



# **SAMCO-*Vm*05**

**DIGITAL INPUT BOARD SDI**

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**INSTRUCTION MANUAL**

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## [For Safe Use]

- Safety instructions are given in this manual and on the product to prevent physical injury to yourself or others, or damage to property.  
Read the instructions thoroughly and use the product correctly.
- After reading, keep this manual to hand for reference.
- Critical safety instructions are marked “Danger” or “Caution” as follows:



This symbol indicates a hazard that could lead to death or serious injury if the warning is ignored and the product is handled incorrectly.



This symbol indicates a hazard that could lead to injury or damage to property if the warning is ignored and the product is handled incorrectly.

- \* Even ignoring an instruction marked “Caution” can have serious consequences under some circumstances. Be sure to abide by all instructions, irrespective of the degree of danger.

### Meanings of symbols



This symbol indicates a potential danger.

The specific danger is indicated in the symbol. (This example indicates a general danger.)



This symbol indicates the need for caution.

The specific caution is indicated in the symbol. (This example indicates a general caution.)



This symbol indicates a prohibition.

The specific prohibited action is indicated in the symbol. (This example indicates a general prohibition.)



This symbol indicates an action that must be performed.

The specific action is indicated in the symbol. (This example indicates a general requirement.)

Thank you for purchasing the **SAMCO-vm05** digital input board (SDI).  
This is a built-in type option board for the SAMCO-vm05 inverter.  
The frequency setting of the inverter can be made with high precision by  
means of the external BCD and the 16-bit binary digital signal input.  
Be sure to read through this manual before using the product.

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## Safety Notes

1. Mount the inverter on a strong metal panel or similar surface using the specified screws.
2. Ground the inverter and the motor using their ground terminals (  ).
3. Install a circuit breaker (MCCB) of the appropriate capacity between the inverter and the power supply.
4. The inverter incorporates high-voltage circuitry that could cause an electric shock or other physical injury. Do not touch the inside of the inverter.
5. When carrying out maintenance or inspection, turn the power off and check with a circuit tester that there is no voltage between X and P on the terminal board after the **CHARGE** lamp goes out.
6. Some internal components in the inverter retain an electric charge even when the inverter is not operating. Do not touch the terminal board.
7. Check the safety of the load when operating the inverter.
8. Turn the power off when not using the inverter for a long time.
9. This inverter is made for domestic use. Please consult us before exporting this product.

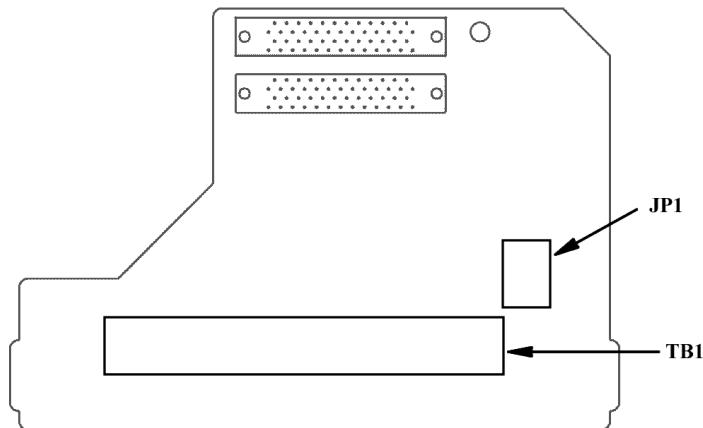
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## 1. GENERAL

- The digital input board (SDI) is provided with the BCD code or binary 16-bit input function for the first speed frequency setting. By means of this SDI board, the first speed frequency setting can be made with high precision by the external 16-bit digital input signal.



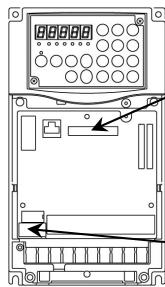
**Digital Input Board (SDI)**

## 2. Mounting of Option Board

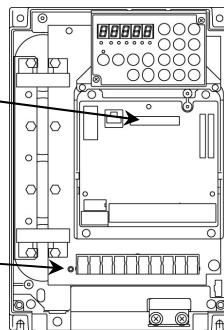
### 2.1 Preparation for Mounting

- The **SAMCO-vm05** power supply shall be turned off and after more than 15 minutes, the rear cover shall be removed to confirm that the **CHARGE** lamp is put out.

