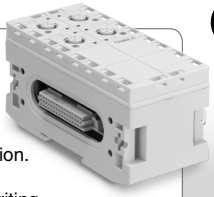
Fieldbus System (For Input/Output)

EX245 Series



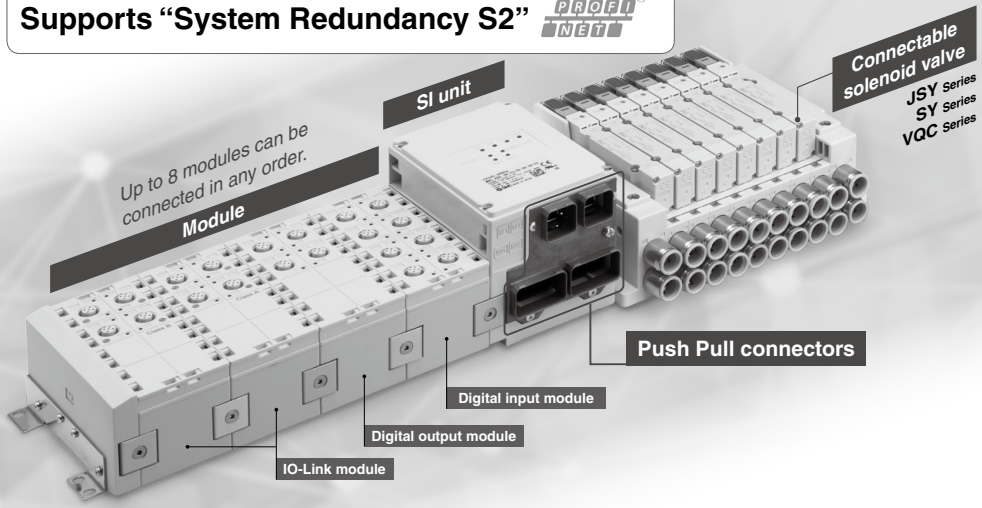
An IO-Link module has been added.

- 2 models (port class A and port class B)
- Diagnosis is possible from the upper level communication.
- The data can be accessed from via PC (setting tool).
- Device parameter setting function, Automatic saving/writing

Supports "System Redundancy S2"

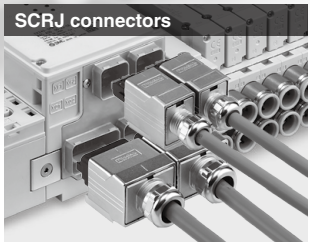
PROFINET

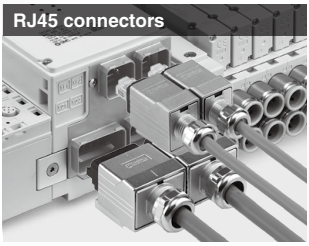
IP65



AIDA*1 specifications compliant

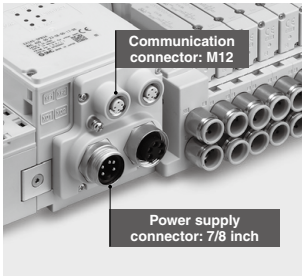
Push Pull Connectors One-touch mounting/removal allows for reduced labor.





*1 Automation Initiative of German (Deutschland) Automobile Manufacturers.

General-purpose connectors

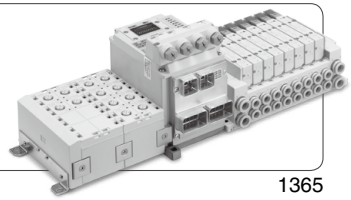


Compliant with PROFIsafe

PROFIsafe

TÜVRheinland CERTIFIED Product Safety Functional Safety www.tuv.com ID 0600000000

- Product certification obtained by a third party (IEC 61508/62061 SIL 3, ISO 13849 PL e Cat.4)
- Equipped with 8 safety input points and 4 safety output points
- The individual control of safety outputs (valves: 3 zones, modules: 1 zone) is possible.



Compatible with the PROFIenergy energy-saving function

PROFINET

PROFIenergy

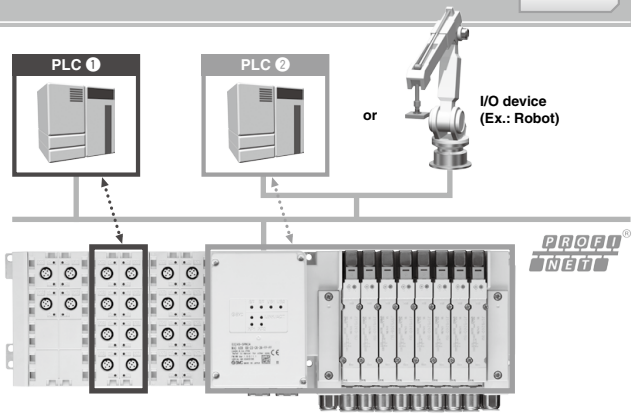
Generally, after factory facilities are shut down, it takes a lot of time to restart them.
PROFIenergy enables PROFINET communication to continue while saving energy by minimizing restart times. When the commands for PROFIenergy energy-saving mode are sent from the I/O controller (PLC) to the I/O device (SI unit), information regarding downtimes is also sent (such as lunch breaks, nighttime, weekends, and holidays).
SMC SI units do not require time for restarting. However, for the connected I/O equipment, such as pressure switches, flow switches, auto switches, and valves, 3 types of energy-saving modes are available for customers to choose from depending on the application.

Mode	Output (Valve/Digital)	Input device (Pressure switch, flow switch, auto switch, etc.)	Input data
Shut down/Clear value mode	OFF	OFF (Power supply)	OFF
Shut down/Hold last value mode	Hold	OFF (Power supply)	Hold
PROCEED mode	Hold	Hold	Hold

Shared Device function

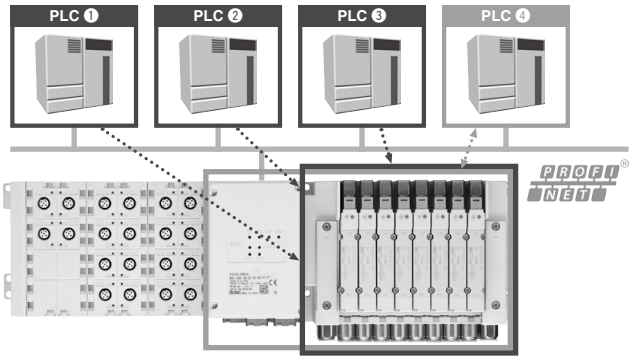
PROFINET

An I/O module connected to an SI unit can be controlled by multiple I/O controllers (PLC).



- Information can be shared with up to 3 controllers in addition to the control PLC.
- The cost of the hardware, cables, and installation space can be reduced.

PLC ① to ③: For monitoring
PLC ④ : For control



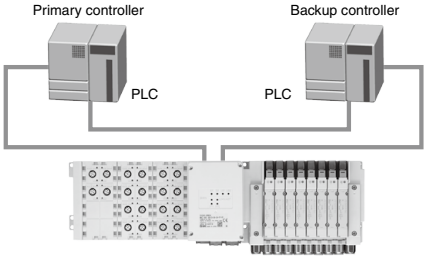
∗ The Shared Device function enables an I/O module connected to the I/O device to be controlled by multiple I/O controllers (PLC). The control status can be shared among other I/O controllers. As the function can be used across the entire PROFINET line, the cost for hardware, cables, and installation space can be reduced.

System Redundancy S2 function

PROFINET

As the EX245-SPN1/2/3A supports System Redundancy S2, it can continue communication using the backup controller when the primary controller malfunctions. This allows for the prevention of problems caused by unexpected communication interruption.

* In order to use System Redundancy S2, the PLC must be able to support this function.



MRP/MRPD function

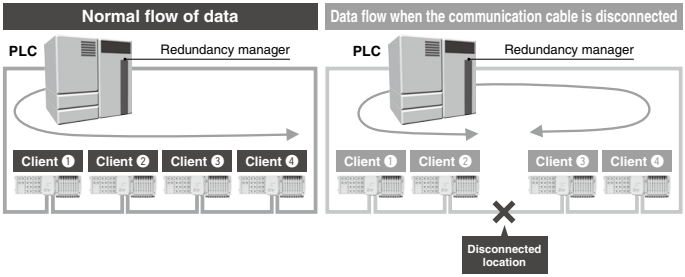
*1 PROFINET *2 PROFIsafe

*1 MRP/MRPD *2 MRP

MRP (Media Redundancy Protocol) function

Communication can be continued even if one of the communication cables in the network is disconnected or damaged. Furthermore, as it is possible to identify the disconnection point quickly, the network disconnection time can be kept within 200 ms.

* In order to use the MRP function, the PLC must be able to support it.



