

# Fieldbus System



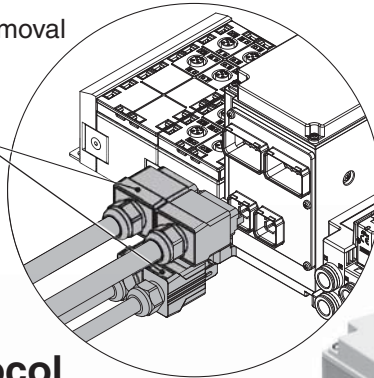
IP65

## ■ AIDA\*<sup>1</sup> specifications compliant

## ■ Push Pull connectors

- One-touch installation and removal
- Reduced wiring time

Push Pull connectors

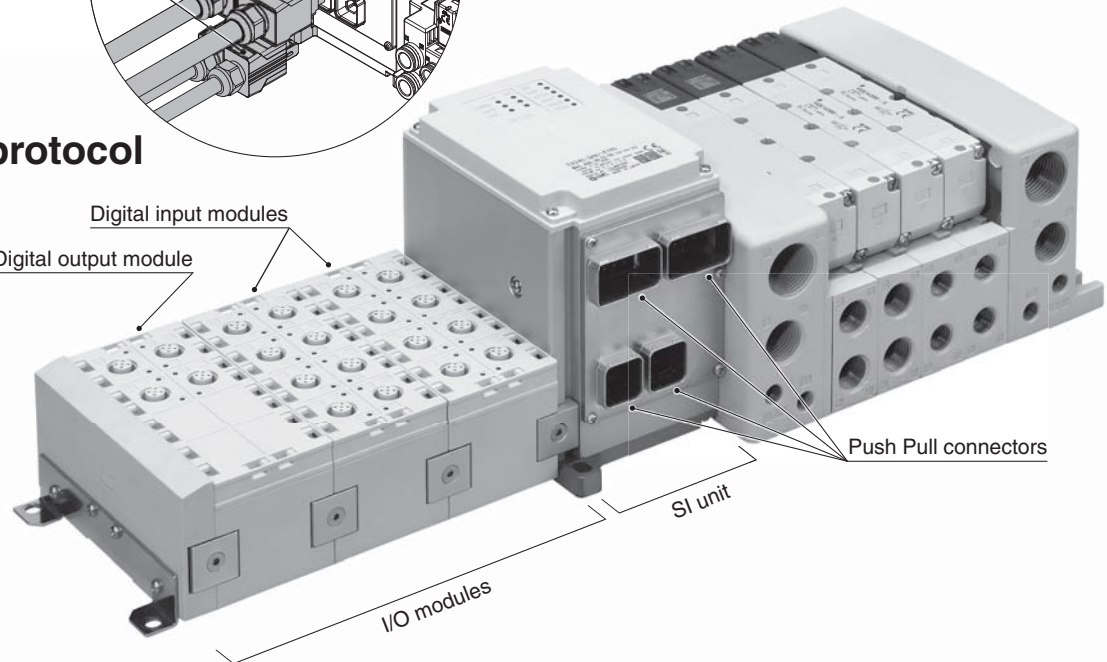


## ■ Compatible protocol



- Fibre-optic cable (SCRJ connector)

Digital input modules  
Digital output module



\*1 Abbreviation of the Automation Initiative of German (Deutschland) Automobile Manufacturers

## ■ Modules can be combined flexibly.

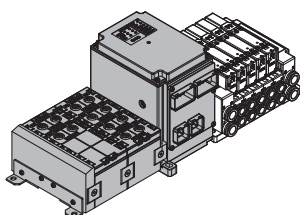
- Number of valves, digital inputs/outputs

Solenoid valve	Max. 32 valves
Digital input	Max. 128 inputs
Digital output	Max. 64 outputs

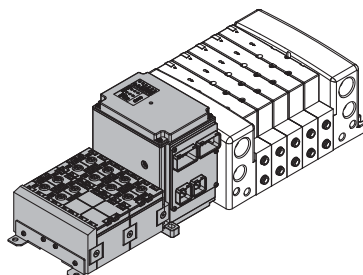
- I/O modules can be connected and removed one by one.
- Up to 8 modules can be connected in any order.

