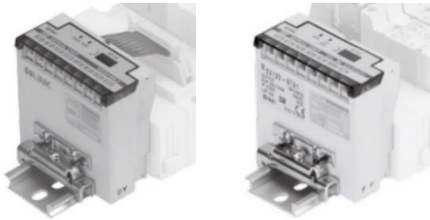




Instruction Manual
Fieldbus device - SI unit for CompoBus/S
EX12#-SCS#



The intended use of this product is to control pneumatic valves and I/O while connected to the CompoBus/S 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 and safety requirements for systems and their components.

ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components

IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements

ISO 10218-1: Robotics — Safety requirements — Part 1: Industrial robots

- 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.

	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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	0 to +55 °C
Ambient humidity	35 to 85% RH (no condensation)
Storage temperature	-20 to +65 °C
Withstand voltage	1500 VAC applied for 1 minute (between FG and external terminal)
Insulation resistance	2 MΩ or more (500 VDC, between FG and external terminal)
Operating atmosphere	No corrosive gas
Enclosure	EX120/121/122: IP20 EX124D/U: IP65
Weight	EX120: 110 g EX121: 140 g EX122: 130 g EX124D/U: 240 g

2.2 Electrical specifications

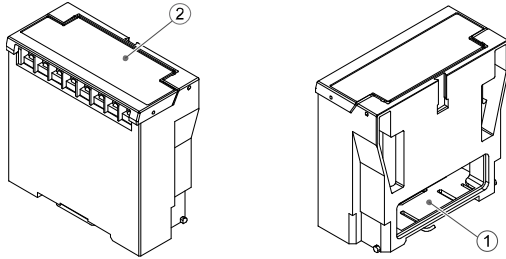
Item	Specifications	
	EX12#-SCS1	EX12#-SCS2
Rated voltage	24 VDC	
Power supply voltage range	Power supply for communication: 14 to 26.4 VDC	
	Power supply for solenoid valves: 24 VDC +10/-5%	
Current consumption	0.1 A or less (for SI unit)	
Output specification	Output type	NPN (positive common) / sink
	Number of outputs	16 outputs 8 outputs
	Connection load	Solenoid valve with surge voltage suppressor of 24 VDC and 1 W or less (manufactured by SMC)
	Output setting at communication error.	Hold / Clear (switch setting)

2.3 Communication specifications

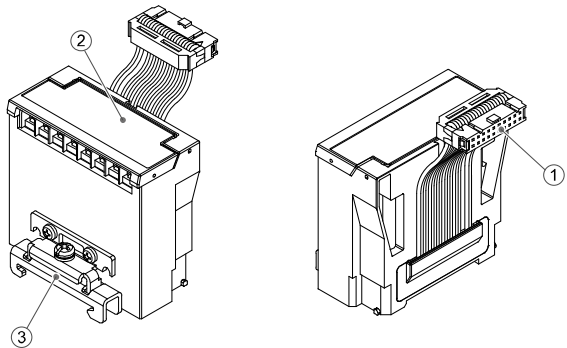
Item		Specifications		
		EX12#-SCS1		EX12#-SCS2
Applicable system		CompoBus/S		
Address setting range		0 to 14		0 to 15
Transmission speed		750 kbps		
Modulation type		Base band type		
Coding type		Manchester symbol type		
Error control		Manchester symbol check, Frame length check, Parity check		
Connection type		T branch, Multi drop		
Max. Cable length	Cable type	Main cable	Branch cable	Total branch cable length
	VCTF cable	100 m	3 m	50 m
	Flat cable	30 m	3 m	30 m

