

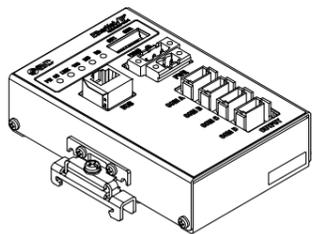


ORIGINAL INSTRUCTIONS

## Instruction Manual

## Fieldbus - Gateway unit for EtherNet/IP™

## EX510-GEN1-X73



The intended use of this product is to control pneumatic valves and I/O while connected to the EtherNet/IP™ 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)<sup>1)</sup>, and other safety regulations.

<sup>1)</sup> 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.

|  |                |  |
|--|----------------|--|
|  | <b>Caution</b> | Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.   |
|  | <b>Warning</b> | Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
|  | <b>Danger</b>  | 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.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further Safety Instructions.

## 2 Specifications

## 2.1 General specifications

| Item                                    | Specifications   |
|---|--|
| Rated voltage                           | 24 VDC   |
| Allowable instantaneous electrical stop | 1 msec. or less  |
| Enclosure rating                        | IP20   |
| Withstand voltage                       | 500 VAC for 1 minute<br>(between FG and terminal block)  |
| Insulation resistance                   | 10 MΩ or more 500 VDC<br>(between FG and terminal block) |
| Ambient temperature                     | Operating: -10 to +50 °C<br>Storage: -20 to +60 °C       |
| Ambient humidity                        | 35 to 85% RH (no condensation)                           |
| Operating atmosphere                    | No corrosive gas   |

## 2 Specifications (continued)

## 2.2 Gateway specifications

| Item                 | Specification   |
|----------------------|---|
| Power supply voltage | Power supply for control / inputs: 24 VDC ±10%<br>Power supply for outputs: 24 VDC +10% / -5%<br>(Warning for voltage drop at approx. 20 V) |
| Rated current        | Power supply for GW control: 200 mA max.<br>Power supply for outputs: 3.6 A max.  |
| Number of Outputs    | 64  |
| Weight               | 400 g (including accessories)   |

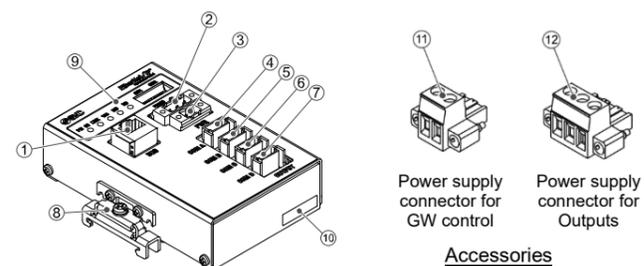
## 2.3 Higher level Communication

| Item                 | Specifications   |
|----------------------|--|
| Communication speed  | 10 / 100 Mbps<br>(auto selection or manual setting)  |
| Communication method | Full duplex/Half duplex<br>(auto selection or manual setting)  |
| Fieldbus protocol    | EtherNet/IP™<br>(conformance version: composite 9)   |
| I/O message          | Input: 16 bytes (assembly instance: 100)<br>Output: 16 bytes (assembly instance: 150)                    |
| IP address setting   | 192.168.0.1 to 192.168.0.254 or<br>192.168.1.1 to 192.168.1.254<br>(setting by switch or by DHCP server) |
| Device information   | Vendor ID: 7 (SMC Corp.)<br>Device type: 12 (communication adapter)<br>Product code: 179                 |

## 2.4 Lower level Bus

| Item                      | Specifications  |
|---------------------------|---|
| Number of branches        | Input: 4 branches / Output: 4 branches  |
| Communication type        | Communication protocol:<br>dedicated for SMC<br>Communication speed: 750 kbps |
| Current for output branch | Max. 1.5 A per branch   |
| Branch cable length       | 20 m max.   |

