



Installation and Maintenance Manual

SI unit - CC-Link compatible

Type EX140-SMJ1



EMC Directive 89/336/EEC
EN61000-6-2:2001: Electromagnetic Compatibility (EMC) - Immunity
EN55011+A1:1998: Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical radio-frequency equipment and light industrial environments.

1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety ISO4414: Pneumatic Fluid power and JIS B 8370: Pneumatic System principles must be observed, along with other relevant safety practices.

⚠ DANGER	In extreme conditions, there is a possibility of serious injury or loss of life.
⚠ WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

⚠ WARNING

- Do not disassemble, modify (including change of printed circuit board) or repair the product.**
An injury or product failure may result.
- Do not operate the product beyond the specification range.**
Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- Do not use the product in the presence of flammable, explosive or corrosive gas.**
Fire, explosion or corrosion may result. This product does not have an explosion proof construction.
- When using the product as part of an interlocking system:**
 - Provide a double interlocking system, for example a mechanical system.
 - Check the product regularly to ensure proper operation.
- Before performing maintenance, be sure of the following:**
 - Turn off the power supply.
 - Stop the air supply, exhaust the residual pressure and verify the release of air from the system.

⚠ CAUTION

- Always perform a system check after maintenance.**
Do not use the product if any error occurs.
Safety cannot be assured if caused by un-intentional malfunction.
- Provide grounding to ensure correct operation and to improve noise resistance of the product.**
This product should be individually grounded using a short cable.
- Follow the instructions given below when handling the product. Failing to do so may result in product damage.**
 - Maintenance space should always be provided around the product.
 - Do not remove labels from the product.
 - Do not drop, hit or apply excessive shock to the product.
 - Follow all specified tightening torques.

1 Safety Instructions (continued)

- Do not bend, apply tensile force, or apply force by placing heavy loads, on the cables.
- Connect wires and cables correctly, and do not connect while the power is ON.
- Do not route wires and cables together with power or high-voltage cables.
- Check the insulation of wires and cables.
- Take proper measures against noise, such as noise filters, when the product is incorporated in equipment or devices.
- Select the required protection (IP) rating according to the environment of operation.
- Take sufficient shielding measures when the product is to be used in the following conditions:
 - where noise due to static electricity is generated.
 - where electro-magnetic field strength is high.
 - where radioactivity is present.
 - where power lines are located.
- Do not use the product in a place where electric surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve are to be directly driven.
- Prevent any foreign matter from entering this product.
- Do not expose the product to vibration or impact.
- Use the product within the specified ambient temperature range.
- Do not expose the product to any heat radiation.
- Use a precision screwdriver with flat blade to adjust the DIP switch.
- Close the cover over the switches before power is applied.
- Do not clean the product with chemicals such as benzene or thinners.

• Power Supply selection

A UL approved direct current (DC) power supply should be used with this product, as follows:

- A limited voltage / current supply in accordance with UL508.
A circuit from which power is supplied by the secondary coil of a transformer according to the following:
Maximum voltage (no load) : Less than 30Vrms (42.4V peak)
Maximum current : (1) Less than 8A (including when short circuited)
(2) Limited by circuit protection (such as a fuse) with the following rating.

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

- A Class 2 power supply unit in accordance with UL1310, or a power supply circuit of maximum 30Vrms (42.4V peak) or less, using a Class 2 transformer in accordance with UL1585 as power source.

