



# Installation & Maintenance Manual

## SI unit - AS-i compatible

Type **EX250-SAS3**  
**EX250-SAS5**  
**EX250-SAS7**  
**EX250-SAS9**



### Safety Instructions

The unit and this manual contain essential information to protect users and others from possible injury and property damage and to ensure correct handling. Please confirm that you fully understand the meaning of the following messages (signs) before reading the text, and always follow the instructions. Please read the Installation & Maintenance Manual for related apparatus and understand it before operating the actuator.

#### IMPORTANT MESSAGES

Read this manual and follow the instructions. Signal words such as WARNING, CAUTION and NOTE, will be followed by important safety information that must be reviewed carefully.

<b>⚠WARNING</b>	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
<b>⚠CAUTION</b>	Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.
<b>NOTE</b>	Provides you helpful information.

#### ⚠WARNING

**Do not disassemble, modify (including change of printed circuit board) or repair.**

An injury or failure can result.

**Do not operate outside of the specification range.**

Fire, malfunction or damage can result.

Please use it after confirming the specification.

**Do not use the product in environments with possible presence of flammable, explosive or corrosion gas.**

Otherwise fire, explosion or corrosion can result.

The product is not designed to be explosion proof.

**Do not apply voltages exceeding 250V between a lead wire and a metal fitting.**

Pay attention to perform an insulation test because it could damage the insulation of the lead wire and cause failure.

#### Safety Instructions (continue)

**These instructions must be followed when using the product in an interlocking circuit:**

- Provide double interlocking through another system such as mechanical protection.
- Check the product regularly to ensure proper operation. Otherwise malfunction can cause an accident.

**These instructions must be followed when performing maintenance work:**

- Turn off the power supply
- Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work.

Otherwise it can cause injury.

#### ⚠CAUTION

**Perform a proper functional check after completing maintenance work.**

Stop operation when an abnormality is observed or the product is not working properly.

Safety cannot be assured due to unexpected malfunctions.

#### NOTE

The direct-current power supply should be a UL authorized power supply.

1.Limited voltage current circuit in accordance with UL508

A circuit to which power is supplied by the secondary coil of a transformer that meets the following conditions.

- Max. voltage(with no load): less than 30Vrms(42.4V peak)
- Max. current: (1)less than 8A(including when short circuited)  
(2)limited by circuit protector (such as fuse) with the following ratings

No load voltage (V peak)	Max.current rating (A)
0 to 20 [V]	5.0
20 to 30 [V]	100 / peak voltage

2.UL1310 compatible class 2 power supply unit or circuit of max. 30Vrms (42.4V peak) or less using a UL1585 compatible class 2 transformer as power supply. (Class 2 circuit)

Follow the instructions given below when handling the product.

Failure to follow instructions may damage the unit.

- Operate the product within the specified voltage range.
- Reserve a space around the unit for maintenance.
- Do not remove labels.
- Do not drop, hit or apply excessive shock to the product.
- Do not bend or apply tensile force to cables, or apply a force by placing a heavy load on them.
- Connect wires and cables correctly.
- Do not connect wires while the power is on.
- Do not lay wires or cables with the same wiring route as a power line or high-voltage line.
- Verify the insulation of the wiring.
- Take proper measures against noise such as a noise filter when the product is incorporated in equipment or devices.
- Select an operation environment according to enclosure(IP67).
- Take sufficient shielding measures when installing the product at the following place.
  - (1)A place where a noise due to static electricity etc. is generated
  - (2)A place of high electric field strength
  - (3)A place possibly exposed to radioactivity
  - (4)A place near power cable

#### Safety Instructions (continue)

- Do not use the product nearby a place where an electric surge is generated.
- Use the product equipped with a surge absorber when a surge-generating load such as a solenoid valve is driven directly.
- Prevent foreign matter such as remnant of wires from entering the product.
- Do not expose the product to vibration and impact.
- Keep the specified ambient temperature range (+5 to +45°C ).
- Do not expose the product to heat radiation from a heat source located nearby.
- Use a precision screw driver with small flat blade when setting rotary switch and DIP switch.
- Perform maintenance and check at regular intervals.
- Perform a proper functional check.
- Do not use the product with chemicals such as benzine and thinner.

