

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 • February 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

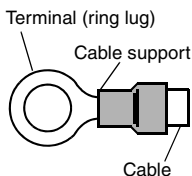
200V Models					
Motor output		Inverter Model	Wire Size (AWG)	Torque	
kW	HP			ft-lbs	(N·m)
18.5	25	-185LFU2	1	3.6	4.9
22	30	-220LFU2	1 or 1/0	6.5	8.8
30	40	-300LFU2	2/0 2/0 or 1/0 1/0	6.5	8.8
37	50	-370LFU2	4/0 4/0 or 1/0 1/0	6.5	8.8
45	60	-450LFU2	4/0 4/0 or 1/0 1/0	6.5	8.8
55	75	-550LFU2	2/0 2/0	10.1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

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



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	-055LFU	30
7.5	10	-075LFU	40
11	15	-110LFU	60
15	20	-150LFU	80
18.5	25	-185LFU	100
22	30	-220LFU	125
30	40	-300LFU	150
37	50	-370LFU	175
45	60	-450LFU	225
55	75	-550LFU	250

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

Motor Overload Protection

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

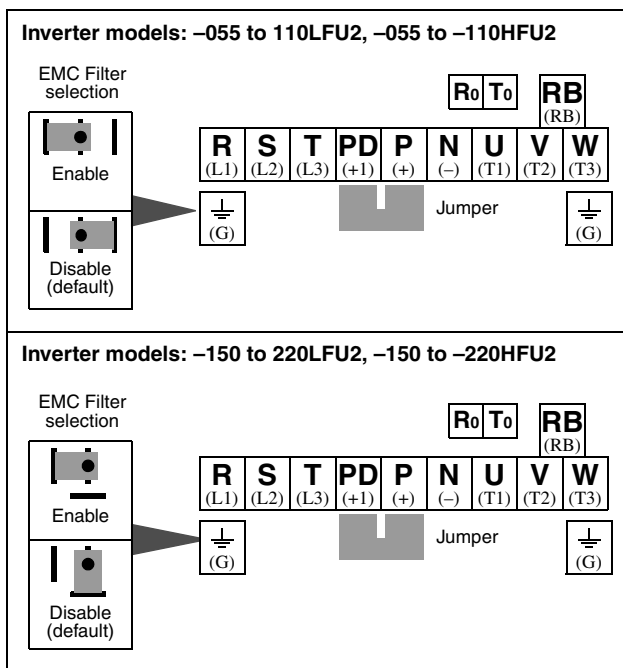
- B012 “electronic overload protection”
- B212 “electronic overload protection, 2nd motor”
- B312 “electronic overload protection, 3rd motor”

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



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



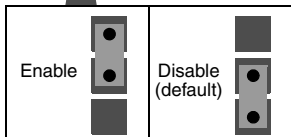
**Inverter models: -300 to 370LFU2,
-300 to -370HFU2**

R₀ T₀



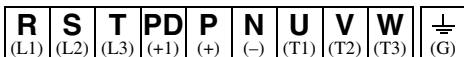
Jumper

EMC Filter selection



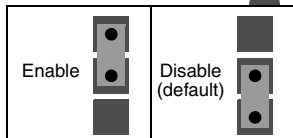
**Inverter models: -450LFU2,
-450 to -550HFU2**

R₀ T₀



Jumper

EMC Filter selection



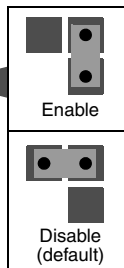
Inverter models: -550LFU2

EMC Filter selection

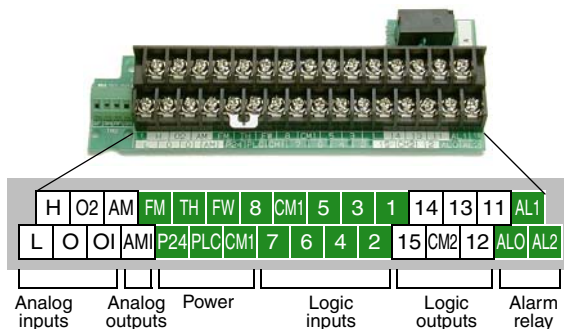
R₀ T₀



Jumper



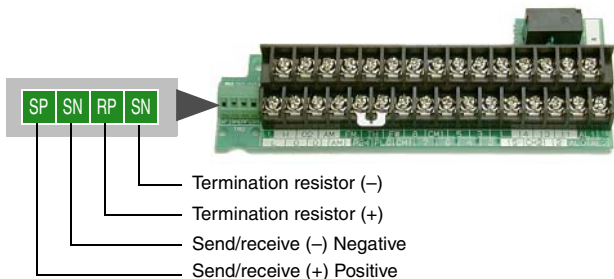
Control Circuit Terminals



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), 4.7k Ω input impedance
FW	Forward/stop command	27VDC max. (use P24 or an external supply referenced to terminal CM1), 4.7k Ω 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

