



# SI unit Installation and Maintenance manual

## EX240-SIB1 ( INTERBUS )

For future reference, please keep this manual in a safe place.

This manual should be read in conjunction with the current product catalogue.

### Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by label of "CAUTION", "WARNING".

To ensure safety, be sure to observe ISO, JIS and other safety practices.

⚠	<b>CAUTION:</b> Operator error could result in injury or equipment damage.
⚠	<b>WARNING:</b> Operator error could result in serious injury or loss of life.

### ⚠ CAUTION

Thoroughly read this manual and operate the product within the specified range. Follow the instructions.

Do not drop or impart any impact to the product.

Use within specified voltage range. Use outside of specified voltage will cause malfunction, damage to unit, electric shock, and fire.

Do not touch the terminal or internal circuit board while they are energized. It may cause malfunction, damage to unit, and electric shock.

Use within operating ambient temperature. Do not use where temperatures can rapidly change even though it is within the specifications.

Foreign objects should be prevented from entering the product. Contamination by foreign objects, such as wire chips will cause fire, breakage, and malfunction.

Use within the operating environment of the protection structure. IP65 is achieved by mounting on manifold solenoid valve and process wire connector properly.

Carry out regular checks to confirm correct operation. Safety may not be maintained by unintentional malfunction or incorrect operation.

### ⚠ WARNING

The product specified here is designed to be used in standard factory automation equipment. Do not use in machinery and/or equipment where operators may be injured, and malfunction or failure may cause loss of life.

Do not disassemble to repair or modify the product.

### Outline

This SI unit is able to connect to remote bus of INTERBUS system. Maximum is 4096 I/O points (512 slaves) per PLC master unit. Transmission distance between slaves is 400m for the maximum and total distance is 12.8km for the maximum.

This SI unit is able to perform maximum of 32 points input / 32 points of outputs as slave. Input is able to handle ON/OFF input signal of sensor and others by using DI unit (EX240-IE1 etc.).

### ⚠ CAUTION

As maximum point (maximum slave number) and others may differ according to each master unit, please refer to the manual of each product manufacture for details.

### Applicable solenoid valves and DI unit

SI unit	Applicable solenoid valve	DI unit
EX240-SIB1	VQ2000, VQ4000 SX3000, SY5000	EX240-IE1

Refer to the catalogues for each solenoid valve for details.

### ⚠ CAUTION

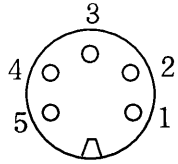
We do not guarantee the operation error and break down in case the solenoid valves other than indicated above, load other than solenoid valve and input machine is connected to SI unit.

### Specifications

Item	Specifications	
Input point	32 points	
Output point	32 points	
Occupied slave number	Possible to set 1, 2 and 4 BYTE	
Output style	P-MOSFET open drain style (PNP)	
Transmission distance	400m (between slaves), 12.8km (total extension)	
Transmission speed	500kbps	
Output connecting load	24VDC, Solenoid valve with lamp-surge voltage protection circuit of 2.1W or less	
Residual voltage	≤0.3VDC	
Power supply voltage	Unit	24VDC±10%
	Solenoid valve	24VDC±10%
Current consumption[mA]	≤200mA (SI unit) + current consumption for sensor	
Weight	≤450g	
Operating ambient temperature	0~+50°C	
Operating ambient humidity	30~95%RH (No dew allowed)	
Vibration resistance	10~57Hz	0.35mm (constant amplitude)
	57Hz~150Hz	5G (constant acceleration)
Impact resistance	15G/11ms to ±X,Y,Z direction, 3 times each	
Noise resistance	1000Vp-p pulse width 1μS leading 1nS	
Withstand voltage	1500VAC 50/60Hz for 1min. between the terminal and the case	
Insulation resistance	More than 10MΩ (500VDC) between the terminal and the case	
Operating atmosphere	No corrosive gas	
Protection class	IP65	
ID code	DIO	03(HEX)
	DI	02(HEX)
	DO	01(HEX)

## Connection

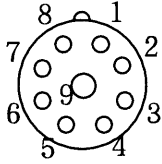
Power connector Franz Binder Co. 723 series 5pin male  
72309-0115-80-05



- 1: SV24V for solenoid valve 24V
  - 2: SV0V for solenoid valve 0V
  - 3: PE Protective earth
  - 4: SI/DI24V for SI/DI unit 24V
  - 5: SI/DI0V for SI/DI unit 0V
- Housing: Shield

Female connector: Franz Binder Co. 72309-0114-70-15 etc.

Remote IN CONINVERS Co. RC series 9pin(8+1) male

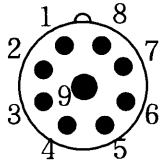


- 1: DO
  - 2: /DO
  - 3: DI
  - 4: /DI
  - 5: GND
  - 6: n. c.
  - 7: n. c.
  - 8: n. c.
  - 9: n. c.
- Housing: Shield

Female connector: Remote bus cable

PHOENIX CONTACT Co. etc.

Remote OUT CONINVERS Co. RC series 9pin(8+1) female



- 1: DO
  - 2: /DO
  - 3: DI
  - 4: /DI
  - 5: GND
  - 6: n. c.
  - 7: n. c.
  - 8: n. c.
  - 9: RBSTL
- Housing: Shield

Male connector: Remote bus cable

PHOENIX CONTACT Co. etc.

n.c.··· not connected

### CAUTION

Power of the product and all other equipment should be turned off while wiring.

Tighten the wiring with connector screw completely. Short circuit, fire, and malfunction will be caused if connector screw is not tightened enough.

Avoid incorrect wiring. It may damage the product and/or other equipment.

Ensure that the PE terminal under the bottom side of unit is correctly earthed.

