

SJ/L-EN Ethernet Communications Module Instruction Manual

- SJ100 Series
- L100 Series
- SJ200 Series
- L200 Series



NOTE: REFER ALSO TO THE PERTINENT INVERTER INSTRUCTION MANUAL

Manual Number: HAL1052
December 2005

After reading this manual,
keep it handy for future reference.

Hitachi America, Ltd.

NOTES:

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NOTES:

Chapter 1 – General Description

The SJ/L-EN module is an Ethernet communication interface for the Hitachi SJ200, L200, SJ100 and L100 series of AC Variable Frequency Inverters. The module is mounted externally to the inverter.

The SJ/L-EN uses the open MODBUS/TCP communication protocol. It utilizes a 10Base-T physical interface with a 10 Mbps data transfer rate. Even though the board uses the MODBUS/TCP, this does not necessarily mean that all MODBUS services and functions are supported. Detailed description of the available functionality is provided in Chapter 4 of this manual. The board will act as a MODBUS/TCP slave that can be read from and written to over the Ethernet network from a MODBUS/TCP master device. It will not initiate communication with other devices on the network. It will only respond to requests from a master device. The SJ/L-EN will allow a user to control the operation of the inverter, monitor its operation, and modify parameters.

Before using this product, please read this manual and the relevant inverter manual, and be sure to follow all safety precautions noted therein. After unpacking the SJ/L-EN board, carefully inspect it for any defect or damage, and be sure all parts are present.

Carton Contents

- (1) SJ/L-EN Ethernet Communication Module
- (1) 2 ft. RJ11 Male/Male Cable to connect inverter to SJ/L-EN
- (1) DIN-rail SNAP-TRACK™
- (2) DIN-rail mounting clips for above
- (1) CD-ROM containing this manual (pdf) and NetEdit3 software

WARRANTY

The warranty period under normal installation and handling conditions shall be eighteen (18) months from the date of purchase, or twelve (12) months from the date of installation, whichever occurs first. The warranty shall cover repair or replacement, at Hitachi's sole discretion, of the SJ/L-EN Module.

Service in the following cases, even within the warranty period, shall be to the customers account:

1. Malfunction or damage caused by misuse, modification or unauthorized repair.
2. Malfunction or damage caused by mishandling, dropping, etc., after delivery.
3. Malfunction or damage caused by fire, earthquake, flood, lightning, abnormal input voltage, contamination, or other natural disasters.

If service is required for the product at your worksite, all expenses associated with field repair are the purchaser's responsibility. This warranty only covers service at Hitachi designated service facilities.

If making a warranty claims in reference to the above, please contact the distributor from whom you purchased the SJ/L-EN, and provide the model number, purchase date, installation date, and description of damage or missing components.

*SNAP-TRACK is a trademark of TYCO Electronics.

SAFETY PRECAUTIONS



HIGH VOLTAGE: This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.



WARNING: Indicates a potentially hazardous situation that, if not avoided, can result in serious injury or death.



CAUTION: Indicates a potentially hazardous situation that, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING), so be sure to observe them.



HIGH VOLTAGE: Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock. Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic controllers or rotating machinery.



WARNING: This equipment should be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in bodily injury.



WARNING: HAZARD OF ELECTRICAL SHOCK. DISCONNECT INCOMING POWER BEFORE WORKING ON THIS CONTROL.



WARNING: Wait at least five (5) minutes after turning OFF the input power supply before performing maintenance or an inspection. Otherwise, there is the danger of electric shock.



WARNING: Do not install or remove the SJ/L-EN Ethernet module while the inverter is energized. Otherwise there is the danger of unpredictable inverter operation.



WARNING: Never modify the unit. Otherwise, there is a danger improper and/or unpredictable inverter operation.



CAUTION: Be sure to secure the SJ/L-EN module with the supplied mounting screws. Make sure all connections are made securely; otherwise there is danger of a loose connection and unpredictable operation.



CAUTION: Alarm connection may contain hazardous live voltage even when inverter is disconnected. When removing the front cover for maintenance or inspection, confirm that incoming power for alarm connection is completely disconnected.



CAUTION: Be sure not to touch the surface or terminals of the SJ/L-EN Ethernet module while the inverter is energized; otherwise there is the danger of electric shock.



CAUTION: The software lock modes described in the inverter manuals are NOT supported via the SJ/L-EN module. This means that network commands can bypass any software lock settings configured via the inverter keypad. It is incumbent on the user to make sure no safety lockouts are violated through network commands.



CAUTION: When configuring parameters with the standard keypad, the inverter checks for and inhibits invalid parameter combinations when the STR key is pressed. The SJ/L-EN bypasses this check, so it is incumbent on the user to make sure invalid configuration parameters or combinations are not sent through network commands. Otherwise undesirable inverter behavior may occur.



CAUTION: Certain parameter data ranges vary depending on model and capacity. The SJ/L-EN does NOT check to make sure these data are within range. It is incumbent on the user to make sure data for these parameters is within range for the specific model and rating. These parameters are noted in the parameter tables in the Appendix. Otherwise undesirable inverter behavior may occur.

NOTES:

Chapter 2 – Installation and Wiring

Orientation to Product Features

Figure 2-1 below shows the physical layout of the SJ/L-EN Ethernet module. In particular, note the location of status LEDs and DIP-switches.

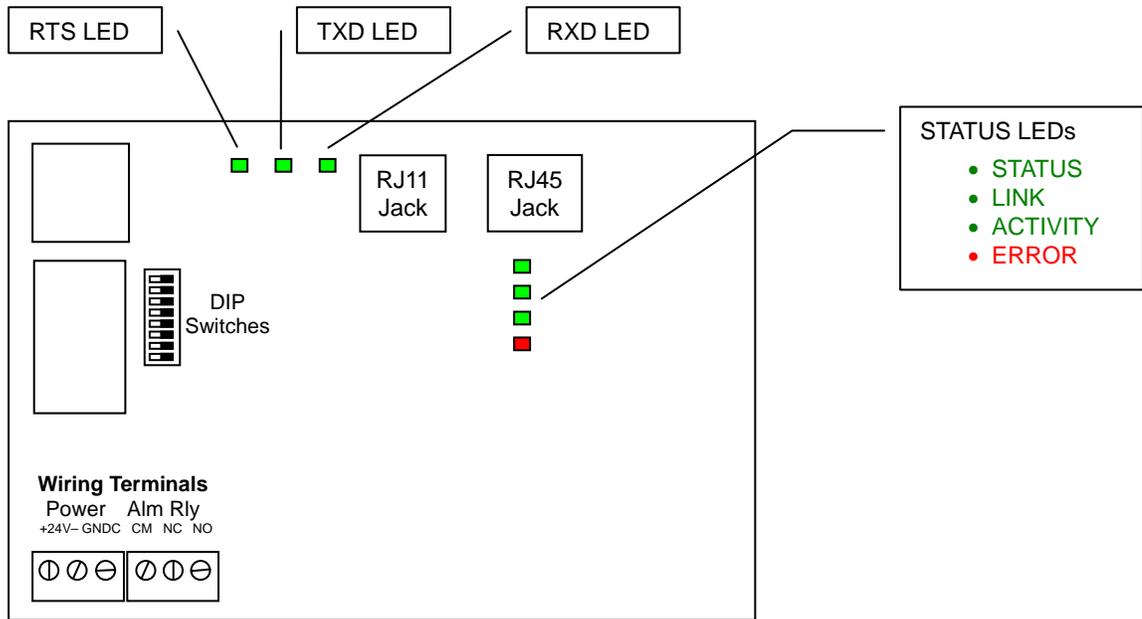


Figure 2-1
SJ/L-EN Layout

The pin-out for the RJ45 connector is as follows:

1. TX Data +
2. TX Data -
3. RX Data +
4. NC
5. NC
6. RX Data -
7. NC
8. NC

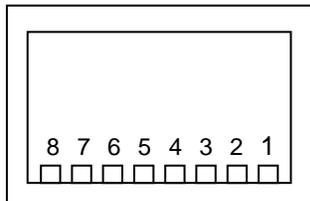


Figure 2-2
SJ/L-EN RJ45 Pinouts

The pin-out for the RJ11 connector is as follows:

1. RX Data +
2. RX Data -
3. GND
4. TX Data +
5. TX Data -
6. GND

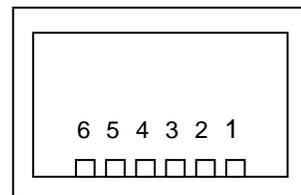


Figure 2-3
SJ/L-EN RJ11 Pinouts

Installing the Module

Gently push the SJ/L-EN board into the supplied piece of SNAP-TRACK until it is securely seated. If mounting the SJ/L-EN on a DIN-Rail, attach the two DIN-Rail Clips to the back of the SNAP-TRACK. The assembly can then be affixed to a DIN rail using the clips. Otherwise, the SNAP-TRACK can be affixed directly to a flat surface using double-sided tape, with screws, or other mounting method of your choice.

Make sure the inverter is powered down. Connect the SJ/L-EN to the inverter using the 2 ft. long RJ11 Male/Male cable supplied. Plug one end into the RJ11 Jack on the SJ/L-EN marked "SERIAL". The other end of this cable plugs into the RJ45 connector on the inverter. In the case of the SJ200, the keypad and male/male adapter on the inverter must be removed, and the cable will plug into the RJ45 Jack on the front of the SJ200.

Note: Even though the communication connector jack on the inverter is RJ45 and the 2 ft. cable plug is RJ11, the RJ11 plug will fit into the center of the RJ45 jack and connect properly.

The SL/L-EN requires 24 VDC to be supplied to it, via the terminals marked "+ 24 V –" on the lower left of the board. This power may be supplied from the inverter in the case of the L100 and SJ100, where 24 VDC is available between terminals P24 and L. In the case of the L200 and SJ200, an external 24 VDC power supply must be provided by the user. The terminal marked GNDC is an additional grounding point, and may be used to terminate the shield lead if shielded cable is used to connect to the SJ/L-EN.

The ethernet network cable will plug into the RJ45 jack on the SJ/L-EN marked "ETHERNET".

User Interface

The SJ/L-EN has seven LEDs to convey module status and activity.

Four LEDs next to the RJ45 connector:

- **STATUS (GREEN)** – This LED will be ON whenever the SJ/L-EN is receiving proper power from the inverter and the self diagnostics have shown the board to be functioning normally.
- **LINK (GREEN)** – This LED is ON when the SJ/L-EN is receiving valid Ethernet pulses.
- **ACTIVITY (GREEN)** – This LED is ON whenever there is Ethernet traffic in the cable.
- **ERROR (RED)** – This LED will be ON if the SJ/L-EN has failed due to a hardware watchdog timeout, or the Ethernet communications has been absent for the software watchdog timeout period.

Two LEDs near the right edge of the board:

- **RTS** – This LED indicates communication between the SJ/L-EN to the inverter through the serial port.
- **TXD** – This LED indicates communication from the SJ/L-EN to the inverter through the serial port.
- **RXD** – This LED indicates communication to the SJ/L-EN from the inverter through the serial port.

(All three of these LEDs should be rapidly blinking; if not, there may be a problem with the connection.)

NOTES:

Chapter 3 – Configuration

Install NetEdit3 Software

NetEdit3 Software is provided on the CD-R enclosed with the SJ/L-EN module. This software is required to configure the board. It can also be used to update the SJ/L-EN firmware in the event of a future update. NetEdit3 is compatible with Microsoft® Windows® 98, Windows ME, Windows 2000, Windows XP, and Windows NT4.

In Windows, run the program “SetupNE3.exe” on the CD-R to install the program. Follow the on-screen instructions to complete the installation.

Configuration of the SJ/L-EN Board

Ensure that the SJ/L-EN is properly installed as described in Chapter 2. Attach a standard Ethernet Crossover cable to the RJ45 connector on the SJ/L-EN. Connect the other end to the RJ45 port of a Windows PC with an Ethernet adapter installed. If connecting the SJ/L-EN to a hub, switch or router, use a patch (straight-through) cable instead. For best results, use Category 5, commercial quality cables rated for 10BaseT applications.

There are 8 DIP-switches on the SJ/L-EN board (see Figure 2-1). Switches 6 and 7 are not used. Switches 0 to 5 may be used to set a 6-bit binary number representing 000001 to 111111 binary or 1 to 63 in decimal, for a device (module) ID. However, for normal Modbus/TCP use, switches 0-5 should all be set to ZERO (off). When configured that way, the device ID is obtained from board’s FLASH memory. The value will be programmed into the SJ/L-EN flash memory by means of the NetEdit3 software; this ID can be any 32-bit binary value (i.e. 0 to 4,294,967,295 decimal).

Make sure that all wiring is secure in the inverter, and that the power connections are free and clear. Be sure to separate power wiring from control wiring. If they have to be crossed, be sure that they cross at a right angle. Connect the inverter to the PC Ethernet port, and that the PC is started and running Windows. Power up the inverter, and observe the LEDs on the SJ/L-EN board. The STATUS LED should be illuminated, and the LINK, ACTIVITY, RTS, RXD and TXD LEDs should be blinking (may appear as though ON continuously, due to high blink rate). The red ERROR LED should NOT be illuminated. See Chapter 4 for detailed description of LED functions. If the LED conditions are not correct, proceed to Chapter 5 for Troubleshooting. If you power up the inverter before powering up the PC, an error code may appear. After powering up the PC and properly connecting the cable, you should be able to clear the error with the STOP/RESET key on the inverter keypad.

If the LEDs are correct, power down the inverter again. After the inverter CHARGE LED has extinguished, replace the covers on the inverter and reinstall the keypad. Then you can power up the inverter and continue with the configuration.

