
| MI7 | 62 | General-purpose input 7 |
| MI8 | 63 | General-purpose input 8 |
| AHD | 65 | Analog holding command |
| CP1 | 66 | Multi-stage position select 1 |
| CP2 | 67 | Multi-stage position select 2 |
| CP3 | 68 | Multi-stage position select 3 |
| ORL | 69 | Zero-return limit function |
| ORG | 70 | Zero-return trigger function |
| FOT | 71 | Forward drive stop |
| ROT | 72 | Reverse drive stop |
| SPD | 73 | Speed/position control select |
| PCNT | 74 | Pulse counter input |
| PCC | 75 | Pulse counter clear |

## Intelligent Output Terminal Listing

| Symbol | Code | Input Terminal Name |
|--------|------|---------------------|
| RUN | 00 | Run signal |
| FA1 | 01 | Freq. arrival type 1 – constant speed |
| FA2 | 02 | Freq. arrival type 2 – over-frequency |
| OL | 03 | Overload advance notice signal |
| OD | 04 | Output deviation for PID control |
| AL | 05 | Alarm signal |
| FA3 | 06 | Freq. arrival type 3 – at frequency |
| OTQ | 07 | Over-torque signal |
| IP | 08 | Instantaneous power failure signal |
| UV | 09 | Under-voltage signal |
| TRQ | 10 | In torque limit signal |
| RNT | 11 | Run time over |
| ONT | 12 | Power-ON time over |
| THM | 13 | Thermal alarm signal |
| BRK | 19 | Brake release signal |
| BER | 20 | Brake error signal |
| ZS | 21 | Zero speed detect |
| DSE | 22 | Speed deviation maximum |
| POK | 23 | Positioning completion |
| FA4 | 24 | Freq. arrival type 4 – over-frequency (2) |
| FA5 | 25 | Freq. arrival type 5 – at frequency (2) |
| OL2 | 26 | Overload advance notice signal (2) |
| ODC | 27 | Analog [O] terminal disconnect detect |
| OIDC | 28 | Analog [OI] terminal disconnect detect |
| O2DC | 29 | Analog [O2] terminal disconnect detect |
| FBV | 31 | PID feedback comparison |
| NDC | 32 | Network detection signal |
| LOG1 | 33 | Logic output 1 |
| LOG2 | 34 | Logic output 2 |
| LOG3 | 35 | Logic output 3 |
| LOG4 | 36 | Logic output 4 |
| LOG5 | 37 | Logic output 5 |

| Symbol | Code | Input Terminal Name |
|--------|------|---------------------|
| LOG6 | 38 | Logic output 6 |
| WAC | 39 | Capacitor life warning |
| WAF | 40 | Low cooling fan speed |
| FR | 41 | Starting contact signal |
| OHF | 42 | Heat sink overheat warning |
| LOC | 43 | Low output current signal |
| MO1 | 44 | General output 1 |
| MO2 | 45 | General output 2 |
| MO3 | 46 | General output 3 |
| MO4 | 47 | General output 4 |
| MO5 | 48 | General output 5 |
| MO6 | 49 | General output 6 |
| IRDY | 50 | Inverter ready |
| FWR | 51 | Forward rotation signal |
| RVR | 52 | Reverse rotation signal |
| MJA | 53 | Major failure signal |
| WCO | 54 | Window comparator for terminal [O] |
| WCOI | 55 | Window comparator for terminal [OI] |
| WCO2 | 56 | Window comparator for terminal [O2] |

## Analog Input Configuration

The following tables show the parameter settings required for various analog input signal types.