2 Specifications

Communication and General Specification

Item	Specifications					
Communication specification	Applicable system	CC-Link Ver.1.10				
	Occupied station	1 station				
	Station number setting range	1 to 64 (Set with a rotary switch)				
	Station type	Remote I/O				
	Communication speed	156k bps	625k bps	2.5M bps	5M bps	10M bps
	Cable length between stations	20cm or more				
Max. cable length	1200m	900m	400m	160m	100m	
	Communication power voltage	15V DC to 30V DC				
Solenoid valve voltage	24V DC +10%/-5%					
Output	16 points					
Current consumption	Com./internal power supply: 24V DC/0.1A or less Solenoid valve power supply: 24V DC /1.4A or less					
Environment resistance	Enclosure	IP20				
	Withstand voltage	500VAC 1min. (Between FG and external terminal)				
	Insulation resistance	2MΩ or more (500VDC between FG and external terminal)				
	Ambient temperature	Operating temperature: 0° to +55°C (when 8 points are on) 0° to +50°C (when 16 points are on) Storage: -10°C to 60°C				
	Ambient humidity	35% to 85%RH (No due condensation)				
	Vibration resistance	5G (Per JIS C0911 10 to 55Hz one-way amplitude :0.5mm)				
	Impact resistance	10G (Per JIS C0912)				
	Operation atmosphere	No corrosive gas				
Standard	CE marked					
Weight	80g or less					

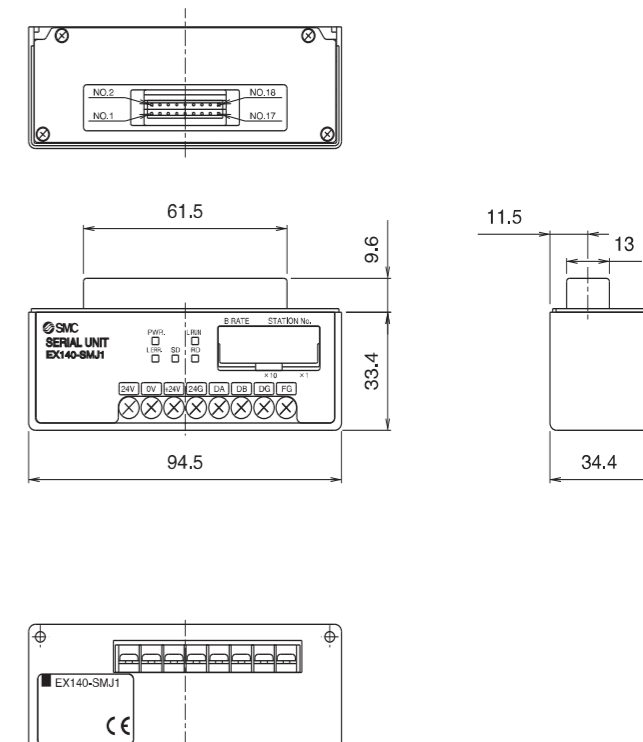
Electrical Specification

Item	Specification	
Power voltage range and power consumption	Power voltage and power consumption for SI unit	DC15 to 30V 0.1A or less
	Power voltage and power consumption for solenoid valve	DC24V+10%,-5% (DC22.8 to 26.4V) Per spec. of solenoid valve numbers 1.4A or less
Solenoid valve connection specification	Output	N-ch MOS-FET (Open drain method)
	Connection load	DC24V, a solenoid valve with a lamp/surge protection circuit (by SMC)
	Residual voltage	DC0.4V or less
	Insulating method	Photo coupler Insulating method

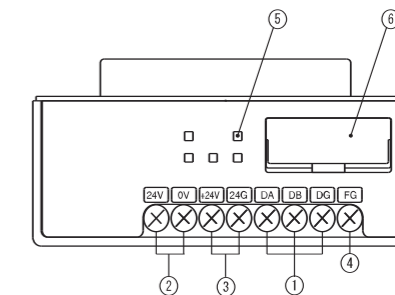
Applicable solenoid valve series

Representative series	Applicable series
SQ series	SQ1000,2000 series
SZ series	SZ3000 series

3 Outline dimensions (mm)



4 Names / Functions of Individual Parts



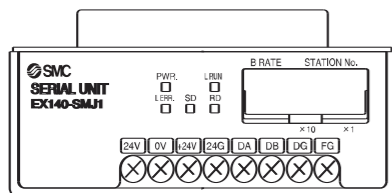
No.	Parts	Purpose
1	Communication terminal (DA,DB,DG)	To connect the CC-Link line with a CC-Link-dedicated cable.
2	Power supply terminal (24V,0V)	To supply power to the Solenoid Valves.
3	Power supply terminal (+24V,24G)	To supply power to the SI unit controller.
4	FG terminal	For connection to Functional Ground.
5	Display	The status of the SI unit is indicated using LED's.
6	Setting switch area	The station number and transmission speed are set.