3 Name and function of parts

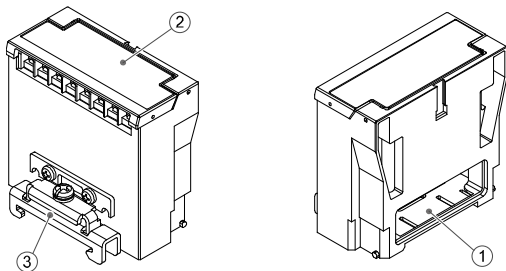
EX120-SCS1/2



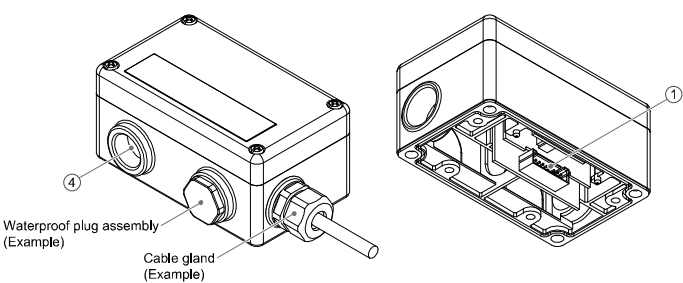
EX121-SCS1/2



EX122-SCS1/2



EX124D/U-SCS1/2



3 Name and function of parts (continued)

No.	Part	Description
1	Output connector	Connector for the valve manifold.
2	LED and Switch cover	LED display to indicate the status of the SI unit. Switches for setting the node address and hold / clear setting.
3	DIN rail mounting bracket	For mounting to a DIN rail.
4	Wiring entry (4 places)	For connecting the communication and power supply cables to the SI unit (EX124U/D-SCS1/2 only). For wiring, use a G1/2 cable gland to ensure an enclosure rating of IP65 / IP67. Use waterproof plug (Part number AXT100-B04A) for unused wire entries.

4 Installation

4.1 Mounting

Warning

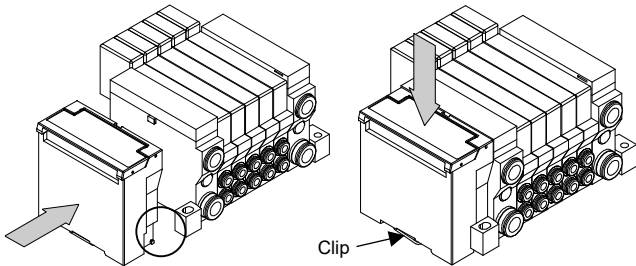
- Do not install the product unless the safety instructions have been read and understood.
- Applicable valve series: SV, SY, VQ series.

Caution

- Be sure to turn OFF the power.
- Check there is no foreign matter inside the SI unit.
- If the SI unit is not assembled properly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.
- Refer to the catalogue or operation manual for the applicable valve manifold on the SMC website (URL: <https://www.smcworld.com>) for further assembly details.

4.2 Mounting (EX120-SCS1/2)

- 1) Align the raised part on the manifold side of the SI unit (at the bottom) with the groove on the manifold and press it in evenly.
- 2) Confirm that the SI unit and manifold are securely locked together and slide the SI unit downwards.

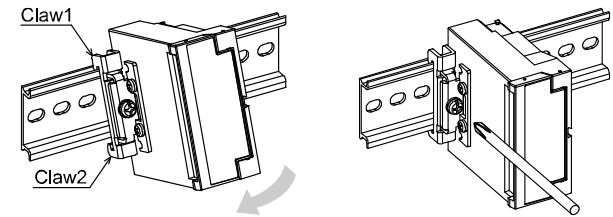


- 3) For removal lift the clip at the bottom of the SI unit using a flat blade screwdriver. By lifting the clip the hook will be removed from the manifold to release the SI unit.
- 4) Slide the SI unit upwards with the clip pulled out.

