



ORIGINAL INSTRUCTIONS

Instruction Manual

Fieldbus device - SI unit for CC-Link

EX180-SMJ3# / SMJ5#



The intended use of this product is to control pneumatic valves and I/O while connected to the CC-Link 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	-10 to +50 °C
Ambient humidity	35 to 85%RH (No condensation)
Storage temperature	-20 to +60 °C
Withstand voltage	500 VAC applied for 1 minute (between FG and external terminal)
Insulation resistance	10 MΩ or more (500 VDC, between FG and external terminal)
Operating atmosphere	No corrosive gas, no dust
Enclosure	IP20
Weight	110 g

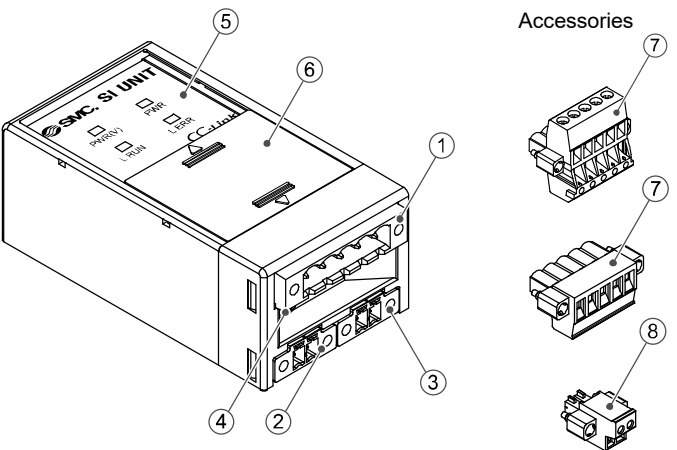
2.2 Electrical specifications

Item	Specifications
Rated voltage	24 VDC
Power supply voltage range	Power supply for SI unit: 24 VDC ±10% Power supply for the solenoid valves: 24 VDC +10/-5%
Voltage drop warning	Warning generated at approx. 20 V
Current consumption	Power supply for SI unit: 0.1 A or less
Output specification	Output type
	EX180-SMJ3: NPN (positive common) / sink EX180-SMJ5: PNP (negative common) / source
	Number of outputs
	32 points
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	CC-Link Ver. 1.10
Occupied number of stations	1 node
Allowable node number setting	1 to 64
Station type	Remote I/O node
Transmission speed	156 kbps 625 kbps 2.5 Mbps 5 Mbps 10 Mbps
Min. cable length between nodes	20 cm or more
Max. total cable length	1200 m 900 m 400 m 160 m 100 m

3 Name and function of parts



No.	Part	Description
1	Fieldbus interface connector (BUS)	Connector for CC-Link (7) used to connect to the CC-Link bus line.
2	Power supply connector (PWR(V))	Connector for the power supply (8) used to supply power for the solenoid valves.
3	Power supply connector (PWR)	Connector for the power supply (8) used to supply power for the SI unit.
4	FE terminal	Functional Earth connection.
5	Display	LED diagnostic display.
6	Switch setting part	Switch to set the number of host stations and the communication speed.
7	Communication connector	Communication connector for: EX180-SMJ3/5 (EX180-CMJ1). EX180-SMJ3A/5A (EX180-CMJ2).
8	Power supply connector	Power supply connector (2 pcs.) (Part No. EX180-CP1).

4 Installation

4.1 Mounting

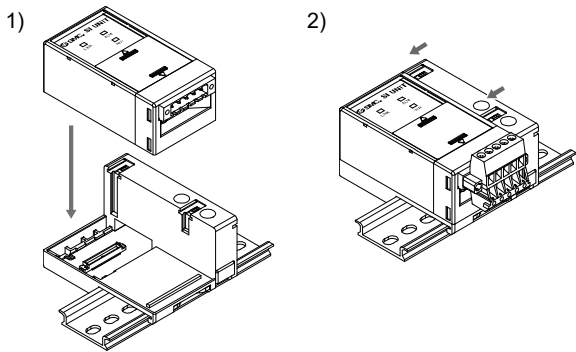
Warning

- Do not install the product unless the safety instructions have been read and understood.
- Applicable valve series: SJ2000, SJ3000, S0700

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.

- Mount the SI unit to the valve manifold so that the mounting guide of the SI unit case mates with the manifold groove.
- Secure the SI unit using the two sliding locks.



Caution

The EX180-SMJ3/5 cannot be mounted on the valve manifold for the EX180-SMJ1 and vice versa.

4 Installation (continued)

4.2 Environment

Warning

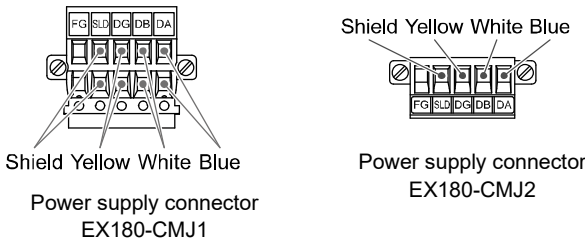
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.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

Wiring of the CC-Link cable and communication connector is shown below.