| A006 | A005 | [AT] | External Frequency Command Input | Trim Frequency Command Input | Reverse available (bipolar input) |
|------|------|------|------|------|------|
| 00 OR 03 | 00 | OFF | [O] — [L] | ✘ | ✘ |
| | | ON | [OI] — [L] | ✘ | ✘ |
| | 01 | OFF | [O] — [L] | ✘ | ✘ |
| | | ON | [O2] — [L] | ✘ | ✔ |
| 01 | 00 | OFF | [O] — [L] | [O2] — [L] | ✘ |
| | | ON | [OI] — [L] | [O2] — [L] | ✘ |
| | 01 | OFF | [O] — [L] | [O2] — [L] | ✘ |
| | | ON | [O2] — [L] | ✘ | ✔ |
| 02 | 00 | OFF | [O] — [L] | [O2] — [L] | ✔ |
| | | ON | [OI] — [L] | [O2] — [L] | ✔ |
| | 01 | OFF | [O] — [L] | [O2] — [L] | ✔ |
| | | ON | [O2] — [L] | ✘ | ✔ |
| — | 02 | OFF | [O] — [L] | [O2] — [L] | ✘ |
| | | ON | Keypad pot. | [O2] — [L] | ✘ |
| | 03 | OFF | [OI] — [L] | [O2] — [L] | ✘ |
| | | ON | Keypad pot. | [O2] — [L] | ✘ |
| | 04 | OFF | [O2] — [L] | ✘ | ✔ |
| | | ON | Keypad pot. | [O2] — [L] | ✘ |

The table below applies when the [AT] input function is not assigned to *any* intelligent input terminal. The A005 setting, normally used in conjunction with an [AT] input, is ignored.

| A006 | A005 | [AT] | External Frequency Command Input | Trim Frequency Command Input | Reverse available (bipolar input) |
|------|------|------|------|------|------|
| 00 | — | (not assigned to any input terminal) | [O2] — [L] | ✘ | ✔ |
| 01 | — | | Summation of [O] — [L] and [OI] — [L] | [O2] — [L] | ✘ |
| 02 | — | | Summation of [O] — [L] and [OI] — [L] | [O2] — [L] | ✔ |
| 03 | — | | Summation of [O] — [L] and [OI] — [L] | ✘ | ✘ |

## Analog Output Function Listing

The following tables show all functions available for assignment to the three analog output terminals.

| C027 Setting for Terminal [FM] | | | |
|------|------|------|------|
| Option Code | Function Name | Description | Corresponding Signal Range |
| 00 | Output frequency | Actual motor speed, represented by PWM signal | 0 to max. frequency in Hz |
| 01 | Output current | Motor current (represented by PWM signal) | 0 to 200% (% of max. rated output current) |
| 02 | Output torque | Rated output torque | 0 to 200% |
| 03 | Digital output frequency | Output frequency (available only at [FM] output) | 0 to max. frequency in Hz |
| 04 | Output voltage | Rated output voltage to motor | 0 to 133% (0.75 x full scale = 100% voltage) |
| 05 | Input power | Rated input power | 0 to 200% |
| 06 | Electronic thermal overload | Percentage of electronic overload attained | 0 to 100% |
| 07 | LAD frequency | Internal ramp generator frequency | 0 to max. frequency in Hz |

| C027 Setting for Terminal [FM] | | | |
|---|---|---|---|
| Option Code | Function Name | Description | Corresponding Signal Range |
| 08 | Digital current monitor | Signal freq. = 1,440 Hz when output current = C030 setting | 0.2 x rated current to 2.0 x rated current (A) |
| 09 | Motor temperature | Thermistor input temp. reading in PWM format | 0 to 200°C |
| 10 | Heat sink temperature | Inverter heatsink temp. reading in PWM format | 0 to 200°C |
| 12 | General YA(0) analog output | Internal analog value from EZ-Sequence | 0 to 100% |

| C028 Setting for Terminal [AM]; C029 Setting for Terminal [AMI] | | | |
|---|---|---|---|
| Option Code | Function Name | Description | Corresponding Signal Range |
| 00 | Output frequency | Actual motor speed, represented by PWM signal | 0 to max. frequency in Hz |
| 01 | Output current | Motor current (represented by PWM signal) | 0 to 200% (% of max. rated output current) |
| 02 | Output torque | Rated output torque | 0 to 200% |
| 03 | Digital output frequency | Output frequency (available only at [FM] output) | 0 to max. frequency in Hz |
| 04 | Output voltage | Rated output voltage to motor | 0 to 133% (0.75 x full scale = 100% voltage) |
| 05 | Input power | Rated input power | 0 to 200% |
| 06 | Electronic thermal overload | Percentage of electronic overload attained | 0 to 100% |
| 07 | LAD frequency | Internal ramp generator frequency | 0 to max. frequency in Hz |
| 09 | Motor temperature | Thermistor input temp. reading in PWM format | 0 to 200°C |
| 10 | Heat sink temperature | Inverter heatsink temp. reading in PWM format | 0 to 200°C |
| 13 | General YA(1) analog output | Internal analog value from EZ-Sequence | 0 to 100% (output only from terminal [AM]) |
| 14 | General YA(2) analog output | Internal analog value from EZ-Sequence | 0 to 100% (output only from terminal [AMI]) |