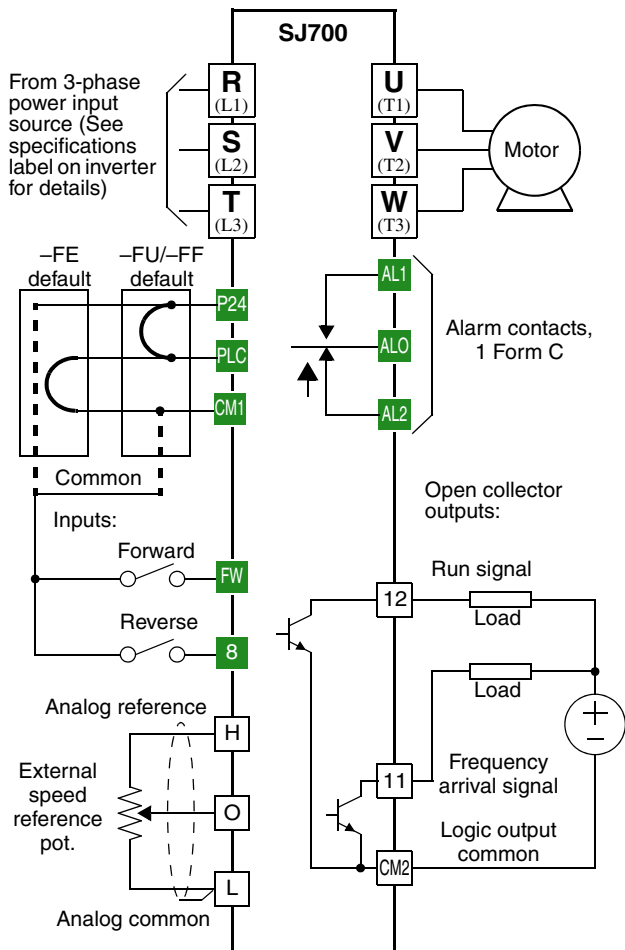
Terminal Name	Description	Ratings and Notes
FM	PWM output	0 to 10VDC, 1.2 mA max., 50% duty cycle
AM	Voltage analog output	0 to 10VDC, 2 mA max.
AMI	Current analog output	4-20 mA, nominal load impedance 250Ω
L	Common for analog inputs	Sum of OI, O, and H currents (return)
OI	Analog input, current	4 to 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 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
AL1	Relay contact, normally closed during RUN	
AL2	Relay contact, normally open during RUN	