## Manifold Solenoid Valves

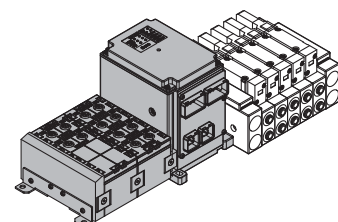
SY3000/5000/7000



VQC1000/2000/4000/5000



SV1000/2000/3000



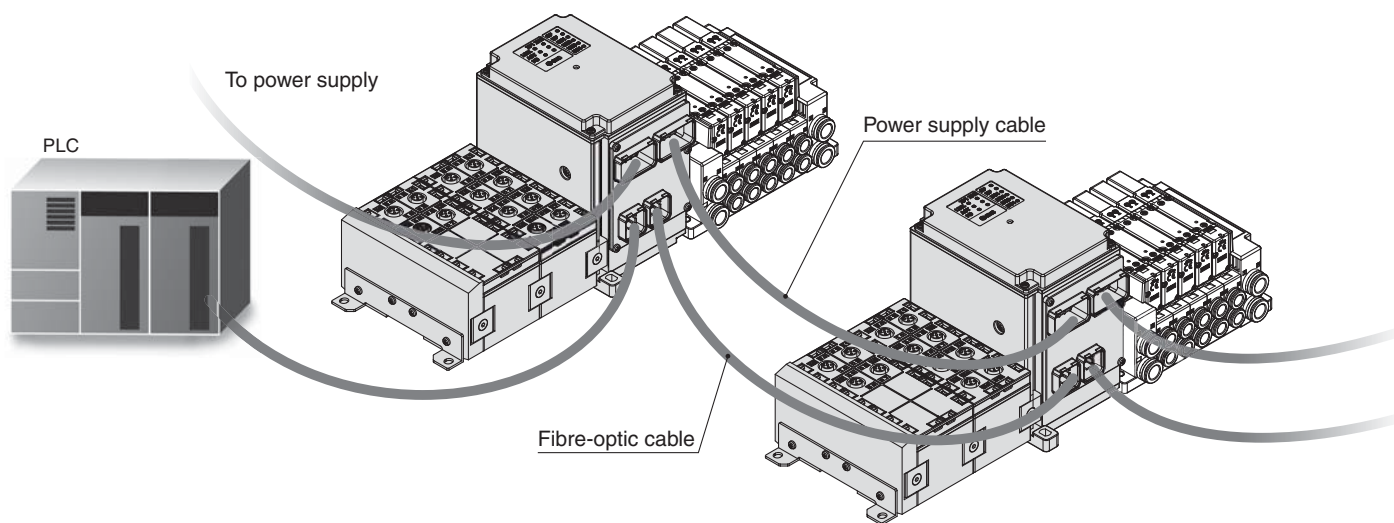
# EX245 Series



16-EU680-UK

## Dual communication and dual power connectors

Dual communication connectors allow daisy chain or ring topology for Media Redundancy Protocol (MRP). Dual power connectors allow for daisy chain connections avoiding branch or splitter adapters, saving cost and reducing wiring.

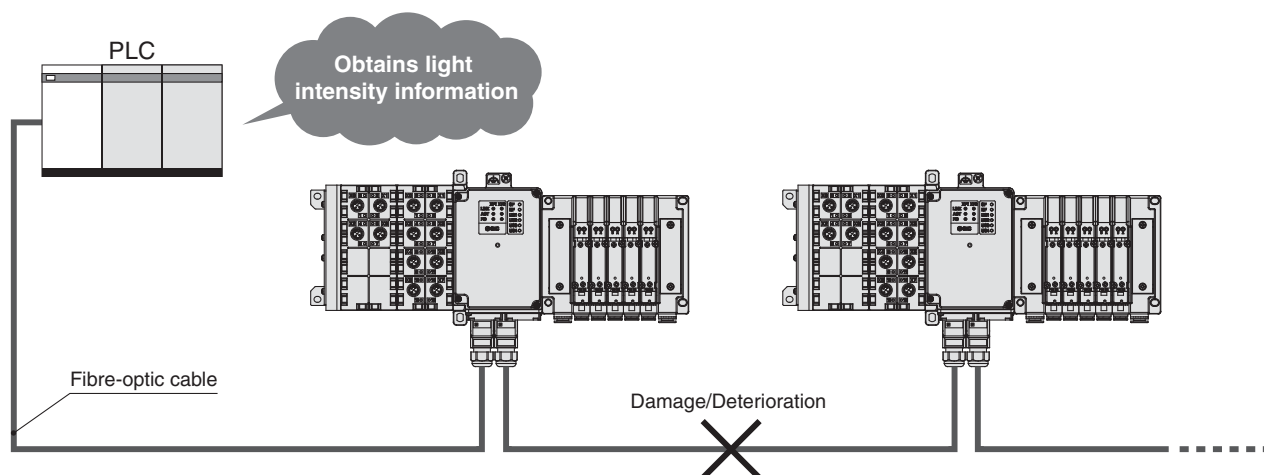


### An external branch connector is not necessary. Reduced wiring space

Easy to use one touch AIDA Push Pull connectors (compliant with AIDA specifications) saves time when installing and maintaining.

## Fibre-optic cable maintenance alarm

This feature continuously monitors the received light intensity from the fibre-optic cable and reports it to the PLC. Any loss of intensity is an indicator of damage to the cable so may give a warning before communication is lost. This allows preventative maintenance and so avoids unplanned shutdowns.