- Connect the signal lines to the assigned pins (shown below).
- The communication connector is suitable for use with wire sizes from AWG24 to AWG12 (0.2 mm² to 2.5 mm²).
- The wire terminal screws tightening torque is 0.5 to 0.6 N•m.



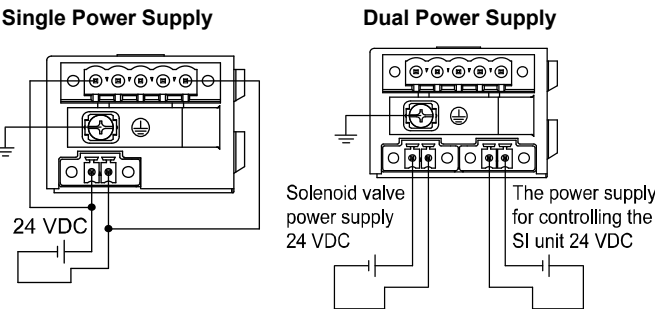
- Connect the Shield line for the CC-Link cable to “SLD” on each unit.
- When assembling the connector to the SI unit tighten the connector fixing screws (M2.5 screws) to a tightening torque of 0.2 to 0.3 N•m.

5.2 Terminating Resistor

- A bus termination resistor is required at the end of the CC-Link main line. An internal terminating resistor is included.
- An external terminating resistor should not be used when the internal resistor is used.
- The terminating resistor value will be outside of the specified range. A network communication error may occur.

5.3 Power supply connector

- Connect the power supply wiring to the 2 x power supply connectors (Part No. EX180-CP1).
- The power supply connector is suitable for use with wire sizes from AWG28 to 16 (0.14 mm² to 1.5 mm²).
- The EX180 power supply structure consists of two systems. These systems can operate using a single or dual power supply.
- Connect the wires to the assigned pins (shown below).
- When assembling the power supply connector to the SI unit tighten the wiring screws (M2 slotted head screws) firmly with a tightening torque of 0.22 to 0.25 N•m.



5 Wiring (continued)

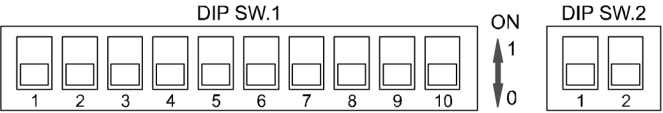
5.4 Ground Connection

- Connect the ground (FG) terminal to Functional Earth.
Individual grounding should be provided close to the product.
Resistance to ground should be 100 ohms or less.
Tighten the FG terminal (M3 round head screw) firmly with a tightening torque of 0.3 N•m.

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 Node setting

- The CC-Link node setting can be set from 1 to 64 using DIP SW1 switch No. 1 to 7.

Node	X10 (Switch No.)			X1 (Switch No.)			
	40 (No.1)	20 (No.2)	10 (No.3)	8 (No.4)	4 (No.5)	2 (No.6)	1 (No.7)
1	0	0	0	0	0	0	1
2	0	0	0	0	0	1	0
3	0	0	0	0	0	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
63	1	1	0	0	0	1	1
64	1	1	0	0	1	0	0

6.1.2 Communication speed setting

- The CC-Link communication speed can be set using DIP SW1 switch No. 8, 9 and 10.

Communication speed	No.8	No.9	No.10
156 kbps	0	0	0
625 kbps	0	0	1
2.5 Mbps	0	1	0
5 Mbps	0	1	1
10 Mbps	1	0	0

6.1.3 HOLD / CLEAR setting

- Set the reaction of outputs to a communication error using DIP SW2 switch No. 1.

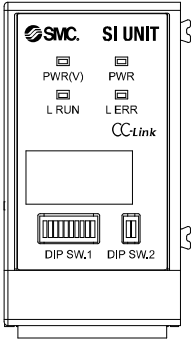
Status	No.1	Description
HOLD	1	Hold the last state before communication error.
CLEAR	0	Clear all outputs.

6.1.4 Terminating Resistor setting

- The CC-Link main line internal terminating resistor can be selected using DIP SW2 switch No.2.

No.2	Terminating resistor	Description
1	Yes	Connect the internal terminating resistor (110 Ω).
0	No	The terminating resistor is not connected.

7 LED display



LED		Description
PWR(V)	ON	Solenoid valve power supply is supplied at the specified voltage.
	OFF	Solenoid valve power supply is not supplied at the specified voltage.
PWR	ON	SI unit power supply supplied within the specified range.
	OFF	SI unit power supply not connected or out of range.
L RUN	ON	Normal communication
	OFF	Communication terminated (Time over error).
L ERR	ON	Communication error.
	Flashing	Address or communication speed changed during operation.
	OFF	Normal communication.

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



- 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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