Set Up the SJ/L-EN with NetEdit3

With the inverter powered up and the Ethernet cable connected from the SJ/L-EN to your PC, launch the NetEdit3 program. Figure 3-1 shows the initial screen on program start-up. Should an error code appear on the inverter display at power-up, simply press the STOP/RESET key on the keypad to clear it.

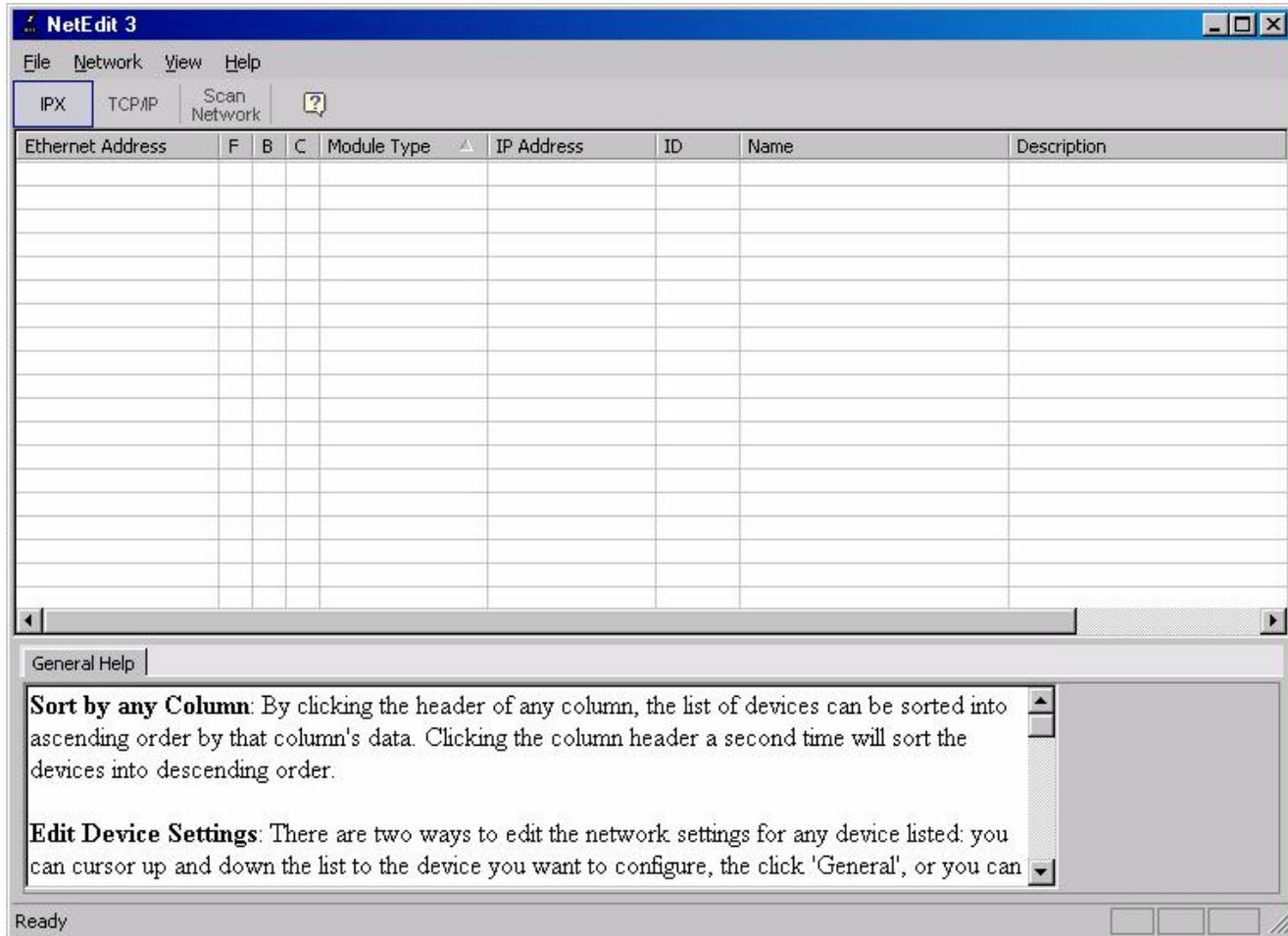


Figure 3-1 NetEdit3 Initial Screen

The NetEdit3 software should find and list any SJ/L-EN attached to the network. If not, just click on “Scan Network”. An entry will appear in the Device List (grid area), with the board details as shown in Figure 3-2. If more than one board is connected in a common network, you will see a line entry for each of them. The “Module Info” and “General Settings” tabs will now also appear next to the “General Help” tab, below the Device List. You can then click on the line for the board you wish to configure, and click on the “General Settings” tab and then the “General” button to bring up the General Settings dialog box containing the device details, or you can simply double-click on the device in the Device List. In the General Settings dialog box (Figure 3-3), you can enter the Module ID for the device, provided the DIP Switches on the board are all set to zero. Otherwise, the Module ID will reflect the DIP switch setting, and will be grayed out, indicating it cannot be modified with NetEdit3. You can also input a Name for the device, and a Description. The default Name will be “Hitachi Drive”, and the default Description will be “SJ/L-EN”.

The device’s IP Address will also be shown. Change this to the desired IP address for your Modbus/TCP network. Your master device will need this address to communicate with this node. Note that all SJ/L-EN boards ship with the default IP address of “255.255.255.255”. When you change the IP address, the NetEdit3 software may no longer be able to see it in TCP/IP mode if the PC’s IP address is not on the same sub-network. You can communicate to the SJ/L-EN despite this using the IPX mode, however you will have to make sure IPX support is installed in Windows on that PC.

Once you have made the necessary changes, you can exit NetEdit3, and disconnect the cable from your PC to the SJ/L-EN board. You may now connect the SJ/L-EN to your network to begin normal operation.

