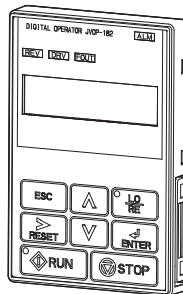


# Inverter HF-520 Option LED Operator Installation Manual

Type: JVOP-182-H

## NOTICE

1. Make sure that this installation manual is delivered to the end user of inverter unit.
2. Read this manual before installing or operating the inverter unit, and store it in a safe place for reference.



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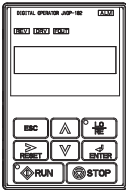
# 1 Preface and Safety

Sumitomo manufactures products used as components in a wide variety of industrial systems and equipment. The selection and application of Sumitomo products remain the responsibility of the equipment manufacturer or end user. Sumitomo accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any Sumitomo product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All systems or equipment designed to incorporate a product manufactured by Sumitomo must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by Sumitomo must be promptly provided to the end user. Sumitomo offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the Sumitomo manual. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED.** Sumitomo assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.


## ◆ Applicable Documentation

The following manuals are available for the JVOP-182-H LED Operator Option:

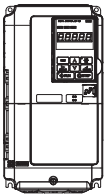
### LED Operator

	<p><b>LED Operator HF-520, SF-520 Series Installation Manual Manual No: DM2307E (this book)</b></p>	<p>Read this manual first. The installation manual is packaged with the option and contains information required to install the option and set up related unit parameters.</p>
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### RS-232C Interface Option

	<p><b>SF-520 Option RS-232C Interface Technical Manual Manual No: DM2203E</b></p>	<p>The Technical Manual is packaged with the RS-232C Interface Option and contains a basic overview of wiring, settings, functions, and fault diagnoses.</p>
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### Inverter

	<p><b>Operating and Maintenance Manual HF-520 Manual No: DM2301E SF-520 Manual No: DM2201E</b></p>	<p>The unit manuals cover basic installation, wiring, operation procedures, functions, troubleshooting, and maintenance information. The manuals also include important information about parameter settings and unit tuning. Access these sites to obtain Sumitomo instruction manuals: <a href="http://cyclo.shi.co.jp">http://cyclo.shi.co.jp</a></p>
	<p><b>Technical Manual HF-520 Manual No: DM2302E SF-520 Manual No: DM2202E</b></p>	

# 1 Preface and Safety

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## ◆ Terms

<b>Note:</b>	Indicates a supplement or precaution that does not cause unit damage.
<b>LED:</b>	Light emitting diode.
<b>Option:</b>	LED Operator
<b>Drive:</b>	<ul style="list-style-type: none"><li>• HF-520 Series</li><li>• SF-520 Series</li></ul>

---

## ◆ Registered Trademarks

Company names and product names listed in this manual are the registered trademarks of those companies.

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## ◆ Supplemental Safety Information

Read and understand this manual before installing, operating or servicing this option. The option must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or fatal injury or damage to the products or to related equipment and systems.



**Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.**

## **WARNING**

Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

## **CAUTION**

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

## **NOTICE**

Indicates an equipment damage message.

### ■ **General Safety**

#### **General Precautions**

- The diagrams in this section may include options and units without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option board should be used according to the instructions described in this manual.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.

## **DANGER**

**Heed the safety messages in this manual.**

Failure to comply will result in death or serious injury.

The operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this manual.

### NOTICE

**Do not expose the unit to halogen group disinfectants.**

Failure to comply may cause damage to the electrical components in the option.

Do not pack the unit in wooden materials that have been fumigated or sterilized.

Do not sterilize the entire package after the product is packed.



# 2 Product Overview

### ◆ About This Product

The option provides an enhanced unit user interface that can operate the Sumitomo unit from up to 3 meters away. The option is an LED display that simplifies the task of interfacing with the unit to perform these tasks:

- Read or modify unit parameters.
- Read and copy unit parameter settings to another Sumitomo unit.
- Operate the unit.
- Monitor unit operation status.

All keys except for the STOP key on the units built-in LED operator will not function when the option is connected to HF-520 and SF-520. </>

<1> If desired, to also disable the STOP key on the units built-in LED operator, set parameter o2-02 (STOP Key Function Selection) to 0 (Disabled).


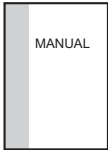
### 3 Receiving

Perform the following tasks after receiving the option:

- Inspect the option for damage.  
If the option appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct model by checking the model number printed on the Name plate of the option.
- If you have received the wrong model or the option does not function properly, contact your supplier.