MRPD (Media Redundancy for planned duplication) function

It is possible to duplicate routes with a ring topology configured with PROFINET IRT communication.
Communication reconnection time is faster than with the MRP function, so communication can be continued without recovery time.

NET Load Class Ⅲ compatible

PROFINET

Passed and certified under the highest network load (Class Ⅲ) specified by PROFINET.

Fast Start Up function

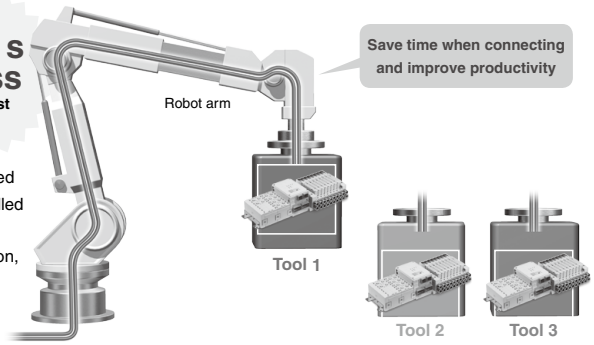
PROFINET

Time from power ON to communication connection:

Approx. 10 s → **0.5 s or less** for the Fast Start Up function

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.

* In order to use the Fast Start Up function, the PLC must be able to support it.

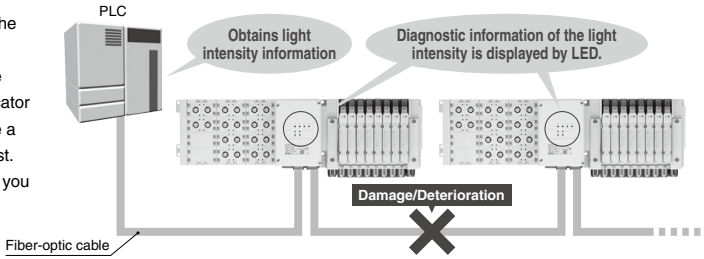


Fiber-optic cable maintenance alarm

PROFINET **PROFIsafe**

* Available for the EX245-SPN1A and the EX245-FPS1

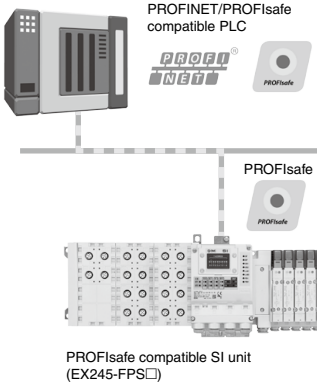
This feature continuously monitors the received light intensity from the fiber-optic cable and reports it to the PLC. Any loss of intensity is an indicator of damage to the cable, so may give a warning before communication is lost. By using preventative maintenance, you can avoid unexpected shutdowns.



Supports safety communication (PROFIsafe)

PROFIsafe

PROFIsafe is established as an international standard (IEC 61784-3-3). It is a communication protocol that transmits safety-related data by PROFINET communication and can be used up until safety standards ISO 13849-1 PL e and IEC 61508/IEC 62061 SIL 3.



The PROFINET/PROFIsafe compatible PLC allows for PROFINET and PROFIsafe compatible SI units to be mixed on one communication line.

Compliant with safety standards

PROFIsafe

The aim is to facilitate a safe design (featuring ISO/IEC compliance) of the customer's equipment and facilities. The EX245-FPS□ has been certified under the following categories by a third-party organization (TÜV Rheinland).

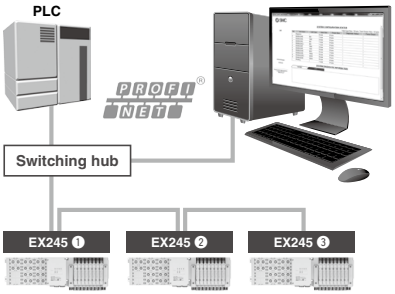
Product Safety
Functional Safety
TÜVRheinland
CERTIFIED
www.tuv.com
ID 0600000000

IEC 61508/IEC 62061 SIL 3
ISO 13849 PL e/Cat. 4

- **SIL (Safety Integrity Level)**
  A safety integrity level as defined by international standard IEC 61508/62061
  There are 4 levels of safety, with the lowest being SIL 1 and the highest being SIL 4.
- **PL (Performance Level)**
  A scale used to define the capability of safety-related parts to perform a safety function as defined by international standard ISO 13849
  There are 5 levels of safety function, with the lowest being PL a and the highest being PL e.

Built-in web server function, FW (firmware) updates

PROFINET



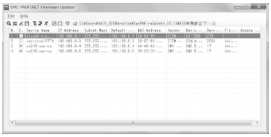
Connection example

All products are accessible via PC.

● FW updates ● Status checks ● Forced outputs, etc.

- The status (errors and diagnostic contents) of all products can be checked via web browser.
- Easy operation testing, initial operation checking of equipment, and maintenance without a PLC

FW (firmware) update tool



- Batch firmware updating for up to 255 units is possible from the Ethernet line.
- Easy to handle future version upgrades

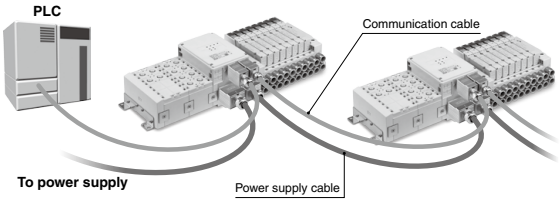
∗ If using an IO-Link module, be sure to use the latest GSD file and firmware version available. However, depending on the product's hardware and firmware versions, it may not be possible to use the firmware update function.

Dual communication and dual power connectors

PROFINET PROFIsafe

- 2 power connectors and 2 communication connectors are mounted, making daisy-chain connection possible.
- An external branch connector is not necessary. Reduced wiring space
- Loop through current between power connectors: Max. 16 A∗1

∗1 The max. allowable current for the 7/8 inch power supply connector is 10 A. The max. loop through current between connectors is 6 A.



Modules can be combined flexibly.

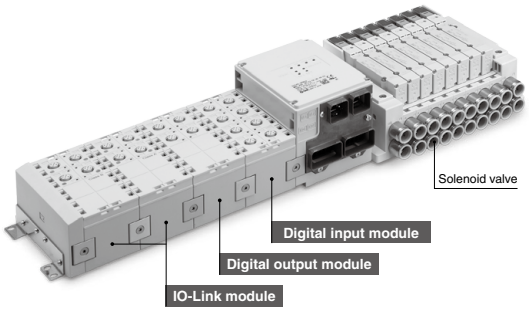
PROFINET PROFIsafe

● Solenoid valve/Digital inputs/outputs/Number of IO-Link ports

	Number of points/ports per each module	Max. number of points/ports per each SI unit
Solenoid valve	—	32 valves
Digital input	16 inputs	128 inputs
Digital output	8 outputs	64 outputs
IO-Link	4-port	32-port

∗ Only the EX245-SPN□A (PROFINET) is applicable to the IO-Link module.

- Each module can be connected and removed one by one.
- Up to 8 modules can be connected in any order.



Connectable Solenoid Valve Series

Series	Flow rate characteristics (4/2→5/3) C[dm³/(s·bar)]	Max. number of solenoids	Applicable cylinder size
JSY3000	2.77	32	ø50
JSY5000	6.59		ø80
SY3000	1.6	32	ø50
SY5000	3.6		ø63
VQC2000	3.2	24	ø63
VQC4000	7.3		ø160

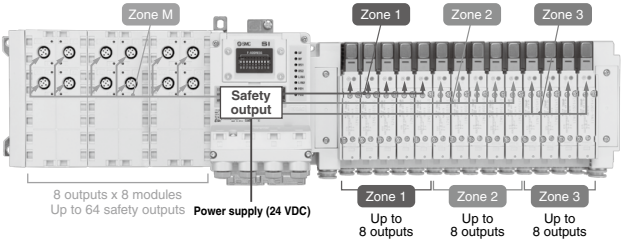
∗ For models other than the applicable models, please contact your SMC sales representative.

∗ The use of validated products may be required for valve manifolds used in the safety-related parts of equipment which is compliant with international standard ISO 13849. For validated products, please contact your SMC sales representative.