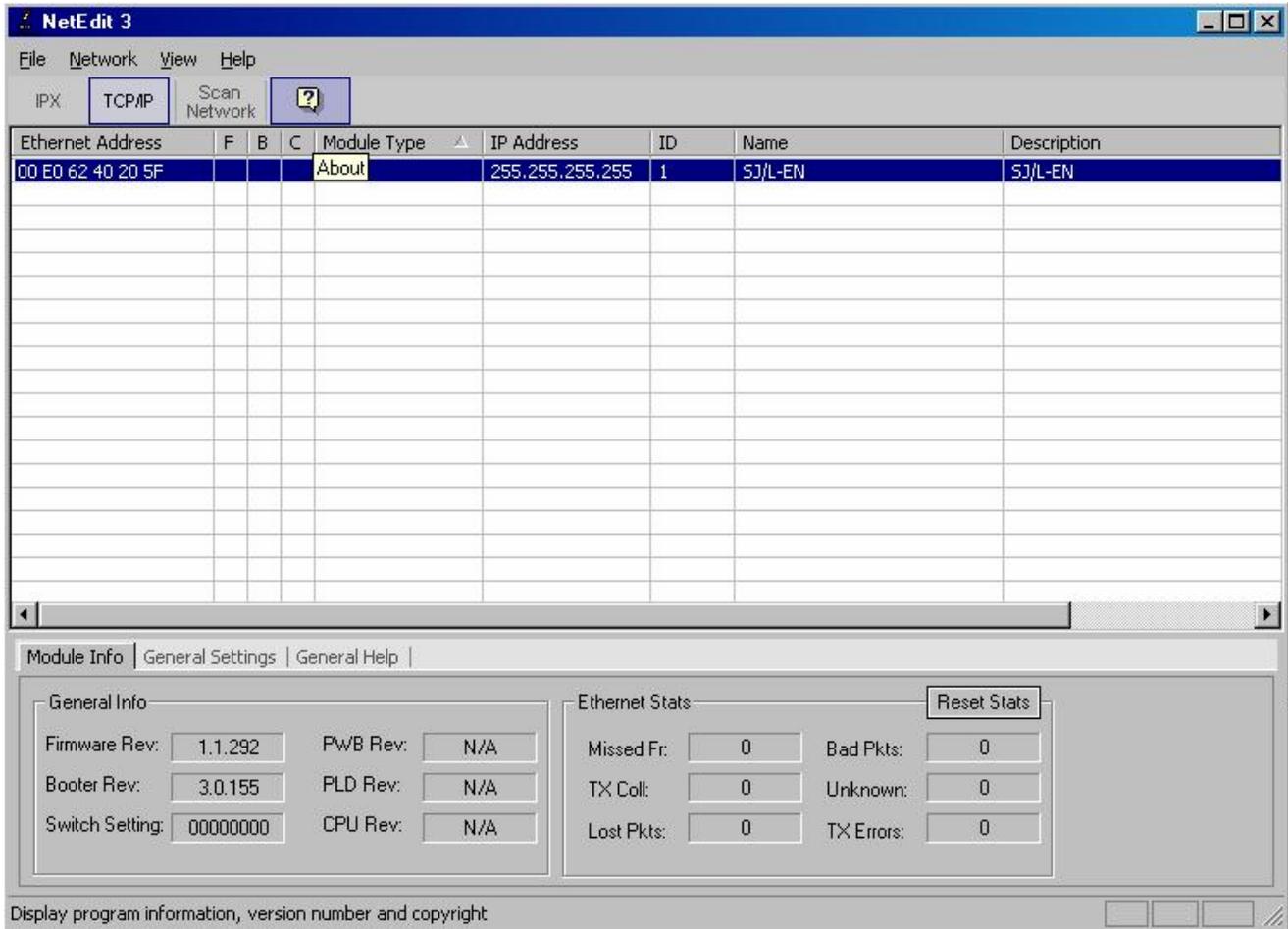


Figure 3-2 NetEdit3 Screen after Scan of Network

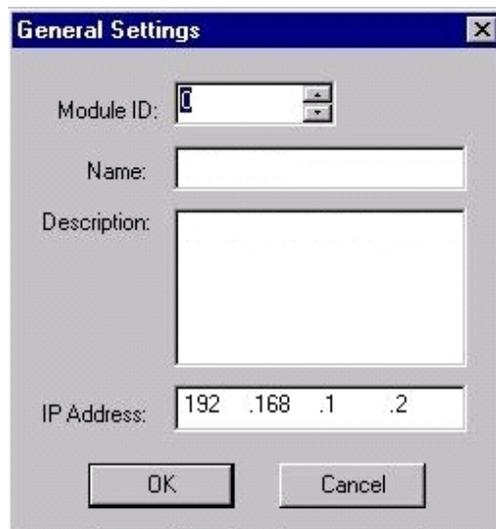


Figure 3-3 NetEdit3 General Settings Dialog Box

NOTES:

Chapter 4 – Operation

Setting Up the Inverter for Ethernet Network Operation

Once the SJ/L-EN board has been properly configured and connected to a network as described in Chapter 3, it is capable of reading data from and writing data to the inverter. However if it is desired to have either the RUN command and/or the speed reference come from the Ethernet master, you must change two inverter parameters as shown in the following table.

Function Code	Name	Description	Run Mode Edit Lo Hi	Defaults			Setting for Ethernet Control
				-FE (EU)	-FU (US)	-FR (Jpn)	
A001	Frequency Source Setting	Five options; select codes: * 00 Keypad potentiometer 01 Control terminal 02 Function F001 setting 03 RS485 serial command 10 Calculate function output	x x	01	01 (or 00*)	02	02
A002	Run command source setting	Three options; select codes: * 01 Input terminal [FW] or [RV] (assignable) 02 Run key on keypad, or digital operator 03 RS485 serial command	x x	01	01 (or 02)*	02	02

* Available options and factory defaults for L100/SJ100 series and L200/SJ200 series are different. Refer to pertinent inverter manual.

Supported MODBUS Functions

The SJ/L-EN is implemented with the MODBUS/TCP communication protocol. It supports the following MODBUS functions:

- READ MULTIPLE REGISTERS (03) – This function reads the contents of a contiguous block of holding registers in the inverter.
- READ INPUT REGISTERS (04) – This function reads from 1 to up to around 125 contiguous input registers in the inverter.
- WRITE SINGLE REGISTER (06) – This function will write to a single holding register in the inverter.
- WRITE MULTIPLE REGISTERS (16) – This function will write to a block of contiguous registers in the inverter.

Additional MODBUS/TCP protocol details, including specifications, application information, implementation guides, and other resources are available from the web site www.modbus.org.

NOTES:

Chapter 5 – Troubleshooting

In general, the first step to troubleshooting should be to inspect the status LEDs on the SJ/L-EN board, in addition to the inverter operator/keypad display. These will give valuable clues to the nature of the problem. Refer to the description of the proper LED indications on page 11.

In addition, the inverter operator/keypad (if installed) will provide diagnostic information for certain types of errors.

The error code for a communication error is: **E60**

The following table summarizes possible error causes and remedies.

Code	Trip Name	Cause	Check	Remedy
E60	Ethernet Communication Error	Defective connection	Connectors (plugs & jacks), cable	Replace or repair; press STOP/RESET on inverter keypad, or apply RST input
		PC not powered up or not connected to inverter	That PC is powered on and connected	Press STOP/RESET on inverter keypad or apply RST input
		Network configuration error	Verify proper Ethernet setup of SJ/L-EN and master device	Reconfigure incorrect settings.
		Board lockup	Check status LEDs	Press STOP/RESET key on inverter, apply RST input, or cycle power
		Board defective	Check status LEDs	Replace SJ/L-EN

Refer also to the inverter's Instruction Manual, Chapter 6, for additional troubleshooting assistance.

NOTES:

Appendix – Parameter List

Note: Parameters in **BOLDFACE** can be edited while inverter is in the **RUN** mode. “RO” means the parameter is Read Only, and “R/W” means the value can be read or written. Please refer to page 32 for a key to other symbols used in these tables.