#### ◆ Contents and Packaging

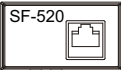

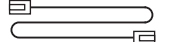
Table 1 Contents of Package

Description:	Option	Installation Manual
—		
Quantity:	1	1

#### ■ Parts Sold Separately

Proper installation of the option requires a digital operator cable (sold separately). A communication cable may be purchased from Sumitomo or recommended LAN cables may be used.

**Table 2 Item Names and Part Numbers (Sold Separately)**

Item	Yaskawa Part Number	Notes	Page
 <p>SF-520 RS-232C Interface Option</p>	SI-232/J-H	<2>	21
 <p>Digital Operator Cable 1 m (3 ft.) &lt;1&gt;</p>	ICS-1	Alternate cables (customer-supplied), RJ45 8-pin Straight Connector UTP Cat5e cable	20
 <p>Digital Operator Cable 3 m (10 ft.) &lt;1&gt;</p>	ICS-3	Alternate cables (customer-supplied), RJ45 8-pin Straight Connector UTP Cat5e cable	20

<1> Digital Operator Cable: Used to connect the digital operator to the drive (sold separately).

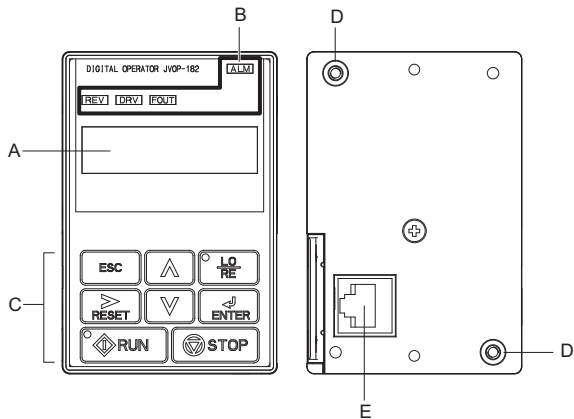
<2> To connect the option to SF-520, install the RS-232C Interface Option to the unit.

#### ◆ Tool Requirements

Screwdriver (M3) is required to install the option on an enclosure panel door.

# 4 Option Components

### ◆ Option



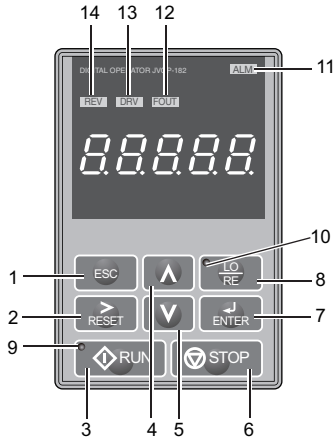
A – Data Display Area  
B – LED Indicators  
C – Keys

D – Installation Mounting Holes  
E – Communication Cable Connector

Figure 1 Option Components





## ◆ Keys

Refer to [Figure 2](#) and [Table 3](#) for details on key names and functions.













**Figure 2 Keys**

**Table 3 Key Names and Functions**

No.	Key	Name	Function
1		ESC Key	<ul style="list-style-type: none"> <li>Returns to the previous display.</li> <li>Moves the cursor one space to the left.</li> <li>Pressing and holding this button will return to the following display: Drive: Frequency Reference Converter: DC Bus Voltage Reference Regenerative unit: DC Bus Voltage</li> </ul>
2		RESET Key	<ul style="list-style-type: none"> <li>Moves the cursor to the right.</li> <li>Resets the unit to clear a fault situation.</li> </ul>
3		RUN Key	Starts the unit and motor.
4		Up Arrow Key	Scrolls up to display the next item, selects parameter numbers and increments setting values.