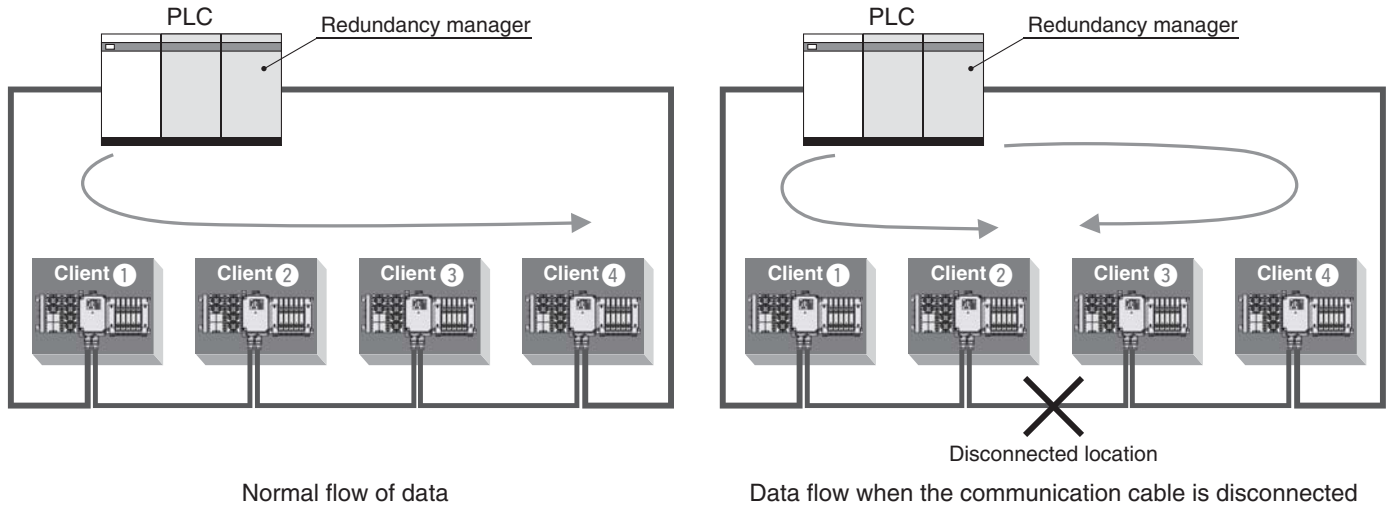


## MRP function (Ring wiring)

MRP (Media Redundancy Protocol) function:

Even if a communication cable is disconnected or damaged at any location, **communication can be continued. The cable segment that is causing the problem is identified** allowing quick and easy replacement.

To use the MRP function, the PLC should be able to support the MRP function.



## Fast Start Up function

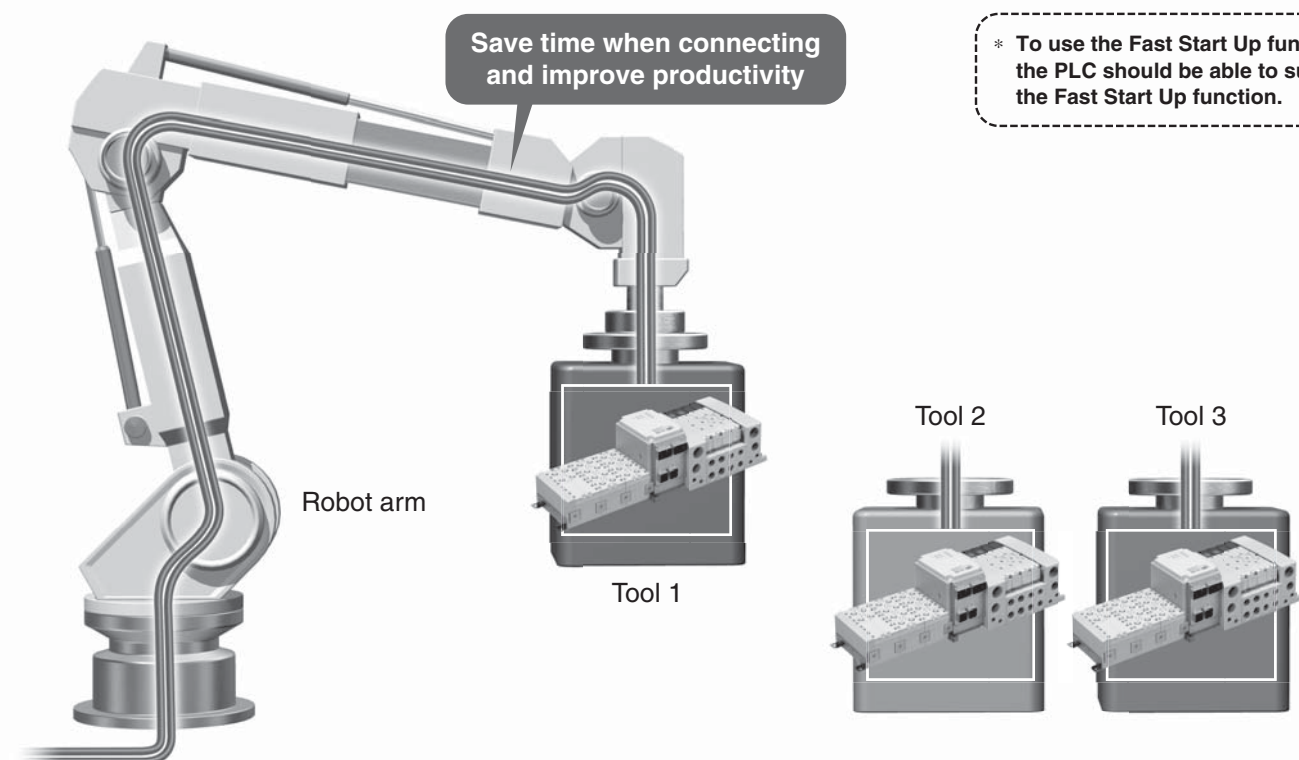
For the Fast Start Up function, time from power ON to communication connection

Approx. 10 sec.