## Programming Error Codes

The SJ700₂ inverter operator keypad displays a special code (begins with the Ɓ character) to indicate a programming error. Programming errors exist when one parameter conflicts with the meaningful range permitted by related parameter(s). Note that particular real-time frequency (speed) input levels can cause a conflict in some situations. After a conflict exists, the error code will appear on the display, or you can view it later with D090 in Monitor Mode. Also, the PGM LED on the display will flash ON/OFF when programming. These indications are automatically cleared when the parameter is corrected to the allowed range.

| Prg Error Code | Function code of parameter out of bounds | Boundary defined by... | |
|---|---|---|---|
| | | <, > | Base parameter |
| Ɓ001 Ɓ201 | A061 / A261 | > | A004 / A204 / A304 |
| Ɓ002 Ɓ202 | A062 / A262 | > | |
| Ɓ004 Ɓ204 Ɓ304 | A003 / A203 / A303 | > | |
| Ɓ005 Ɓ205 Ɓ305 | F001, A020 / A220 / A320 | > | |
| Ɓ006 Ɓ206 Ɓ306 | A021 to A035 / A221 to A235 A321 to A325 | > | |
| Ɓ009 | P015 | > | |
| Ɓ012 Ɓ212 | A062 / A262 | > | A061 / A261 |
| Ɓ015 Ɓ215 | F001, A020 / A220 | > | |
| Ɓ016 Ɓ216 | A021 to A035 / A221 to A235 | > | |
| Ɓ019 | A061 / A261 | < | P015 |
| Ɓ021 Ɓ221 | | < | A062 / A262 |
| Ɓ025 Ɓ225 | F001, A020 / A220 | < | B082 |
| Ɓ031 Ɓ231 | A061 / A261 | < | |
| Ɓ032 Ɓ232 | A062 / A262 | < | |
| Ɓ035 Ɓ235 Ɓ335 | F001, A202 / A220 / A320 | < | |

| Prg Error Code | Function code of parameter out of bounds | Boundary defined by... | |
|---|---|---|---|
| | | **<, >** | **Base parameter** |
| *8036* | A021 to A035 | < | B082 |
| *8037* | A038 | < | |
| *8085 8285 8385* | F001, A020 / A220 / A320 | >f-x,<br><f+x | A063 ± A064<br>A065 ± A066<br>A067 ± A068<br>(see note below) |
| *8086* | A021 to A035 | >f-x,<br><f+x | |
| *8091 8291* | A061 / A261 | > | B112 |
| *8092 8292* | A062 / A262 | > | |
| *8095 8295* | F001, A020 / A220 | > | |
| *8096* | A021 to A035 | > | |
| *8 1 10* | B100, B102, B104, B106, B108, B110 | > | B112 |
| | B102, B104, B106, B108, B110 | < | B100 |
| | B100 | > | B102 |
| | B104, B106, B108, B110 | < | |
| | B100, B102 | > | B104 |
| | B106, B108, B110 | < | |
| | B100, B102, B104 | > | B106 |
| | B108, B110 | < | |
| | B100, B102, B104, B106 | > | B108 |
| | B110 | < | |
| | B100, B102, B104, B106, B108 | > | B110 |
| *8 120* | B017, B019 | < | B015 |
| | B015 | > | B017 |
| | B019 | < | |
| | B015, B017 | > | B019 |

## Auto-tuning Procedure

The SJ700₂ auto-tuning feature calibrates the inverter to the parameters of a specific motor such as winding resistance and reactance. For optimum sensorless vector control, it is important to auto-tune during the initial installation, and after replacing either the motor or the inverter.

*Caution:* Auto-tuning requires that you configure the inverter for the desired type of vector control (set A044 = 03, 04, or 05). Then you can perform the auto-tuning procedure, which is detailed in the SJ700₂ Inverter Instruction Manual.