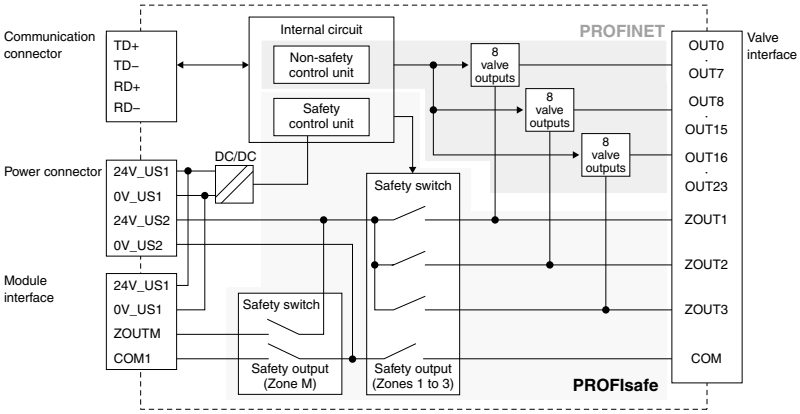
Safety Output

PROFIsafe

The EX245-FPS□ has safety outputs inside the product that can control 3 zones for valves and 1 zone for output modules individually.
When the safety switch is turned OFF by directive from the PLC, the voltage supplied to the valve or output module is shut off, and it switches to safe state.
The safety switch of this product has two redundancies, one on the 24 V side and the other on the 0 V side. It continuously runs diagnostics.
The safety switch is turned OFF in the event of an error detection.



The valve/actuator will not turn ON when the PROFIsafe signal is OFF, even if an ON instruction is given via PROFINET signal. Only when both PROFINET and PROFIsafe instruct the device to turn ON will the valve/actuator turn ON.



⚠Safety Definition

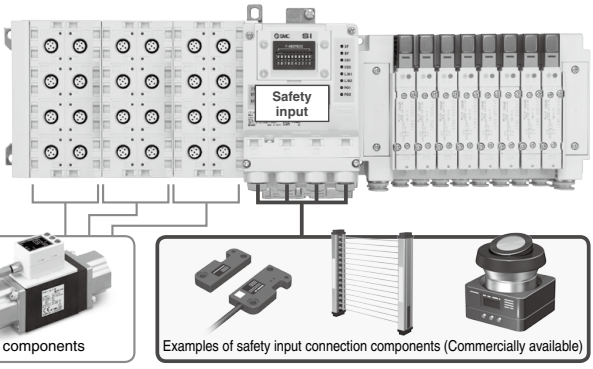
The safe state of the EX245-FPS□ is a condition in which the safety output described above is turned OFF to shut off the supply of power to the valve manifold.
This product does not cover valve manifolds that are being used in connection with this product or the safety function and safe state of electric/air equipment that includes a peripheral circuit.

Safety Input

PROFIsafe

The EX245-FPS□ is equipped with safety inputs. The safety inputs of this product can connect to components (e.g. laser scanners, light curtains, etc.) that are compatible with the safety inputs.
The safety input can be loaded in 2 ways:

- Single channel (1 out of 1): 8 safety inputs (SIL 2/PL d)
- Dual channel (1 out of 2): 4 safety inputs (SIL 3/PL e)

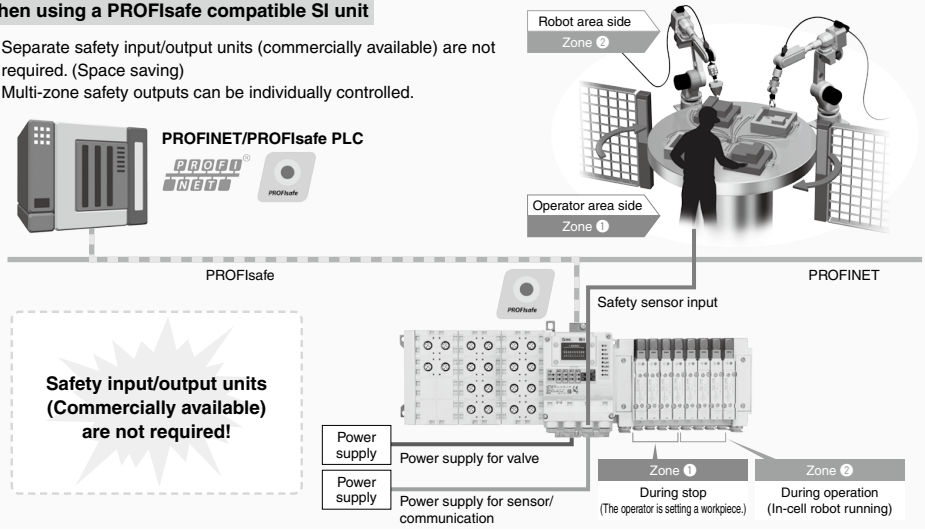


Safety Input/Output Construction Example

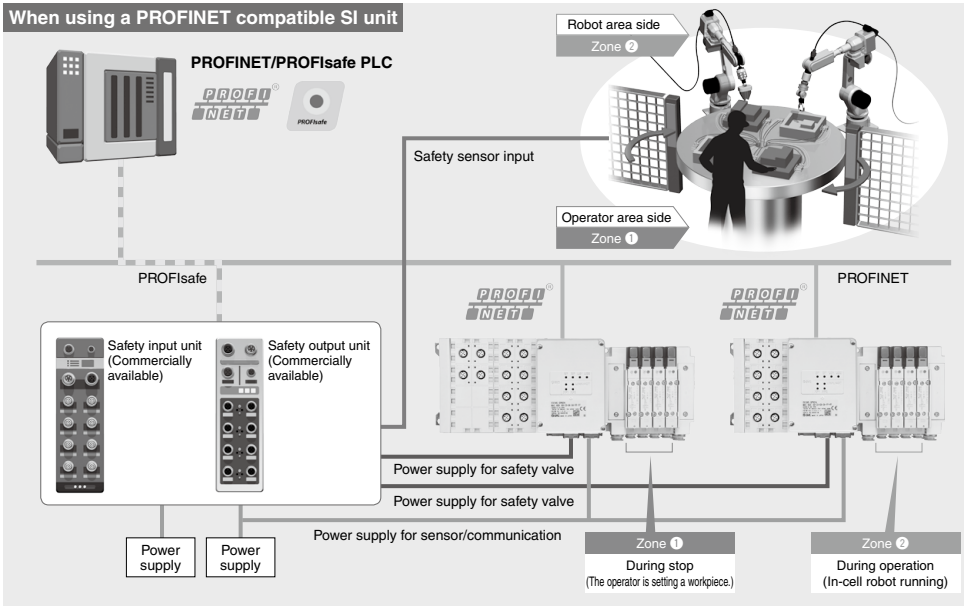
PROFIsafe

When using a PROFIsafe compatible SI unit

- Separate safety input/output units (commercially available) are not required. (Space saving)
- Multi-zone safety outputs can be individually controlled.



When using a PROFINET compatible SI unit



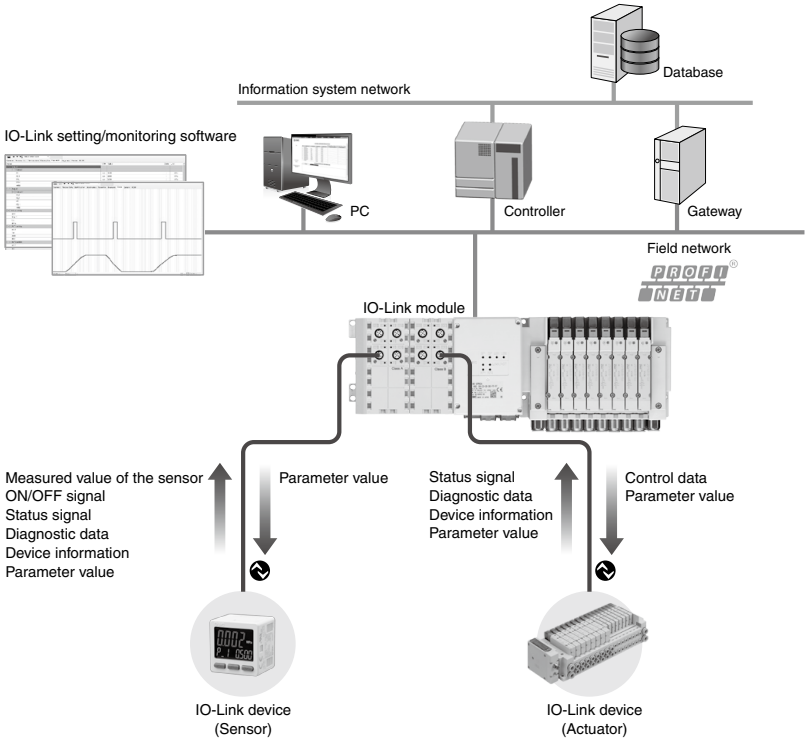
⚠Safety of the machine or system

The manufacturer of the machine/system and its user are responsible for the safety of the machine/system. Use of the EX245-FPS□ requires machine/system safety concepts which are in accordance with the corresponding directives and standards, safety function validation, and hazard and risk analysis. Target SILs (IEC 61508/62061 compliance) and performance levels/categories (ISO 13849 compliance) are determined based on the risk analysis. For more information, refer to the "Safety of the machine or system" section in the operation manual of the EX245-FPS□.

