



ORIGINAL INSTRUCTIONS

Instruction Manual

Fieldbus device - SI unit for AS-Interface

EX250-SAS3 / -SAS5 / -SAS7 / -SAS9



The intended use of this product is to control pneumatic valves and I/O while connected to the AS-Interface protocol.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)^{*)}, and other safety regulations.

- ^{*)} ISO 4414: Pneumatic fluid power - General rules relating to systems.
- ISO 4413: Hydraulic fluid power - General rules relating to systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
- ISO 10218-1: Manipulating industrial robots -Safety. etc.
- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

Caution

- Provide grounding to assure the noise resistance of the Fieldbus system. Individual grounding should be provided close to the product using a short cable.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further Safety Instructions.
- Special products (-X) might have specifications different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

2.1 General specifications

Item	Specifications
Ambient temperature	-5 to +45 °C
Ambient humidity	35 to 85% RH (no condensation)
Storage temperature	-20 to +60 °C
Withstand voltage	500 VAC applied for 1 minute
Insulation resistance	500 VDC, 10 MΩ or more
Operating atmosphere	No corrosive gas
Enclosure rating	IP67
Weight	250 g

2.2 Electrical specifications

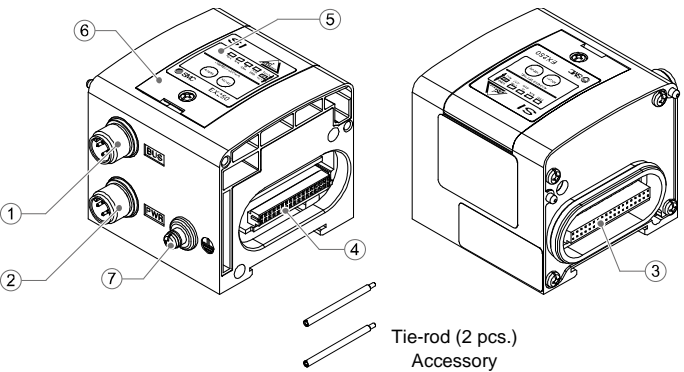
Item		Specifications			
		EX250-SAS3	EX250-SAS5	EX250-SAS7	EX250-SAS9
Power supply voltage	For communication	26.5 to 31.6 VDC *1 Supplied by AS-Interface circuit.			
	For outputs	24 VDC +10% / -5%, PELV *2		-	
SI unit current consumption		100 mA or less	65 mA or less	100 mA or less	65 mA or less
Input specification	Number of inputs	8 inputs	4 inputs	8 inputs	4 inputs
	Input type	TTL			
	Input block	EX250-IE1 to IE3			
	Supply voltage	24 VDC			
	Supply current	240 mA or less *3	120 mA or less *3	240 mA or less *4	120 mA or less *4
Output specification	Number of outputs	8 outputs	4 outputs	8 outputs	4 outputs
	Output type	PNP (negative common) / source			
	Load	Solenoid valve with surge voltage suppressor of 24 VDC and 1.5 W or less (manufactured by SMC)			
	Supply current	24 VDC			
	Residual voltage	0.3 V or less			
	Supply current	500 mA or less *5	250 mA or less *5	240 mA or less *4	120 mA or less *4

- *1: The power supply for communication must be specifically for AS-i.
- *2: The power supply for output equipment must be suitable for PELV (Protection Extra Low Voltage) specified by IEC364-4-41.
- *3: Power for input equipment is supplied from the power for communication.
- *4: The AS-Interface circuit provides current to the internal parts of the SI unit and all connected equipment.
Since there is a limit on the possible supply current to all connected equipment, select the equipment connected to the input/output device to stay within the possible supply current.
- *5: Power for output equipment is supplied from the power for outputs.

2.3 Communication specifications

Item	Specifications	
	EX250-SAS3/-SAS7	EX250-SAS5/-SAS9
Applicable system	AS-Interface (AS-i)	
Address Mode	Standard Address Mode	
Number of occupied slaves	2	1
Max. number of connected slaves	31	
Address setting range	1 to 31	
IO Code (Hex)	7, 7	7
ID Code (Hex)	F, F	F
ID Code1 (Hex)	Set within 0 to F (optional)	
ID Code2 (Hex)	E, E	E
D0	IN0, IN4 / OUT0, OUT4	IN0 / OUT0
D1	IN1, IN5 / OUT1, OUT5	IN1 / OUT1
D2	IN2, IN6 / OUT2, OUT6	IN2 / OUT2
D3	IN3, IN7 / OUT3, OUT7	IN3 / OUT3

3 Name and function of parts



No.	Part	Description
1	Communication connector	Connector for communication signals via AS-Interface line.
2	Power supply connector for output equipment	Supplies power to the solenoid valve or output block (EX250-SAS3 / -SAS5 only).
3	Input block connector	Connector for input block.
4	Output block connector	Connector for solenoid valve or output block etc.
5	Display window	Displays the status of the SI unit using LED's.
6	Switch cover	Address etc. are set using the switches inside.
7	FE terminal	Functional Earth (M3 screw).