### Model Indication Method

# EX250 – SAS

Model ●

3	PNP output	Input 8/output 8	2 isolated common type
5	PNP output	Input 4/output 4	2 isolated common type
7	PNP output	Input 8/output 8	1 common type
9	PNP output	Input 4/output 4	1 common type

### Specification

General specification

Item	Specification
Operating ambient temp.	+5 to +45 °C
Storage ambient humidity	35 to 85% RH (No condensation)
Storage ambient temp.	-20 to +60 °C
Vibration proof	50m/s <sup>2</sup>
Impact proof	100m/s <sup>2</sup>
Noise immunity	±1000Vp-p. Pulse duration 1 μ s. On first transition 1ns
Withstand voltage	500V AC for 1min. Between body and external terminals.
Insulation resistance	500V DC 10M ohm or more. Between body and external terminals.
Operating environment	No corrosive gas
Weight	250g or less
Enclosure	IP67

Communication specification

Item	Specification	
	EX250-SAS3/7	EX250-SAS5/9
Applicable system	AS-Interface(AS-i)	
AS-i Version	Version2.11	
Address mode	Standard Address Mode	
Number of occupied slave	2	1
Max.number of connected Slaves	31	
Address Assignment range	1 to 31	
IO Code(HEX)	7,7	7
ID Code(HEX)	F,F	F
ID Code1(HEX)	Set within 0 to F optionally	
ID Code2(HEX)	E,E	E
D0	IN 0,4 / OUT 0,4	IN 0 / OUT 0
D1	IN 1,5 / OUT 1,5	IN 1 / OUT 1
D2	IN 2,6 / OUT 2,6	IN 2 / OUT 2
D3	IN 3,7 / OUT 3,7	IN 3 / OUT 3

#### Specification (continue)

Electrical specification(EX250-SAS3/5)

Item	Specification	
	EX250-SAS3	EX250-SAS5
Power supply voltage	For communication	Supplied from AS-Interface communication 26.5 to 31.6VDC *1
	For output	24VDC <sup>+10%</sup> PELV *2
Current consumption *3	100mA MAX.	65mA MAX.
Input specification	Input point	8 4
	Input style	TTL
	Connection block	Input block : EX250-IE1 to 3 *4
	Supply voltage for block	24VDC±20%
Output specification	Current consumption *5	240mA MAX. 100mA MAX
	Output point	8 4
	Output style	P-MOS FET open drain style
	Connection block	Solenoid valve with lamp surge protection circuit for 24VDC and 1.5W or less surge voltage
	Supply voltage for block	24VDC±10%
Residual voltage	0.3V or less	
Current consumption *6	500mA MAX.	250mA MAX.

- \*1 : The power supply for the communication must use the special power supply made for AS-i. Refer to each manufacturer's manual etc. for details.
- \*2 : The power supply for the output equipment must use the one which suits PELV (Protection Extra Low Voltage) demanded by IEC364-4-41.
- \*3 : Current consumption inside SI unit.
- \*4 : Refer to the Input Block Technical Specifications for details.
- \*5 : Power for input equipment is supplied from communication power.
- \*6 : Power for output equipment is supplied from output equipment power.

Electrical specification(EX250-SAS7/9)

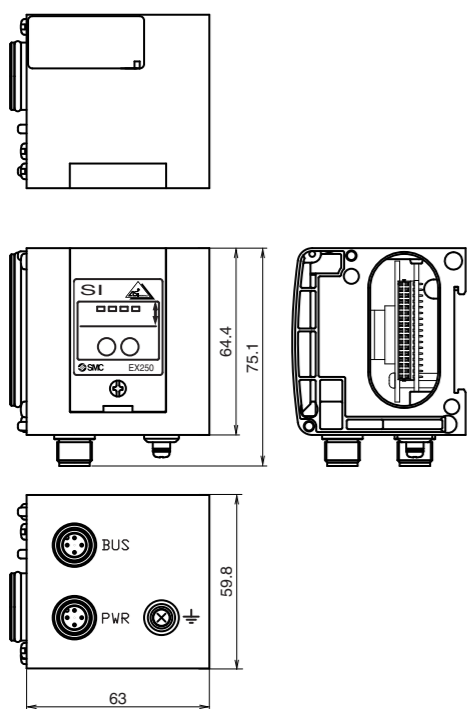
Item	Specification		
	EX250-SAS7	EX250-SAS9	
Power supply voltage	For communication	Supplied from AS-Interface communication 26.5 to 31.6VDC*1	
Current consumption *2	For communication	100mA MAX. 65mA MAX.	
Input and output specification	Input point	8 4	
	Input style	TTL	
	Connection Input block	Input block : EX250-IE1 to 3 *3	
	Supply voltage for Input block	24VDC±20%	
	Output point	8 4	
Output specification	Output style	P-MOS FET open drain style	
	Connection output block	Solenoid valve with lamp surge protection circuit for 24VDC and 1.5W or less surge voltage	
	Supply voltage for output block	24VDC±10%	
	Residual voltage	0.3V or less	
	Current consumption *4	240mA MAX.	120mA MAX.