Approx. **0.5 sec.**

In the case of a tool changer, it takes about 10 seconds for communication to be connected in some products after the power to the device installed on the tool is turned ON. For products which support the Fast Start Up function, communication can be operational even faster.

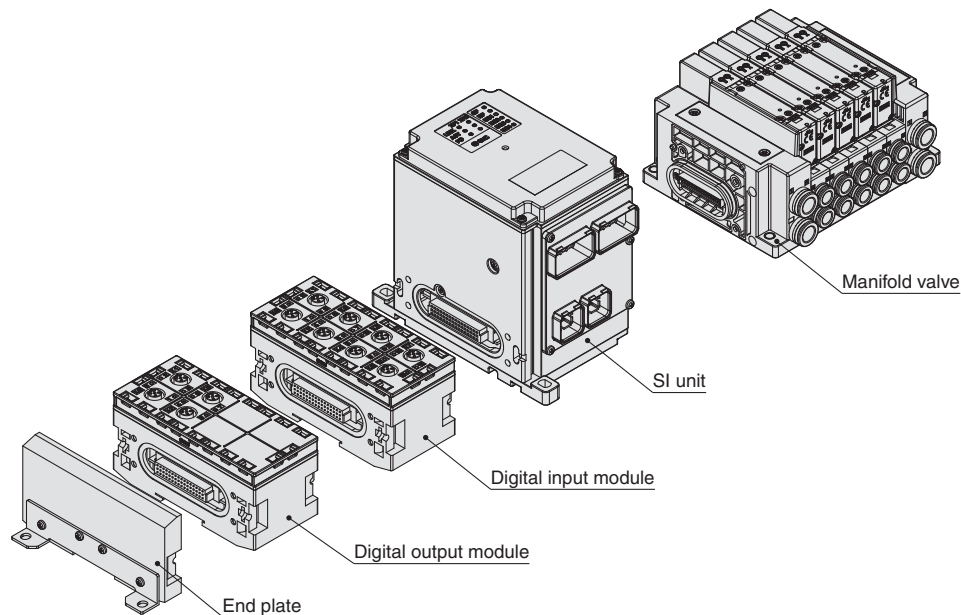
\* To use the Fast Start Up function, the PLC should be able to support the Fast Start Up function.



# Fieldbus System For Input/Output **EX245 Series**



## Construction



## How to Order

### SI Unit

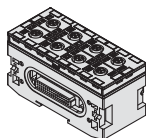
#### EX245-SPN1

##### SI unit specification

Model	Protocol	Max. number of modules	Max. number of digital inputs	Max. number of digital outputs	Communication connector	Power connector
SPN1	PROFINET	8	128	64	Push Pull connector (SCRJ): 2 pcs.	Push Pull connector (24 V): 2 pcs.

### Digital Input Module

#### EX245-DX1

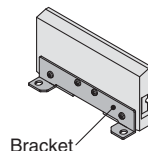


##### Digital input module specification

<b>DX1</b>	Digital input (16 inputs)
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### End Plate

#### EX245-EA2-1

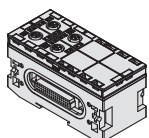


##### Bracket

<b>1</b>	With bracket
<b>2</b>	Without bracket

### Digital Output Module

#### EX245-DY1



##### Digital output module specification

<b>DY1</b>	Digital output (8 outputs)
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\* Please contact SMC for manifold valve part numbers.

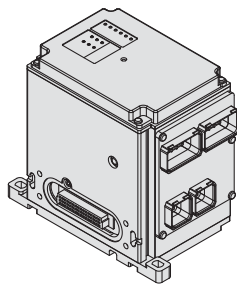


## Specifications

### Common Specifications for All Units/Modules

Item	Specifications
Operating temperature range	Operating: -10 to 50 °C, Stored: -20 to 60 °C (No condensation)
Operating humidity range	Operating, Stored: 35 to 85 %RH (No condensation)
Withstand voltage	500 VAC for 1 minute between external terminals and FE
Insulation resistance	500 VDC, 10 MΩ or more between external terminals and FE
Enclosure	IP65 (Manifold assembly, With seal cap)
Standards	CE marking, RoHS compliant