## 3 Name and function of parts



| No | Part                             | Description   |
|----|----------------------------------|---|
| 1  | Communication socket (BUS)       | Connection for EtherNet/IP™ line (RJ45 connector).                              |
| 2  | Power supply socket (PWR(V), FE) | Connection for power supply for outputs such as a solenoid valve and FE.        |
| 3  | Power supply socket (PWR)        | Connection for power supply for Gateway control.                                |
| 4  | Comms. Port A (COM A)            | Connection for SI unit (manifold valve) etc. using a branch cable (EX510-FC##). |
| 5  | Comms. Port B (COM B)            |   |
| 6  | Comms. Port C (COM C)            |   |
| 7  | Comms. Port D (COM D)            |   |
| 8  | Mounting bracket                 | Used for mounting on a DIN rail.  |
| 9  | Display / switch setting         | LED indicator and DIP switches for communication settings.                      |
| 10 | MAC address label                | Label to show Ethernet MAC address.   |
| 11 | Mating communication connector   | Connector for GW control power supply (1 pc.).                                  |
| 12 | Mating power supply connector    | Connector for output power supply (1 pc.).                                      |

## 4 Installation

## 4.1 Installation

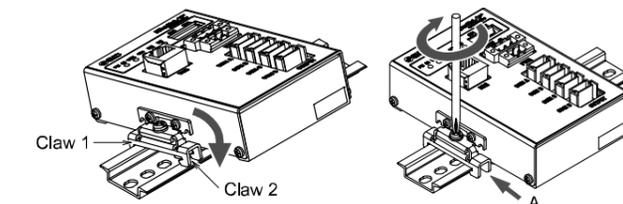
## Warning

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

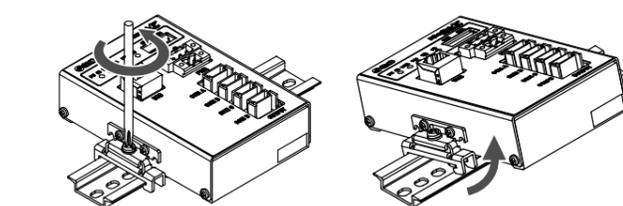
## • DIN rail mounting

For mounting, hook claw 1 to the upper side of the DIN rail. Then hook claw 2 to the lower side (slide the GW unit in the direction of arrow A and confirm that the claw 2 locates onto the DIN rail). Tighten the mounting bracket screw to fix the GW unit to the DIN rail. (Tightening torque: 0.6 N•m).

Note: There is a mounting bracket at each side of GW unit.



For removal, loosen the mounting bracket screw. Then remove the GW unit by unhooking claw 2 then claw 1.



## 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 specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product specifications.

## 5 Wiring

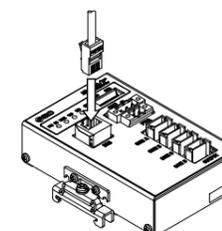
## 5.1 Communication wiring

- Connections should be made with the power supply turned OFF.
- Connect the EtherNet cable to the Gateway unit communication connector.
- It is recommended to use an EtherNet cable with shield.

## Pin layout of Communication connector

Connector: RJ45, 8-pin socket

| No. | Signal |
|-----|--------|
| 1   | TX+    |
| 2   | TX-    |
| 3   | RX+    |
| 4   | -      |
| 5   | -      |
| 6   | RX-    |
| 7   | -      |
| 8   | -      |



## 5 Wiring (continued)

## 5.2 Power Supply wiring

- Connect the power supply wiring to the two power supply 2-pin and 3-pin connectors (2-pin: for GW control, 3-pin: for outputs). The power supply structure consists of 2 systems, which can be used with either a single or dual power supply.
- The power supply connector is suitable for use with wire sizes from AWG24 to AWG12 (0.2 mm<sup>2</sup> to 2.5 mm<sup>2</sup>).
- Tighten the connector securely to 0.5 to 0.6 N•m tightening torque.

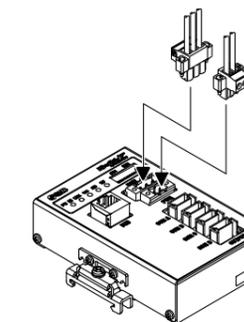
## 5.2.1 Pin layout of Power supply connector

For Gateway control: 2-pin plug

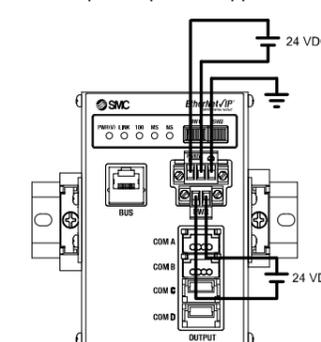
| No | Description | Function                   |
|----|-------------|----------------------------|
| 1  | 24 V        | +24 VDC for controlling GW |
| 2  | 0 V         | 0 V for controlling GW     |