4 Names / Functions of Individual Parts (continued)

Terms definition

No.	Term	Definition
1	Total of station	Total number of occupied stations among all slaves connected by the CC-Link.
2	Station number	Number from 01 to 64, assigned to the slave stations. Number 0 is assigned to the master CC-Link. Slave stations must be assigned numbers according to the number of occupied stations so that they are not duplicated.
3	Slave station	General term for any station except the master station.
4	Number of occupied slaves	Number of networked stations in use by a slave. Depending on the data, 1 to 4 stations can be set. The remote I/O only occupies one station.
5	Remote I/O	A station which can only use digital data. Occupies only 1 station. (Example: digital units, solenoid valves, sensors, etc)

LED indication



Display	Meaning
PWR.	LED is ON when the communication power is connected
L RUN	Check whether SI unit is communicating with the master station correctly. LED is ON when SI unit is receiving normal data from the master station. LED is OFF for time-out.
SD	LED is ON when data is being sent
RD	LED is ON when data is being received
L ERR.	LED is ON during communication errors (CRC errors). LED is also ON during a time-out (the L RUN light goes OFF). LED is ON for station number setting and communication speed setting errors (the light goes OFF when the setting has been corrected and power has been restored). LED flashes when the station number and communication speed settings have changed during communication. (the L RUN LED illuminates and the SI unit operates according to the station number and communication speed settings input when power is applied.)

If data link is correct, "PWR.", "LRUN", "SD", and "RD" LED's are ON.

5 Wiring

Communication wiring

The connection between a CC-Link-dedicated cable and an SI unit communication terminal for CC-Link is shown below.

- Be sure to connect a signal line to its dedicated terminal. (Refer to Fig.1)
Tighten the terminals securely with a torque of 0.5 to 0.6 [N·m].

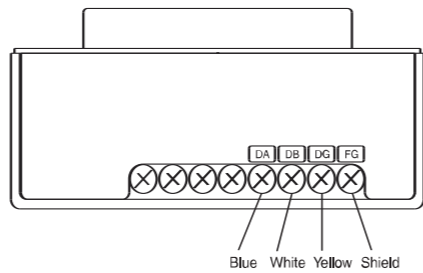


Fig.1

- Be sure to connect a terminating resistor between "DA" and "DB" at both ends of the CC-Link system (Refer to Fig.2). Use a cable with the same specifications as a CC-Link-dedicated cable. If a cable with any other specifications is used, normal data transmission cannot be guaranteed.

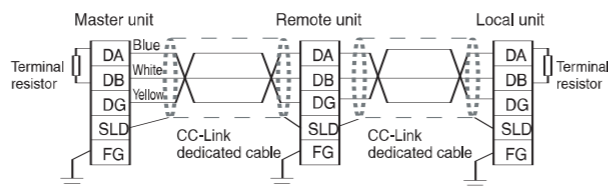


Fig.2

- The appropriate termination resistor differs depending on the CC-Link cable used (Refer to the table and Fig. 3 below.)
The CC-Link-dedicated cable's shield line should be connected to the "FG" terminal of the SI unit.

Cable type	Terminal resistor
CC-Link dedicated cable	110Ω 1/2W
CC-Link dedicated cable compatible to Ver.1.10	(Brown, Brown, Brown)
CC-Link dedicated high performance cable	130Ω 1/2W
	(Brown, Orange, Brown)

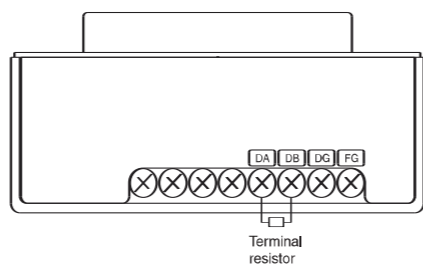


Fig.3

5 Wiring (continued)

Power supply wiring

Connect the power wiring to the SI unit's solenoid valve and communication power supply terminals.