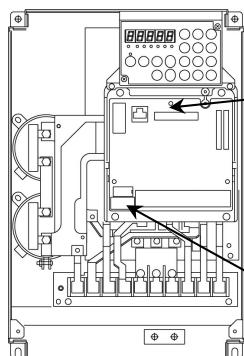
Please do not mount or remove the option board, when the power supply is ON and the **CHARGE** lamp is lit, since it causes not only unstable operation, but also danger to the human body.



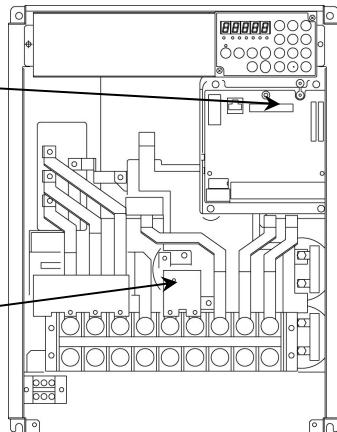
SHF-1.5K~4.0K  
SPF-2.2K~5.5K



SHF-5.5K~11K  
SPF-7.5K~15K



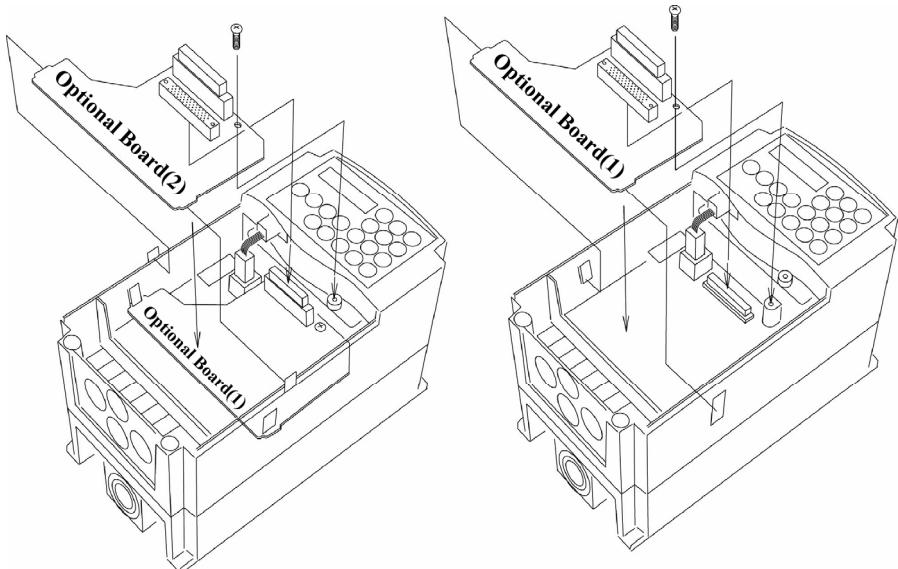
SHF-15K~22K  
SPF-18.5K~30K



SHF-30K~55K  
SPF-37K~55K

## 2.2 Mounting of Option Board

- The SDI option board shall be inserted into the connector and be fixed with the attached screws as shown below.



