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Introduction

The Hitachi Serial Communications Operator Interface, SC-OPE 3I, is an easy-to-use inverter operator panel. Its 4-line dot matrix display shows inverter status and works in conjunction with its keypad to provide inverter control and parameter editing capability.
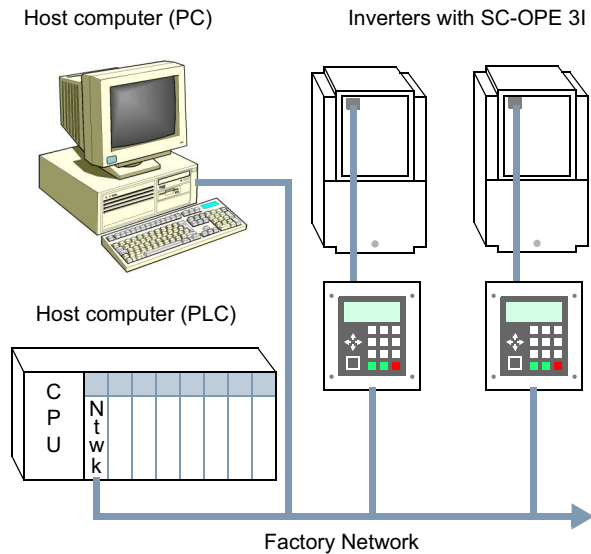
The SC-OPE 3I has various mounting options:

- Directly on the inverter (SJ300 / L300P)

- Panel-mounting with bezel/housing

- DIN-rail mounting inside panel

The SC-OPE 3I ("I" connotes *industrial* version) provides a built-in network interface for connecting an inverter to popular factory networks, including:

- DirectNet

- Allen-Bradley DF1

- Modbus ASCII

- Modbus RTU

- Metasys N2

This manual includes specific examples for ModBus RTU and DirectNet connections with DirectLogic PLCs. See "Using a Factory Network for Inverter Operation" on page 4–1.

Host computer (PC)

Inverters with SC-OPE 3I

Host computer (PLC)

C P U

N t w k

Factory Network

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Conventions in this Manual

Paragraphs with special meanings are accompanied with a symbol in the margin. These include:

Note: A Note calls attention to a detail that you may need to know to use the product feature being discussed.

Tip: A Tip suggests a way to apply the product that you may find helpful in your application.

Caution: A Caution message informs you of the potential of a minor hazard or an inconvenience in applying the product.

Warning: A Warning message informs you of the potential of bodily injury or equipment damage.

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Keypad Orientation

MONITOR

Monitor Mode displays important inverter data such as motor current in amperes or percent, torque in percent, and output frequency. You can configure the monitor values to be displayed. The Run command source and frequency setting source are also displayed. When the sources for Run command and Frequency Setting are set to be the SC-OPE keypad, you can use Monitor Mode to change the motor speed and run the motor.

QUICK MENU

The Quick Menu displays a short list of frequently used parameters. You can configure a SC-OPE to display the particular subset of parameters most often referenced or changed in your application.

HELP

The Help screen displays user-configurable text such as contact information for technical help or application assistance.

PROGRAM

Program Mode provides access to edit the inverter's parameters. The parameters are organized into categories to provide a tree-like structure to access and edit parameter values.

MODE

The Mode key allows navigation between the SC-OPE's normal modes or functions and Configuration Mode, used to configure the SC-OPE. Configuration Mode includes a data transfer utility that is used in communications with a PC. A configuration file stores the SC-OPE's network port settings, inverter family type, and other data.

ESC CANCEL

The Esc/Cancel key provides a way to exit a menu item or cancel a pending data change operation.

HAND AUTO

The Hand/Auto key provides a way to quickly change the Run command source (terminal strip or SC-OPE keypad), and to change the Frequency Setting source (terminal, potentiometer input, or keypad).

CHANGE DATA

The Change Data function allows you to change the value of the inverter parameter currently displayed on the SC-OPE.

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STORE ENTER After a Change Data operation, use the Store/Enter key to *store* the new value to the inverter's RAM. Pressing the Store/Enter key is required when you want to *enter* certain operational modes or sub-menu topics (denoted by the [Enter] prompt on the SC-OPE display).
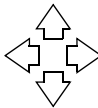
The Arrow keys provide a way to select menu functions or move the display cursor while editing parameters.