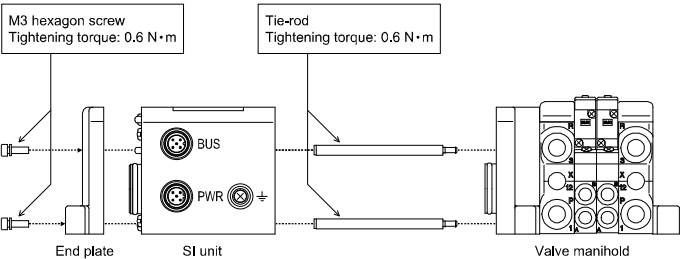
4 Installation

4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

Assembly of the units



Hold the SI unit and the Input / Output blocks together in order to ensure there is no gap between them, while tightening the screws.
Tighten the screws with the specified tightening torque (0.6 N•m).

Assembly Precautions

- Be sure to turn OFF the power supply.
- Check there is no foreign matter inside the SI unit.
- Check there is no damage and no foreign matter stuck to the gasket.
- Tighten the screws with the necessary tightening torque to maintain IP67 enclosure rating.

4.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not install in a location subject to vibration or impact in excess of the product specifications.

5 Wiring

- Wiring should be carried out with the power supply turned OFF.
- Do not route the communication cable near to high voltage cables such as a power cable or high current electrical cable.
- The drain wire should be connected to ground at one point only in the communication network. Grounding should only be made at one point.

5.1 Communication connector

- Select appropriate cables to mate with the connector on the SI unit.

5.1.1 EX250-SAS3 / EX250-SAS5

BUS: M12 4-pin plug

No.	Signal	Description	Connector
1	AS-i +	AS-Interface line (+)	
2	(0 V)	Power supply for output (-)	
3	AS-i -	AS-Interface line (-)	
4	(24 V)	Power supply for output (+)	

PWR: M12 4-pin plug

No.	Signal	Description	Connector
1	24 V	Power supply for output (+)	
2	N.C.	Not used	
3	0 V	Power supply for output (-)	
4	N.C.	Not used	

BUS connector pin No.2 is connected to PWR connector pin No.3.
BUS connector pin No.4 is connected to PWR connector pin No.1.

- The M12 cable, AS-i cable and connector for T-branch are not supplied by SMC.
- Contact each manufacturer for the catalogue details etc.
- Wire the AS-Interface cable so that the total voltage drop is 3 V or less.

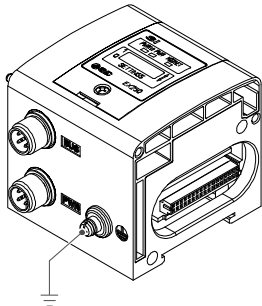
5.1.2 EX250-SAS7 / EX250-SAS9

BUS: M12 4-pin plug

No.	Signal	Description	Connector
1	AS-i +	AS-Interface line (+)	
2	-	Reserved	
3	AS-i -	AS-Interface line (-)	
4	-	Reserved	

5.2 Ground Terminal

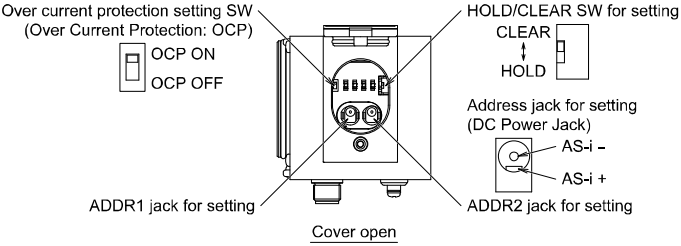
- Connect the ground terminal to ground.
- Individual grounding should be provided close to the product with a short cable to assure the noise resistance of the Fieldbus system.
- Resistance to ground should be 100 ohms or less.



6 Setting

6.1 Switch and Address setting

- The settings should only be made with the power supply turned OFF.
- Open the cover and set the switches with a small flat blade screwdriver. After setting close the cover and tighten the cover screw (tightening torque 0.6 N•m).
- Check all of the settings before use.