## 4 Option Components

No.	Key	Name	Function
5		Down Arrow Key	Scrolls down to display the previous item, selects parameter numbers and decrements setting values.
6		STOP Key	Stops unit operation. <b>Note:</b> The STOP key can be enabled or disabled when operating from the external terminal or network communications by setting parameter o2-02.
7		ENTER Key	<ul style="list-style-type: none"> <li>Enters parameter values and settings.</li> <li>Selects a menu item to move between displays.</li> </ul>
8		LO/RE Selection Key	Switches unit control between the operator (LOCAL) and an external source (REMOTE) for the Run command and frequency reference. <b>Note:</b> The LOCAL/REMOTE key is only effective when the unit is stopped in Drive Mode. As a safety precaution, it is possible to disable the LO/RE Selection Key by setting parameter o2-01 (LOCAL/REMOTE Key Function Selection) to 0 (disabled). <1>
9		RUN Light	Illuminated during an operation. <i>Refer to Option LED Status Indicators on page 15</i> for details.
10		LO/RE Light	Illuminated while the option is selected to run the unit (LOCAL mode).
11		ALM LED Light	<i>Refer to LED Screen Display on page 16</i>
12		REV LED Light	
13		DRV LED Light	
14		FOUT LED Light	

<1> o2-01 (LOCAL/REMOTE Key Function Selection) is not compatible with SF-520. LO/RE Selection Key is always effective.

## ◆ Option LED Status Indicators

Table 4 LED Status and Meaning

LED	ILLUMINATED	Flashing <f>	Flashing Quickly <f>	Off
	When the option is selected for Run command and frequency reference control (LOCAL).	—	—	When a device other than the option is selected for Run command and frequency reference control (REMOTE).
	During run.	<ul style="list-style-type: none"> <li>During deceleration to stop.</li> <li>When a Run command is input and the frequency reference is 0 Hz.</li> </ul>	<ul style="list-style-type: none"> <li>During deceleration when a Fast Stop command was entered.</li> <li>During stop by External Fault digital input.</li> </ul>	During stop.
Examples				

<1> Refer to [Figure 3](#) for the difference between “flashing” and “flashing quickly”.

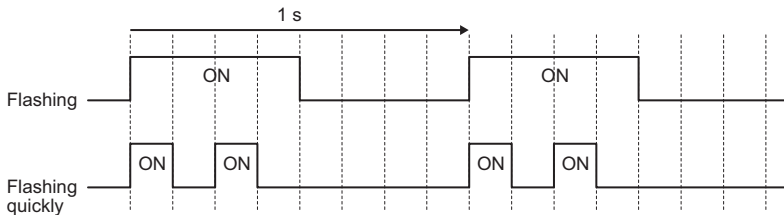


Figure 3 RUN LED Status

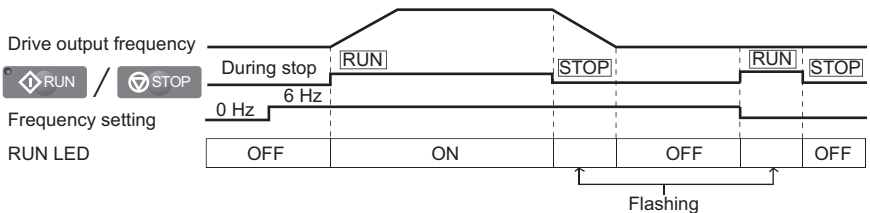

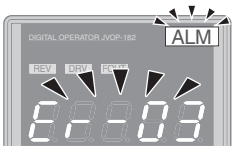
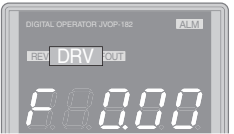


Figure 4 RUN LED and Drive Operation

## 4 Option Components

### ◆ LED Screen Display

Display	Lit	Flashing	Off
ALM	When the unit detects an alarm or error	<ul style="list-style-type: none"> <li>When an alarm occurs</li> <li>oPE detected</li> </ul>	Normal state (no fault or alarm)
REV	Motor is rotating in reverse	–	Motor is rotating forward
DRV	Drive Mode	–	Programming Mode
FOUT	Displays output frequency (Hz)	–	–
As illustrated in this manual			



## 5 Installation Procedure

### ◆ Section Safety

#### NOTICE

##### **Damage to Equipment**

**Use only Sumitomo connection cables or recommended cables.**

Failure to comply may cause the unit or option to function incorrectly.