- \*1 : The power supply for the communication must use the special power supply made for AS-i. Refer to each manufacturer's manual etc. for details.
- \*2 : Current consumption inside SI unit.
- \*3 : Refer to the Input Block Technical Specifications for details.
- \*4 : Total current value which can be supplied from all connected input blocks and all connected equipment. Refer to technical specifications for details.

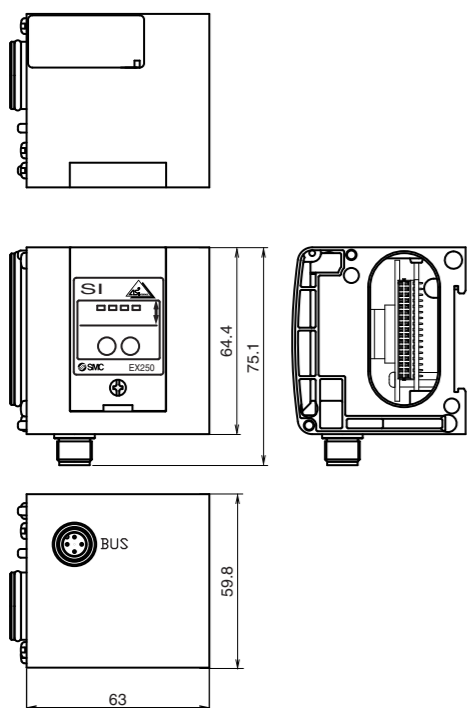
Example) EX250-SAS9  
 Valve: VQC1100NY-5 (Low watt type 0.5W)× 4pieces  
**0.5[W] + 24[V] × 4[pieces]=84[mA] (Turning on four outputs simultaneously)**  
 EX250-SAS9 can supply Max.120mA current for input and output block.  
 So, EX250-SAS9 can supply the current to the sensor connected with the input block as follows.  
**120[mA] – 84[mA]=36[mA]**  
 We recommend the use of low watt type valves and the number of outputs at the same time to be reduced.  
 We also recommend sensors with a low current consumption to be used. (Two wire type sensor etc.)