Serial Port Terminals

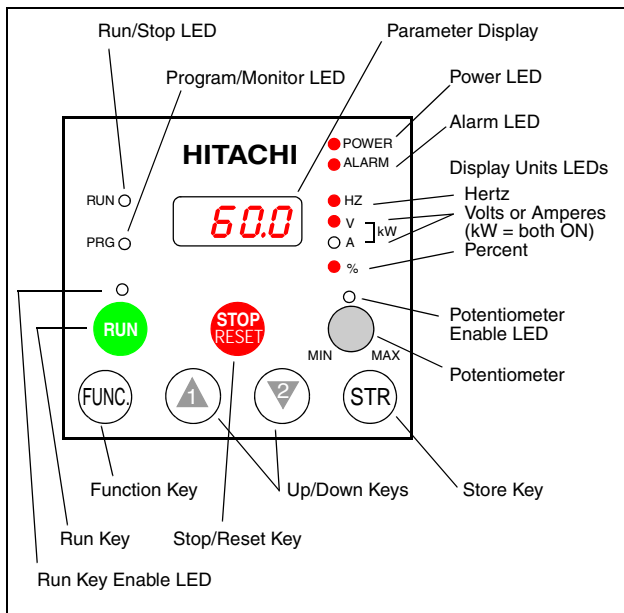


Basic Wiring Diagram

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

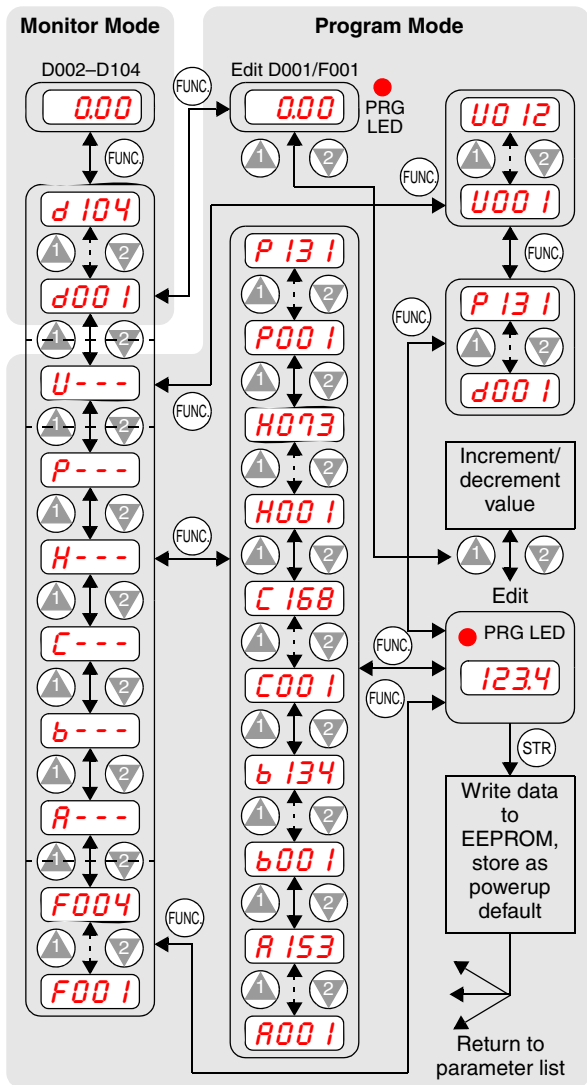


- **Run/Stop LED** – ON when the inverter output is ON and the motor is developing torque, and OFF when the inverter output is OFF (Stop Mode).
- **Program/Monitor LED** – This LED is ON when the inverter is ready for parameter editing (Program Mode). It is normally OFF when the parameter display is 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...)

- **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 $kW = (V \times A)/1000$.
- **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 <i>0.00</i>	
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	<ul style="list-style-type: none"> • Inverter output was short-circuited • Motor shaft is locked • Load is too heavy • A dual-voltage motor is wired incorrectly 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	<ul style="list-style-type: none"> • DC braking power(A054) set too high • Current transformer / noise error
E05.-	Overload protection	<ul style="list-style-type: none"> • Motor overload is detected by the electronic thermal function
E06.-	Braking resistor overload	<ul style="list-style-type: none"> • Regenerative braking resistor exceeds the usage time or usage ratio
E07.-	Over voltage protection	<ul style="list-style-type: none"> • DC bus voltage exceeds a threshold, due to regenerative energy from motor
E08.-	EEPROM error	<ul style="list-style-type: none"> • Built-in EEPROM memory experienced noise, high temperature, etc.
E09.-	Under-voltage error	<ul style="list-style-type: none"> • DC bus voltage decreased enough to cause a control circuit fault
E 10.-	CT error (current transformer)	<ul style="list-style-type: none"> • High electrical noise near inverter • A fault occurred in the built-in CT
E 11.-	CPU error	<ul style="list-style-type: none"> • Built-in CPU had internal error
E 12.-	External trip	<ul style="list-style-type: none"> • [EXT] input signal detected
E 13.-	USP (Unattended Start Protection)	<ul style="list-style-type: none"> • When (USP) was enabled, an error occurred when power was applied while a Run signal was present
E 14.-	Ground fault	<ul style="list-style-type: none"> • A ground fault was detected between the inverter output and the motor. This feature protects the inverter, and does not protect humans.
E 15.-	Input over-voltage	<ul style="list-style-type: none"> • Input voltage was higher than the specified value, 60 sec. after powerup
E 16.-	Instantaneous power failure	<ul style="list-style-type: none"> • Input power removal > 15ms or > 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
0000	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 terminals. Please refer to the manual for the expansion card for additional details.
E7.-	Expansion card #2 error	

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  Output frequency Motor current DC bus voltage  Cumulative op. time Cumulative ON time
---.1	Stop	---.6	Starting	
---.2	Deceleration	---.7	DC braking	
---.3	Constant speed	---.8	Overload restriction	
---.4	Acceleration	---.9	Forcible or servo ON	