**Properly connect the connectors.**

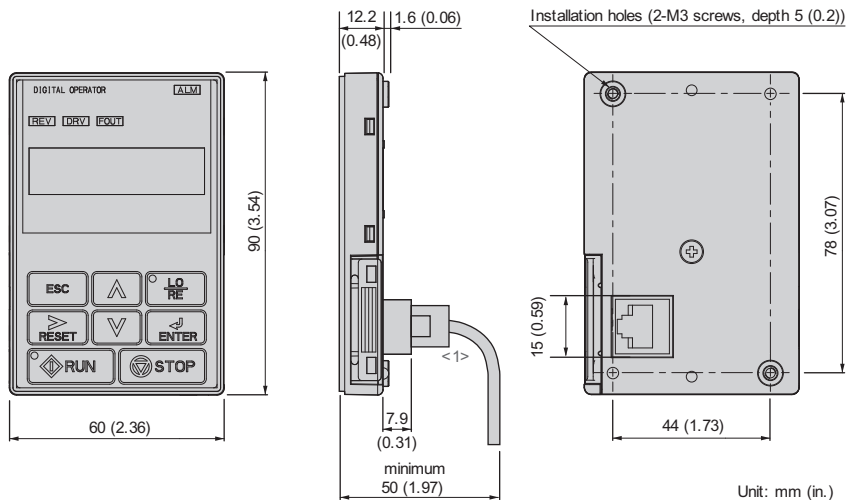
Failure to comply may prevent proper operation and possibly damage equipment.

**Do not exceed communication cable bend radius specifications.**

Failure to comply may result in broken wires or loose connections.

## 5 Installation Procedure

### ◆ Option Dimensions



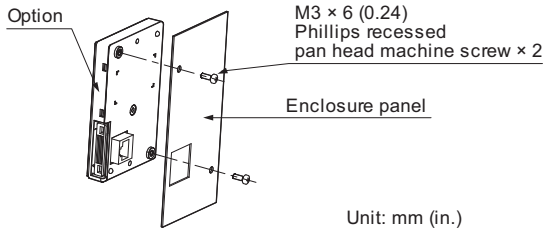
<1> Use only Sumitomo cables or cables recommended by Sumitomo. Refer to [Item Names and Part Numbers \(Sold Separately\)](#) on page 11

Figure 5 Dimensions

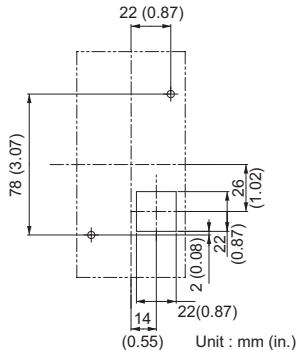
## ◆ Installing the Option

**NOTICE:** Prevent foreign matter such as metal shavings or wire clippings from falling into the unit during installation and project construction. Failure to comply could result in damage to the unit. Place a temporary cover over the top of the unit during installation. Remove the temporary cover before startup, as the cover will reduce ventilation and cause the unit to overheat.

1. Cut an opening in the enclosure panel for the option according to [Figure 6](#).
2. Position the option so the LED display faces outwards, and mount it to the enclosure panel as shown in [Figure 6](#).



**Figure 6 External/Face-mount Installation**



**Figure 7 Panel Cut-out Dimensions (External/Face-mount Installation)**

## 5 Installation Procedure

### ◆ Connecting the Option to the Unit

This section contains instructions for connecting the option to units.

#### ■ Connecting the Option to HF-520

Plug the customer-supplied communication cable into the communication cable connector of the option and the drive communications port as shown in **Figure 8**. Ensure both cable ends are firmly connected. **Refer to Item Names and Part Numbers (Sold Separately) on page 11** for information regarding recommended cables.

- Note:** Use only Sumitomo recommended cables. Using a cable not specified may cause the option or drive to malfunction.
- Note:** The STOP key on the built-in LED operator of the drive is the only functional key on the drive when the option is connected and parameter b1-02 is set to 0. Set parameter o2-02 (STOP Key Function Selection) to 0 (Disable) to disable the STOP key.