RUN FWD **RUN REV** The Run FWD and Run REV keys send the corresponding commands to the inverter to run the motor. The inverter must be configured to use the keypad as the Run command source, quickly done by using the Hand/Auto key.

STOP RESET The Stop/Reset key will cause the inverter to stop the motor if it is running. When a trip condition exists, the Reset function will clear the trip condition for normal inverter operation (if the cause of the trip has been eliminated).

Warning: The Stop/Reset key on the SC-OPE is not a substitute for an Emergency Stop push button. Always include a mechanical Emergency Stop switch within easy reach of an operator in your application.

LED Indicators The Power LED is ON whenever the SC-OPE has power. The inverter directly powers the SC-OPE in most applications, so the LED also indicates the presence of inverter input power.

The RUN LED is ON whenever a Run command is active (the actual output frequency > 0 and the motor is turning in either direction).

The Fault LED is ON whenever the inverter has recorded a trip event that has not been cleared.

Specifications

The SC-OPE 3I product features are outlined in the following table.

Item	Description
Inverter compatibility	Hitachi SJ100, L100, SJ300, L300P, J300
Display	LCD dot matrix, 20-character x 4-line display
Keypad	Membrane keys
Key functions	Monitor, Quick Menu, Help Screen, Program Mode, Mode Change, Esc/Cancel, Hand/Auto, Store/Enter, Change Data, Run FWD, Run REV, Stop/Reset, Right Arrow, Left Arrow, Up Arrow, Down Arrow
LED indicators	Power LED, Run LED, Fault LED
Firmware	L100 / SJ100 families, or SJ300 / L300P families (down-load either firmware type)
Front connector	Modular RJ11, RS-232
Rear connector	Modular RJ45, SC-OPE-to-inverter connection only
Bottom connector	10-pin connector, RS–422 / RS–485 differential / external +5V power
Mounting options	1)Directly on inverter housing (SJ300 or L300P only) 2) Panel mount (use bezel kit); connect to inverter via cable 3) DIN rail mounting
Power consumption	+5V +/- 5% regulated, 200 mA maximum
Dimensions, mm (in.)	W = 112 (4.41), H = 131(5.16), D = 40 (1.58)
Bezel dimensions, mm (in.)	W = 161 (6.34), H = 187 (7.4), D = 38 (1.50)
Bezel mounting hole center locations, mm (in.)	Horizontal = 137 (5.39), Vertical = 135 (5.32)
Network port protocols *1	DirectNet, Allen-Bradley DF1, ModBus RTU, ModBus ASCII, MetasysN2
Network baud rates	300, 600, 1200, 2400, 4800, 9600, 19200
Network mode (electrical)	RS-232, RS-485 2-wire, RS-485 4-wire, RS-422 4-wire
Accessory kits	SC-OPE3BK (bezel kit), SC-OPE3CK (configuration kit)

*1 The communication protocols ModBus RTU, DirectNet, and DF1 are discussed in Chapter 4, "Using Factory Networks for Inverter Operation."

Kit Product Components

SC-OPE3BK Bezel Kit The Bezel Kit includes parts for mounting the SC-OPE 3I to either a panel or DIN rail, and the cable required to connect the SC-OPE 3I to an inverter.

Quantity	Component Description for Bezel Kit
1	Bezel/housing for SC-OPE
1	Gasket (for seal between bezel/housing and control panel door)
1	O-ring (for seal between SC-OPE keypad and bezel/housing cutout)
1	Network Termination Board
1	Communication cable, 6', connects SC-OPE to inverter
1	Connector plug (for RS-485 port connections and external +5V power)
4	Mounting screws for bezel/housing, 6-32 thread x 1 1/4"
4	Nuts for mounting screws, 6-32 thread
4	Lock washers for mounting screws, 6-32 size
2	Screws for back of bezel/housing (without DIN rail clips), 3-38 thread x 1"
2	DIN rail clips
2	Screws for back of bezel/housing (with DIN rail clips), 4-40 x 1 1/4"

SC-OPE3CK Configuration Kit The Configuration Kit includes software and communications cable for using a PC to manage SC-OPE settings and inverter parameter transfers. Use of the communication cable requires a cable adapter (included).