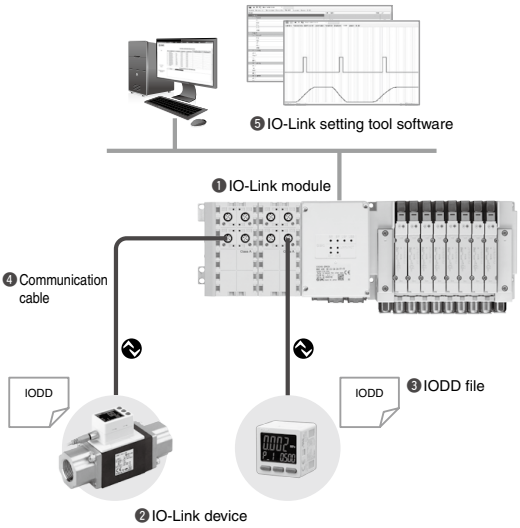
IO-Link

IO-Link is a communication technology for sensors and actuators that is an international standard, IEC 61131-9.
This technology is used to send/receive device information such as manufacturer, product part number, parameters, and diagnostic data, as well as the control data including ON/OFF signals and measured values of the sensor, by connecting the IO-Link master and device in a 1:1 configuration.
IO-Link enables condition monitoring and error detection of the sensor and equipment, and it can contribute to the reduction of startup labor and recovery time and the realization of preventive and predictive maintenance.

Reduced design and startup labor	● Batch setting of device parameters from the upper level ● Remote check of device information ● Detection and remote unified check of device misconnection/non-connection
Minimum recovery time due to error detection	● Early detection of location where problem is occurring via communication ● Early obtaining of information on problem phenomenon via communication ● Early recovery during product replacement (automatic setting of device parameters)
Preventive and predictive maintenance through condition monitoring	● Monitors changes in measured values of a sensor during signal ON/OFF ● Monitors the number of device operations and automatically notifies when the set number of operations has been exceeded ● Remote monitoring of device and equipment conditions via communication



IO-Link System Configuration



❶ IO-Link module
- Acts as a gateway between the IO-Link communication and the upper level communication

❷ IO-Link device
- A sensor/actuator connecting to an IO-Link module in a 1:1 configuration

❸ IODD file
- A file in which device properties and parameters are described
- Registered to the setting tool
- Provided by the device manufacturer

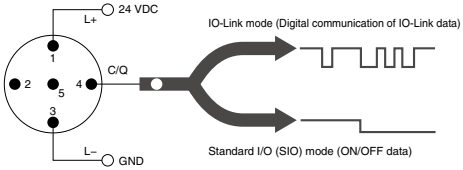
❹ Communication cable
- A 4-wire or 5-wire general-purpose cable that is the same as the existing sensor cable (Unshielded cable)
- Max. cable length: 20 m

❺ IO-Link setting tool software
- Software for the setting and monitoring of an IO-Link module/device*1

*1 A setting tool compatible with the IO-Link master of every manufacturer is used for the SMC EX245 series IO-Link module. (IO-Link Device Tool V5 manufactured by TMG Technologie und Engineering, Germany)

IO-Link Interface

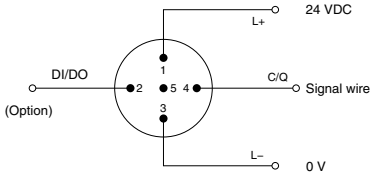
The connecting part between the IO-Link module and the device is called a "port." Each port can be switched between "IO-Link mode" for digital communication and "standard I/O mode" for conventional contact input/output.



Reference: IO-Link Consortium

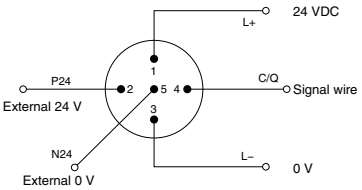
2 types of interfaces

There are two methods for power supply: one is for sensors, and the other is for actuators.



Port class A

The control power supply wire and signal wire can be connected with one cable. (Mainly for sensors)



Port class B

The control power supply wire, external power supply wire, and signal wire can be connected with one cable. (Mainly for actuators)

IO-Link Module

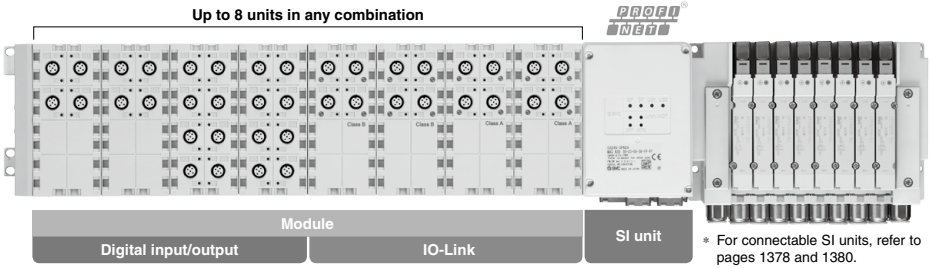
PROFINET

The mixed use of digital and IO-Link modules is possible.

Digital input/output modules, and IO-Link module can be mixed, and up to 8 units can be connected in any order.

Supports 4 ports

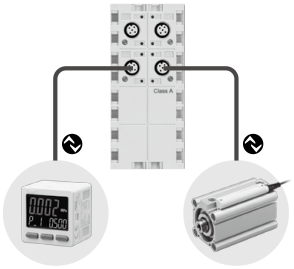
4 IO-Link devices can be connected.



∗ For connectable SI units, refer to pages 1378 and 1380.

Supports both port class A and port class B

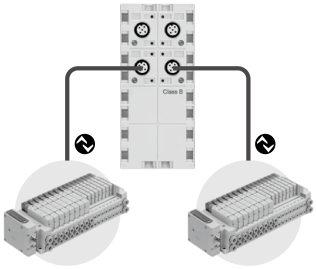
Port class A
IO-Link module



For connecting IO-Link sensors

Pressure sensors, flow sensors, actuator position sensors, electro-pneumatic regulators, etc.

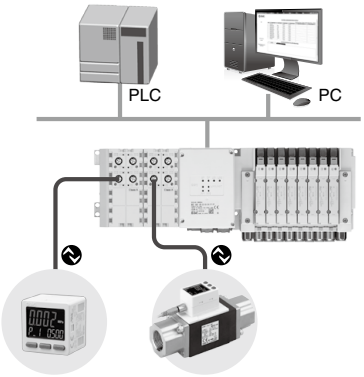
Port class B
IO-Link module



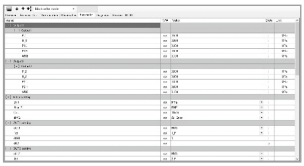
For connecting IO-Link compatible SI units (for valve driving)

∗ A special wiring Y branch connector for port class A electrical power supply is available. For details, refer to Accessories ❽ on page 1388.

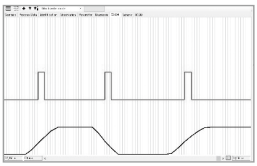
The data can be accessed from via PC (setting tool).



Setting screen



Monitoring screen



The setting and monitoring of the IO-Link module and device are possible via PC, without using the PLC.

- Process data
- Device parameters, IO-Link module parameters
- IO-Link module information, Device information
- Port diagnosis, Device diagnosis

∗ The PC setting tool is an IO-Link device tool manufactured by Technologie Management Gruppe (hereinafter referred to as TMG). It can be downloaded for free from the TMG website, however, for usage beyond 30 days, a license key is required.

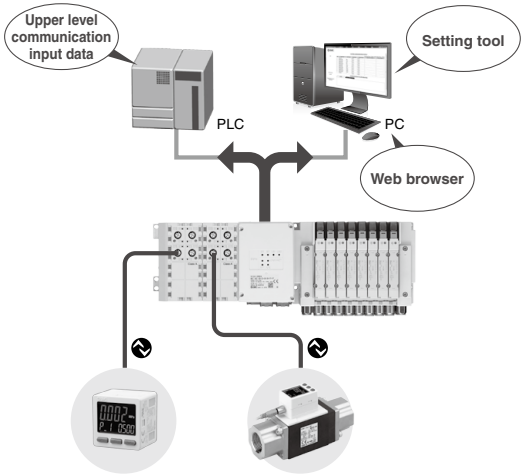
IO-Link Module

PROFINET

Diagnosis function

Diagnosis is possible from the upper level communication.

IO-Link module diagnostic information can be obtained via PLC program or PC (web browser).
Device diagnostic information can be obtained via PC (setting tool).