For Outputs: 3-pin plug

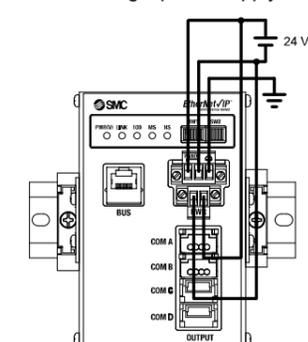
| No | Description | Function              |
|----|-------------|-----------------------|
| 1  | 24 V        | +24 VDC for output    |
| 2  | 0 V         | 0 V for output        |
| 3  | FE          | Functional Earth (FE) |



For separate power supplies



For single power supply



## 5.3 Ground connection

## Caution

A secure earth connection (protection class 3) should be made from the FG terminal to a Ground connection point. Resistance to ground should be 100 Ω or less.

## 5 Wiring (continued)

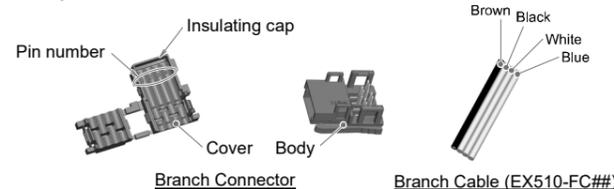
### 5.4 Branch cable wiring

The wiring between each unit should use branch cables (EX510-FC##) and branch connectors (EX510-LC1). Two branch connectors are attached to each SI unit and Output unit.

#### 5.4.1 Pressure welding the branch connector

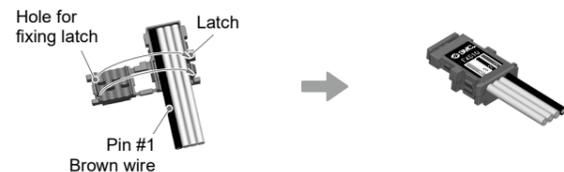
The pressure welding assembly method of the branch connector is described below.

##### • Components



##### • Assembly procedure

- 1) Set a branch cable into the cover with the Brown wire to pin #1.
- 2) Push the cable end up to the insulating cap on the cover.
- 3) Fold the cover so that the branch cable is trapped between the cover.
- 4) Fix the latch tip by inserting it through the fixing latch hole.



- 5) Check that the wire colour marked on the branch connector is the same as the branch cable wire colour.

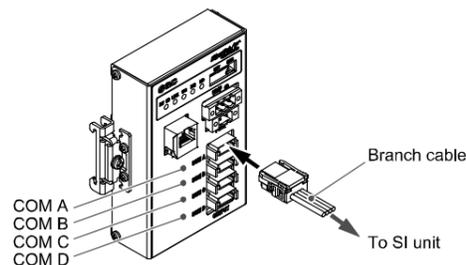
##### • Cable clamping

- 1) Tentatively fix the Body. Fit the 4 latches on the body to the 4 ditches in the cover and press them until the latch engages.
- 2) Press fit the cover to the body using suitable pliers.
- 3) Check that all of the 4 latches are fully engaged.

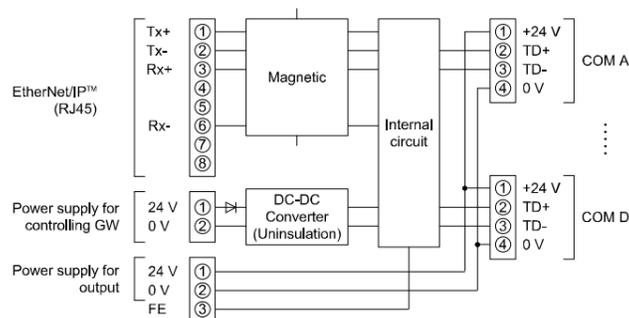


#### 5.4.2 Connection of Branch cables

Connect the branch cables in order from the top (COM A, B, C, D).