4 Installation (continued)

4.3 DIN rail mounting (EX121-SCS1/2, EX122-SCS1/2)

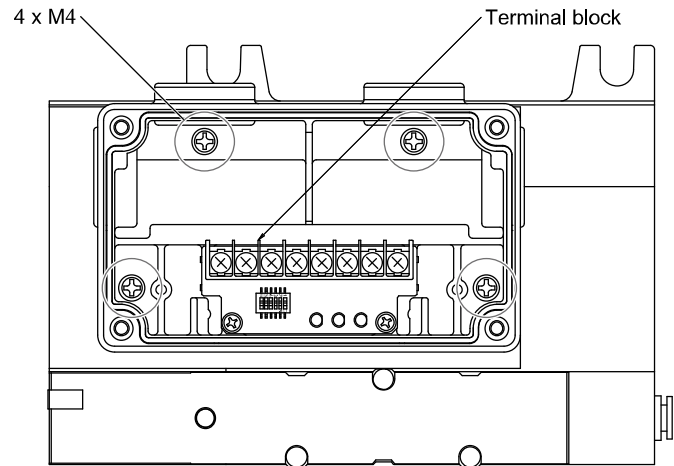
- 1) Hook claw 1 to the upper side of the DIN rail and claw 2 to the lower side.
- 2) Tighten the mounting bracket screw to fix the SI unit to the DIN rail (Tightening torque: 0.6 N•m).



- 3) For removal loosen the mounting bracket screw and remove the SI unit by unhooking claw 2 then claw 1.

4.4 Mounting (EX124#-SCS1/2)

- 1) Connect the SI unit wiring to the valve manifold. Ensure the cable does not get caught between the SI unit and the valve manifold.
- 2) Mount the SI unit to the manifold, then connect the communication wiring and power supply wiring to the terminal block. Tighten the 4 x M4 screws diagonally so that the SI unit is securely fixed (Tightening torque: 0.6 N•m).



- 3) Mount the cover to the SI unit after setting the switches. Tighten the 4 x M4 screws diagonally so that the cover unit is securely fitted (Tightening torque: 0.6 N•m).

4.5 Environment

Warning

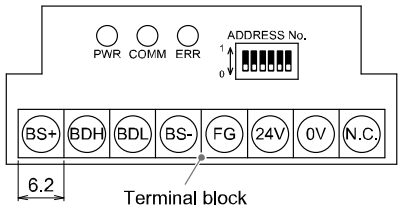
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

5 Wiring

5.1 Communication Connector

The connection between the CompoBus/S cable and the SI unit communication terminals is shown below.

- Connect the signal lines to the assigned terminals (shown below).
- The terminal screws tightening torque is 0.5 to 0.6 N•m.



5 Wiring (continued)

Terminal	Connection
BS+	Communication power supply (+)
BDH	Communication line High
BDL	Communication line Low
BS-	Communication power supply (-)

5.1.1 Cable for Communication Line

Cable type	Specification
VCTF cable	Vinyl code VCTF JIS C3306 2 cores, nominal section 0.75 mm ² (signal line x 2) Conductor resistance (at 20°C): 25.1 kΩ/km.
CompoBus/S flat cable SCA-4F10 (100 m)	Nominal section 0.75 mm ² x 4 (Signal line x2, Power line x2) Ambient temperature: 60°C max.

5.2 Terminating Resistor

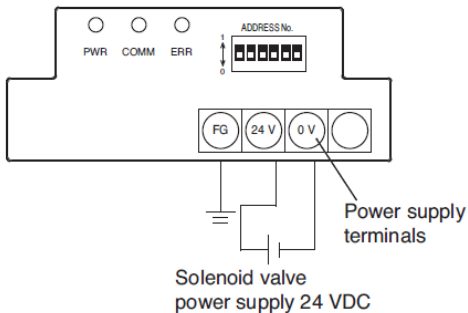
- For stable communication a termination resistor must be mounted to the trunk end located at the opposite end to the master (the furthest point from the master). The termination resistor is supplied by OMRON Corporation with reference to the table below.

Part No.	Specification	Description
SRS1-T	Terminal base with termination resistor.	Available for both VCTF and Flat cable.
SCN-TH4T	Crimp connector with termination resistor.	Available only for Flat cable.

