

# Fieldbus device Operation Manual



EX250 Series for EtherNet/IP™

Thank you for purchasing an SMC EX250 series Fieldbus device (Hereinafter referred to as "SI Unit"). Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations. Please keep this manual handy for future reference.

To obtain the operation manual about this product, please refer to the SMC website (URL <http://www.smcworld.com>) or contact SMC directly. Refer to the operation manual EX250-IE1 / -IE2 / -IE3 for the input block specifications, and EX9-OET1 / -OET2 / -OEP1 / -OEP2 / PE1 for the output block and power block specifications.

## 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.

- 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.

## Operator

- The operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- Read and understand the operation manual carefully before assembling, operating or providing maintenance to the product.

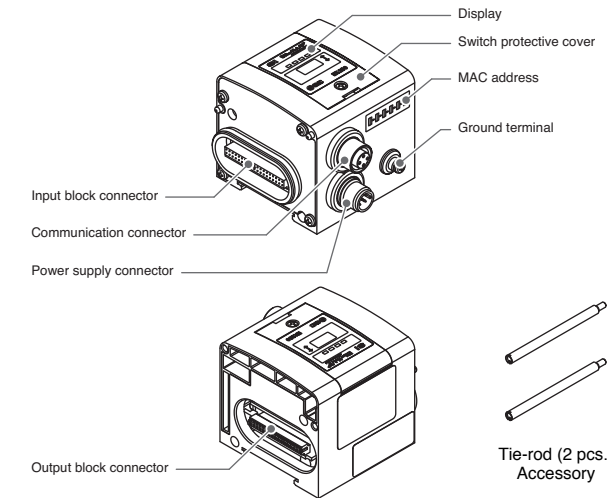
## Safety Instructions

- Warning**
  - Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
  - Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
  - Do not operate in an atmosphere containing flammable or explosive gases. Fire or an explosion can result. This product is not designed to be explosion proof.
- If using the product in an interlocking circuit:**
  - Provide a double interlocking system, for example a mechanical system.
  - Check the product regularly for proper operation.
  - Otherwise malfunction can result, causing an accident.
- The following instructions must be followed during maintenance:**
  - Turn off the power supply.
  - Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance.
  - Otherwise an injury can result.
- Caution**
  - When handling the unit or assembling/replacing units:
    - Do not touch the sharp metal parts of the connector or plug for connecting units.
    - Take care not to hit your hand when disassembling the unit.
    - The connecting portions of the unit are firmly joined with seals.
    - When joining units, take care not to get fingers caught between units.
    - An injury can result.
- After maintenance is complete, perform appropriate functional inspections.**
  - Stop operation if the equipment does not function properly.
  - Safety cannot be assured in the case of unexpected malfunction.
- Provide grounding to assure the safety and noise resistance of the Fieldbus system.**
  - Individual grounding should be provided close to the product with a short cable.

## NOTE

The direct current power supply to combine should be UL1310 Class2 power supply when conformity to UL is necessary.

## Summary of Product parts

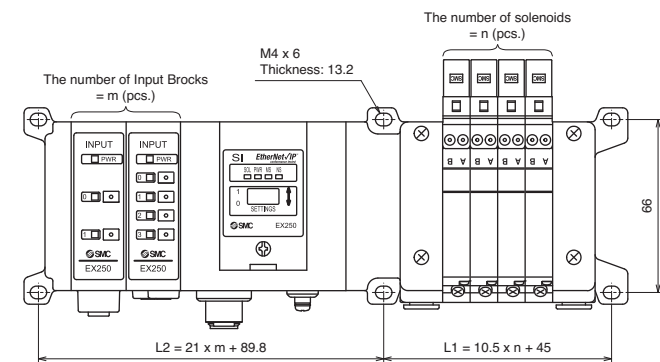


Element	Description
Communication connector	Connect the EtherNet/IP™ line.
Power supply connector	Supplies power to the solenoid valve, Output block, SI Unit and Input block.
Input block connector	Connects the solenoid valve, Output block, etc.
Output block connector	Connects the solenoid valve, Output block, etc.
Display	LED display showing the SI Unit status.
Switch protective cover	Incorporates the internal switch setting IP address and communication method.
Ground terminal	Used for grounding.
MAC address	A unique MAC address of 12 hexadecimal number digits to each SI Unit.

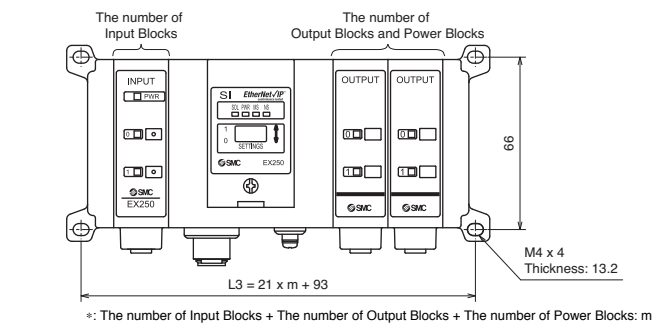
## Mounting and Installation

### Installation

Installation example: With solenoid valve connected



Installation example: With output block connected



L [mm]	0	1	2	3	4	5	6	7	8	9	10
L1	45	55.5	66	76.5	87	97.5	108	118.5	129	139.5	150
L2	89.8	110.8	131.8	152.8	173.8	194.8	215.8	236.8	257.8	278.8	299.8
L3		114	135	156	177	198	219	240	261	282	303

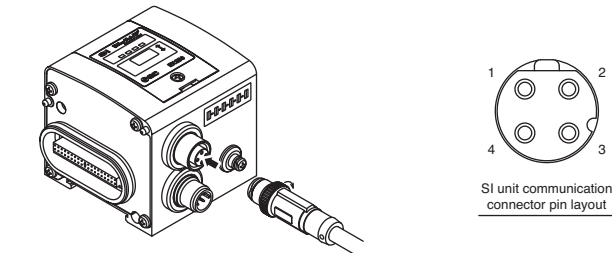
\*: The number of Input Blocks + The number of Output Blocks + The number of Power Blocks: m  
 \*: L1 shows the dimensions of the VQC1000 series solenoid valve.  
 \*: Each dimension shows the SI Unit without solenoid valves connected and with the end plate R (on the Output block side) connected.  
 Standard settings of L dimensions are with 10 or less m blocks. Contact SMC sales for the setting with over 10 blocks mounted.

## Wiring

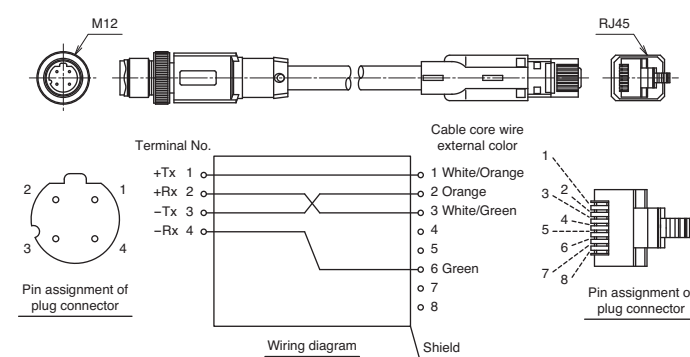
Wiring (for power supply, communication, input and output) and piping are done on only one side. On the side, make a space for wiring and piping.

**1. Communication wiring**  
Connect the Ethernet communication cable to the communication connector of SI Unit.

**Cable connection**  
1) Aligning the key groove with the communication connector (4-pin, socket) of SI Unit, plug the Ethernet communication cable (plug).  
2) Tighten the lock nut on the cable side by turning it clockwise by hand.  
3) Confirm that the connector does not move.



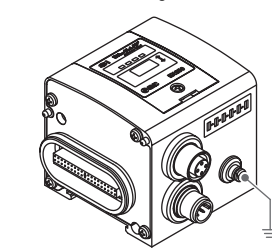
Pin layout and connection diagram of Ethernet communication cable  
Model No.: EX9-ACQEN-PSRJ



Refer to "Media Planning and Installation Manual" of ODVA for detail of Wiring.

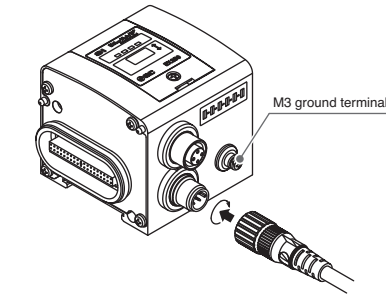
Cable specifications	
Core wire	AWG26
Sheath color	Blue green

**2. Ground terminal**  
Connect the ground terminal to ground. Resistance to ground should be 100 ohms or less.



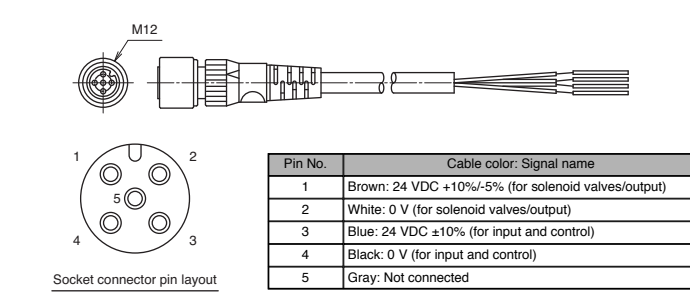
**3. Power supply wiring**  
Connect the power supply cable to the power supply connector of SI Unit.

**Cable connection**  
1) Aligning the key groove with the power supply connector (plug) of SI Unit, plug the power supply cable (socket).  
2) Tighten the lock nut on the cable side by turning it clockwise by hand.  
3) Confirm that the connector does not move.

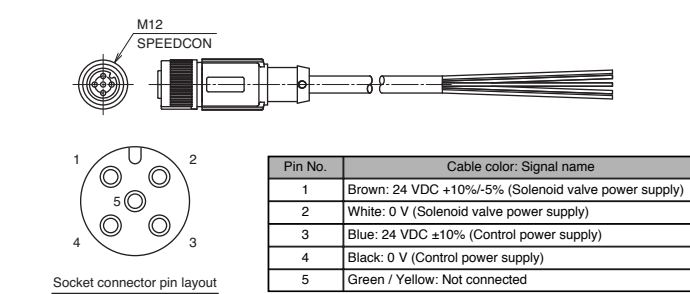


**NOTE**  
D class grounding (with the ground resistance of 100 ohm or less) should be performed for ground terminal, and ground at one point.

Pin layout and connection diagram of power supply connector cable (unit: mm)  
Model No.: EX500-APQ-S

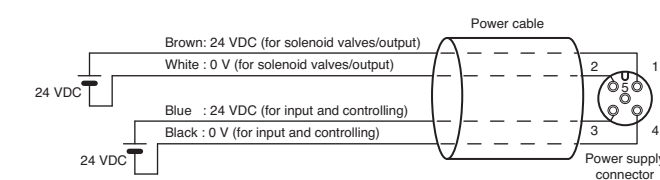


Model No.: PCA-140180Q

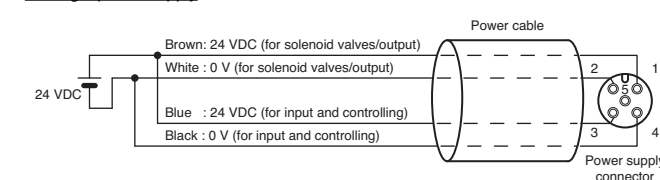


**Connecting one or two power supplies to SI Unit**  
Both of single power supply and two power supply systems can be adopted, however, the wiring should be made separately (for solenoid valves/output and for input and control) for both systems.

A. Two power supplies



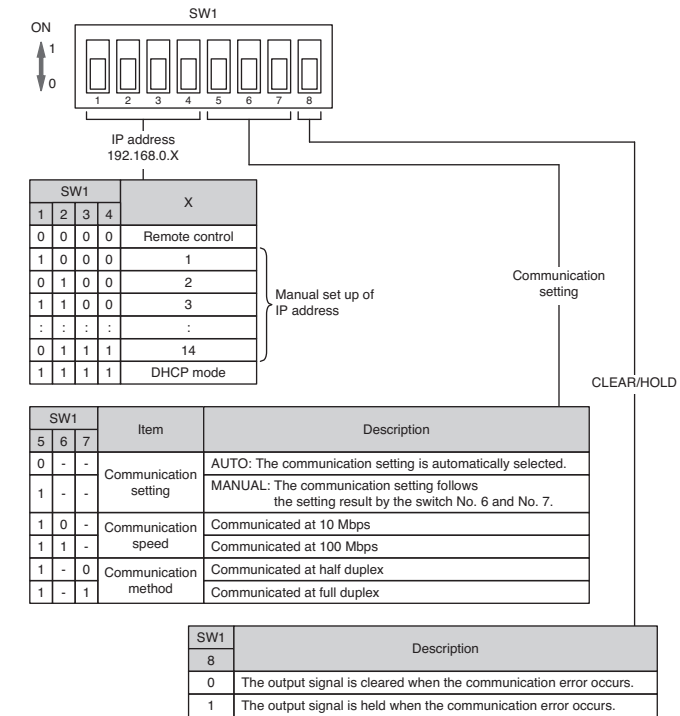
B. Single power supply



## Switch Setting

Open the switch protective cover and set the switches with a sharp-pointed watchmakers screwdriver etc.

**NOTE**  
1. Be sure to turn off the power supply before setting the switches.  
2. Be sure to set these switches before use.  
3. After setting the switch, close the switch protective cover and tighten the screws with proper tightening torque. (Tightening torque: 0.6 Nm)

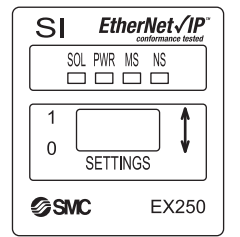


- Remote control (SW1 Dip switches 1-4 OFF)**  
SMC's EX250 SI Unit will respond to the following Rockwell Automation BOOTP/DHCP Server commands.
- Enable DHCP**  
Selecting this function will enable the EX250 SI Unit to retrieve its IP address\* from the BOOTP/DHCP Server. If DHCP is enabled the EX250 SI Unit will retrieve its IP address\* during the next power up. If the IP address\* is not acquired after approximately 30 seconds from when the power is supplied, the previous IP address\* from immediately before will be set.
- Disable BOOTP/DHCP**  
Selecting this function will disable the EX250 from retrieving its IP address\* from the BOOTP/DHCP Server, and will cause the EX250 to retain its current configuration during the next power up.
- DHCP mode (SW1 Dip switches 1-4 ON)**  
The IP address\* is acquired from the DHCP Server. If the IP address\* is not acquired after approximately 30 seconds from when the power is supplied, the previous IP address\* from immediately before will be set. The IP address\* will be lost if the power supply is disconnected.
- Manual set up of IP address\***  
The IP address\* range is 192.168.0.1 to 192.168.0.14.  
\* Information such as the subnet masks is included.

**Default settings**  
At the time of factory shipment, the product is in "Remote Control Mode" and set to "Enable DHCP".

**NOTE**  
If the stored address of an EX250 is not known, please go to the "DHCP Mode" section.

## LED Indication



Display	State	Description
SOL	OFF	Insufficient power supply for solenoids
	Green light ON	Normal power supply for solenoids
PWR	OFF	Insufficient power supply for input and control
	Green light ON	Normal power supply for input and control
MS	OFF	The power supply for control is OFF
	Green light ON	Operating normally
	Green flashes	Setting error (Device has not been configured)
	Red flashes	Recoverable internal error
NS	Red light ON	Unrecoverable internal error
	OFF	The power supply for control is OFF or IP address not set
	Green flashes	EtherNet/IP™-level communication not established
	Green light ON	Multiple EtherNet/IP™-level communications established
	Red flashes	Multiple EtherNet/IP™-level communications time out
	Red light ON	IP address duplicated

## Maintenance

Refer to the operation manual from SMC website (URL <http://www.smcworld.com>) for more information about maintenance.

## Troubleshooting

Refer to the operation manual from SMC website (URL <http://www.smcworld.com>) for more information about troubleshooting.

## Specifications

- Power for SI Unit/Input Block: 24 VDC ±20%, 1.1 A or less (inside of SI Unit: 0.1 A or less (input block: 1 A or less (Depending on number of connecting sensors and specifications)))
- Power for solenoid valve: 24 VDC +10%/-5%, 2 A or less (Depending on number of solenoid valve station and specifications)
- Connection load: Solenoid valve with protection circuit for 24 VDC and 1.5 W or less surge voltage. (made by SMC)
- Operating ambient temp.: 5 to 45 °C Storage ambient temp.: -20 to +60 °C
- Pollution degree: Pollution degree 3 (UL508)

Technical documentation giving detailed specification information can be found on the SMC website (URL <http://www.smcworld.com>).

## Dimensions

Refer to the operation manual from SMC website (URL <http://www.smcworld.com>) for more information about dimensions.