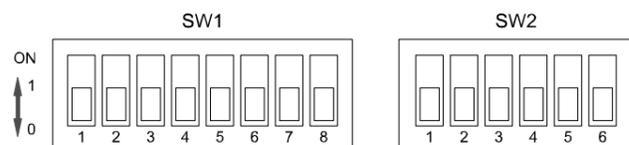
### 5.5 Internal Circuit and Wiring



## 6 Setting

### 6.1 Switch Setting

- (1) Switch setting must be performed with power supply turned OFF.
- (2) Set the switches using a small flat blade screwdriver.
- (3) Be sure to set the switches before use. The factory default settings are all "OFF".
- (4) SW2 switch number 2 is not used and should remain OFF.



#### 6.1.1 IP address setting

| SW2    | SW1 |     |     |     |     |     |     |     | IP Address          |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|---------------------|
|        | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |                     |
| OFF    | ON  | OFF | 192.168.0.1         |
| OFF    | OFF | ON  | OFF | OFF | OFF | OFF | OFF | OFF | 192.168.0.2         |
| :      | :   | :   | :   | :   | :   | :   | :   | :   | :                   |
| OFF    | ON  | OFF | ON  | ON  | ON  | ON  | ON  | ON  | 192.168.0.253       |
| OFF    | OFF | ON  | 192.168.0.254       |
| ON     | ON  | OFF | 192.168.1.1         |
| ON     | OFF | ON  | OFF | OFF | OFF | OFF | OFF | OFF | 192.168.1.2         |
| :      | :   | :   | :   | :   | :   | :   | :   | :   | :                   |
| ON     | ON  | OFF | ON  | ON  | ON  | ON  | ON  | ON  | 192.168.1.253       |
| ON     | OFF | ON  | 192.168.1.254       |
| ON/OFF | ON  | DHCP mode           |
| ON/OFF | OFF | Remote control mode |

- 1) DHCP mode is the mode to obtain IP address from DHCP server. Obtained IP address is lost when the power supply is cut.
- 2) Remote control mode is the mode to respond to commands via the BOOTP/DHCP server provided by Rockwell Automation. Refer to the BOOTP/DHCP server manual for further details.

#### 6.1.2 Communication setting

| SW2 |     |     | Item                  | Content   |
|-----|-----|-----|-----------------------|---|
| 3   | 4   | 5   |                       |   |
| OFF | -   | -   | Communication setting | AUTO: Communication setting is automatically selected.    |
| ON  | -   | -   |                       | MANUAL: Communication setting by switches SW2 No.4 and 5. |
| ON  | OFF | -   | Communication speed   | 10 Mbps   |
| ON  | ON  | -   |                       | 100 Mbps  |
| ON  | -   | OFF | Communication method  | Half duplex   |
| ON  | -   | ON  |                       | Full duplex   |

#### 6.1.3 Hold / Clear setting

Set the output status for when the fieldbus has a communication error or is in an idle state.

| SW2 | Content  |
|-----|--|
| 6   |  |
| OFF | CLEAR: The output is cleared during communication error. |
| ON  | HOLD: The output is held during communication error.     |

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

## 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    | Contents       |  |
|--------|----------------|--|
| PWR(V) | OFF            | Power supply for solenoid valves is out of specification or OFF. |
|        | Green ON       | Power supply for solenoid valves is normal.                      |
| LINK   | OFF            | Power supply OFF / initialised.                                  |
|        | Green ON       | Ethernet communication established.                              |
|        | Green flashing | Data sent / received.  |
| 100    | OFF            | Communication at 10 Mbps / Unit is OFF.                          |
|        | Green ON       | Communication at 100 Mbps.                                       |
| MS     | OFF            | Power supply OFF.  |
|        | Green ON       | Operating normally.  |
|        | Green flashing | Setting error.   |
|        | Red flashing   | Recoverable internal error.                                      |
| NS     | Red ON         | Unrecoverable internal error.                                    |
|        | OFF            | Power supply OFF / IP address is not set.                        |
|        | Green flashing | EtherNet/IP™ level communication has not been established.       |
|        | Green ON       | Multiple EtherNet/IP™ level communications established.          |
|        | Red flashing   | Multiple EtherNet/IP™ level communications has timed out.        |
|        | Red ON         | IP address duplicated.   |

## 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 should 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](https://www.smcworld.com) or [www.smc.eu](https://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  
 Specifications are subject to change without prior notice from the manufacturer.  
 © 2021 SMC Corporation All Rights Reserved.  
 Template DKP50047-F-085M