Inverter Parameter	Modbus Start Address	Modbus End Address	Parameter Name	Magnitude	Read/Write	Data Range	
D – Monitoring Functions							
D001	3001	3002	Output frequency monitor	L200/SJ200	X10	RO	0 – 4000
				L100/SJ100	X100		0 - 36000
D002	3003	3004	Output current monitor	L200/SJ200	X10	RO	0 – 2000
				L100/SJ100	X10		0 – 65535
D003	3005	3006	Rotation direction monitor	X1	RO	0 – 2	
D004	3007	3008	Process Variable (PV) PID feedback monitor	X100	RO	0 – 999900	
D005	3009	3010	Intelligent input terminal status	X1	RO	0 – 65535	
D006	3011	3012	Intelligent output terminal status	X1	RO	0 – 65535	
D007	3013	3014	Scaled output frequency monitor	L200/SJ200	X1000	RO	0 – 999900
				L100/SJ100			0 – 356400
D080 ^{‡§}	3159	3160	Trip counter	X1	RO	0 – 65535	
D081 [§]	3161	3162	Error Code of Trip 1	X1	RO	0 – 255	
D082 [§]	3163	3164	Error Code of Trip2	X1	RO	0 – 255	
D083 [§]	3165	3166	Error Code of Trip 3	X1	RO	0 – 255	
D100	3199	3200	Output Frequency Setting by using Volume of the Inverter	X100	RO	0-36000	
D101 [‡]	3201	3202	Output Frequency Monitor (L100/SJ100 ONLY)	X100	RO	0 – 36000	
D102 [‡]	3203	3204	Frequency Setpoint (L100/SJ100 ONLY)	X100	RO	1 – 36000	
D107 ^{‡§}	3211	3212	MCU Version	X1	RO	0 – 65535	

F – Main Profile Functions

F001	4001	4002	Output frequency setting(Hz) / PID Setpoint (%)	L200/SJ200	X10	RO	0 – 4000
				L100/SJ100	X100		0 – 36000
F002	4003	4004	Acceleration time 1	L200/SJ200	X100	R/W	-9999 – 300000
				L100/SJ100	X10		0 – 30000
F202	4403	4404	Acceleration time 1, 2 nd motor	L200/SJ200	X100		-9999 – 300000
				SJ100 (NOT L100)	X10		0 – 30000
F003	4005	4006	Deceleration time 1	L200/SJ200	X100	R/W	1 – 30000 -9999 – 300000
				L100/SJ100	X10		0 – 30000
F203	4405	4406	Deceleration time 1, 2 nd motor	L200/SJ200	X100	R/W	-9999 – 300000
				SJ100 (NOT L100)	X10		0 – 30000
F004	4007	4008	Keypad RUN key routing		X1	R/W	0 – 1

A – Standard Functions

A001 *	1	2	Frequency source setting		X1	R/W	0 – 5 *
A002 *	3	4	Run command source setting		X1	R/W	1 – 5 *
A003	5	6	Base frequency setting	L200/SJ200	X1	R/W	30 – 400
				SJ100	X100		5000 – 36000
				L100	X1		50 – 360
A203	405	406	Base frequency setting, 2 nd motor	L200/SJ200	X1	R/W	30 – 400
				SJ100	X100		5000 – 36000
				L100	X1		50 – 360
A004	7	8	Maximum frequency setting	L200/SJ200	X1	R/W	30 – 400
				SJ100	X100		5000 – 36000
				L100	X1		50 – 360

A204	407	408	Maximum frequency setting, 2 nd motor	L200/SJ200	X1	R/W	30 – 400
				SJ100	X100		5000 – 36000
				L100	X1		50 – 360
A005	9	10	[AT] selection	L200/SJ200	X1	R/W	0 – 3
A011	21	22	[O]–[L] input active range start frequency	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100			0 – 36000
A012	23	24	[O]–[L] input active range end frequency	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100			0 – 36000
A013	25	26	[O]–[L] input active range start voltage		X1	R/W	0 – 100
A014	27	28	[O]–[L] input active range end voltage		X1	R/W	0 – 100
A015	29	30	[O]–[L] input start frequency select		X1	R/W	0 – 1
A016	31	32	Analog input filter time constant		X1	R/W	1 – 8
NOTE: For following Multi-speed frequency parameters, range is 0 – 40000 for L200/SJ200, and 0 – 36000 for L100/SJ100.							
A020	39	40	Multi-speed frequency 0		X100	R/W	0 – 40000
A220[§]	439	440	Multi-speed frequency 0, 2nd motor		X100	R/W	0 – 40000
A021	41	42	Multi-speed frequency 1		X100	R/W	0 – 40000
A022	43	44	Multi-speed frequency 2		X100	R/W	0 – 40000
A023	45	46	Multi-speed frequency 3		X100	R/W	0 – 40000
A024	47	48	Multi-speed frequency 4		X100	R/W	0 – 40000
A025	49	50	Multi-speed frequency 5		X100	R/W	0 – 40000
A026	51	52	Multi-speed frequency 6		X100	R/W	0 – 40000
A027	53	54	Multi-speed frequency 7		X100	R/W	0 – 40000
A028	55	56	Multi-speed frequency 8		X100	R/W	0 – 40000
A029	57	58	Multi-speed frequency 9		X100	R/W	0 – 40000
A030	59	60	Multi-speed frequency 10		X100	R/W	0 – 40000
A031	61	62	Multi-speed frequency 11		X100	R/W	0 – 40000
A032	63	64	Multi-speed frequency 12		X100	R/W	0 – 40000
A033	65	66	Multi-speed frequency 13		X100	R/W	0 – 40000
A034	67	68	Multi-speed frequency 14		X100	R/W	0 – 40000
A035	69	70	Multi-speed frequency 15		X100	R/W	0 – 40000
A038	75	76	Jog frequency setting		X100	R/W	0 – 999
A039	77	78	Jog stop mode		X1	R/W	0 – 2
A041 [†]	81	82	Torque boost method selection		X1	R/W	0 – 1
A241	481	482	Torque boost method, 2 nd motor (SJ100 only)		X1	R/W	0 – 1