Power with correct capacity should be prepared by considering the in-rush current when starting.

Influence of noise should be avoided for the wiring. Wiring should be separated from power cables and high voltage cables.

Ensure that the power is within the specified voltage range.

Ensure that the cable is capable of supporting the solenoid valve, SI unit (DI unit) and sensor in terms of rating.

24VDC power source for solenoid valve and for unit can be used in either single power source or other power source cable with shield, please ground shield power source side.

## Correspondence of SI unit output No. and solenoid valve and DI unit

### 1. Standard wiring

SI unit is able to connect maximum of 4 DI unit of 8 input. Input is assigned 0~7, 8~15, etc from SI unit side.

The outputs of the SI unit are assigned from the D side(down) solenoid valve in the order 0, 1, 2, etc. The SI unit can be mounted from the direction of the D side or the U side(up). Products exist that can only be mounted from one side of the manifold. Please refer to the current catalogue for each solenoid valve.

When the number of stations on a VQ manifold are 8 or less the internal wiring will default to double solenoid wiring.

Output No.	SI unit	Station	U	Output No.	SI unit	Station	D
9···	B	Double	5	0···	A	Double	5
8···	A	Double	5	1···	B	Double	5
7···	Va	Single	4	2···	A	Single	4
6···	A	Single	4	3···	Va	Single	4
5···	Va	Single	3	4···	A	Single	3
4···	A	Single	3	5···	Va	Single	3
3···	B	Double	2	6···	A	Double	2
2···	A	Double	2	7···	B	Double	2
1···	B	Double	1	8···	A	Double	1
0···	A	Double	1	9···	B	Double	1

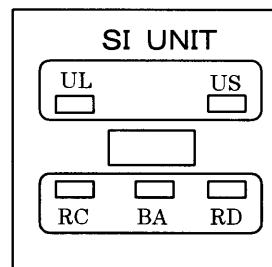
Output No.	SI unit	Station	D	Output No.	SI unit	Station	U
0~7···	DI unit	1		0~7···	DI unit	1	
8~15···	DI unit	2		8~15···	DI unit	2	
16~23···	DI unit	3		16~23···	DI unit	3	
24~31···	DI unit	4		24~31···	DI unit	4	

### 2. Non-standard wiring (mixed wiring)

Mixed wiring is available as a non-standard option. If mixed wiring is specified, the positions of the single and double solenoids on the manifold must be indicated when ordering.

## LED display

LED name	Color	Contents
UL	Green	Lights up when power for SI/DI unit is turned ON.
US	Green	Lights up when power for solenoid valve is turned ON.
RC	Green	Lights up when bus is normal.
BA	Green	Lights up when transmission is normal.
RD	Red	Lights up when transmission is abnormal.



## Switch setting

### (1) Setting of input and output byte (DIO, BYTE setting)

It is set whether SI unit is used input and output (DIO), output (DO) or input (DI). Number of occupied bites (BYTE) can be selected either from 4 byte, 2 byte or 1 byte. 1 byte is 8 points. Setting should be done with power off.

Open the cover and set DIP switch with minus driver and so on.

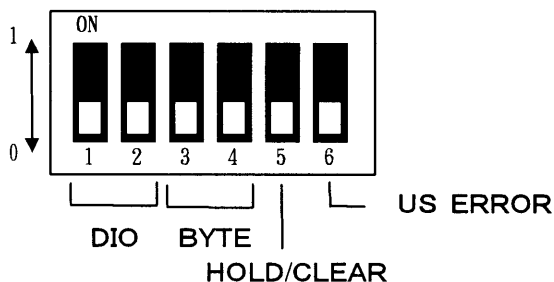
Address for SI unit is automatically layout by master unit. Please refer to manual or others of master unit for the details.

### (2) Setting HOLD/CLEAR

When the communication abnormality occurs, if the output condition of SI unit solenoid valve should be maintained or all OFF is set.

### (3) Setting of power source detection for solenoid valve (US ERROR setting)

When DIO setting is DIO or DO, it sets whether to use or not use the function detect if the power is supplied for output of solenoid valve. This function is invalid for DI as it does not need power source for solenoid valve.



0: OFF, 1: ON

DIO setting	SW1	SW2	BYTE setting	SW3	SW4
DIO	0	0	4 BYTE	0	0
DO	1	0	—	1	0
DI	0	1	2 BYTE	0	1
—	1	1	1 BYTE	1	1

HOLD/CLEAR setting	SW5	US ERROR setting	SW6
CLEAR	0	Use	0
HOLD	1	Not use	1

When shipped from factory, SW1~6 are all OFF.

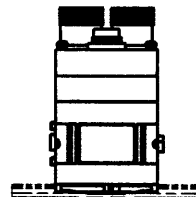
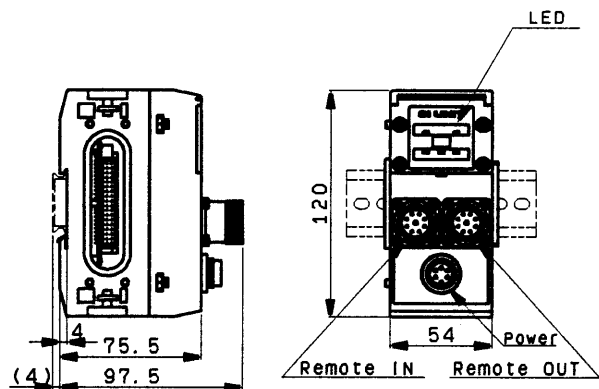
## ⚠ CAUTION

When BYTE setting is 1 byte, it needs firmware version of master is more than version 4.0.

Please refer to the manual of each product manufacture for details.

## Dimension

EX240-SIB1



SMC Corporation

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Please understand that the contents of this manual is subject to change without notice.