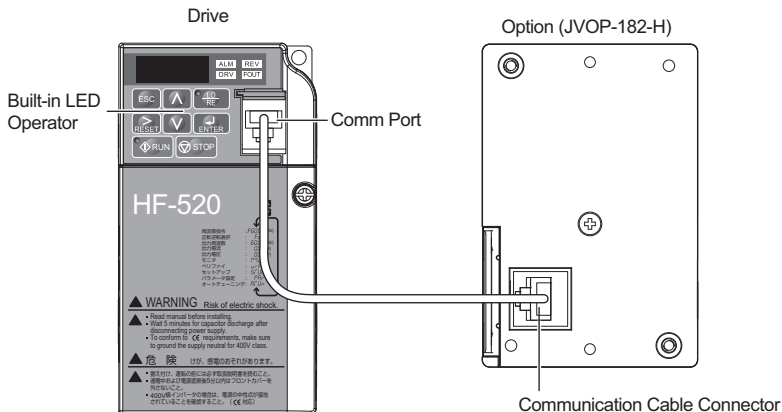


Figure 8 Communication Cable Connection

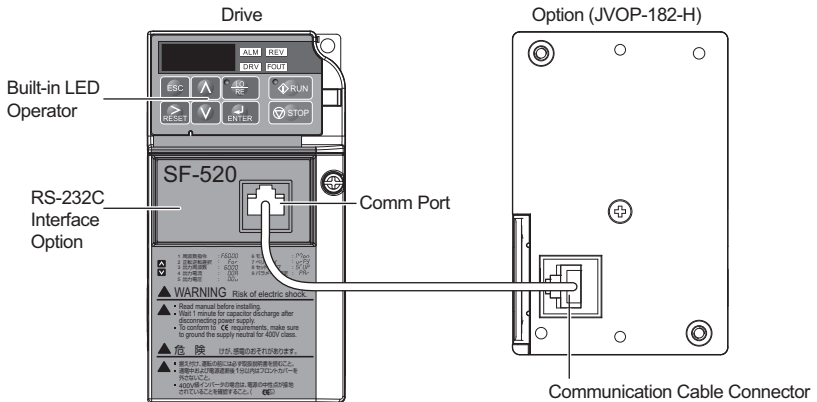
### ■ Connecting the Option to SF-520

**Note:** Attach the RS-232C Interface Option (SI-232/J-H) to the drive before connecting the option to the drive.

Plug the customer-supplied communication cable into the communication cable connector of the option and the drive communications port of the RS-232C Interface Option (SI-232/J-H) as shown in **Figure 9**. Ensure both cable ends are firmly connected. **Refer to Item Names and Part Numbers (Sold Separately) on page 11** for information regarding recommended cables.

**NOTICE:** Use only Sumitomo recommended cables. Using a cable not specified may cause the option or drive to malfunction.

**Note:** The STOP key on the built-in LED operator of the drive is the only functional key on the drive when the option is connected and parameter b1-02 is set to 0. Set parameter o2-02 (STOP Key Function Selection) to 0 (Disable) to disable the STOP key.



**Figure 9** Communication Cable Connection

# 6 Basic Operation

---

### ◆ Basic Operation for Option

The option operates in the same way as the option or built in the unit.  
Refer to the SF-520 Manuals for option main structure and basic Operation.

---

### ◆ Functions characteristic of the Option

#### ■ Read/Copy Function Procedure

##### Read

Reads and saves parameter settings from the unit to the option.

The option can perform the Read function an estimated 100,000 times.

##### Copy

Copies parameter settings from the option to another Sumitomo unit.

These parameters control the Copy function of the digital operator. The Copy function stores parameter settings into the memory of the digital operator to facilitate the transfer of those settings to other units that are the same model, capacity, and same control mode setting.

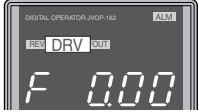














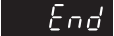


**Note:** Parameter settings can only be copied to other units that are the same model, capacity, and have the same control mode setting.

##### Verify

Verifies parameter settings in the unit match parameter settings saved to the option.

The following procedure is used to read parameters from the unit.

**Note:** 1. Set parameter o3-02 (Read Allowable) to 1 (Enable) to read the parameter settings from the unit. Set parameter o3-02 to 0 (Disable) to protect the parameter settings in the option.

Step	Display/Result
1. Turn on the power to the unit. The initial display appears.	
2. Press  ·  to select the Parameter Setting and Press  .	
3. Press  ·  ·  to select o3-01 (Copy Function Selection) and press  .	
4. Press  ·  to select 01.	
5. Press  and the option will read parameter settings from the unit.	
6. Automatically return to the Copy Function Selection display.	
7. Press  repeatedly until the display returns to the initial display.	

# 7 Related Parameters

Parameters related to the use of the option are listed in *Table 5*. Set these parameters as needed for the application.