### SI Unit Specifications

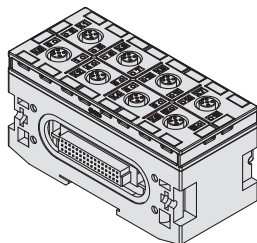


**EX245-SPN1**

Model		EX245-SPN1
Communication	Protocol	PROFINET
	Device type	PROFINET IO
	Communication speed	100 Mbps full duplex
	Configuration file*1	GSD file
	Applicable function	Fibre-optic cable maintenance alarm, MRP, Fast Start Up
Electrical	Internal current consumption (US1)	300 mA or less
	Loop through current between power connector	10 A
	Operating voltage/US1	24 VDC +20 %, -15 %/6 A
	Max. current/US2	24 VDC +20 %, -15 %/4 A
Output	Output type	Source/PNP (Negative common)
	Number of outputs	32 outputs
	Load	Solenoid valve with surge voltage suppressor of 24 VDC, 1 W or less (SMC)
	Power supply	24 VDC, 2 A
	Protection	Short-circuit protection
General	Max. number of modules	8
	Max. number of digital inputs	128
	Max. number of digital outputs	64
	Weight	1000 g

\*1 The configuration file can be downloaded from the SMC website: <http://www.smc.eu>

### Digital Input Module

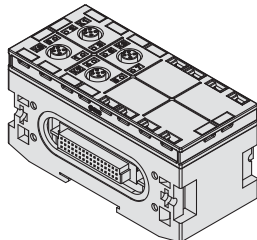


**EX245-DX1**

Model		EX245-DX1
Input	Input type	PNP
	Input connector	M12 (5-pin) socket*1
	Number of inputs	16 inputs
	Supplied voltage	24 VDC
	Max. supplied current	0.5 A/connector, 2 A/module
	Protection	Short-circuit protection
	Input current (at 24 VDC)	Typ. 4.5 mA
	ON voltage	11 to 30 V
	OFF voltage	-3 to 5 V
Internal current consumption		50 mA or less
Weight		280 g

\*1 An M12 (4-pin) connector can also be connected.

### Digital Output Module

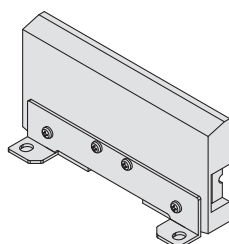


**EX245-DY1**

Model		EX245-DY1
Output	Output type	PNP
	Output connector	M12 (5-pin) socket*1
	Number of outputs	8 outputs
	Supplied voltage	24 VDC
	Max. load current	0.5 A/output, 2 A/module
	Protection	Short-circuit protection
Current consumption		50 mA or less
Weight		280 g

\*1 An M12 (4-pin) connector can also be connected.

### End Plate



**EX245-EA2-□**

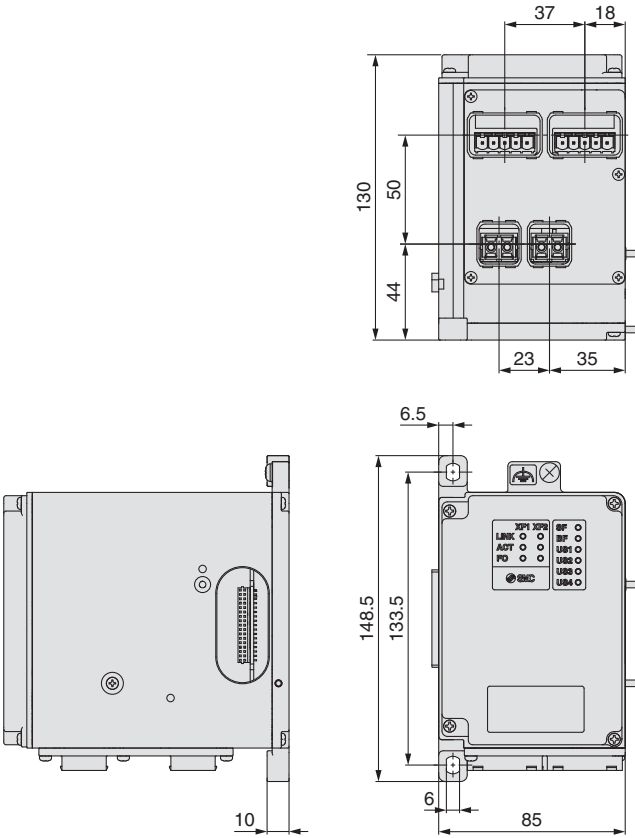
Model	EX245-EA2-1	EX245-EA2-2
Bracket	Yes	No
Weight	200 g	150 g