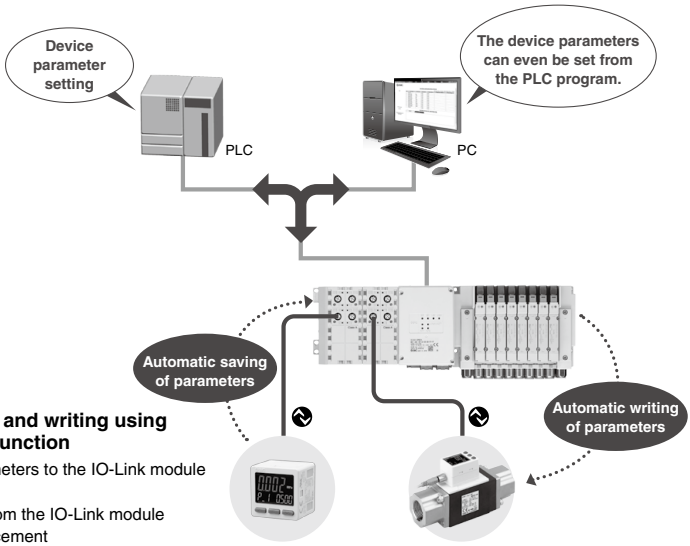
Items of IO-Link module diagnosis
Detection of port short-circuit
Detection of non-connected device
Detection of misconnected device (check error)
Notification of port misconfiguration (excessively large input/output data)
Conditions of diagnostic event (port, device)

Items of device diagnosis
Diagnostic results (problem phenomenon) received from devices are shown in event codes.

Device parameter setting function, Automatic saving/writing

The parameter setting of devices is possible from the upper level communication.

Parameter setting is possible via PC (setting tool).
It is also possible to use output data or message data via PLC program.



Automatic saving and writing using the data storage function

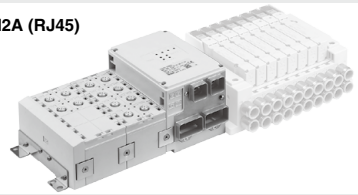
- Saves device parameters to the IO-Link module automatically
- Automatic writing from the IO-Link module during device replacement

CONTENTS

Fieldbus System (For Input/Output)
EX245 Series

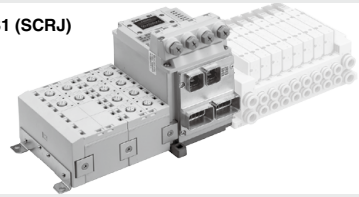
SPN1A (SCRJ)

SPN2A (RJ45)

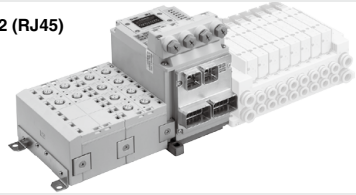


SPN3A (M12)

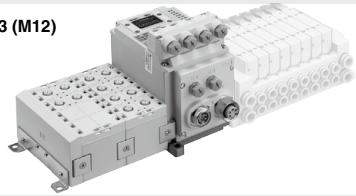
FPS1 (SCRJ)



FPS2 (RJ45)



FPS3 (M12)



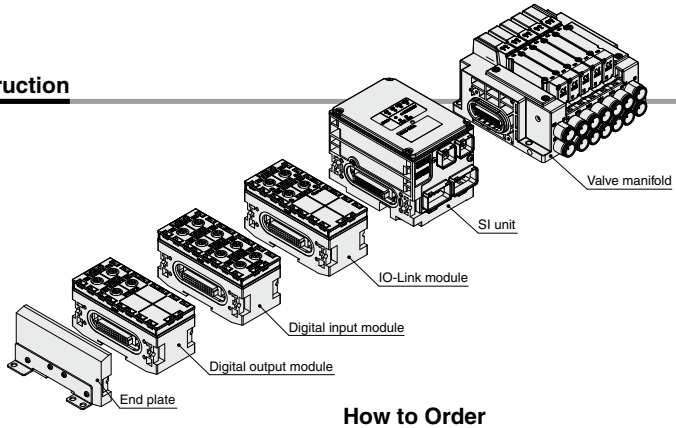
SMC

Fieldbus System For Input/Output

EX245 Series

IP65

Construction



How to Order

SI Unit

EX245 – SPN1A

Connector type

Symbol	Protocol	Communication connector	Power supply connector
SPN1A	PROFINET	Push Pull connector (SCRJ): 2 pcs.	Push Pull connector (24 V): 2 pcs.
SPN2A		Push Pull connector (RJ45): 2 pcs.	Push Pull connector (24 V): 2 pcs.
SPN3A		M12 connector (4-pin, Socket, D-coded): 2 pcs.	7/8 inch connector (5-pin, Plug): 1 pc. 7/8 inch connector (5-pin, Socket): 1 pc.
FPS1	PROFIsafe	Push Pull connector (SCRJ): 2 pcs.	Push Pull connector (24 V): 2 pcs.
FPS2		Push Pull connector (RJ45): 2 pcs.	Push Pull connector (24 V): 2 pcs.
FPS3		M12 connector (4-pin, Socket, D-coded): 2 pcs.	7/8 inch connector (5-pin, Plug): 1 pc. 7/8 inch connector (5-pin, Socket): 1 pc.


EX245-SPN1A


EX245-SPN2A


EX245-SPN3A


EX245-FPS1


EX245-FPS2


EX245-FPS3

IO-Link Module

EX245 – LA1

IO-Link module specification

LA1	Class A (4-port)
LB1	Class B (4-port)

Digital Input Module

EX245 – DX1

Digital input module specification

DX1	Digital input (16 inputs)

Digital Output Module

EX245 – DY1

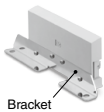
Digital output module specification

DY1	Digital output (8 outputs)

End Plate

EX245 – EA2 – 1

For JSY/SY



For VQC

Bracket

1	General-purpose
2	Without bracket
3	For JSY/SY (Only for EX245-SPN□A)
4	For VQC4000 (Only for EX245-SPN□A)
5	For VQC2000 (Only for EX245-SPN□A)

∗ For the EX245-EA2-3/4/5, only the EX245-SPN□A can be connected. The bracket is adjusted according to the mounting hole pitch of the valve manifold.

∗ When using the EX245-FPS□, please select the EX245-EA2-1 or 2.

∗ Refer to the **Web Catalog** for valve manifold part numbers.
If you are considering using a manifold valve compatible with PROFIsafe, be sure to check with your SMC sales representative prior to ordering.

Specifications

Common 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/UKCA marking, UL (CSA)

EX245-SPN1A

EX245-SPN2A

EX245-SPN3A

SI Unit (EX245-SPN□A) PROFINET

Model			EX245-SPN1A	EX245-SPN2A	EX245-SPN3A
Communication	**Protocol**		PROFINET		
	Device type		PROFINET IO		
	Communication speed		100 Mbps full duplex		
	Configuration file*1		GSD file		
	Applicable function		MRP function, MRPD function, Fast Start Up function, Shared Device function, PROFIenergy function, Web server function, FW update function, Conformance Class C, NET Load Class Ⅲ		
		Fiber-optic cable maintenance alarm		—	
Electrical	**Internal current consumption (US1)**		300 mA or less	200 mA or less	
	Loop through current between power connectors		16 A		6 A
	Operating voltage/ Max. current	**US1**	24 VDC +20%, –15%/6 A		
		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		
	Applicable modules		Input module, Output module, IO-Link module		
	Weight		465 g		540 g

*1 The configuration file can be downloaded from the SMC website: https://www.smcworld.com

EX245-FPS1

EX245-FPS2

EX245-FPS3

SI Unit (EX245-FPS□) PROFINET, PROFIsafe

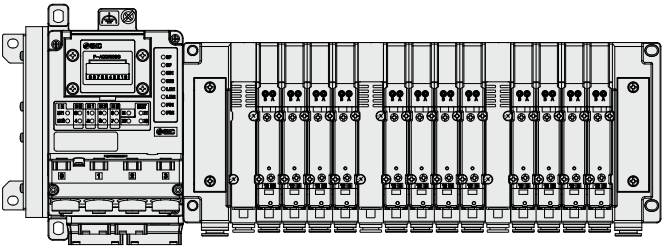
Model			EX245-FPS1	EX245-FPS2	EX245-FPS3
Communication	**Protocol**		PROFINET, PROFIsafe		
	Device type		PROFINET IO		
	Communication speed		100 Mbps full duplex		
	Applicable function		MRP function, Conformance Class C, NET Load Class Ⅰ		
		Fiber-optic cable maintenance alarm		—	
Electrical	**Internal current consumption (US1)**		350 mA or less	300 mA or less	
	Loop through current between power connectors		16 A		10 A
	Operating voltage/ Max. current	**US1**	24 VDC +20%/–15%, 6 A		
		US2	24 VDC +20%/–15%, 4 A (Excludes valves)		
Safety input	**Number of inputs**		Dual channel: 4 inputs, Single channel: 8 inputs		
	External supply voltage		24 VDC +20%/–15%		
	Max. supply current		UT1: 2 A, UT2: 1 A		
	Cross-circuit detection		Yes		
	Over current/Short-circuit detection function		Yes		
	Input type		PNP		
	ON voltage		11 to 30 V		
	OFF voltage		–3 to 5 V		
	Input current (at 24 VDC)		Typ. 3.8 mA		
	Input characteristics		Type 3 (IEC 61331)		
Safety output	**Number of safety outputs**	**Valve side**	3 zones		
		Module side	1 zone		
	Max. current	**Valve side**	1.5 A (Total of 3 zones)		
		Module side	4 A		
	Short-circuit protection		Yes		
	Power supply source		US2		
Output	**Output type**		PNP		
	Number of outputs		8 outputs/zone, Total of 24 outputs		
	Load		Solenoid valve with surge voltage suppressor of 24 VDC, 1 W or less (SMC)		
	Protection		Short-circuit protection		
	Power supply		24 VDC, 1.5 A		
General	**Max. number of modules**		8		
	Max. number of digital inputs		128		
	Max. number of digital outputs		64		
	Applicable modules		Input module, Output module		
	Weight		1,100 g		1,200 g