6.1.1 Address setting

- The AS-I cable should be disconnected from the SI unit while setting the address.
- Open the cover and set the address using an AS-Interface address programming device and DC power jack cable etc. (PEPPERL + FUCHS: VAZ-PK-V1-Cinch, SIEMENS: 3RK1901-3HA00 etc.)
- The 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 default address setting is 0. Set different address for ADDR1 and ADDR2 as EX250-SAS3/-SAS7 occupy 2 slaves respectively.
- *: If the address is to be set using the AS-I cable line via a master unit, in EX250-SAS3/-SAS7, it is possible to set the slaves one by one using the DC power jack for address setting inserted, to disconnect from the AS-I cable line the slave which is not subject to address setting at the moment (ADDR1 or ADDR2).
- LED's turned ON during address setting is not unusual.

EX250-SAS3/-SAS7

- ADDR1: Address setting for IN0 to 3 / OUT0 to 3
- ADDR2: Address setting for IN4 to 17 / OUT4 to 7

6.1.2 Address setting procedure via the AS-i line

The following is the procedure for address setting of the master unit via the AS-i line with EX250-SAS3/-SAS7 (8 inputs / 8 outputs, and address connector – 2 pcs.).

For setting the unit which occupies 2 slaves (EX250-SAS3/-SAS7), plug the cable jack into the address which is not to be set (ADDR2 when ADDR1 is set) to disconnect the address from the AS-i line.

<Address setting of ADDR1>

1. Plug the cable jack into the connector for setting ADDR2 (to disconnect ADDR2 from the line).
2. Connect the AS-i line to the SI unit communication connector to apply the AS-i power supply.
3. Set the ADDR1 address from the master unit.
4. Turn off the AS-i power supply.

<Address setting of ADDR2>

5. Remove the cable jack from the connector for setting ADDR2, and plug it into ADDR1 (to disconnect ADDR1 from the line).
 6. Apply the AS-i power supply.
 7. Set the address of ADDR2 from the master unit.
 8. Turn off the AS-i power supply.
 9. Pull out the cable jack from the connector for setting ADDR1.
- Address setting completed. After setting, wire any other AS-i units.

6.1.3 HOLD / CLEAR Switch setting

Set whether to maintain the SI unit output condition (HOLD) or to turn OFF the outputs (CLEAR) when a communication error is generated.

*: The default switch setting is set to CLEAR.

6 Setting (continued)

6.1.4 Over Current Protection Switch setting

The default setting of this switch is OCP-ON.

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

When an over current load is connected with an input/output block (input block, output block, solenoid valve), and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will turn ON, and the COM-ERR LED will flash.

The power supply to each block will be disconnected.

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

When an over current load is connected with an input/output block (input block, output block, solenoid valve), and the unit supply current value (specification value) is exceeded, the SI unit IN-ERR LED will turn ON, and the COM-ERR LED will flash.

The power supply to the input/output block does not change.

- Using the SI unit with the setting OCP-OFF does not conform to the AS-I specification.
- Therefore, always 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.

6.2 Configuration

Technical documentation giving detailed configuration information can be found on the SMC website (URL: <https://www.smcworld.com>).

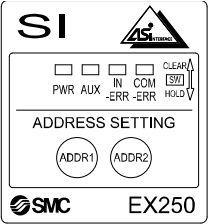
7 How to Order

Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

8 Outline Dimensions (mm)

Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for outline dimensions.

9 LED Display




LED		Description
PWR	Green LED is ON	Power supply for AS-Interface line is turned ON.
AUX	Green LED is ON	EX250-SAS3 / SAS5 <ul style="list-style-type: none">• Power supply for output equipment is turned ON. EX250-SAS7 / SAS9 <ul style="list-style-type: none">• LED is OFF at normal condition
IN-ERR	Red LED is ON	Input power supply over current is detected. *1 (LED is OFF at normal condition).
COM-ERR	Red LED is ON	Communication error. (LED is OFF at normal condition).
	Red LED is flashing	Peripheral equipment error. *1 (over current of input power, blown fuse).

- *1: EX250-SAS3/-SAS5: Input block.
EX250-SAS7/-SAS9: Input block, Output block, Solenoid valve.

10 Maintenance

10.1 General Maintenance

-  **Caution**
- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
 - If handled improperly, compressed air can be dangerous.
 - Maintenance of pneumatic systems should be performed only by qualified personnel.
 - Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
 - After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
 - If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
 - Do not make any modification to the product.
 - Do not disassemble the product, unless required by installation or maintenance instructions
 - Stop operation if the product does not function correctly.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

12 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

13 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
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