Though the power supply consists of two systems, it can operate with either a single or separate power supplies. Be sure to connect the power to the dedicated terminal (Refer to Fig. 4).

Tighten it securely with a torque of 0.5 to 0.6 [N·m].

*NoteD-type Ground (3rd type ground) for the FG terminal (the SLD and FG terminals in CC-Link are connected within the SI units.)

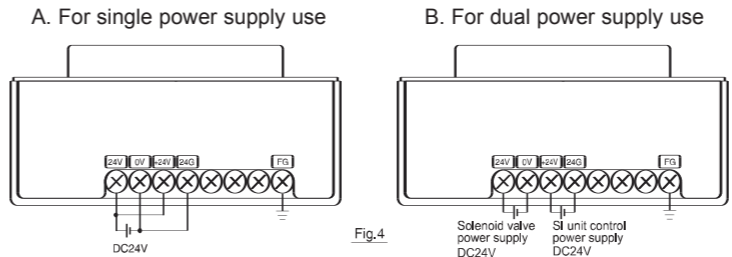
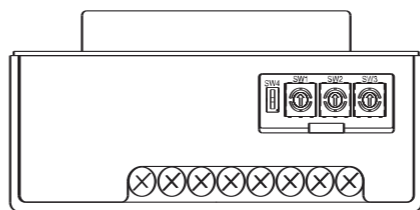


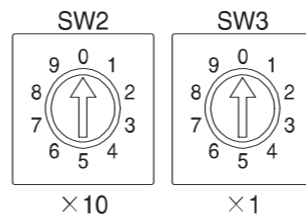
Fig.4

6 Switch Setting

- The setting for station number and communication speed can be carried out with the rotary switches in the SI unit cover.
- The setting for HOLD/CLEAR can be carried out with the DIP switch in the SI unit cover.
- The settings should be carried out when the power for the SI unit is turned off.



Station number setting
STATION NO.

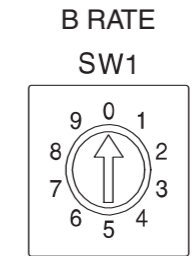


Setting	Setting range
x10	0~6
x1	0~9

- The station number should be any number from 01 to 64. When number 00 or 65 or more are set, "L ERR" LED will turn ON.
- The station number cannot be duplicated. It will an installation error.
- The setting at shipment is 00.

6 Switch Setting (continued)

Setting of Transmitting speed

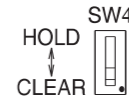


Setting	Transmitting speed
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps

- The setting for communication speed should be in the range of 0 to 4. If the setting is out of this range, "L ERR" LED will turn ON. After turning the power off, correct the number.
- Set the same communication speed as the master station.
- The setting at shipment is 0 (156kbps).

HOLD/ CLEAR setting

* The setting at shipment is CLEAR.



HOLD/CLEAR	Function
CLEAR	Clear the output when errors occur.
HOLD	Hold the output when errors occur.

7 Contacts

AUSTRIA	(43) 2262-62 280	ITALY	(39) 02-92711
BELGIUM	(32) 3-355 1464	NETHERLANDS	(31) 20-531 8888
CZECH REP.	(420) 5-414 24611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 70 25 29 00	POLAND	(48) 22-548 50 85
FINLAND	(358) 207-513 513	PORTUGAL	(351) 2 610 89 22
FRANCE	(33) 1-64 76 1000	SPAIN	(34) 945-18 4100
GERMANY	(49) 6103 4020	SWEDEN	(46) 8-603 0700
GREECE	30) 1- 342 6076	SWITZERLAND	(41) 52-396 3131
HUNGARY	(36) 1-371 1343	TURKEY	(90) 212 221 1512
IRELAND	(353) 1-403 9000	UNITED KINGDOM	(44) 1908-56 3888

SMC Corporation www.smcworld.com (Global) www.smceu.com (Europe)

Specifications are subject to change without prior notice from the manufacturer. The descriptions of products in this document may be used by other companies. © SMC Corporation All Rights Reserved.