* The configuration file can be downloaded from the SMC website: https://www.smcworld.com

Specifications

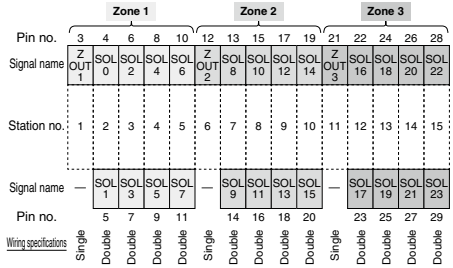
Manifold Wiring Example

∗ For details on input/output module connection, refer to the operation manual.



<Valve interface pin arrangement>

Pin no.	Valve zone	Signal name	Function
1	Common	M OUT1	Common 0 V
2			
3	Zone 1	Z OUT1	Zone 1: Safety output
4		SOL0	Output 0 (Output is available only when Zone 1 is turned ON.)
⋮		⋮	⋮
11		SOL7	Output 7 (Output is available only when Zone 1 is turned ON.)
12	Zone 2	Z OUT2	Zone 2: Safety output
13		SOL8	Output 8 (Output is available only when Zone 2 is turned ON.)
⋮		⋮	⋮
20		SOL15	Output 15 (Output is available only when Zone 2 is turned ON.)
21	Zone 3	Z OUT3	Zone 3: Safety output
22		SOL16	Output 16 (Output is available only when Zone 3 is turned ON.)
⋮		⋮	⋮
29		SOL23	Output 23 (Output is available only when Zone 3 is turned ON.)



The stations corresponding to the safety outputs (Z OUT n) are configured by single wiring.

EX245-DX1

Digital Input Module

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.

EX245-DY1

Digital Output Module

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.

Specifications

EX245-LA1

EX245-LB1

IO-Link Module

Model		EX245-LA1		EX245-LB1
IO-Link version		Version 1.1		
IO-Link port class		Class A		Class B
Communication speed		COM1 (4.8 kBaud) COM2 (38.4 kBaud) COM3 (230.4 kBaud) ∗ Changes automatically according to the connected device		
Number of IO-Link ports		4		
Compatible SI unit		EX245-SPN1A, EX245-SPN2A, EX245-SPN3A		
Max. supply current	Device power supply (L+)	0.5 A/Connector (2 A/Unit)		0.5 A/Connector (1 A/Unit)
	External power supply (P24)	—		1.6 A/Connector (3 A/Unit)
Input	Pin no.	2	4	4
	Input type	PNP		
	Protection	Short-circuit protection		
	Rated input current	Approx. 2.5 mA	Approx. 5.8 mA	
	ON voltage	13 V or more		
	OFF voltage	8 V or less		
Output	Pin no.	4		
	Output type	PNP		
	Max. load current (C/Q line)	0.25 A/Output (Supplied from the power supply for control/input)		
	Protection	Short-circuit protection		
Current consumption		50 mA or less		
Weight		280 g		

For JSY/SY

For VQC

EX245-EA2-□

End Plate

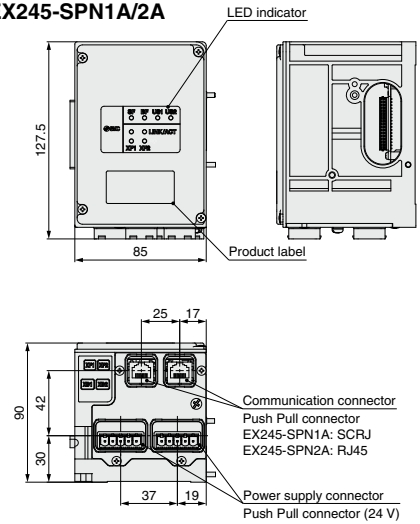
Model	EX245-EA2-1	EX245-EA2-2	EX245-EA2-3	EX245-EA2-4	EX245-EA2-5
Bracket	Yes (General-purpose)	No	Yes (Mounting hole for JSY/SY)	Yes (Mounting hole for VQC4000)	Yes (Mounting hole for VQC2000)
Weight	120 g	80 g	120 g	150 g	120 g

∗ For the EX245-EA2-3/4/5, only the EX245-SPN□A can be connected. The bracket is adjusted according to the mounting hole pitch of the valve manifold.
∗ When using the EX245-FPS□, please select the EX245-EA2-1 or 2.