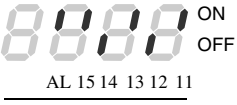
Restoring Factory Default Settings


Action	Display	Function/Parameter
Press the (FUNC.), (1) or (2) keys as needed.	<i>b---</i>	“B” Group selected
Press the (FUNC.) key.	<i>b001</i>	First “B” Group parameter
Press/hold (1) until...	<i>b085</i>	Country code for initialization selected
Press the (FUNC.) key. If setting is correct, then skip next step.	<i>02</i>	00 = Japan 01 = Europe 02 = United States
To change country code, press (1) or (2) key to set; (STR) to store.		
Press the (FUNC.) key.	<i>b085</i>	Country code for initialization selected
Press the (2) key.	<i>b084</i>	Initialization function selected
Press the (FUNC.) key.	<i>00</i>	0 = disable initialization, clear trip history only
Press the (1) key.	<i>01</i>	1 = enable initialization
Press the (STR) key.	<i>b084</i>	Initialization now enabled to restore all defaults
Press/hold the (2) and (FUNC.) keys. Do not release yet.	<i>b084</i>	First part of key sequence, the “B” is flashing
Press and hold the (STOP RESET) (STOP) key.	<i>b084</i>	Entire “B084” display will begin flashing
After the display begins flashing, then release the (STOP RESET) (STOP) key.	<i>0 EU 0USA</i>	Default parameter country code shown during initialization process
Release the (2) and (FUNC.) keys together.	<i>d001</i>	Final part of key sequence, function code for output frequency monitor shown after initialization is complete

Parameter Tables

“D” Group: Monitoring Functions

Parameter Monitoring

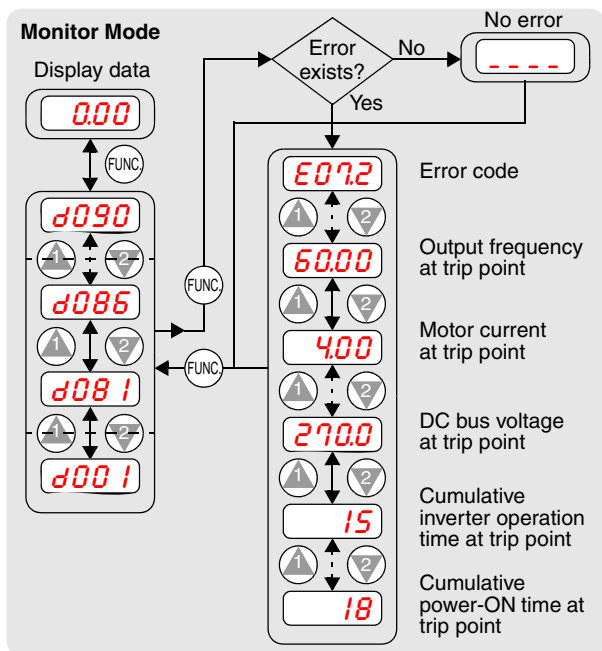
Func. Code	Name / Description	Units
D001	Output frequency monitor	Hz
D002	Output current monitor	A
D003	Rotation direction monitor  Forward Stop Reverse <hr style="width: 50%; margin: 0 auto;"/> Direction	—
D004	Process variable (PV), PID feedback monitor	%
D005	Intelligent input terminal status  8 7 6 5 4 3 2 1 FW <hr style="width: 50%; margin: 0 auto;"/> Terminal Numbers	—
D006	Intelligent output terminal status  AL 15 14 13 12 11 <hr style="width: 50%; margin: 0 auto;"/> 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  1: Capacitor on main circuit board 2: Cooling fan (slow speed)	—
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 52 for an error code listing)	—
D102	DC voltage monitor	V
D103	BRD load factor monitor	%
D104	Electronic thermal overload monitor	%

Trip History Navigation Map



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 <ul style="list-style-type: none"> • 00 Forward • 01 Reverse 	00	

“A” Group: Standard Functions

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
A001	Frequency source setting <ul style="list-style-type: none"> • 00 Keypad potentiometer • 01 Control terminal • 02 Function F001 setting • 03 RS485 serial command • 04 Expansion board 1 • 05 Expansion board 2 • 06 Pulse train input • 07 Easy sequence • 10 Calculate function input 	01 / 01 / 02	
A002	Run command source setting <ul style="list-style-type: none"> • 01 Input terminal FW or RV (assignable) • 02 Run key on keypad, or digital operator • 03 RS485 serial command • 04 Start/Stop, expansion card #1 • 05 Start/Stop, expansion card #2 	01 / 01 / 02	
A003/ A203/ A303	Base frequency setting	50. / 60. / 60.	
A004/ A204/ A304	Maximum frequency setting	50. / 60. / 60.	
A005	[AT] selection <ul style="list-style-type: none"> • 00 Select between [O] and [OI] at [AT] • 01 Select between [O] and [O2] at [AT] • 02 Select between [O] and keypad pot. • 03 Select between [OI] and keypad pot. • 04 Select between [O2] and keypad pot. 	00	
A006	[O2] selection <ul style="list-style-type: none"> • 00 No summing, [O2] and [OI] • 01 Sum of [O2] and [OI], negative sum (reverse speed reference) inhibited • 02 Sum of [O2] and [OI], negative sum (reverse speed reference) allowed • 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 <ul style="list-style-type: none"> • 00 Use A011 start value • 01 Use 0 Hz 	01	
A016	External frequency filter time constant	8.	