# EX245 Series

## Dimensions

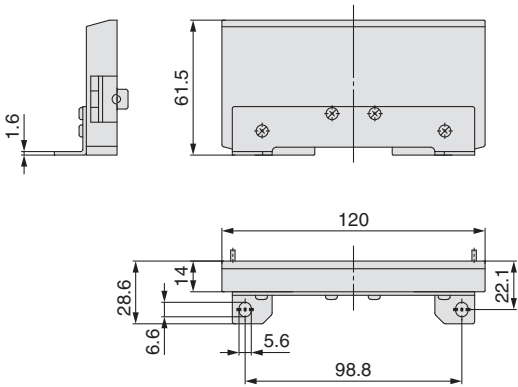
### SI Unit

#### EX245-SPN1

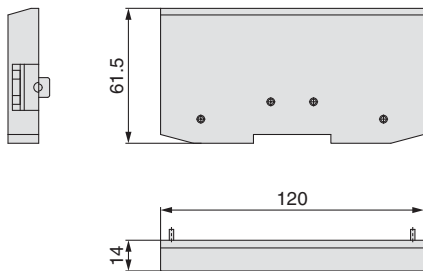


### End Plate

#### EX245-EA2-1

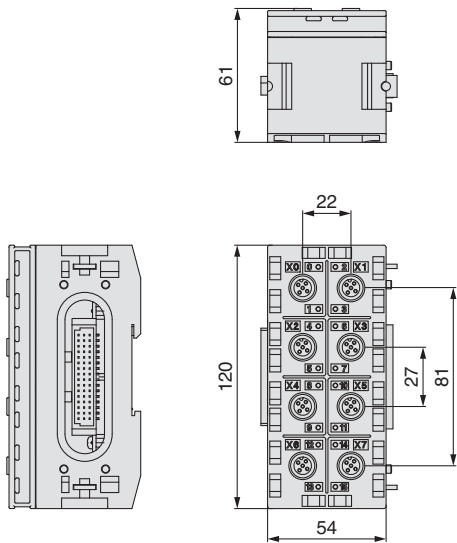


#### EX245-EA2-2



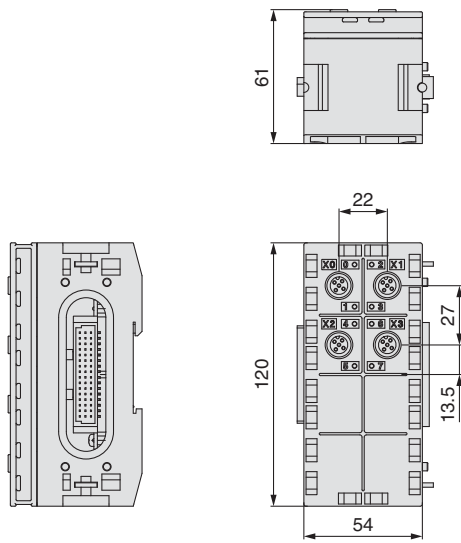
### Digital Input Module

#### EX245-DX1



### Digital Output Module

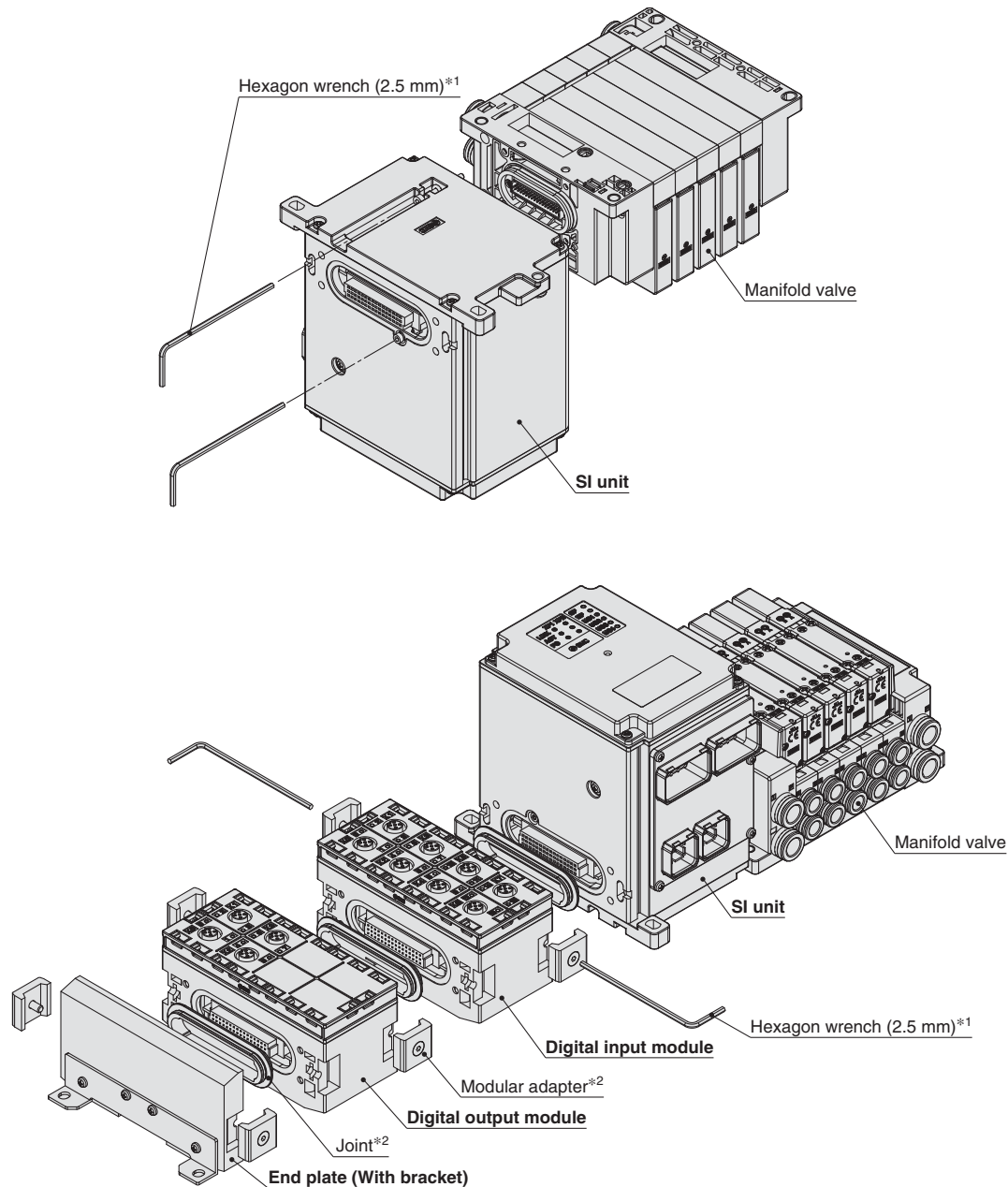
#### EX245-DY1



## Assembly Examples

Manifold valve ————— Please contact SMC for order numbers.  
 SI unit ————— EX245-SPN1  
 Digital module (Input) ————— EX245-DX1  
 Digital module (Output) ————— EX245-DY1  
 End plate ————— EX245-EA2-1

The modules and manifold valve are not assembled at the time of shipment.  
 After assembling the SI unit and manifold valve, assemble the modules.



\*1 Hexagon wrench is not included. It should be provided by the customer.

\*2 Joint and modular adapter are shipped together with the product.



## EX245 Series

# Specific Product Precautions 1

Be sure to read this before handling the products. For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <http://www.smc.eu>

### Design / Selection

#### Warning

**1. Do not use beyond the specification range.**

Using beyond the specification range can cause a fire, malfunction, or damage to the system.

Check the specifications before operation.

**2. When using for an interlock circuit:**

- **Provide a multiple interlock system which is operated by another system (such as a mechanical protection function).**
- **Perform an inspection to confirm that it is working properly.**

Otherwise, injuries due to malfunction may occur.

#### Caution

**1. Use within the specified voltage range.**

Using beyond the specified voltage range is likely to cause a malfunction or damage to the product.

**2. Do not install in places where it can be used as a foothold.**

Applying any excessive load, such as stepping on the product by mistake or placing a foot on it, will cause it to break.

**3. Provide sufficient space for maintenance.**

When designing a system, take into consideration the amount of space needed to perform maintenance.

**4. Do not remove the name plate.**

Improper maintenance or incorrect use of the Operation Manual can cause equipment failure or malfunction. Also, there is a risk of losing conformity with safety standards.

**5. Beware of inrush current when the power supply is turned on.**

Some connected loads can apply an initial charge current which will trigger the over current protection function, causing the module to malfunction.