When the communication cable is connected to the terminal base with termination resistor, it is necessary to connect both BDH and BDL to the appropriate terminal. If the network is connected in T branch style it is necessary to connect a termination resistor to the end of the longest branch cable (furthest point from the master).

5.3 Power supply connector

- The SI unit is a multiple power supply type slave and requires two separate power supplies for communication and solenoid valves.
 - (1) Power supply for communication
If VCTF cable is used for communication, the power must be supplied for the SI unit by separate cable.
If CompoBus/S flat cable is used for the communication, the power is supplied for the SI unit by the flat cable.
 - (2) Power supply for solenoid valves 24 VDC, +10% -5% is required. The power supply and cables used should be selected with consideration to the current consumption of the solenoid valves and the SI unit. Connect the wires to the assigned terminals.
- The terminal screws tightening torque is 0.5 to 0.6 N•m.



Terminal	Connection
FG	Functional Earth.
24V	Connection for power supply (+) for solenoid valve.
0V	Connection for power supply (-) for solenoid valve.
N.C.	Unused terminal.

5 Wiring (continued)

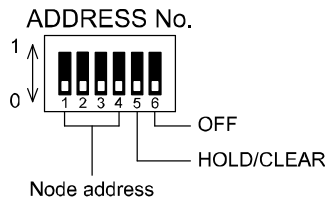
5.4 Ground Connection

- Connect the ground (FG) terminal to ground. Individual grounding should be provided close to the product. Resistance to ground should be 100 ohms or less.

6 Setting

6.1 Switch Settings

- The switches should only be set with the power supply turned OFF.
- Open the cover and set the switches with a small flat blade screwdriver. Close the cover after setting.
- Set the switches before use.



6.1.1 Address setting

The Node Address can be set using switch SW1 to SW4.

Node address	SW 1	SW 2	SW 3	SW 4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0

Node address	SW 1	SW 2	SW 3	SW 4
8	0	0	0	1
9	1	0	0	1
10	0	1	0	1
11	1	1	0	1
12	0	0	1	1
13	1	0	1	1
14	0	1	1	1
15	1	1	1	1

0: OFF 1: ON

- Set the node address so that it does not duplicate the node address of other slaves. If a node address is duplicated, normal communication

will not be established.

- 16 point slaves consist of two 8 point slaves and are assigned to the same channel, therefore node addresses other than the set node addresses can be used as follows.

When the set node address is odd: the previous node address can be used.

When the set node address is even: the next node address can be used.

For example, when node address 5 is set to an SI unit with 16 point slaves, the node address 4 must also be used for the SI unit.

- When an 8 point slave is connected in 4 point mode, the PLC recognises that 2 SI units are connected, so the next node address to the set node address can also be used. If the node address is duplicated with that of other slaves, area duplication occurs, so the CompoBus/S communication will not be established.

6.1.2 HOLD / CLEAR setting

- Set the reaction of outputs to a communication error using switch SW5. The factory default setting is CLEAR.

Status	SW5	Description
CLEAR	0	Clear all outputs.
HOLD	1	Hold the last state before communication error.

- Switch number SW6 must remain OFF (set to 0).

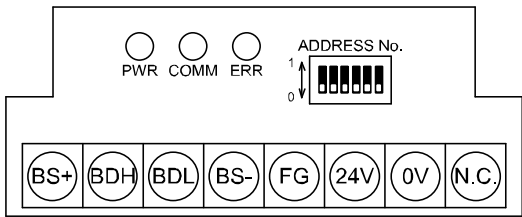
7 How to Order

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

8 Outline Dimensions (mm)

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

9 LED display



LED		Description
PWR	ON	Power supply for communication is ON.
	OFF	Power supply for communication is OFF.
COMM	ON	Normal communication
	OFF	Communication error or stand-by mode.
ERR	ON	Communication error.
	OFF	Normal communication or stand-by mode.

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)
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