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

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
A047/ A247	Automatic torque boost slip gain	100.	
A051	DC braking enable • 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 • 00 PID operation OFF • 01 PID operation ON	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: • 00 [OI] terminal (current input) • 01 [O] terminal (voltage input) • 02 Communication input • 03 Pulse train frequency input • 04 CALCULATE function output	00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
A077	Reverse PID action • 00 PID input = SP - PV • 01 PID input = -(SP - PV)	00	
A078	PID output limit	0.00	
A081	AVR function select • 00 AVR enabled • 01 AVR disabled • 02 AVR enabled except during decel	00	
A082	AVR voltage select	230/230/200 400/460/400	
A085	Operation mode selection • 00 Normal operation • 01 Energy-saver operation • 02 Optimal accel/decel operation	00	
A086	Energy saving mode tuning	50.0	
A092/ A292/ A392	Acceleration (2) time setting	15.0	
A093/ A293/ A393	Deceleration (2) time setting	15.0	
A094/ A294	Select method to switch to Acc2/Dec2 profile • 00 2CH input from terminal • 01 Transition frequency • 02 Motor rotation is reversed	00	
A095/ A295	Acc1 to Acc2 frequency transition point	0.0	
A096/ A296	Dec1 to Dec2 frequency transition point	0.0	
A097	Acceleration curve selection • 00 Linear • 01 S-curve • 02 U-shape • 03 Reverse U-shape • 02 EL-S curve	00	
A098	Deceleration curve selection • 00 Linear • 01 S-curve • 02 U-shape • 03 Reverse U-shape • 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.	
A104	[OI]-[L] input active range end current	100.	
A105	[OI]-[L] input start frequency enable • 00 Use A101 start value • 01 Use 0Hz	01	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
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 <ul style="list-style-type: none"> • 00 Digital operator • 01 Keypad potentiometer • 02 [O] input • 03 [OI] input • 04 Comm. port • 05 Expansion card 1 • 06 Expansion card 2 • 07 Pulse train frequency input 	02	
A142	B input select for calculate function <ul style="list-style-type: none"> • 00 Digital operator • 01 Keypad potentiometer • 02 [O] input • 03 [OI] input • 04 Comm. port • 05 Expansion card 1 • 06 Expansion card 2 • 07 Pulse train frequency input 	03	
A143	Calculation symbol <ul style="list-style-type: none"> • 00 ADD (A input + B input) • 00 SUB (A input - B input) • 00 MUL (A input x B input) 	00	
A145	ADD frequency	0.00	
A146	ADD direction select <ul style="list-style-type: none"> • 00 Plus (adds A145 value to output frequency) • 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 -FE/FU/FR	Set Value
B001	Selection of automatic restart mode <ul style="list-style-type: none"> • 00 Alarm output after trip, automatic restart disabled • 01 Restart at 0Hz • 02 Resume operation after frequency matching • 03 Resume previous freq. after freq. matching, then decelerate to stop and display trip info • 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 <ul style="list-style-type: none"> • 00 Disable • 01 Enable • 02 Disable during stop and ramp to stop 	00	
B005	Number of restarts on power failure / under-voltage trip events <ul style="list-style-type: none"> • 00 Restart 16 times • 01 Always restart 	00	
B006	Phase loss detection enable <ul style="list-style-type: none"> • 00 Disable – no trip on phase loss • 01 Enable – trip on phase loss 	0.00	
B007	Restart frequency threshold	1.0	
B008	Retry after trip select <ul style="list-style-type: none"> • 00 Always retry after trip • 01 Start with 0 Hz • 02 Start with frequency matching • 03 Retry after deceleration and stop with matching frequency • 04 Start with active matching frequency 	00	
B009	Retry after undervoltage select <ul style="list-style-type: none"> • 00 16 times • 01 Unlimited 	00	
B010	Retry count select after overvoltage or overcurrent	3	
B011	Retry wait time after trip	1.0	
B012/ B212/ B312	Level of electronic thermal setting	Rated current of each inverter	
B013/ B213/ B313	Electronic thermal characteristic <ul style="list-style-type: none"> • 00 Reduced torque • 01 Const. torque • 02 V/f free-setting 	01 / 01 / 00	
B015	Free setting, electronic thermal freq. (1)	0.	