Quantity	Component Description for Configuration Kit
1	CD-ROM with Configuration Editor and firmware configuration files
1	Configuration cable, connects SC-OPE to PC, male RJ11 modular connector at both ends (use with adapter below)
1	Cable adapter, 9-pin D-shell female to RJ11 female modular

Frequently Asked Questions

Q. The inverter is already installed and running in my application (using the standard Hitachi keypad). How easy is it to install a SC-OPE 3I and resume control via its keypad?

A. It is easy to connect the SC-OPE and resume operation. See "Inverter Operation from the SC-OPE Keypad" on page 3–4.

Q. Will I be able to use the SC-OPE to initialize the inverter to restore factory default parameters?

A. Yes, for SJ300 and L300P inverters. See "Restoring Factory Default Inverter Settings" on page 3–33. Other inverters require using standard keypad sequences or input terminal signals as described in their instruction manuals.

Q. Can I use the SC-OPE 3I with inverters that do not have a front panel keypad bay for mounting operator interface devices?

A. Yes, but you will have to mount it remotely and use a communications cable to connect the SC-OPE to the inverter. Order the bezel kit SC-OPE3BK; it includes a bezel/housing and the necessary communications cable.

Q. Can I install or remove a SC-OPE 3I in an inverter while it is powered?

A. No—we recommend that you power off the inverter while installing or removing a SC-OPE from an inverter. This precaution applies to any connection on the rear connector of the SC-OPE. So, this includes connecting / disconnecting the SC-OPE to the inverter via an interface cable.

Q. Can I connect or disconnect the SC-OPE 3I to a PC while the inverter is powered?

A. Yes, the RS-232 connection to the PC is designed to connect or disconnect while powered.

Q. When using the SC-OPE with a connection to a PC, must I always have the SC-OPE connected to an inverter to get its power?

A. No, the SC-OPE's bottom connector (10-pin) will accept external +5V power from a supply you provide. Make sure it is regulated +5VDC power, +/- 5%. But in most situations, the SC-OPE will get its power from an inverter. Note that you must never connect the SC-OPE simultaneously to an inverter and another power source.

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Q. **Can I use the same SC-OPE hardware for SJ100, L100, SJ300, L300P, and J300 inverter series?**

A. The same SC-OPE hardware is applicable to the above inverter series. The SC-OPE will mount in the keypad bay on the SJ300 / L300P series. The other inverter series require separate mounting of the SC-OPE (no keypad bay).

Q. **Can I use the same SC-OPE firmware for the SJ100, L100, SJ300, L300P, and J300 inverter series?**

A. It depends on the models involved. There are three unique firmware sets:
1) SJ100 / L100 firmware
2) SJ300 / L300P firmware
3) J300 firmware

You can change between any two inverters that share the same firmware by using only the SC-OPE keypad (for example, SJ100 and L100). To change between inverters that use different firmware sets requires downloading a new firmware set to the SC-OPE (see next question).

Q. **Is is possible to download new firmware to the SC-OPE in the field?**

A. Yes. You will need to order a SC-OPE3CK Configuration Kit; it is licensed for use on a single PC to be used as a configuration station. Of course, a single PC can configure as many SC-OPEs as you need (one at a time).

Q. **Can I use a SC-OPE as a *Copy Unit*, that is—to copy parameters from one inverter to another?**

A. Yes. You can connect or install the SC-OPE into the inverter you want to use as the source for parameter values. After reading the parameters to the SC-OPE EEPROM (retentive) memory, you can write the SC-OPE's memory contents to another inverter. See "Copying Parameters Between Inverters" on page 3–26.

Q. **Can I use the Configuration Editor on a PC to store inverter parameters to a disk file?**

A. No. A "configuration" file contains settings pertaining to the SC-OPE itself.

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Q. My application will need to use the network port at the bottom edge of the SC-OPE. Can I still install the SC-OPE into the keypad bay of the inverter (SJ300 or L300P)?

A. No. The network port at the bottom edge of the SC-OPE uses a 10-pin plug connector. The inverter's keypad bay does not have room for the plug connector, network wiring, and network termination board (when required). Therefore, you will need to plan for either panel mounting or DIN-rail mounting the SC-OPE 3I in any networked application. The Bezel Kit SC-OPE3BK has the required accessories for mounting the SC-OPE 3I via either method.