A042	83	84	Manual torque boost value	L200/SJ200	X10	R/W	0 – 200
				L100/SJ100	X1		0 – 99
A242	483	484	Manual torque boost value, 2 nd motor (except L100)	L200/SJ200	X10	R/W	0 – 200
				SJ100	X1		0 – 99
A043	85	86	Manual torque boost frequency adjustment		X10	R/W	0 – 500
A243	485	486	Manual torque boost frequency adjustment, 2 nd motor (except L100)		X10	R/W	0 – 500
A044	87	88	V/f characteristic curve selection, 1 st motor	L200/L100	X1	R/W	0 – 1
				SJ200/SJ100			0 – 2
A244	487	488	V/f characteristic curve selection, 2 nd motor (except L100)	L200	X1	R/W	0 – 1
				SJ200/SJ100			0 – 2
A045	89	90	V/f gain setting	L200/SJ200	X1	R/W	20 – 100
				L100/SJ100			50 – 100
A046	91	92	Auto torque boost voltage comp. gain (SJ200 only)		X1	R/W	0 – 255
A246	491	492	Auto torque boost voltage comp. gain, 2 nd motor (SJ200 only)		X1	R/W	0 – 255
A047	93	94	Auto torque boost slip comp. gain (SJ200 only)		X1	R/W	0 – 255
A247	493	494	Auto torque boost slip comp. gain, 2 nd motor (SJ200 only)		X1	R/W	0 – 255
A051	101	102	DC braking enable		X1	R/W	0 – 1
A052	103	104	DC braking frequency setting	L200/SJ200	X100	R/W	0 – 6000
				L100/SJ100			0 – 1000
A053	105	106	DC braking wait time		X10	R/W	0 – 50
A054	107	108	DC braking force during deceleration		X1	R/W	0 – 100
A055	109	110	DC braking time for deceleration		X10	R/W	0 – 600
A056 [§]	111	112	Selection of edge/level action of DC braking input [DB]		X1	R/W	0 – 1
A061	121	122	Frequency upper limit setting	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100			0 – 36000
A261 [§]	521	522	Frequency upper limit setting, 2 nd motor		X100	R/W	0 – 40000
A062	123	124	Frequency lower limit setting		X100	R/W	0 – 40000
							0 – 36000
A262 [§]	523	524	Frequency lower limit setting, 2 nd motor	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100			

A063	125	126	Jump frequency 1	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100			0 – 36000
A064	127	128	Width of jump frequency 1	L200/SJ200	X100	R/W	0 – 1000
				L100/SJ100	X10		0 – 100
A065	129	130	Jump frequency 2	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100	X100		0 – 36000
A066	131	132	Width of jump frequency 2	L200/SJ200	X100	R/W	0 – 1000
				L100/SJ100	X10		0 – 100
A067	133	134	Jump frequency 3	L200/SJ200	X100	R/W	0 – 40000
				L100/SJ100	X100		0 – 36000
A068	135	136	Width of jump frequency 3	L200/SJ200	X100	R/W	0 – 1000
				L100/SJ100	X10		0 – 100
A071	141	142	PID Enable		X1	R/W	0 – 1
A072	143	144	PID Proportional(P) gain		X10	R/W	2 – 50
A073	145	146	PID Integral (I) time constant		X10	R/W	0 – 1500
A074	147	148	PID Derivative (D) time constant	L200/SJ200	X100	R/W	0 – 10000
				L100/SJ100	X10		0 – 1000
A075	149	150	PID PV Scale conversion		X100	R/W	1 – 9999
A076	151	152	PID PV source setting	L200/SJ200	X1	R/W	0 – 10
				L100/SJ100	X1		0 – 1
A077 [§]	153	154	Reverse-acting PID select		X1	R/W	0 – 1
A078 [§]	155	156	PID Output Limiter		X10	R/W	0 - 1000
A081	161	162	AVR function select		X1	R/W	0 – 2
A082 *	163	164	AVR voltage select (see respective manuals for allowable values)		X1	R/W	0 = 200 V 1 = 215 V 2 = 220 V 3 = 230 V 4 = 240 V 5 = 380 V 6 = 400 V 7 = 415 V 8 = 440 V 9 = 460 V 10 = 480 V
A092	183	184	Acceleration time (2)	L200/SJ200	X100	R/W	-9999 – 300000
				L100/SJ100	X10		1 – 30000
A292	583	584	Acceleration time (2), 2nd motor	L200/SJ200	X100	R/W	-9999 – 300000
				SJ100	X10		1 – 30000
A093	185	186	Deceleration time (2)	L200/SJ200	X100	R/W	-9999 – 300000
				L100/SJ100	X10		1 – 30000

A293	585	586	Deceleration time (2), 2 nd motor	L200/SJ200	X100	R/W	-9999 – 30000
				SJ100	X10		1 – 30000
A094	187	188	Select method to switch to acc2/dec2 profile		X1	R/W	0 – 1
A294	587	588	Select method to switch to acc2/dec2 profile, 2 nd motor (except L100)		X1	R/W	0 – 1
A095	189	190	Acc1 to Acc2 frequency transition point	L200/SJ200	X10	R/W	0 – 4000
				L100/SJ100	X100		0 – 36000
A295	589	590	Acc1 to Acc2 frequency transition point, 2 nd motor	L200/SJ200	X10	R/W	0 – 4000
				SJ100	X100		0 – 36000
A096	191	192	Dec1 to Dec2 frequency transition point	L200/SJ200	X10	R/W	0 – 4000
				L100/SJ100	X100		0 – 36000
A296	591	592	Dec1 to Dec2 frequency transition point, 2 nd motor	L200/SJ200	X10	R/W	0 – 4000
				SJ100	X100		0 – 36000
A097	193	194	Acceleration curve selection		X1	R/W	0 – 1
A098	195	196	Deceleration curve selection		X1	R/W	0 – 1
A101 [§]	201	202	[OI]–[L] input active range start frequency		X100	R/W	0 – 40000
A102 [§]	203	204	[OI]–[L] input active range end frequency		X100	R/W	0 – 40000
A103 [§]	205	206	[OI]–[L] input active range start current		X1	R/W	0 – 100
A104 [§]	207	208	[OI]–[L] input active range end current		X1	R/W	0 – 100
A105 [§]	209	210	[OI]–[L] input start frequency enable		X1	R/W	0 – 1
A141 [§]	281	282	Input Select for Calculate Func. 1		X1	R/W	0 – 4
A142 [§]	283	284	Input Select for Calculate Func. 2		X1	R/W	0 – 4
A143 [§]	285	286	Calculation Operator Select		X1	R/W	0 – 2
A145 [§]	289	290	ADD Frequency		X100	R/W	0 – 40000
A146 [§]	291	292	ADD Sign Select		X1	R/W	0 – 1