## Outline with Dimensions (in mm)

## EX250-SAS3 / 5



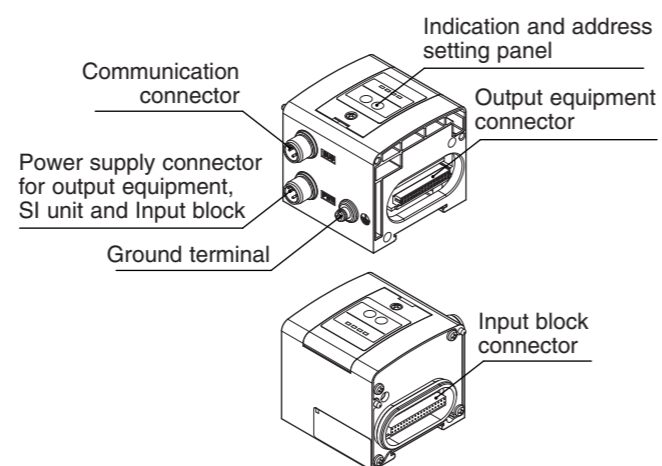
## EX250-SAS7 / 9



## Names and Functions of Individual Parts

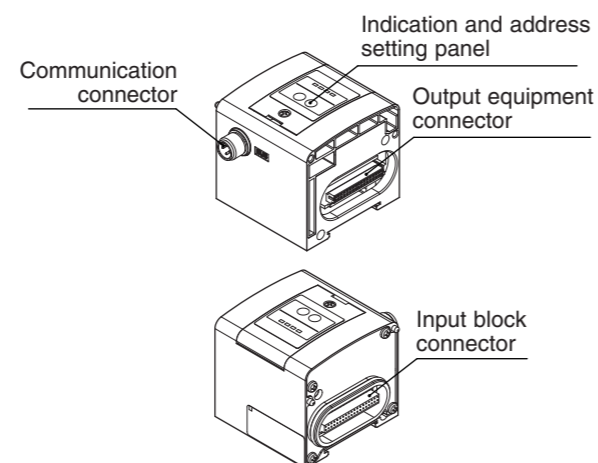
## Body(EX250-SAS3 / 5)

- Communication connector  
To send and receive communication signals through AS-Interface line.
- Power supply connector for output equipment, SI unit and Input block  
To supply power to the output equipment such as a solenoid valve, and output block, SI unit and Input block.
- Output equipment connector  
To connect the output equipment such as a solenoid valve and output block.
- Input block connector  
To connect the Input block.
- Indication and address setting panel  
To provide LED's to indicate the condition of the unit, and the setting of address and HOLD/CLEAR functions.
- Ground terminal  
To be connected to the ground.

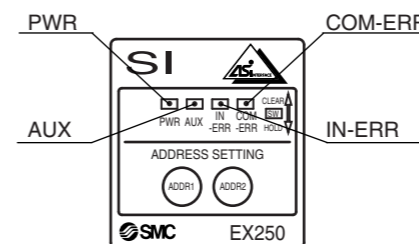


## Body(EX250-SAS7 / 9)

- Communication connector  
To send and receive communication signals through AS-Interface line.
- Output equipment connector  
To connect the output equipment such as a solenoid valve and output block.
- Input block connector  
To connect the Input block.
- Indication and address setting panel  
To provide LED's to indicate the condition of the unit, and the setting of address and HOLD/CLEAR functions.



## LED indication

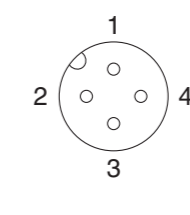


Name	Contents
PWR	Indication of AS-Interface line power supply status.
AUX	Indication of output equipment power supply status.
IN-ERR	Indication of detected input power supply over current.
COM-ERR	Indication of communication error.

## Wiring

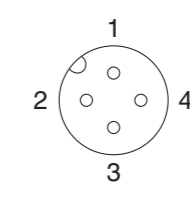
## EX250-SAS3 / 5

## Communication connector : M12 male 4pins



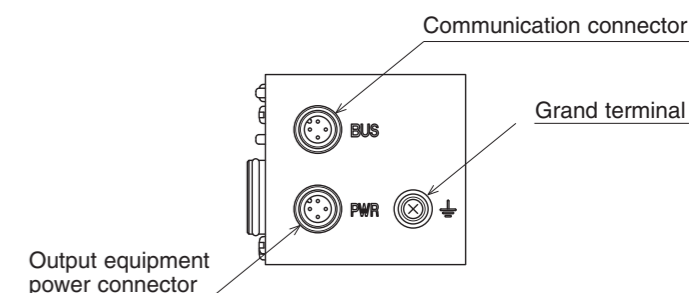
No.	Description	Function
1	AS-i +	Positive AS-Interface line
2	0V	Negative output equipment power line
3	AS-i -	Negative AS-Interface line
4	24V	Positive output equipment power line

## Output equipment power connector : M12 male 4pins



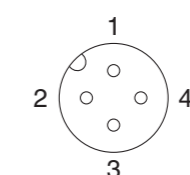
No.	Description	Function
1	24V	Positive output equipment power line
2	NC	Not connected
3	0V	Negative output equipment power line
4	NC	Not connected

※ Connected inside the SI unit.



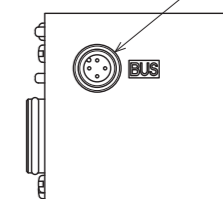
## EX250-SAS7 / 9

## Communication connector : M12 male 4pins



No.	Description	Function
1	AS-i +	Positive AS-Interface line
2	RESERVE	RESERVE
3	AS-i -	Negative AS-Interface line
4	RESERVE	RESERVE

Communication connector



Neither M12 cable, As-i standard cable, nor connector for T-branch are supplied by SMC.