**Table 5 Related Parameters**

No.	Name	Unit		Description	Values
		SF-520	HF-520		
b1-01	Frequency Reference Selection 1	YES	YES	Selects the source of the frequency reference. 0: LED operator - Digital preset speed d1-01 to d1-17 1: Terminals - Analog input terminal A1 or A2 2: MEMOBUS/Modbus serial communications 3: Option PCB 4: Pulse Input (Terminal RP) </>	Default: 1 Range: 0 to 4
b1-02	Run Command Selection 1	YES	YES	Selects the Run command input source. 0: LED operator - RUN and STOP keys on the LED Operator Option 1: Digital input terminals S1 to S7 2: MEMOBUS/Modbus serial communications 3: Option PCB </>	Default: 1 Range: 0 to 3
b1-15	Frequency Reference 2	N/A	YES	Selects the frequency reference input source. 0: LED operator - Digital preset speed d1-01 to d1-17 1: Terminals - Analog input terminal A1 or A2 2: MEMOBUS/Modbus serial communications 3: Option PCB 4: Pulse Input (Terminal RP)	Default: 0 Range: 0 to 4
b1-16	Run Command Source 2	N/A	YES	Selects the Run command input source. 0: LED operator - RUN and STOP keys on the LED Operator Option 1: Digital input terminals S1 to S7 2: MEMOBUS/Modbus serial communications 3: Option PCB	Default: 0 Range: 0 to 3



## 7 Related Parameters

No.	Name	Unit		Description	Values
		SF-520	HF-520		
b1-18	Voltage Reference Source	N/A	N/A	Sets the input source for the DC bus voltage reference. 0: LED operator 1: Control circuit terminal (analog input) 2: MEMOBUS/Modbus communications 3: Option card 7: Input voltage based control 1 8: Input voltage based control 2	Default: 0 Range: 0 to 3, 7, 8
o2-01	LOCAL/REMOTE Key Function Selection	N/A	YES	Enables/Disables the option LOCAL/REMOTE key. 0: Disabled 1: Enabled	Default: 1 Range: 0, 1
o2-02	STOP Key Function Selection	YES	YES	Enables/Disables the operator panel STOP key when the unit is operated from external sources (not operator). 0: Disabled 1: Enabled	Default: 1 Range: 0, 1
o2-05	Frequency Reference Setting Method Selection	YES	YES	Selects if the ENTER key press is required when inputting the frequency reference by the digital operator. 0: Data/Enter key must be pressed to enter a frequency reference. 1: Data/Enter key is not required. The frequency reference is adjusted by the up and down arrow keys.	Default: 0 Range: 0, 1
o2-06	Operation Selection when LED Operator Option is Disconnected	YES	YES	Sets unit action when the option is removed in LOCAL mode or with b1-02 = 0. 0: The drive, converter, or regenerative unit will continue operation. 1: The drive, converter, or regenerative unit will trigger a fault (oPr) and the motor will coast to stop.	Default: 0 Range: 0, 1

## 7 Related Parameters

No.	Name	Unit		Description	Values
		SF-520	HF-520		
o3-01	Copy Function Selection	YES	YES	<p>This parameter controls the copying of parameters to and from the option.</p> <p>0: COPY SELECT (no function)</p> <p>1: All parameters are copied from the unit to the LED Operator Option.</p> <p>2: All parameters are copied from the LED Operator Option to the drive, converter, or regenerative unit.</p> <p>3: Parameter settings in the drive, converter, or regenerative unit are compared to those in the LED Operator Option.</p> <p><b>Note:</b> When using the copy function, the drive model number (o2-04), software number (U1-14), and control method (A1-02) must match or an error will occur.</p>	Default: 0 Range: 0 to 3
o3-02	Copy Allowable	YES	YES	<p>Enables or disables reading of unit parameter settings.</p> <p>0: Disabled - Read not allowed</p> <p>1: Enabled - Read allowed</p>	Default: 0 Range: 0, 1

<1> b1-01 = 4 and b1-02 = 3 are not compatible with the SF-520.

## 8 Option Fault Diagnostics

### ◆ Error Code and Connection Messages

Fault/Error code text will appear on the option display to indicate a specific fault. The fault codes in **Table 6** are displayed on the LED operator built in the drive and/or the option displays. For information on the fault codes not listed in **Table 6**, refer to the unit manual.

When an option fault occurs, ensure that the communication cable is properly connected to the option and it is not loose.

Contact your nearest Sumitomo representative or sales department if the cable appears to be connect properly but still no message appears to indicate the error.