### 3. Description of Set Frequency Input Function

#### 3.1 Function of Terminals (TB1)

Code	Contents	Function								
		Binary 0.01 – 600.00Hz		BCD			JP1 jumper open 0.1 – 600.0 Hz			
		JP1 jumper short circuited (factory preset) 0.01 – 99.99Hz								
E0	16-bit signal terminal for 1 <sup>st</sup> speed frequency setting To be inputted by relay contact or open collector	$2^0$ LSB	0.01Hz	$10^{-2}$ digit	$2^0$	0.01Hz	$10^{-1}$ digit	$2^0$	0.1Hz	
E1		$2^1$	0.02Hz		$2^1$	0.02Hz		$2^1$	0.2Hz	
E2		$2^2$	0.04Hz		$2^2$	0.04Hz		$2^2$	0.4Hz	
E3		$2^3$	0.08Hz		$2^3$	0.08Hz		$2^3$	0.8Hz	
E4		$2^4$	0.16Hz	$10^{-1}$ digit	$2^0$	0.1Hz	$10^0$ digit	$2^0$	1Hz	
E5		$2^5$	0.32Hz		$2^1$	0.2Hz		$2^1$	2Hz	
E6		$2^6$	0.64Hz		$2^2$	0.4Hz		$2^2$	4Hz	
E7		$2^7$	1.28Hz		$2^3$	0.8Hz		$2^3$	8Hz	
E8		$2^8$	2.56Hz	$10^0$ digit	$2^0$	1Hz	$10^1$ digit	$2^0$	10Hz	
E9		$2^0$	5.12Hz		$2^1$	2Hz		$2^1$	20Hz	
E10		$2^1$	10.24Hz		$2^2$	4Hz		$2^2$	40Hz	
E11		$2^2$	20.48Hz		$2^3$	8Hz		$2^3$	80Hz	
E12		$2^3$	40.96Hz	$10^1$ digit	$2^0$	10Hz	$10^2$ digit	$2^0$	100Hz	
E13		$2^{13}$	81.92Hz		$2^1$	20Hz		$2^1$	200Hz	
E14		$2^{15}$	163.84Hz		$2^2$	40Hz		$2^2$	400Hz	
E15		216 MSB	327.68Hz		$2^3$	80Hz		$2^3$	800Hz	
COM	Common Terminal	These 2 COM terminals are common.								
COM										

### 3.2 Basic Function

- The code format selection of the 1st speed frequency setting input signal is specified by the set value of Cd002 (1st speed frequency setting selection).

Cd002 = 15: the 1<sup>st</sup> speed frequency setting input signal is of binary code format.

Cd002 = 16: the 1<sup>st</sup> speed frequency setting input signal is of BCD code format.

- In the case of the BCD code selected, the frequency setting range is selected by the jumper pin (JP1) on the SDI board.

Jumper pin (JP1) short circuited: 0. 01 – 99. 99Hz (factory preset)

Jumper pin (JP1) open: 0. 1 – 600. 0Hz

\* When the jumper pin is switched over, please confirm that the power supply is OFF and the **CHARGE** lamp is put out. If switched over during the power ON, normal operation does not take place.

### 3.3 Precautions

- For the input signal, no voltage relay contact for micro current or the open collector (Sink type) shall be used.
- When the open collector signal is used for the input signal, please use a transistor having the following specifications.

$$I_c \geq 50\text{mA} \quad V_{ce} \geq 50\text{V}, \text{ leak current } \leq 1\mu\text{A}$$

The system shall be designed in a manner that  $V_{ce} \leq 1\text{V}$ , when  $I_c = 2\text{mA}$ .

- In the case of the binary code format, the readout value of the input data is limited to [600Hz].

**Example:** When the frequency setting data exceeding [60000] is inputted in the decimal number, the readout frequency setting value is [60, 000Hz] between [60, 000 -- 65, 535].

- In the case of the BCD code format, if one digit out of 4 digits is inputted as more than the hexadecimal [A], the data is not read out as an invalid value. The maximum value of the input data is limited to [600Hz].

**Example 1:** When the frequency is set at 30. 0Hz and “05A0” is inputted in the BCD format as the frequency setting data, the inverter does not read out “05A0”. The set frequency remains 30. 0Hz for the inverter.

**Example 2:** When “6661” is newly inputted in the BCD format in the state that jumper pin (JP1) is open, the set frequency value read out in the inverter is 600Hz.

- When the BCD code format is selected at the 1st speed frequency setting, the 1st speed frequency value of the inverter is cleared to [0. 00Hz]. Later on, the 1st speed frequency is set subject to the state of the input signal and the lower limit frequency set value, but it is not read out in the invalid signal input state such as [05A0].