Func. Code	Name / Description	Default Value -FE/FU/FR	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 <ul style="list-style-type: none"> • 00 Disable • 01 Enable for accel and constant speed • 02 Enable for constant speed only • 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) <ul style="list-style-type: none"> • 00 Disable • 01 Enable for accel and constant speed • 02 Enable for constant speed only • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 00 Low-level access, [SFT] blocks edits • 01 Low-level access, [SFT] blocks edits (except F001 and Multi-speed parameters) • 02 No access to edits • 03 No access to edits except F001 and Multi-speed parameters • 10 High-level access, including B031 	01	
B034	Run/power on warning time	0.	
B035	Rotational direction restriction <ul style="list-style-type: none"> • 00 Enable for both directions • 01 Enable for forward only • 02 Enable for reverse only 	00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
B036	Reduced voltage start selection <ul style="list-style-type: none"> • 00 Short • 01, 02, 03, 04, 05 (middle) • 06 Long 	06	
B037	Function code display restriction <ul style="list-style-type: none"> • 00 Display all • 01 Display only utilized functions • 02 Display user-selected functions only (configure with U01 to U12) • 03 Data comparison display • 04 Basic display 	00	
B038	Initial display selection <ul style="list-style-type: none"> • 00 Last value when STR key was pressed • 01 D001 • 02 D002 • 03 D003 • 04 D007 • 05 F001 	01	
B039	Automatic user parameter function enable <ul style="list-style-type: none"> • 00 Disabled • 01 Enabled 	00	
B040	Torque limit selection <ul style="list-style-type: none"> • 00 4-quadrant mode • 01 Selected by two input terminals • 02 From analog O2 input (0 to 200%) • 03 From expansion card 1 • 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 <ul style="list-style-type: none"> • 00 Disable • 01 Enable 	00	
B046	Reverse Run protection enable <ul style="list-style-type: none"> • 00 Disable • 01 Enable 	00	
B050	Controlled deceleration and stop on power loss <ul style="list-style-type: none"> • 00 Disable • 01 Enable 	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	
B054	Initial output frequency decrease during power loss	0.00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
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	[O/OI/O2] input maximum limit level of window comparator	100	
B067	[O/OI/O2] input minimum limit level of window comparator	-100	
B068	[O/OI/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) <ul style="list-style-type: none"> • 00 Trip history clear • 01 Parameter initialization • 02 Trip history clear and parameter initialization 	00	
B085	Country code for initialization <ul style="list-style-type: none"> • 00 Japan version • 01 Europe version • 02 US version • 03 (reserved) 	01 / 02 / 00	
B086	Frequency scaling conversion factor	1.0	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
B087	STOP key enable • 00 Enable • 01 Disable • 02 Disable only the STOP function	00	
B088	Restart mode after FRS • 00 Restart from 0Hz • 01 Restart from frequency detected from actual speed of motor • 02 Restart from active matching frequency	00	
B089	Automatic carrier frequency reduction • 00 Disable • 01 Enable	00	
B090	Dynamic braking usage ratio	00	
B091	Stop mode selection	00	
B092	Cooling fan control • 00 Fan always ON • 01 Fan ON during Run, OFF during Stop	00	
B095	Dynamic braking control • 00 Disable • 01 Enable during RUN only • 02 Enable always	00	
B096	Dynamic braking activation level	360/ 720	
B098	• Thermistor for thermal protection control • 00 Disable • 01 Enable – PTC thermistor • 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 -FE/FU/FR	Set Value
B112	Free-setting V/f frequency (7)	0.	
B113	Free-setting V/f voltage (7)	0.0	
B120	Brake Control Enable • 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 • 00 Disable • 01 Enable during deceleration and constant speed • 02 Enable during acceleration	00	
B131	Over-voltage LADSTOP level	380/380/380 760/760/760	
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 -FE/FU/FR	Set Value
C001	Terminal [1] function	44 option codes available (see page 45)	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 / 03	
C007	Terminal [7] function		02	
C008	Terminal [8] function		01	
C011	Terminal [1] active state	<ul style="list-style-type: none"> • 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 / 00	
C017	Terminal [7] active state		00	
C018	Terminal [8] active state		00	
C019	Terminal [FW] active state		00	
C021	Terminal [11] function	22 option codes available (see page 47)	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	8 option codes available (see page 50)	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 -FE/FU/FR	Set Value
C031	Terminal [11] active state	<ul style="list-style-type: none"> • 00 Normally open (NO) • 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 <ul style="list-style-type: none"> • 00 Output during acceleration/deceleration and constant speed operation • 01 Output only during constant speed 	01	
C039	Low current indication detection level	Rated current x 1.0	
C040	Overload signal output mode <ul style="list-style-type: none"> • 00 During accel/decel • 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 <ul style="list-style-type: none"> • 00 Disable • 01 Enable, 3-bit code • 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 -FE/FU/FR	Set Value
C070	Data command method • 02 Digital operator • 03 RS485 • 04 Expansion card 1 • 05 Expansion card 2	02	
C071	Communication speed selection • 02 (Test) • 03 2400bps • 04 4800bps • 05 9600bps • 06 19200bps	04	
C072	Node allocation	1.	
C073	Communication data length selection • 07 7-bit data • 08 8-bit data	7	
C074	Communication parity selection • 00 No parity • 01 Even parity • 02 Odd parity	00	
C075	Communication stop bit selection • 01 1 stop bit • 02 2 stop bits	1	
C076	Action upon communication error selection • 00 Trip • 01 Trip after deceleration and stop • 02 No action (ignore errors) • 03 Free-run stop • 04 Decelerate and stop	02	
C077	Communication timeout before trip	0.00	
C078	Communication wait time	0.	
C079	Communication protocol select • 01 ASCII • 02 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 • 00 Display • 01 No display	00	
C101	Up/Down memory mode selection • 00 Clear last frequency (return to F001) • 01 Keep last freq. adjusted by UP/DWN	00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
C102	Reset mode selection <ul style="list-style-type: none"> • 00 Cancel trip state at input signal ON transition, Stops inverter if in Run Mode • 01 Cancel trip state at signal OFF transition, Stops inverter if in Run Mode • 02 Cancel trip state at input signal ON transition, no effect if in Run Mode 	00	
C103	Restart mode after reset <ul style="list-style-type: none"> • 00 Restart at 0 Hz • 01 Resume after frequency matching • 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	
C142	Logic output 1 function A	22 option codes (see page 47)	00
C143	Logic output 1 function B		00