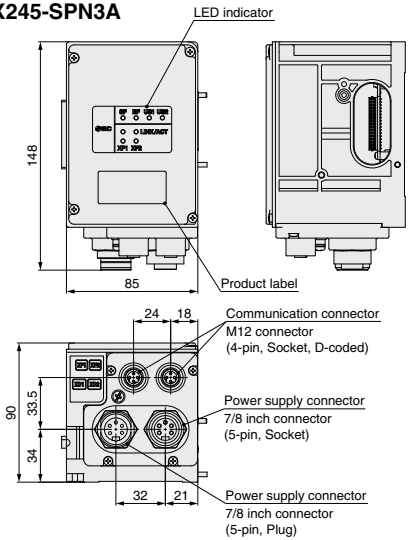
Dimensions/Parts Description

SI Unit

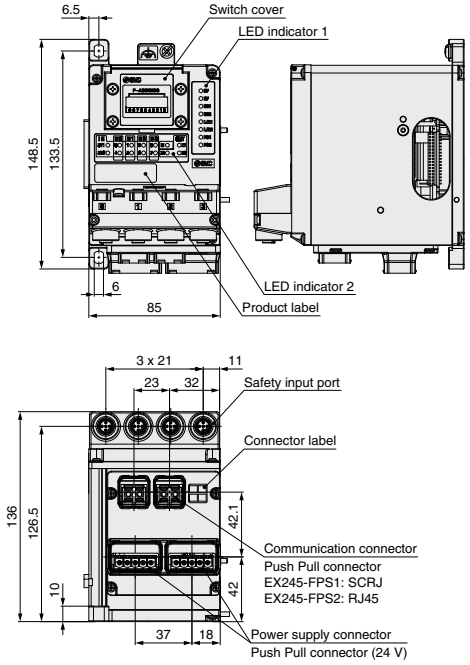
EX245-SPN1A/2A



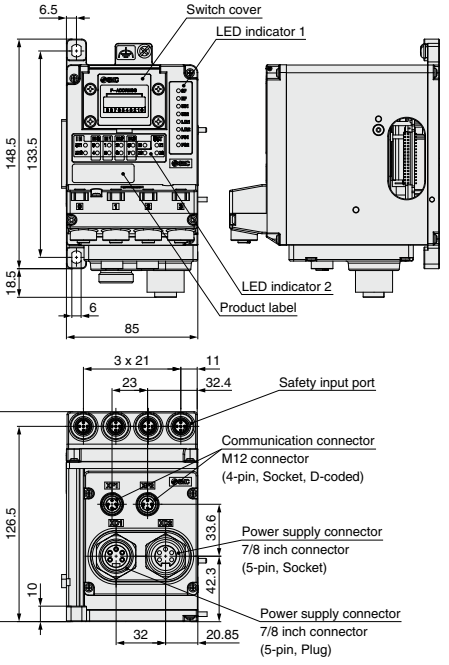
EX245-SPN3A



EX245-FPS1/2



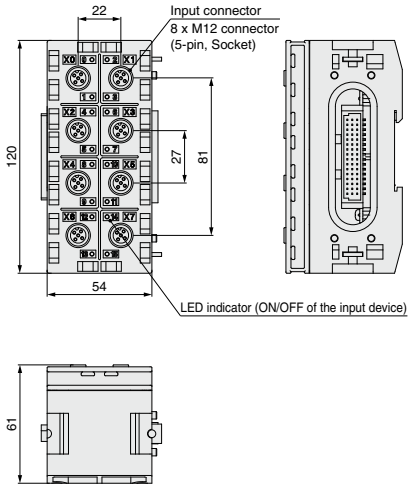
EX245-FPS3



Dimensions/Parts Description

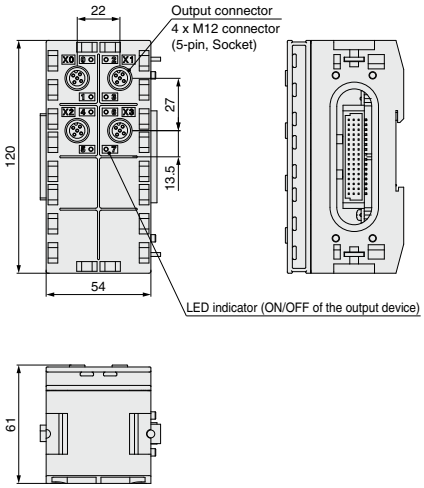
Digital Input Module

EX245-DX1



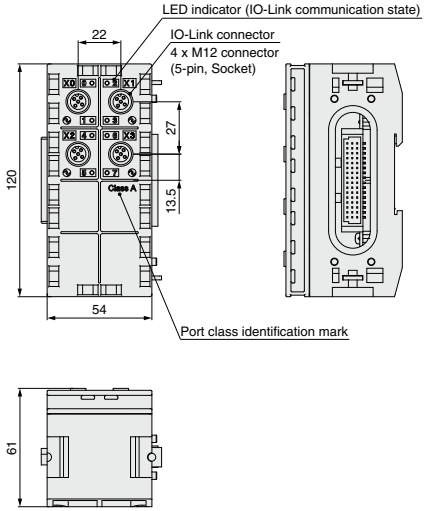
Digital Output Module

EX245-DY1



IO-Link Module

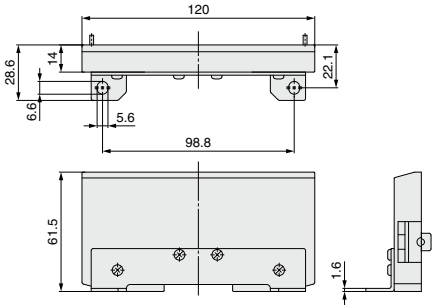
EX245-LA1/LB1



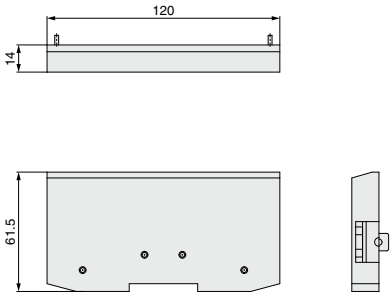
Dimensions/Parts Description

End Plate

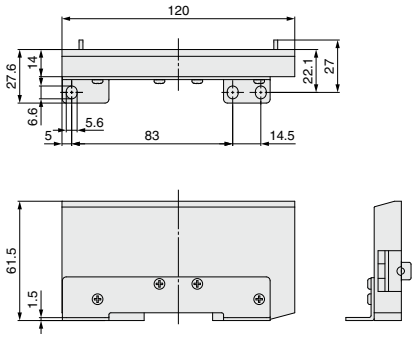
EX245-EA2-1 (General-purpose bracket)



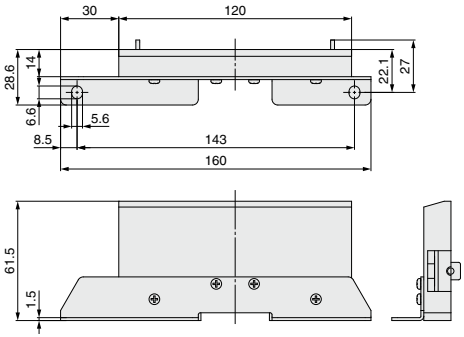
EX245-EA2-2 (Without bracket)



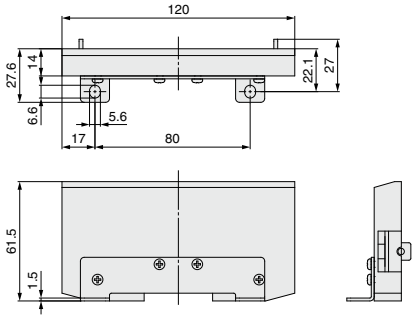
EX245-EA2-3 (For JSY/SY)



EX245-EA2-4 (For VQC4000)



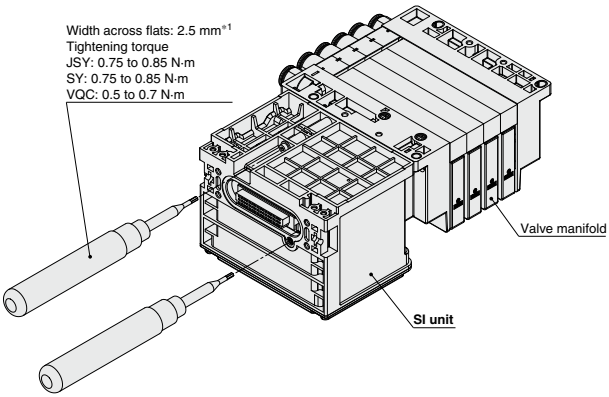
EX245-EA2-5 (For VQC2000)

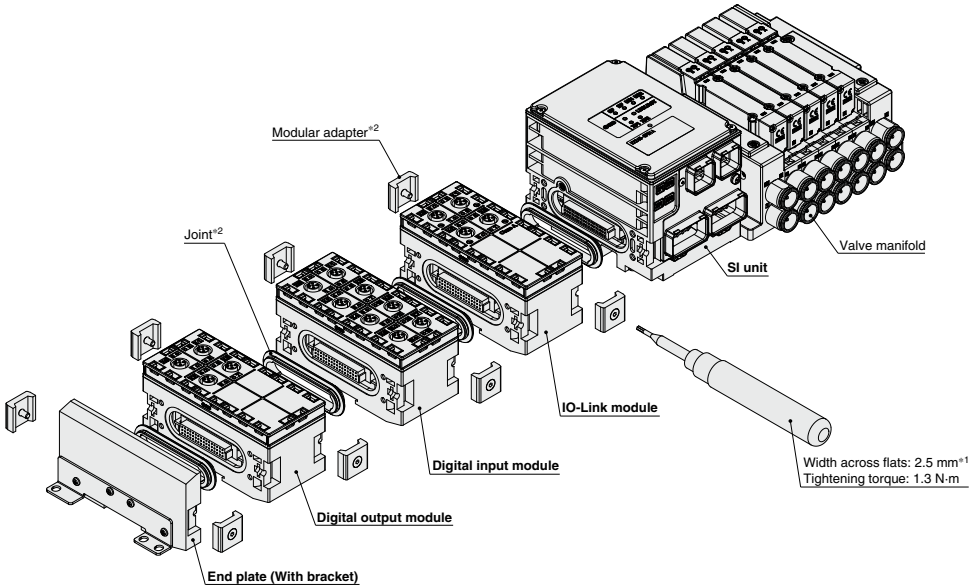


Assembly Examples

Valve manifold
SI unit ——— EX245-SPN1A
IO-Link module ——— EX245-L□1
Digital input module ——— EX245-DX1
Digital output module ——— EX245-DY1
End plate ——— EX245-EA2-3

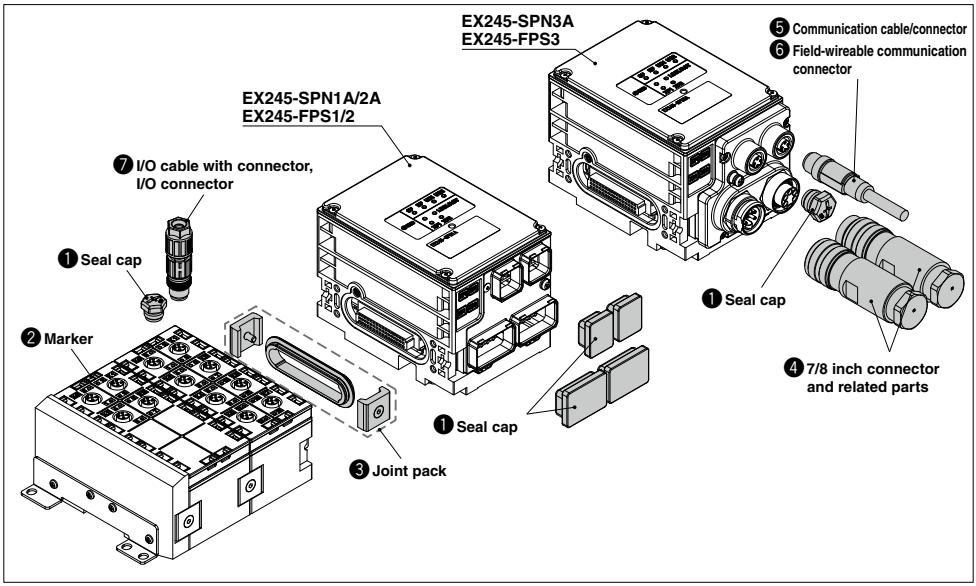
∗ If you are considering using a valve manifold compatible with PROFIsafe, be sure to check with your SMC sales representative prior to ordering.