### 3.4 Electrical Specifications

Item	Specifications
Type Of Signal	Binary 16-bit or BCD 4-digit
Input Status	Contact Signal or Open Collector
Maximum Source Current	2mA or less
Set Resolution	BINARY 0.01Hz BCD 0.1Hz or 0.01Hz
Set Frequency Range	BINARY 0.01Hz – 600.00Hz BCD 0.01Hz – 99.99Hz or 0.1Hz – 600.0Hz
Response Time	Maximum 60msec. after the input data becomes stable.
Input Circuit	<p>The diagram illustrates the internal logic of the input circuit. It features two parallel input paths. Each path includes a 10KΩ resistor connected between the input signal and ground. The collector of each of the two NPN transistors is connected to a 24V power source. The emitters of the transistors are connected to a 12KΩ resistor, which is shared by both and connects to the CPU and ground. A diode is also present in the circuit. The output is labeled E0~E15, and there is a connection to COM.</p>

### 3.5 Example of Input

- Example of input for the setting of 54.32Hz (JP1 short circuited)

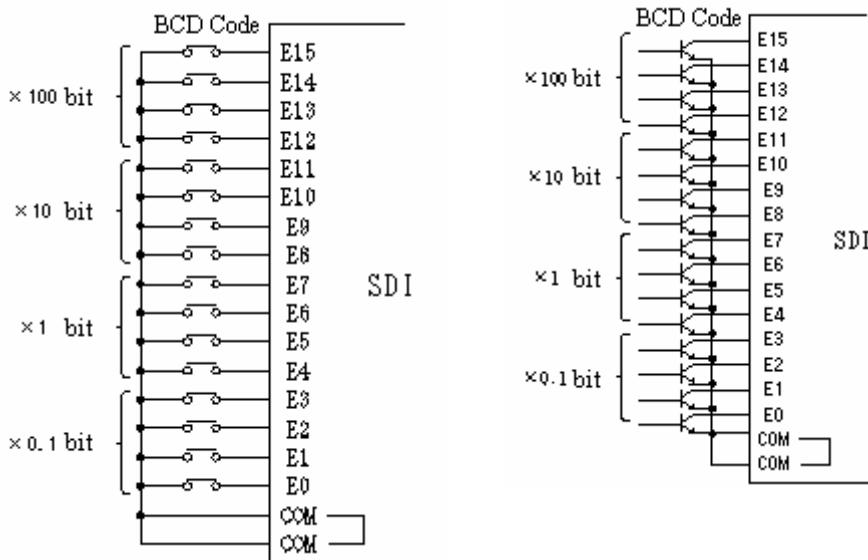
Signal Format	Names Of Input Terminals															
	E15	E14	E13	E12	E11	E10	E9	E8	E7	E6	E5	E4	E3	E2	E1	E0
Binary	0	0	0	1	0	1	0	1	0	0	1	1	1	0	0	0
BCD	0	1	0	1	0	1	0	0	0	0	1	1	0	0	1	0

- ① [1] in the above table shows that the open collector signal is “ON” and the input terminal and the COM terminal are short circuited.
- ② [0] in the above table shows that the contact signal or the open collector signal is “OFF” and the input terminal and the COM terminals are open.

### 3.6 Example of Connection

(1) In the case of input by relay contact

(2) In the case of input by open collector signal



## 4. Precautions on Use

- If the option board is mounted or removed after the power supply is turned on, it may cause not only improper operation, but also the danger to the human body. Be sure to confirm that the CHARGE lamp is put out before mounting or removing the option board.
- Two option boards can be mounted on the inverter at the same time.  
(The first option board is mounted on the slot 1 of the inverter and the second board is mounted on the slot 2 of the option board mounted on the slot 1.)

Such mounting may not be made subject to the combination as shown below.

Slot1 Slot2	Not Mounted	SB – PG	SWS	SAS	SDI
Not Mounted	–	○	○	○	○
SB – PG	–	×	×	×	×
SWS	–	×	×	×	○
SAS	–	○	○	×	○
SDI	–	×	○	×	×

- Simultaneous mounting allowed
- ✗ Simultaneous mounting not allowed
- When the power supply is turned on, it is automatically detected whether the option board is mounted or not together with the relevant function codes and if there is any discrepancy, the contents of the function codes are automatically corrected following the table below shown.

SDI Board	Cd002: 1 <sup>st</sup> speed frequency setting selection
Mounted	When Cd002 = 15 or 16, it is automatically corrected to Cd002 = 1.
Not mounted	No automatic correction



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