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
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 47)	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 47)	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 47)	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 47)	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 47)	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	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
C169	Multi-speed position determination time	0	

“H” Group: Motor Constants Functions

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
H001	Auto-tuning Setting <ul style="list-style-type: none"> • 00 Auto-tuning OFF • 01 Auto-tune (measure motor resistance and inductance, without rotating) • 02 Auto-tune (rotate motor) 	00	
H002/ H202	Motor data selection <ul style="list-style-type: none"> • 00 Standard motor data • 01 Auto-tuning data • 02 Adaptive tuning data 	00	
H003/ H203	Motor capacity	Factory set	
H004/ H204	Motor poles setting <ul style="list-style-type: none"> • 2 poles • 4 poles • 6 poles • 8 poles 	4	
H005/ H205	Motor speed constant	1.590	
H006/ H206/ H306	Motor stabilization constant	100.	
H020/ H220	Motor constant R1	Inverter rating	
H021/ H221	Motor constant R2	Inverter rating	
H022/ H222	Motor constant L	Inverter rating	
H023/ H223	Motor constant I_0	Inverter rating	
H024/ H224	Motor Constant J	Inverter rating	
H030/ H230	Auto-tuned motor constant R1	Inverter rating	
H031/ H231	Auto-tuned motor constant R2	Inverter rating	
H032/ H232	Auto-tuned motor constant L	Inverter rating	
H033/ H233	Auto-tuned motor constant I_0	Inverter rating	
H034/ H234	Auto-tuned motor constant J	Inverter rating	

Func. Code	Name / Description	Default Value -FE/FU/FR	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 -FE/FU/FR	Set Value
P001	Operation mode on expansion card #1 error • 00 Trip (stop motor) • 01 Continuous operation	00	
P002	Operation mode on expansion card #2 error • 00 Trip (stop motor) • 01 Continuous operation	00	
P010	Feedback option enable • 00 Disable • 01 Enable	00	
P011	Encoder pulse-per-revolution (PPR) setting	1024	
P012	Control pulse setting • 00 ASR mode • 01 APR mode • 02 APR2 • 03 HAPR	00	
P013	Pulse input mode setting • 00 Quadrature • 01 Count and direction • 02 Separate Fwd & Rev pulse trains	00	
P014	Home search stop position setting	0.	
P015	Home search speed setting	5.00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
P016	Home search direction setting • 00 Forward • 01 Reverse	00	
P017	Home search completion range setting	5	
P018	Home search completion delay time setting	0.00	
P019	Electronic gear set position selection • 00 Position feedback side • 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 • 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 • 00 Inverter • 01 Expansion card 1 • 02 Expansion card 2 • 03 Easy sequence	00	
P032	Positioning command input selection • 00 Inverter • 01 Expansion card 1 • 02 Expansion card 2	00	
P033	Torque command input selection • 00 [O] terminal • 01 [OI] terminal • 02 [O2] terminal • 03 Parameter F001 ???	00	
P034	Torque command setting	0.	
P035	Torque command polarity selection • 00 Use signal polarity at terminal [O2] • 01 Use motor rottion direction	00	
P036	Torque bias mode • 00 Disabled • 01 Digital op ??? • 02 [O2] terminal	00	
P037	Torque bias value	0.	
P038	Torque bias polarity selection • 00 Use signal polarity at terminal [O2] • 01 Use motor rottion direction	00	