Contact with each manufacturer about the detail of the catalog etc. Wire the cable with AS-Interface line so that the total voltage drop becomes 3V or less.

## SW Setting

### Address setting

AS-i cable line should be disconnected from SI unit while setting address. Open the cover and set the address by using an AS-Interface address programming device and DC power jack cable etc. Address assignment range is 1 to 31.

The address can be set regardless of connecting order, but it is not possible to set address overlap. The address at shipment from the factory is 0. Set different address for ADDR1 and ADDR2 as EX250-SAS3 / EX250-SAS7 occupy 2 slaves respectively.

\*If address is set by AS-i cable line via master unit, in EX250-SAS3 / EX250-SAS7, it is possible to set the slaves one by one cutting off from AS-i cable line with DC power jack for address setting inserted into the side which is not subject to address setting at the moment (ADDR1 or ADDR2). Also LED illumination during address setting is not unusual.

EX250-SAS3 / EX250-SAS7

ADDR1: Address setting for IN0 to 3/OUT0 to 3

ADDR2: Address setting for IN4 to 7/OUT4 to 7

### HOLD/CLEAR setting

To set whether to maintain the SI unit output condition (HOLD) or turn it off when communication error is generated (CLEAR).

This switch at shipment from the Factory is set to CLEAR.

### Over Current Protection setting SW (EX250-SAS3/5)

1.Over Current Protection setting SW-ON (OCP-ON)

When the over current load is connected with the input block, and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will illuminate and the COM-ERR LED will flash and the power supply to the input block will be stopped.

2.Over Current Protection setting SW-OFF (OCP-OFF)

When the over current load is connected with the input block, and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will illuminate and the COM-ERR LED will flash.

The power supply to the input block will not flash.

\*This switch at shipment from the Factory is set to OCP-ON.

### Over Current Protection setting SW (EX250-SAS7/9)

1.Over Current Protection setting SW-ON (OCP-ON)

When the over current load is connected with the input blocks, and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will illuminate and the COM-ERR LED will flash and the power supply to each input block will be stopped.

2.Over Current Protection setting SW-OFF (OCP-OFF)

When the over current load is connected with the input blocks, and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will illuminate and the COM-ERR LED will flash.

The power supply to each input block will not change.

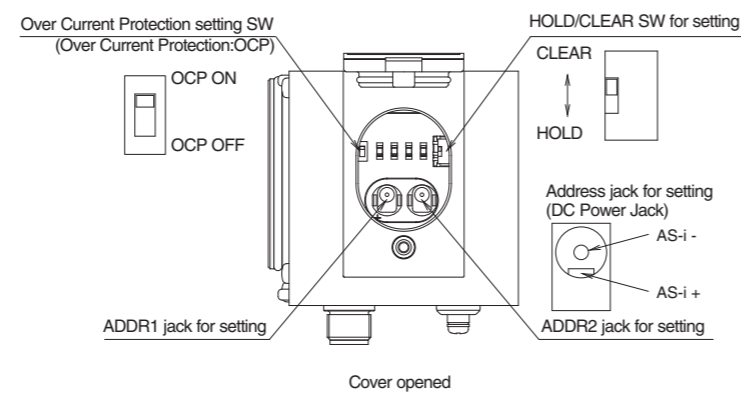
\*This switch at shipment from the Factory is set to OCP-ON.

Using the SI unit with the setting OCP-OFF does not conform to the AS-i specification.

Therefore, please use the SI unit with OCP-ON.

Turn off the power supply and remove the cause immediately when over current load is connected with the input block, and the peripheral fault error occurs by over current detection.

Using the SI unit with the peripheral fault error will cause unit damage.



## Error Display Function

Name	LED Condition	Contents	Display
IN-ERR	Red Light ON	Indicates input power over current is detected. (Light off at normal condition)	PWR AUX IN COM -ERR -ERR
COM-ERR	Red Light ON	Indicates communication error. (Light off at normal condition)	PWR AUX IN COM -ERR -ERR
	Red Flashing	Indicates peripheral equipment error. (Over current of input power, blown fuse, etc.)	PWR AUX IN COM -ERR -ERR

OFF Light Flash

## Contact

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
ITALY	(39) 02 92711		

## SMC Corporation

URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

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