B – Fine-Tuning Functions							
B001	1001	1002	Selection of automatic restart mode	X1	R/W	0 – 3	
B002	1003	1004	Allowable under-voltage power failure time	X10	R/W	3 – 250	
B003	1005	1006	Retry wait time before motor restart	X10	R/W	3 – 1000	
B004 [§]	1007	1008	Instantaneous power failure/under-voltage trip alarm enable	X1	R/W	0 – 1	
B005 [§]	1009	1010	Number of restarts on power failure/under-voltage events	X1	R/W	0 – 1	
B012	1023	1024	Level of electronic thermal setting, 1 st motor	L200/SJ200	X100	R/W	2000 – 12000
				L100/SJ100	X1		0 – 65535
B212	1423	1424	Level of electronic thermal setting, 2 nd motor	L200/SJ200	X100	R/W	2000 – 12000
				SJ100			0 – 65535
B013	1025	1026	Electronic thermal characteristic, 1 st motor	L200/SJ200	X1	R/W	0 – 2
				L100/SJ100			0 – 1
B213	1425	1426	Electronic thermal characteristic, 2 nd motor	L200/SJ200	X1	R/W	0 – 2
				SJ100			0 – 1
B021	1041	1042	Overload restriction operation mode	X1	R/W	0 – 2	
B022	1043	1044	Overload restriction setting	L200/SJ200	X100	R/W	20 – 12000 *
				L100/SJ100	X1		0 – 65535
B023	1045	1046	Deceleration rate at overload restriction	X10	R/W	1 – 300	
B031	1061	1062	Software lock mode selection	X1	R/W	0 – 3	
B032	1063	1064	No Load Current Setting (L100 Only)	X1	R/W	0 - 100	
B080[§]	1159	1160	[AM] terminal analog meter adjustment	X1	R/W	0 – 255	
B081[†]	1161	1162	[FM] terminal analog meter adjustment	X1	R/W	0 – 255	
B082	1163	1164	Start frequency adjustment	L200/SJ200	X100	R/W	50 – 990
				L100/SJ100	X10		5 – 99
B083	1165	1166	Carrier frequency setting	X10	R/W	5 – 160 *	
B084	1167	1168	Initialization mode	L200/SJ200	X1	R/W	0 – 2
				L100/SJ100			0 – 1
B085	1169	1170	Country code for initialization	X1	R/W	0 – 2	
B086	1171	1172	Frequency scaling factor	X10	R/W	1 – 999	
B087	1173	1174	STOP key enable	X1	R/W	0 – 1	
B088	1175	1176	Restart mode after FRS	X1	R/W	0 – 1	

B089	1177	1178	Data select for operator when operating on network (L200/L100/SJ100 only)	X1	R/W	1 – 7
B090	1179	1180	Dynamic braking usage ratio (SJ200 and SJ100 only)	X10	R/W	0 – 1000
B091	1181	1182	Stop mode selection (except L100)	X1	R/W	0 – 1
B092	1183	1184	Cooling fan control (SJ200 and SJ100 only)	X1	R/W	0 – 1
B095	1189	1190	Dynamic braking control (SJ200 only)	X1	R/W	0 – 2
B096	1191	1192	Dynamic braking activation level (SJ200 only)	X1	R/W	330 – 760 *
B130 [§]	1259	1260	OV LADSTOP Selection	X1	R/W	0 – 1
B140	1279	1280	Overcurrent Trip Suppression (SJ200 Only)	X1	R/W	0 – 1
B150 [§]	1299	1300	Carrier Frequency Mode	X1	R/W	0 – 1

C – Intelligent Terminal Functions

C001	2001	2002	Intelligent input 1 function	X1	R/W	1 – 255 *
C002	2003	2004	Intelligent input 2 function	X1	R/W	1 – 255 *
C003	2005	2006	Intelligent input 3 function	X1	R/W	1 – 255 *
C004	2007	2008	Intelligent input 4 function	X1	R/W	1 – 255 *
C005	2009	2010	Intelligent input 5 function	X1	R/W	1 – 255 *
C006	2011	2012	Intelligent input 6 function (SJ200 and SJ100 only)	X1	R/W	1 – 255 *
C011	2021	2022	Intelligent input 1 active state	X1	R/W	0 – 1
C012	2023	2024	Intelligent input 2 active state	X1	R/W	0 – 1
C013	2025	2026	Intelligent input 3 active state	X1	R/W	0 – 1
C014	2027	2028	Intelligent input 4 active state	X1	R/W	0 – 1
C015	2029	2030	Intelligent input 5 active state	X1	R/W	0 – 1
C016	2031	2032	Intelligent input 6 active state (SJ200 and SJ100 only)	X1	R/W	0 – 1
C021	2041	2042	Intelligent output 11 function	X1	R/W	0 – 8 *
C022	2043	2044	Intelligent output 12 function	X1	R/W	0 – 8 *
C023 [†]	2045	2046	[FM] signal selection	X1	R/W	0 – 5
C024	2047	2048	Alarm relay function (SJ100 only)	X1	R/W	0 – 5
C026 [§]	2051	2052	Alarm relay output function	X1	R/W	0 – 8 *
C028 [§]	2055	2056	[AM] signal function	X1	R/W	0 – 1
C031	2061	2062	Intelligent output 11 active state	X1	R/W	0 – 1
C032	2063	2064	Intelligent output 12 active state	X1	R/W	0 – 1
C033 [†]	2065	2066	Alarm relay active state	X1	R/W	0 – 1
C036 [§]	2071	2072	Alarm relay output active state	X1	R/W	0 – 1

C041	2081	2082	Overload level setting		X10	R/W	0 – 2000
C042	2083	2084	Frequency arrival setting for acceleration	L200/SJ200	X100	R/W	0 – 20000
				L100/SJ100	X1		0 – 65535
C043	2085	2086	Arrival frequency setting for deceleration	L200/SJ200	X10	R/W	0 – 4000
				L100/SJ100	X100		0 – 36000
C044	2087	2088	PID deviation level setting		X10	R/W	0 – 1000
C052 [§]	2103	2104	PID FBV Function High Limit		X10	R/W	0 – 1000
C053 [§]	2105	2106	PID FBV Function Low Limit		X10	R/W	0 – 1000
C071 [§]	2141	2142	Communication speed selection		X1	R/W	4 – 6
C072 [§]	2143	2144	Node allocation		X1	R/W	1 – 32
C074 [§]	2147	2148	Communication parity selection		X1	R/W	0 – 2
C075 [§]	2149	2150	Communication stop bit selection		X1	R/W	1 – 2
C076 [§]	2151	2152	Communication error select		X1	R/W	1 – 2
C077 [§]	2153	2154	Communication time-out		X100	R/W	0 - 9999
C078 [§]	2155	2156	Communication wait time		X1	R/W	0 – 1000
C081	2161	2162	[O] input span calibration	L200/SJ200	X10	R/W	0 – 2000
				L100/SJ100	X1		0 - 255
C082	2163	2164	[OI] input span calibration	L200/SJ200	X10	R/W	0 – 2000
				L100/SJ100	X1		0 – 255
C085 [§]	2169	2170	Thermistor input tuning		X10	R/W	0 – 2000
C086 [§]	2171	2172	[AM] output offset		X10	R/W	0 – 1000
C091†	2181	2182	Debug mode enable		X1	R/W	0 – 1
C092†			DO NOT EDIT			R/W	
C093†			DO NOT EDIT			R/W	
C094†			DO NOT EDIT			R/W	
C095†			DO NOT EDIT			R/W	
C101 [§]	2201	2202	UP/DOWN memory mode		X1	R/W	0 – 1
C102 [§]	2203	2204	RESET mode selection		X1	R/W	0 – 2
C141 [§]	2281	2282	Input A Select for Logic Output		X1	R/W	0 – 8
C142 [§]	2283	2284	Input B Select for Logic Output		X1	R/W	0 – 8
C143 [§]	2285	2286	Logic Function Select		X1	R/W	0 – 2
C144 [§]	2287	2288	Terminal 11 ON Delay		X10	R/W	0 – 1000
C145 [§]	2289	2290	Terminal 11 OFF Delay		X10	R/W	0 – 1000
C146 [§]	2291	2292	Terminal 12 ON Delay		X10	R/W	0 – 1000
C147 [§]	2293	2294	Terminal 12 OFF Delay		X10	R/W	0 – 1000
C148 [§]	2295	2296	Relay Output ON Delay		X10	R/W	0 – 1000
C149 [§]	2297	2298	Relay Output OFF Delay		X10	R/W	0 – 1000
C196 [§]	2391	2392	Capacity code selection		X1	RO	1 – 25 *
C197 [§]	2393	2394	Voltage code selection		X1	RO	0 – 1