**Table 6 Fault/Error Code Displays**

LED Operator (JVOP-182-H)	LED Operator (HF-520 and SF-520 built-in)	Description
CPFD0	</>	LED Operator (JVOP-182-H) Communication Error 1
		Occurs when the unit cannot communicate with the option within 5 seconds after the power is switched on.
<b>Cause</b>		<b>Possible Solution</b>
Communication cable between the option and the unit is not properly connected.		Remove and reconnect the option.
Problem with the option.		Replace the option.
Problem with the control circuit in the unit.		<ul style="list-style-type: none"> <li>• Cycle power to the unit.</li> <li>• Replace the unit.</li> </ul>
LED Operator (JVOP-182-H)	LED Operator (HF-520 and SF-520 built-in)	Description
CPFD1	</>	LED Operator (JVOP-182-H) Communication Error 2
		Occurs when the unit does not respond to the option for longer than 2 seconds.
<b>Cause</b>		<b>Possible Solution</b>
Connector on the option cable is loose or damaged.		Remove and reconnect the option.
Problem with the option.		Replace the option.
Problem with the control circuit in the unit.		<ul style="list-style-type: none"> <li>• Cycle power to the unit.</li> <li>• Replace the unit.</li> </ul>

## 8 Option Fault Diagnostics

LED Operator (JVOP-182-H)	LED Operator (HF-520 and SF-520 built-in)	Description
oPr	oPr	<p>LED Operator Option Connection Fault</p> <p>Data should appear on the LED operator built in the unit. By reconnecting the option to the unit, data should also appear on the option display.</p> <p>An oPr fault will occur when both of the following conditions are true:</p> <p>Output is interrupted when the option is disconnected (o2-06 = 1).            The Run command is assigned to the option (b1-02/b1-16= 0 and LOCAL is selected).</p>
Cause		Possible Solution
Option is not properly connected to the unit.		<ul style="list-style-type: none"> <li>• Check the connection between the option and the unit.</li> <li>• Replace the cable if damaged.</li> <li>• Turn off the unit input power and disconnect the option. Reconnect the option and reapply unit input power.</li> </ul>

<1> Display will vary depending on operation status.

# 9 Specifications

**Table 7 Option Specifications**

Model	JVOP-182-H
Connector	RJ-45
Power Supply	Powered from the unit (DC +5 V $\pm$ 5%)
Operating Temperature	-10 to +50 °C (+14 to +122 °F)
Humidity	up to 95% RH (no condensation)
Storage Temperature	-20 to +60 °C (-4 to +140 °F) (allowed for short-term transport of the product)
Area of Use	Indoor (free of corrosive gas, airborne particles, etc.)
Altitude	Up to 1000 m (3280 ft.)
Shock	10 to 20 Hz: 9.8 m/s <sup>2</sup> 20 to 55 Hz: 5.9 m/s <sup>2</sup>
Read Function Limitation	Estimated 100,000 times

# 10 Warranty

## ◆ Warranty policy on inverter

Warranty period	The warranty period is 18 months from date of shipment or 12 months after initial operation, whichever comes first.
Warranty condition	<p>In the event that any problem or damage to the Product arises during the "Warranty Period" from defects in the Product whenever the Product is properly installed and combined with the Buyer's equipment or machines maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agreed upon in writing between the Seller and Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge at a designated facility, except as stipulated in the "Warranty Exclusions" as described below.</p> <p>However, if the Product is installed or integrated into the Buyer's equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.</p>
Warranty exclusion	<p>Notwithstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by:</p> <ol style="list-style-type: none"> <li>1. Installation, connection, combination or integration of the Product in or to the other equipment or machine that rendered by any person or entity other than the Seller.</li> <li>2. Insufficient maintenance or improper operation by the Buyer or its customers such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller;</li> <li>3. Improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer's or its customers' operation of the Product not in conformity with the specifications;</li> <li>4. Any problem or damage on any equipment or machine to which the Product is installed, connected or combined or any specifications particular to the buyer or its customers;</li> <li>5. Any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller;</li> <li>6. Any parts in the Product that are supplied or designated by the Buyer or its customers;</li> <li>7. Earthquake, fire, flood, salt air, gas, lightning, acts of God or any other reasons beyond the control of the Seller;</li> <li>8. Normal wear and tear, or deterioration of the Product's parts, such as the cooling fan bearings;</li> <li>9. Any other troubles, problems or damage to the Product that are not attributable to the Seller.</li> </ol>
Others	The Seller will not be responsibility for the installation and removal of the inverter. Any inverter transportation cost shall be born by both Seller and Buyer.

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Specifications, dimensions, and other items are subject to change without prior notice.



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