Func. Code	Name / Description	Default Value -FE/FU/FR	Set Value
P039	Forward maximum speed for torque-controlled operation	0.00	
P040	Reverse maximum speed for torque-controlled operation	0.00	
P044	DeviceNet comm watchdog timer	1.00	
P045	Inverter action on DeviceNet comm error <ul style="list-style-type: none"> • 00 Trip • 01 Decelerate and trip • 02 Hold last speed • 03 Free run stop • 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 <ul style="list-style-type: none"> • 00 Trip • 01 Decelerate and trip • 02 Hold last speed • 03 Free run stop • 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 <ul style="list-style-type: none"> • 00 Low • 01 High 1 • 02 High 2 	00	
P069	Home position direction selection <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 00 X00 • 01 X01 • 02 X02 • 03 X03 • 04 X04 • 05 X05 • 06 X06 • 07 X07 	00	

Func. Code	Name / Description	Default Value -FE/FU/FR	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 cmd enable
ADD	50	Add frequency enable
F-TM	51	Force Terminal Mode
ATR	52	Permission of torque command input
KHC	53	Clear cumulative power value
SON	54	Servo ON
FOC	55	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 command hold
CP1	66	Multi-stage position select, bit 1
CP2	67	Multi-stage position select, bit 2
CP3	68	Multi-stage position select, bit 3
ORL	69	Home limit function
ORG	70	Home trigger function
FOT	71	Forward drive stop
ROT	72	Reverse drive stop
SPD	73	Speed / position switching
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	Communication port disconnect detect
LOG1	33	Logical operation result 1
LOG2	34	Logical operation result 2
LOG3	35	Logical operation result 3
LOG4	36	Logical operation result 4
LOG5	37	Logical operation result 5

Symbol	Code	Input Terminal Name
LOG6	38	Logical operation result 6
WAC	39	Capacitor life warning
WAF	40	Cooling fan low speed
FR	41	Starting contact signal
OHF	42	Heatsink overheat warning
LOC	43	Low current indication 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 signal
FWR	51	Forward rotation
RVR	52	Reverse rotation
MJA	53	Major failure
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 **H** 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
H001 H201	A061 / A261	>	A004 / A204 / A304
H002 H202	A062 / A262	>	
H004 H204 H304	A003 / A203 / A303	>	
H005 H205 H305	F001, A020 / A220 / A320	>	
H006 H206 H306	A021 to A035 / A221 to A235 A321 to A325	>	
H009	P015	>	
H012 H212	A062 / A262	>	A061 / A261
H015 H215	F001, A020 / A220	>	
H016 H216	A021 to A035 / A221 to A235	>	
H019	A061 / A261	<	P015
H021 H221		<	A062 / A262
H025 H225	F001, A020 / A220	<	

Prg Error Code	Function code of parameter out of bounds	Boundary defined by...	
		<, >	Base parameter
<i>8031 8231</i>	A061 / A261	<	B082
<i>8032 8232</i>	A062 / A262	<	
<i>8035 8235 8335</i>	F001, A202 / A220 / A320	<	
<i>8036</i>	A021 to A035	<	
<i>8037</i>	A038	<	
<i>8085 8285 8385</i>	F001, A020 / A220 / A320	>f-x, <f+x	A063 ± A064 A065 ± A066 A067 ± A068 (see note below)
<i>8086</i>	A021 to A035	>f-x, <f+x	
<i>8091 8291</i>	A061 / A261	>	B112
<i>8092 8292</i>	A062 / A262	>	
<i>8095 8295</i>	F001, A020 / A220	>	
<i>8096</i>	A021 to A035	>	
<i>8110</i>	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	

Prg Error Code	Function code of parameter out of bounds	Boundary defined by...	
		<, >	Base parameter
8 120	B017, B019	<	B015
	B015	>	B017
	B019	<	
	B015, B017	>	B019

 **Note:** Set frequency (speed) values are not permitted to be inside the jump frequency ranges, if defined. When a frequency reference value from a real-time source (such as keypad potentiometer or analog input) are inside a jump frequency range, the actual speed is automatically forced to equal the lowest point of the jump range.

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.

NOTES: