



# Operation Manual

PRODUCT NAME

SI unit for AnyWireASLINK

MODEL / Series / Product Number

*EX180-SAW1-X237*

**SMC Corporation**

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# 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)\*1), and other safety regulations.

\*1) 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: Manipulating industrial robots -Safety.  
etc.



## 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

### 1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### 2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### 3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### 4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



# Safety Instructions

## Caution

### **1. The product is provided for use in manufacturing industries.**

The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.  
If anything is unclear, contact your nearest sales branch.

## **Limited warranty and Disclaimer/Compliance Requirements**

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".

Read and accept them before using the product.

### **Limited warranty and Disclaimer**

#### **1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)**

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

#### **2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

#### **3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

##### **\*2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### **Compliance Requirements**

#### **1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.**

#### **2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

## Operator

- ◆ This 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 this 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.  
Do not use the components other than the specified components.  
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**


- 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 noise resistance of the product.  
Individual grounding should be provided close to the product with a short cable.

## ■NOTE

○Follow the instructions given below when designing, selecting and handling the product.

- The instructions on design and selection (installation, wiring, environment, adjustment, operation, maintenance, etc.) described below must also be followed.

### \*Product specifications

- When conformity to UL is necessary the SI unit must be used with a UL1310 Class2 power supply.
- The SI unit is a UL approved product only if they have a  mark on the body.
- Use the specified voltage.  
Otherwise failure or malfunction can result.
- Reserve a space for maintenance.  
Allow sufficient space for maintenance when designing the system.
- Do not remove any nameplates or labels.  
This can lead to incorrect maintenance, or misreading of the operation manual, which could cause damage or malfunction to the product.  
It may also result in non-conformity to safety standards.

### ●Product handling

#### \*Installation

- Do not drop, hit or apply excessive shock to the fieldbus system.  
Otherwise damage to the product can result, causing malfunction.
- Tighten to the specified tightening torque.  
If the tightening torque is exceeded the mounting screws may be broken.
- Never mount a product in a location that will be used as a foothold.  
The product may be damaged if excessive force is applied by stepping or climbing onto it.

#### \*Wiring

- Avoid repeatedly bending or stretching the cables, or placing heavy load on them.  
Repetitive bending stress or tensile stress can cause breakage of the cable.
- Wire correctly.  
Incorrect wiring can break the product.
- Do not perform wiring while the power is on.  
Otherwise damage to the fieldbus system and/or I/O device can result, causing malfunction.
- Do not route wires and cables together with power or high voltage cables.  
Otherwise the fieldbus system and/or I/O device can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line.  
Route the wires (piping) of the fieldbus system and/or I/O device separately from power or high voltage cables.
- Confirm proper insulation of wiring.  
Poor insulation (interference from another circuit, poor insulation between terminals, etc.) can lead to excess voltage or current being applied to the product, causing damage.
- Take appropriate measures against noise, such as using a noise filter, when the fieldbus system is incorporated into equipment.  
Otherwise noise can cause malfunction.

#### \*Environment

- Do not use the product in area that is exposed to corrosive gases, chemicals, sea water, water or steam.  
Otherwise failure or malfunction can result.
- Do not use in an area where surges are generated.  
If there is equipment which generates a large amount of surge (solenoid type lifter, high frequency induction furnace, motor, etc.) close to the fieldbus system, this may cause deterioration or breakage of the internal circuit of the fieldbus system. Avoid sources of surge generation and crossed lines.
- When a surge-generating load such as a relay or solenoid is driven directly, use an fieldbus system with a built-in surge absorbing element.  
Direct drive of a load generating surge voltage can damage the fieldbus system.
- The product is CE marked, but not immune to lightning strikes. Take measures against lightning strikes in the system.
- Prevent foreign matter such as remnant of wires from entering the fieldbus system to avoid failure and malfunction.
- Mount the product in a place that is not exposed to vibration or impact.  
Otherwise failure or malfunction can result.
- Do not use the product in an environment that is exposed to temperature cycle.  
Heat cycles other than ordinary changes in temperature can adversely affect the inside of the product.
- Do not expose the product to direct sunlight.  
If using in a location directly exposed to sunlight, shade the product from the sunlight.  
Otherwise failure or malfunction can result.
- Keep within the specified ambient temperature range.  
Otherwise malfunction can result.
- Do not operate close to a heat source, or in a location exposed to radiant heat.  
Otherwise malfunction can result.

#### \*Adjustment and Operation

- Perform settings suitable for the operating conditions.  
Incorrect setting can cause operation failure.
- Please refer to the PLC manufacturer's manual etc. for details of programming and addresses.  
For the PLC protocol and programming refer to the relevant manufacturer's documentation.

#### \*Maintenance

- Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.  
There is a risk of unexpected malfunction.
- Perform regular maintenance and inspections.  
There is a risk of unexpected malfunction.
- After maintenance is complete, perform appropriate functional inspections.  
Stop operation if the equipment does not function properly.  
Otherwise safety is not assured due to an unexpected malfunction or incorrect operation.
- Do not use solvents such as benzene, thinner etc. to clean the each unit.  
They could damage the surface of the body and erase the markings on the body.  
Use a soft cloth to remove stains.  
For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.

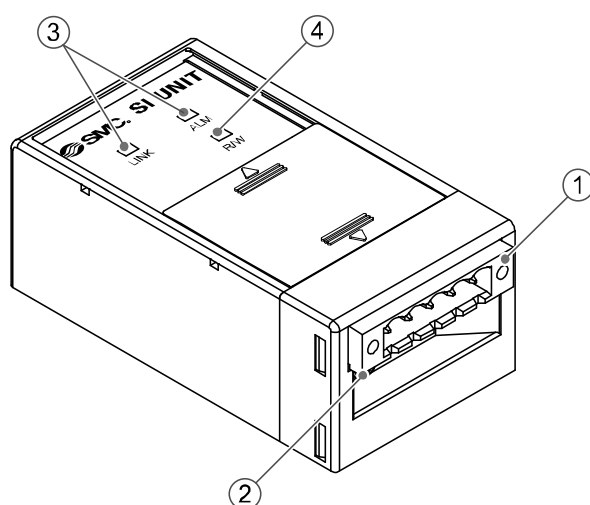
## How to Order

EX180-S AW1 -X237

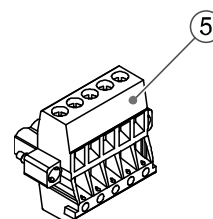
- Network, number of outputs, output type

AW1	Applicable for AnyWireASLINK, 32 outputs, NPN output (positive common)
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## Summary of Product Parts



Communication connector (1 pc.)



### Accessories

No.	Element	Description
1	Fieldbus interface connector (BUS)	The connector ((5)) used to connect to the AnyWireASLINK bus line.
2	FG terminal	Functional Earth.
3	Display	LED diagnostic display.
4	Address setting port	Set the address using a dedicated address writer. Refer to page 10 for details of the address setting.



# Installation and Cabling

## ■ General Instructions on Installation

### ○ Applicable valve series

The EX180 series SI unit can be mounted on the following valve manifolds.

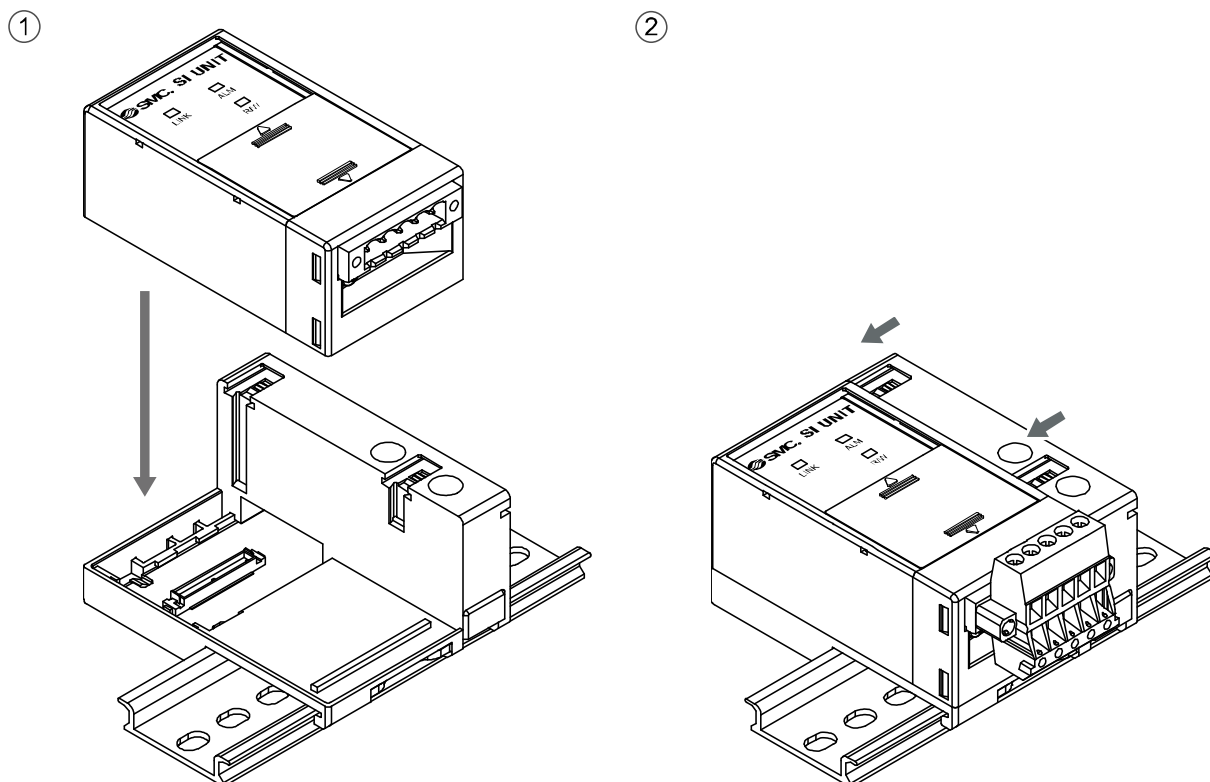
#### ● Manifolds

SJ2000, SJ3000, S0700 series

\*: Refer to the catalogues and operation manuals for details on the solenoid valves and manifolds.

#### ● How to mount the manifold

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



## ■ Connecting Cables

Wiring of the AnyWireASLINK cable and communication connector is shown below.

- (1) Connect the AnyWireASLINK to the assigned pins. (Figure 1)

The AnyWireASLINK communication connector is suitable for use with wire sizes from AWG24 to 12 (0.2 mm<sup>2</sup> to 2.5 mm<sup>2</sup>).

The required tightening torque is 0.5 to 0.6 Nm.

Tighten the connector fixing screws (M2.5 slotted head screws) firmly with a tightening torque of 0.2 to 0.3 Nm.

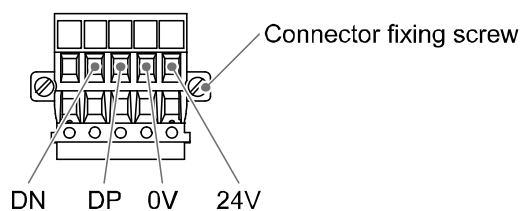
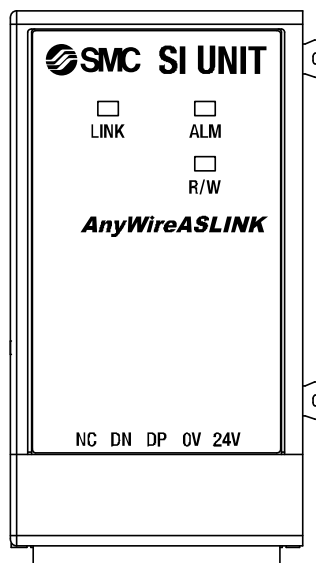










Figure 1

## LED Indication and Settings

### ○LED Indication



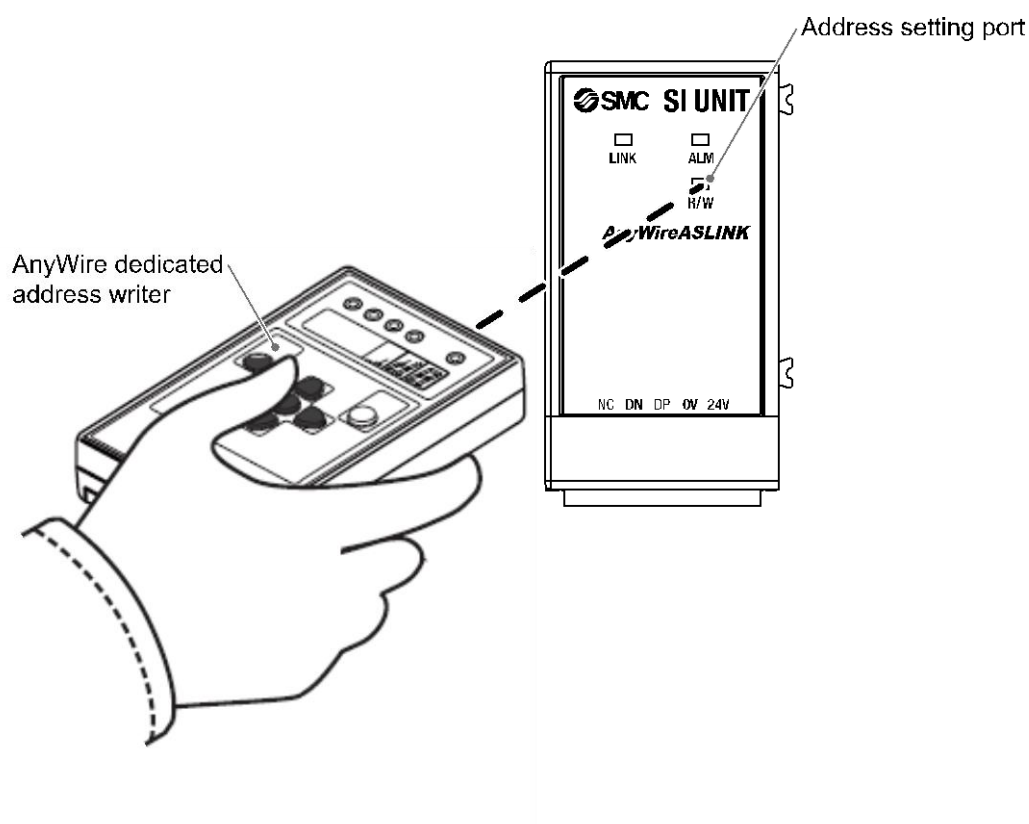
LED description	Display	Description
LINK	ON 	No transmission
	Flashing 	Normal operation
	OFF 	Broken wire to the DP/DN terminals, or no power supply
ALM	ON 	Reduced I/O voltage
	Flashing 	Reduced transmission signal level
	OFF 	Normal operation
LINK ALM	Alternate Flashing LINK  ALM 	When the master unit detects that the ID (address) is duplicated or not set.

### ○Address setting

- The SI unit address number corresponds to the controller I/O memory map. This address number is assigned to the AnyWireASLINK transmission frame (0 to 254), and the SI unit will occupy 32 points, starting from the last assigned number.
- The address number can be set using a single unit (1 point).
- The address to be set will be written to the SI unit using an AnyWire dedicated address writer ARW-03 (Ver.2.10 or newer) or ARW-04. Refer to the AnyWire operation manual for how to use the address writer ARW-03 (Ver.2.10 or newer) or ARW-04.

Settable address No.:0 to 224

<Address writing image>



### ⚠ Caution

The SI unit default address setting is "255 (no setting is performed)".

The SI unit will not output when in this state.

At the same time, no unit ID is registered even though the automatic address recognition function operates (refer to master unit manual).

## ○Output number assignment

### ●Combinations of output data and valve manifold

Output No.	0	2	4	6	8		16		28	30	Solenoid on A
Side D ← (SI unit side)						...		...			
Output No.	1	3	5	7	9		17		29	31	Solenoid on B

\*: The output number refers to the solenoid position on the manifold and starts at zero.

\*: Standard wiring on the manifold is for double-solenoid valves and output number starts A side and B side in that order as shown in the Figure a.

If you mount a single-solenoid valve on the standard wiring manifold, output number for B side valve is skipped.

\*: Custom wiring for mixed mounting single-solenoid valves and double-solenoid-valves can be specified with a Wiring Specification Sheet. Example wiring is shown in the Figure b.

\*: For the SJ series valve manifold, the single or double wiring specification can be selected according to the solenoid type.

\*: Bit status "0" and "1" on a data corresponds solenoid valve status ON and OFF (0: OFF, 1: ON), and output number starts at zero from LSB (least significant bit).

fig. a

	Double	Single	Double	Double	
No.	0	2	4	6	Side A
Station	1	2	3	4	-----
No.	1	3	5	7	Side B
	Open				

fig. b

	Double	Single	Double	Double	
No.	0	2	3	5	Side A
Station	1	2	3	4	-----
No.	1	-	4	6	Side B
	Open				

## Troubleshooting

### <LINK LED is not flashing>

Check items	Actions
Check the SI unit connection.	Remove the SI unit and connect it again.
Check the master unit connection.	<p>Check whether the master unit LINK LED is flashing, then take the following actions.</p> <p>(1) If the master unit LINK LED is flashing and the SI unit LINK LED is ON, there is a possibility that the master unit has been damaged.</p> <p>(2) If the master unit LINK LED is flashing and the SI unit LINK LED is OFF, there is a possibility that no power (24 VDC) is supplied to the master unit, a part of the transmission line (DP/DN) is broken or the SI unit is damaged.</p> <p>(3) If the master unit LINK LED is not flashing, confirm that power is supplied to the master unit. At the same time, refer to the master unit users manual as another system error may have occurred.</p>

### <ALM LED is ON>

Check items	Actions
Check the connection of the SI unit solenoid valve power supply.	Adjust the voltage so that the solenoid valve power supply voltage is within the rated value (21.6 to 26.4 VDC). At the same time, for the terminal wiring, check that there is no short circuit or incorrect wiring for each transmission line.

### <ALM LED is flashing>

Check items	Actions
Check the voltage of the master unit external power supply voltage (24 VDC).	<p>Adjust the power supply so that the master unit external power supply is within (21.6 to 27.6 VDC). (The recommended voltage is 26.4 VDC)</p> <p>Check the total wire length.</p> <p>Review the transmission cable total wire length and wire size so that a load exceeding the transmission line supply current limit will not be applied, and then check and adjust the connected load.</p> <p>(e.g.: The transmission supply current is 2 A if the wire size is 1.25 mm<sup>2</sup> and the wire length is up to 50 m)</p>

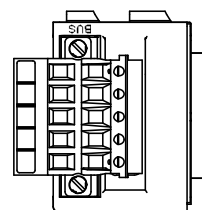
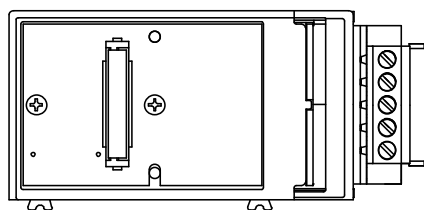
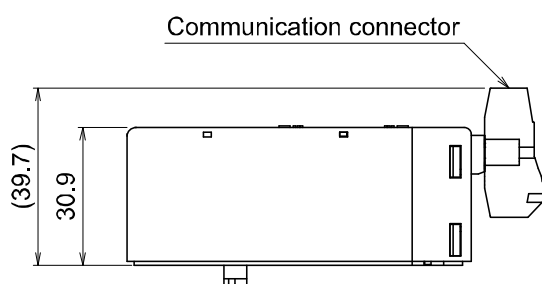
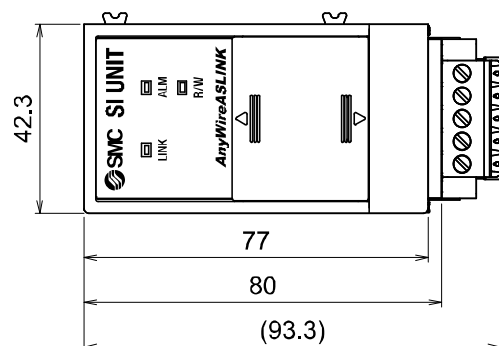
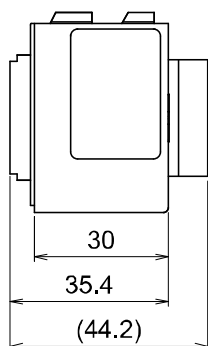
### < LINK and ALM LED flashing alternately >

Check items	Actions
Check the SI unit address.	<p>The SI unit address is not set (default is 255) or the address is duplicated. Take the following measures.</p> <p>(1) Change the address between 0 and 224.</p> <p>(2) Check for the presence or absence of the slave unit flashing LED and reset the address so that it is not duplicated.</p>

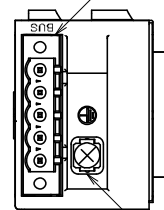
## Specifications

Item		Specifications
Network communication specifications	Applicable system	AnyWireASLINK (4-wire (insulation))
Power supply voltage range		Power supply for SI unit: 24 VDC (Supplied from the AnyWireASLINK transmission line) Power supply for the solenoid valves: 24 VDC +10%/-5% (Voltage drop warning is generated at approximately 16 V)
Current consumption		Power supply for SI unit: 0.1 A or less Power supply for the solenoid valves
Output specification	Output type	NPN (positive common)/sink
	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 the time of communication error	Clear
Environment	Enclosure	IP20
	Withstand voltage	500 VAC 1 min. (Between FG and external terminal)
	Insulation resistance	10 MΩ or more (500 VDC, Between FG and external terminal)
	Ambient temperature	Working temperature: -10 to 50 °C Storage: -20 to 60 °C
	Ambient humidity	35 to 85%RH (Non condensing)
	Operating atmosphere	No corrosive gas, No dust
Standard		CE marking
Weight		110 g or less (Including accessories)

## ■Dimensions



Communication socket



M3  
FG terminal

Before an accessories installation

Unit: mm

Revision history

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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