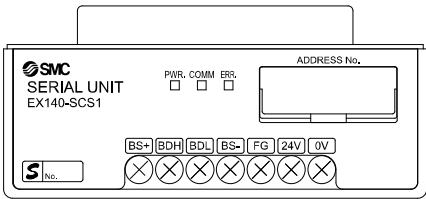




ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device - SI unit for CompoBus/S
EX140-SCS1 / -SCS2



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 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	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, no dust
Enclosure	IP20
Weight	80 g

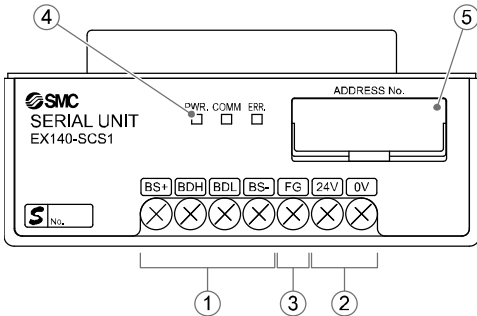
2.2 Electrical specifications

Item	Specifications	
	EX140-SCS1	EX140-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		
Applicable system	CompoBus/S		
Applicable PLC	Omron Coop. C200HX/HG/HE, C200HS, CQM1		
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. Distance	Cable type	Trunk	Stay Total stay
	VCTF cable	100 m	3 m 50 m
	Flat cable	30 m	3 m 30 m
Max number of I/O	Master type		Max. No. of I/O
	C200HW-SRM21		IN128 / OUT12 or IN64 / OUT64
	CQM1-SRM21		IN64 / OUT64 or IN32 / OUT32 or IN16 / OUT16

3 Name and function of parts



No.	Part	Description
1	Communication Terminals (BS+, BDH, BDL, BS-)	Connection terminals for CompoBus/S line.
2	Power supply Terminals (24V, 0V)	Connection terminals for Power supply.
3	FG Terminal	Functional Earth.
4	LED	LED display to indicate the status of the SI unit.
5	Switch cover	Switches for setting the node address.

4 Installation

4.1 Mounting

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Applicable valve series: SQ1000, SQ2000, SZ3000
- Refer to the operation manual for the applicable valve manifold on the SMC website (URL: <https://www.smcworld.com>) for mounting.

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.

4.2 Environment

Warning

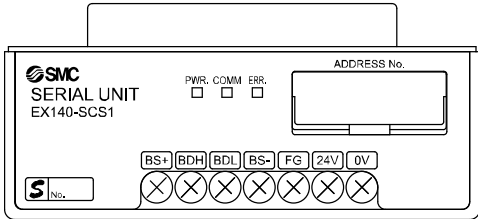
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- 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 dedicated cable and the SI unit communication terminals is shown below.

- Connect the signal lines to the assigned terminals (shown below).
- A suitable screwdriver is #2 pozi head screwdriver with body diameter of 6 mm max.
- The terminal screws tightening torque is 0.5 to 0.6 N•m.



Communication terminals

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.

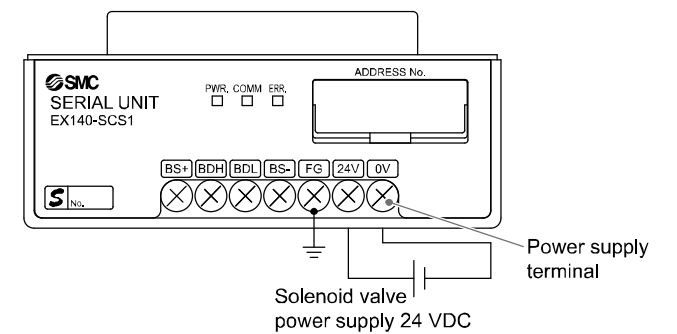
Part No.	Specification	Description
SRS1-T	Terminal base with termination resistor.	Available for both VCTF and Flat cable.
SCN-TH4T	Crimp connector with termination resistor.	Available only for Flat cable.

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.
- A suitable screwdriver is #2 pozi head screwdriver with body diameter of 6 mm max.
- The terminal screws tightening torque is 0.5 to 0.6 N•m.

5 Wiring (continued)



Caution

- When using the CompoBus/S flat cable for communication any unused power supply cables must be isolated at both ends.

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 setting range of the node address depends on the master type or setting of the master as follows.
 - For master unit C200HX/HG/HE or C200HS

- If the maximum number of connected slaves is 16 (IN8/OUT8), the setting range is 0 to 7.
- If the maximum number of connected slaves is 32 (IN16/OUT16), the setting range is 0 to 15.
- For master unit CQM1
- The number of channels occupied by the master PLC and the number of points occupied by one node address are also related.

Number of CH occupied by PLC	Number of points occupied by node address	Setting range	Max. number of connected slaves
IN1 / OUT1	8	IN: 0 to 1 OUT: 0 to 1	IN: 2 OUT: 2
IN2 / OUT2	8	IN: 0 to 3 OUT: 0 to 3	IN: 4 OUT: 4
IN4 / OUT4	8	IN: 0 to 7 OUT: 0 to 7	IN: 8 OUT: 8
IN1 / OUT1	4	IN: 0 to 3 OUT: 0 to 3	IN: 4 OUT: 4
IN2 / OUT2	4	IN: 0 to 7 OUT: 0 to 7	IN: 8 OUT: 8
IN4 / OUT4	4	IN: 0 to 15 OUT: 0 to 15	IN: 16 OUT: 16

- Duplication of node address in different slaves may cause communication error.
- 16 points slave is assigned to be made contained into one channel though it occupies 2 slaves with 8 points. Therefore, node address which are not set to the slave are used as follows.

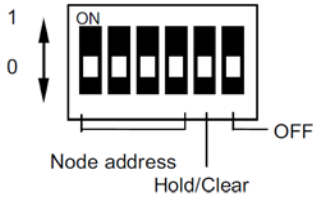
If set node address is odd: Node address with number just before is also used.

If set node address is even: Node address with number just after is also used.

For example, if node address 5 is set to 16 points for SI unit (a kind of slave), node address 4 is also used for the SI unit.

6 Setting (continued)

- For master unit CQM1, if an 8 points slave is connected using 4 points mode, the slave is considered to occupy points for 2 slaves and the node address just after set node address to the slave is also used. If the node address is duplicated with another slave, communication error occurs and makes it impossible to start communication with CompoBus/S.
- During 4 points mode, 16 points slave is not available.



6.1.2 Setting of Node Address switch

The node address can be set using switch SW1 to SW4.

Node address	SW1	SW2	SW3	SW4
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
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

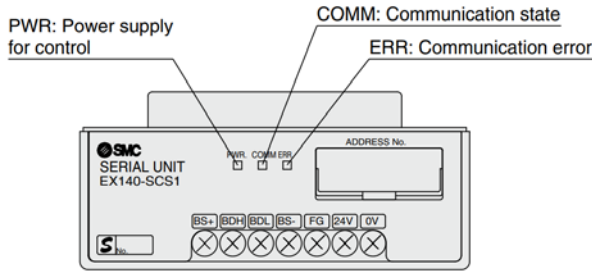
6.1.3 HOLD / CLEAR setting

- 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.

7 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.

8 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.

9 Outline Dimensions (mm)

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

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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