### Mounting

#### Caution

**1. When handling or assembling the SI unit and module:**

- **Do not apply excessive force to the SI unit and module when removing.**

The connecting portions of the modules are firmly joined with seals.

- **When joining modules, take care not to get your fingers caught between the modules.**

Injury may result.

**2. Do not drop, bump, or apply excessive impact.**

Damage, equipment failure, or malfunction may occur.

### Mounting

#### Caution

**3. Observe the tightening torque range.**

Tightening outside of the allowable torque range will likely damage the screw.

IP65 cannot be guaranteed if the screws are not tightened to the specified torque.

**4. When lifting a large manifold solenoid valve unit, take care to avoid causing stress to the valve connection joints.**

The connection joints between the SI unit or the module may be damaged.

Because the product may be heavy, carrying and installation should be performed by more than one operator to avoid strain or injury.

**5. When placing a manifold, mount it on a flat surface.**

Torsion of the manifold can lead to trouble such as air leakage or contact failure.

### Wiring

#### Caution

**1. Provide grounding to improve the noise immunity of the Fieldbus system.**

Use a dedicated grounding separate from the inverter of the drive system and minimise the grounding distance from the module.

**2. Avoid repeatedly bending or stretching the cable and applying heavy objects or force to it.**

Wiring that repeatedly applies bending or tensile stress to the cable can break the circuit.

**3. Avoid miswiring.**

If miswired, there is a danger of malfunction or damage to the Fieldbus system.

**4. Do not wire while energising the product.**

There is a danger of malfunction or damage to the Fieldbus system or input/output devices.

**5. Avoid wiring the power line and high-pressure line in parallel.**

Noise or surge in the power supply line resulting from the power line or high-pressure line could cause a malfunction.

Wiring of the Fieldbus system and input/output devices should be separated from the power line and high-pressure line.

**6. Check the wiring insulation.**

Defective insulation (contact with other circuits, improper insulation between terminals, etc.) may cause damage to the Fieldbus system or each input/output device due to excessive voltage or current.