H – Motor Constants and Functions							
H001	5001	5002	Auto-tuning setting (SJ100 only)	X1	R/W	0 – 2	
H002	5003	5004	Motor data selection, 1 st motor (SJ100 only)	X1	R/W	0 – 1	
H202	5403	5404	Motor data selection, 2 nd motor (SJ100 only)	X1	R/W	0 – 1	
H003	5005	5006	Motor capacity, 1 st motor	L200/SJ200	X1	R/W	0 – 29 *
				SJ100			0 – 10 *
H203	5405	5406	Motor capacity, 2 nd motor	L200/SJ200	X1	R/W	0 – 29 *
				SJ100			0 – 10 *
H004	5007	5008	Motor poles, 1 st motor (except L100)	X1	R/W	2 – 8	
H204	5407	5408	Motor poles, 2 nd motor (except L100)	X1	R/W	2 – 8	
H005	5009	5010	Motor speed constant, 1st motor (SJ100 Only)	X1	R/W	0 – 99	
H205	5409	5410	Motor speed constant, 2nd motor (SJ100 Only)	X1	R/W	0 – 99	
H006	5011	5012	Motor stabilization constant, 1st motor (except L100)	X1	R/W	0 – 255	
H206	5411	5412	Motor stabilization constant, 2nd motor (except L100)	X1	R/W	0 – 255	
H007	5013	5014	Motor Voltage Select (SJ200 Only)	X1	R/W	0 – 1	
H207	5413	5414	Motor Voltage Select, 2 nd motor (SJ200 Only)	X1	R/W	0 - 1	
H020	5039	5040	Motor constant R1, 1 st motor (SJ200 Only)	X1000	R/W	0 – 65535	
H220	5439	5440	Motor constant R1, 2 nd motor (SJ200 Only)	X1000	R/W	0 – 65535	
H021	5041	5042	Motor constant R2, 1 st motor (SJ200 Only)	X1000	R/W	0 – 65535	
H221	5441	5442	Motor constant R2, 2 nd motor (SJ200 Only)	X1000	R/W	0 – 65535	
H022	5043	5044	Inductance L, 1 st motor (SJ200 Only)	X100	R/W	0 – 65535	
H222	5443	5444	Inductance L, 2 nd motor (SJ200 Only)	X100	R/W	0 – 65535	
H023	5045	5046	Io, 1 st motor (SJ200 Only)	X100	R/W	0 – 65535	
H223	5445	5446	Io, 2 nd motor (SJ200 Only)	X100	R/W	0 – 65535	
H024	5047	5048	Inertia J, 1 st motor (SJ200 Only)	X10	R/W	10 – 10000	
H224	5447	5448	Inertia J, 2 nd motor (SJ200 Only)	X10	R/W	10 – 10000	
H030	5059	5060	Motor constant R1, 1 st motor (Auto) (SJ200 Only)	X1000	R/W	0 – 65535	
H230	5459	5460	Motor constant R1, 2 nd motor (Auto) (SJ200 Only)	X1000	R/W	0 – 65535	

H031	5061	5062	Motor constant R2, 1 st motor (Auto) (SJ200 Only)	X1000	R/W	0 – 65535
H231	5461	5462	Motor constant R2, 2 nd motor (Auto) (SJ200 Only)	X1000	R/W	0 – 65535
H032	5063	5064	Inductance L, 1 st motor (Auto) (SJ200 Only)	X100	R/W	0 – 65535
H232	5463	5464	Inductance L, 2 nd motor (Auto) (SJ200 Only)	X100	R/W	0 – 65535
H033	5065	5066	Io, 1 st motor (Auto) (SJ200 Only)	X100	R/W	0 – 65535
H233	5465	5466	Io, 2 nd motor (Auto) (SJ200 Only)	X100	R/W	0 – 65535
H034	5067	5068	Inertia J, 1 st motor (Auto) (SJ200 Only)	X1000	R/W	10 – 10000
H234	5467	5468	Inertia J, 1 st motor (Auto) (SJ200 Only)	X1000	R/W	10 – 10000

O – Other Functions †

O001	8001	8002	Run Mode [0=Stop, 1=Forward, 2=Reverse]	X1	R/W	0 – 2
O002	8003	8004	TRIP Counter	X1	RO	0 – 0
O003	8005	8006	TRIP History 1 Time	X1	RO	0 – 0
O004	8007	8008	TRIP History 1 Cause	X1	RO	0 – 0
O005	8009	8010	TRIP History 1 Freq	X1	RO	0 – 0
O006	8011	8012	TRIP History 1 Current	X1	RO	0 – 0
O007	8013	8014	TRIP History 1 Voltage	X1	RO	0 – 0
O008	8015	8016	TRIP History 2 Time	X1	RO	0 – 0
O009	8017	8018	TRIP History 2 Cause	X1	RO	0 – 0
O010	8019	8020	TRIP History 2 Freq	X1	RO	0 – 0
O011	8021	8022	TRIP History 2 Current	X1	RO	0 – 0
O012	8023	8024	TRIP History 2 Voltage	X1	RO	0 – 0
O013	8025	8026	TRIP History 3 Time	X1	RO	0 – 0
O014	8027	8028	TRIP History 3 Cause	X1	RO	0 – 0
O015	8029	8030	TRIP History 3 Freq	X1	RO	0 – 0
O016	8031	8032	TRIP History 3 Current	X1	RO	0 – 0
O017	8033	8034	TRIP History 3 Voltage	X1	RO	0 – 0
O018	8035	8036	Voltage Class	X1	RO	0 – 0
O019	8037	8038	Inverter Type [1=L100, 2=SJ100, 6=L200, 7=SJ200]	X1	RO	0 – 0
O020	8039	8040	EEPROM Store flag	X1	R/W	0 – 1
O022	8043	8044	Reset Trip	X1	R/W	0 – 1
O023	8045	8046	Serial Data Watchdog Timeout (ms)	X1	R/W	0 – 65535

See footnotes on next page!

* Data Range depends on Model and/or Rating. Verify that data you are writing is valid for the inverter model and rating you are writing to.

‡ These special parameters are NOT accessible via the standard keypads. They can only be accessed by the SJ/L-EN board.

§ Parameter only available in L200 and SJ200.

† Parameter only available in L100 and SJ100.

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NOTES:

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