## EX245 Series

# Specific Product Precautions 2

Be sure to read this before handling the products. For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <http://www.smc.eu>

### Wiring

#### Caution

7. When the Fieldbus system is installed in machinery/equipment, provide adequate protection against noise by using noise filters, etc.

Noise in signal lines may cause a malfunction.

8. Avoid wiring patterns in which excessive stress is applied to the connector.

This may cause equipment failure or malfunction due to contact failure.

### Operating Environment

#### Warning

1. Do not use in an atmosphere containing inflammable or explosive gases.

Use in such an atmosphere is likely to cause a fire or explosion. This system is not explosion-proof.

#### Caution

1. Select the proper type of enclosure according to the operating environment.

IP65 is achieved when the following conditions are met.

- 1) Provide appropriate wiring of the electrical wiring cables, communication connectors, and cables with M12 connectors.
  - 2) Suitable mounting of the SI unit, each module, and the manifold valve
  - 3) Be sure to mount a seal cap on any unused connectors.
- If using in an environment where it may be exposed to water splash, please take measures such as using a cover.

2. Provide adequate protection when operating in locations such as the following.

Failure to do so may cause a malfunction or equipment failure. The effects of countermeasures should be checked in individual equipment and machines.

- 1) Where noise is generated by static electricity, etc.
- 2) Where there is a strong electric field
- 3) Where there is a danger of exposure to radiation
- 4) When in close proximity to power supply lines

3. Do not use in an environment where oils and chemicals are used.

Operating in environments with coolants, cleaning solvents, various oils, or chemicals may cause adverse effects (damage, malfunction) to the product even in a short period of time.

4. Do not use in an environment where the product could be exposed to corrosive gases or liquids.

This may damage the product and cause it to malfunction.

### Operating Environment

#### Caution

5. Do not use in locations with sources of surge generation.

Installation of the Fieldbus system in an area around equipment (electromagnetic lifters, high-frequency induction furnaces, welding machines, motors, etc.) which generates large surge voltages could cause the deterioration of an internal circuitry element of the Fieldbus system or other damage. Implement countermeasures against the surge from the generating source, and prevent the lines from contact with each other.

6. Use the product type that has an integrated surge absorption element when directly driving a load which generates surge voltage by relay, solenoid valves, or lamp.

When a surge generating load is directly driven, the Fieldbus system may be damaged.

7. The product is CE marked, but not immune to lightning strikes. Take measures to protect your system from lightning strike damage.

8. Keep dust, wire scraps, and other foreign matter from entering inside the product.

Failure to do so may cause equipment failure or malfunction.

9. Mount the Fieldbus system in a location where there is no excessive vibration or shock.

Failure to do so may cause equipment failure or malfunction.

10. Do not use in places where there are cyclic temperature changes.

In case that the cyclic temperature is beyond normal temperature changes, the inside of the Fieldbus system is likely to be adversely affected.

11. Do not use in direct sunlight.

This may cause equipment failure or malfunction.

12. Monitor the ambient temperature range.

Failure to do so may cause a malfunction.

13. Do not use the product in places where it will be exposed to radiant heat.

Such places are likely to cause a malfunction.





## EX245 Series

# Specific Product Precautions 3

Be sure to read this before handling the products. For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <http://www.smc.eu>

### Adjustment / Operation

#### **Warning**

1. Do not perform operation or setting with wet hands.

There is a risk of electrical shock.

#### **Caution**

1. Be sure to select settings that are suitable to the operating conditions.

Failure to do so could result in malfunction.

2. For details on programming and address setting, refer to the manual from the PLC manufacturer.

The content of programming related to protocol is designed by the manufacturer of the PLC used.

### Maintenance

#### **Warning**

1. Do not attempt to disassemble, modify (including circuit board replacement), or repair this product.

Such actions are likely to cause injuries or equipment failure.

2. When an inspection is performed:

- Turn off the power supply.
- Stop the air supply, exhaust the residual pressure in the piping, and confirm that the air has been released before performing any maintenance work.

Failure to do so may result in the unexpected malfunction of system components or injury.

#### **Caution**

1. When handling or replacing the SI unit and module:

- Do not apply excessive force to the SI unit and module when removing.

The connecting portions of the modules are firmly joined with seals.

- When joining modules, take care not to get your fingers caught between the modules.

Injury may result.

2. Perform periodic inspection.

An unexpected malfunction in the system composition devices is likely to occur due to the malfunction of machinery or equipment.

3. After maintenance, make sure to perform an appropriate functionality inspection.

In the case of an abnormality such as a faulty operation, stop operation at once. An unexpected malfunction in the system composition devices is likely to occur.

4. Do not use benzine or thinner to clean the modules.

Damage to the surface or erasure of the display may result. Wipe off any stains with a soft cloth.

If the stain is persistent, soak a cloth in a dilute solution of neutral detergent and wring it out tightly before using it to wipe the product. Afterwards, finish wiping with a dry cloth.

### Other

#### **Caution**

1. Refer to the catalog of each series for the Common Precautions and Specific Product Precautions for manifold solenoid valves.



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