∗1 A tightening tool is not included. It should be provided by the customer.
∗2 The joint and modular adapter are shipped together with the digital input/output modules, IO-Link module, and end plate.

EX245 Series
Accessories



❶ Seal Cap (10 pcs.)

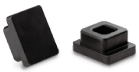
Be sure to mount a seal cap on any unused I/O connectors. Otherwise, the specified enclosure cannot be maintained.

EX9-AWTS
For M12 (10 pcs.)

Number of included seal caps

Product number	EX9-AWTS
EX245-SPN1A/2A	—
EX245-SPN3A	1
EX245-FPS1/2	4
EX245-FPS3	6

EX245-AWC
For communication connectors (10 pcs.)



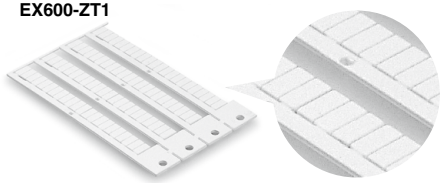
EX245-AWP
For power supply connectors (10 pcs.)

Seal cap for communication connector and power supply connector are included when **EX245-SPN1A/2A or EX245-FPS1/2** is shipped (2 caps for each unit).

❷ Marker (1 sheet, 88 pcs.)

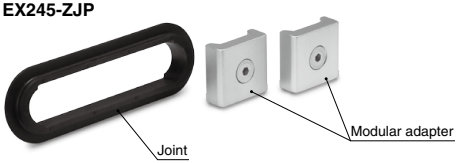
The signal name of I/O device and each module name can be entered and mounted on each module.

EX600-ZT1



❸ Joint Pack

EX245-ZJP



Included when **EX245-DX1/DY1**, **EX245-EA2-□** are shipped.

❹ 7/8 Inch Connector and Related Parts

· **Power supply cable (7/8 inch connector)**

PCA-1558810 Straight 2 m
PCA-1558823 Straight 6 m

· **Power supply field-wireable connector (7/8 inch)**
[Compatible with AWG22-16]

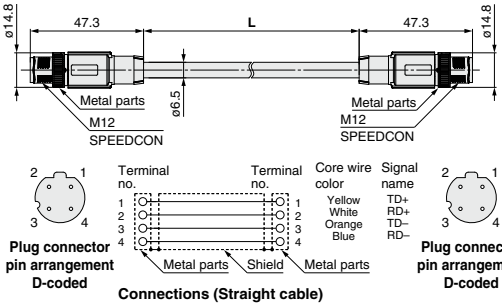
PCA-1578078 Plug
PCA-1578081 Socket

❺ Communication Cable/Connector

EX9-AC 005 EN-PSPS (With connector on both sides (Plug/Plug))

Cable length (L)

005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm



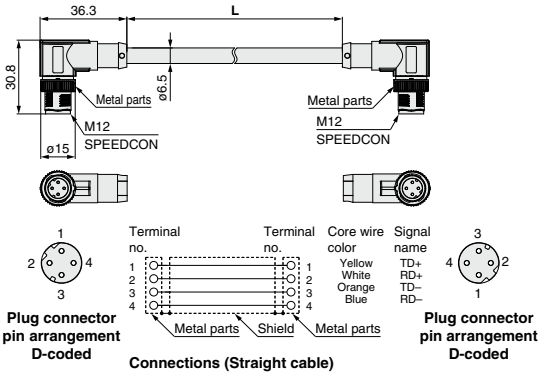
Connections (Straight cable)

Item	Specifications
Cable O.D.	ø6.5 mm
Conductor nominal cross section	0.34 mm²/AWG22
Wire O.D. (Including insulator)	1.55 mm
Min. bending radius (Fixed)	19.5 mm

EX9-AC 005 EN-PAPA (With angled connector on both sides (Plug/Plug))

Cable length (L)

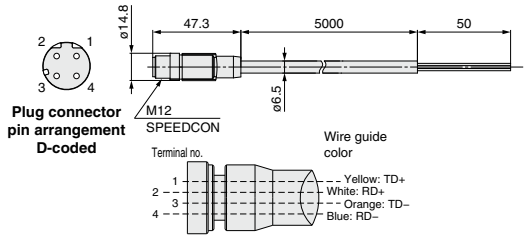
005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm



Connections (Straight cable)

Item	Specifications
Cable O.D.	ø6.5 mm
Conductor nominal cross section	0.34 mm²/AWG22
Wire O.D. (Including insulator)	1.55 mm
Min. bending radius (Fixed)	19.5 mm

PCA-1446566 (Plug)



Connections

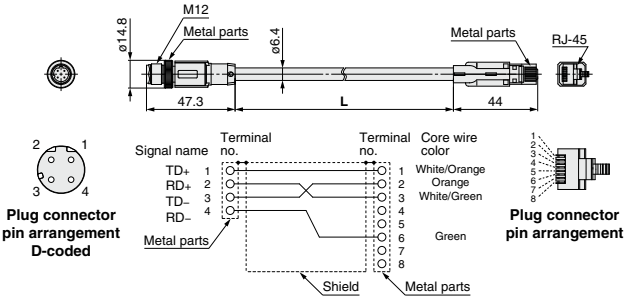
Item	Specifications
Cable O.D.	ø6.5 mm
Conductor nominal cross section	AWG22
Wire O.D. (Including insulator)	1.55 mm
Min. bending radius (Fixed)	45.5 mm

❺ Communication Cable/Connector

EX9-AC 020 EN-PSRJ (Plug/RJ-45 connector)

Cable length (L)

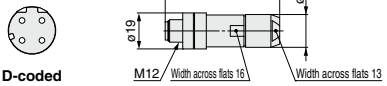
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm



Item	Specifications
Cable O.D.	ø6.4 mm
Conductor nominal cross section	0.14 mm²/AWG26
Wire O.D. (including insulator)	0.98 mm
Min. bending radius (Fixed)	26 mm

❻ Field-wireable Communication Connector

PCA-1446553



Applicable Cable

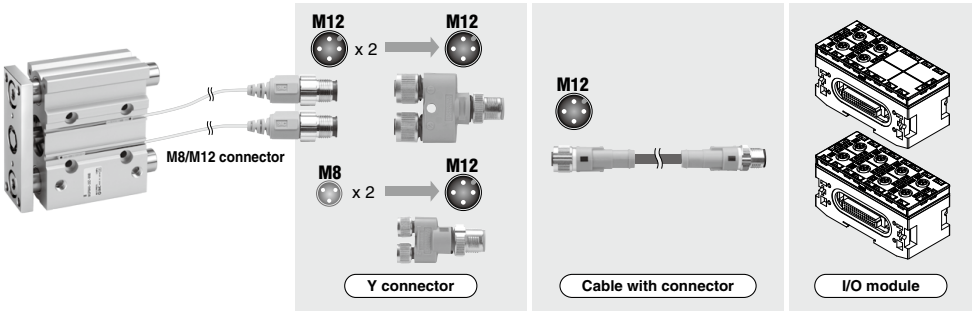
Item	Specifications
Cable O.D.	4.0 to 8.0 mm
Wire gauge (Stranded wire cross section)	0.14 to 0.34 mm²/AWG26 to 22

* The table above shows the specifications for the applicable cable. Adaptation for the connector may vary on account of the conductor construction of the electric wire.

❼ I/O Cable with Connector, I/O Connector

Name	Use	Part no.	Description
Cable with connector	For sensor 	**PCA-1557769**	Cable with M12 connector (4 pins/3 m)
		PCA-1557772	Cable with M8 connector (3 pins/3 m)
Field-wireable connector	For sensor 	**PCA-1557730**	Field-wireable connector (M8/3 pins/Plug/Piercecon® connection)
		PCA-1557743	Field-wireable connector (M12/4 pins/Plug/QUICKON-ONE connection/SPEEDCON)
		PCA-1557756	
Y connector	For sensor 	**PCA-1557785**	Y connector (2 x M12 (5 pins)-M12 (5 pins)/SPEEDCON)
		PCA-1557798	Y connector (2 x M8 (3 pins)-M12 (4 pins)/SPEEDCON)

∗ When using the Y connector, connect it to the connector on the I/O module through the sensor cable with the M12 connector (PCA-1557769).

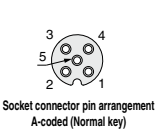


For IO-Link Module

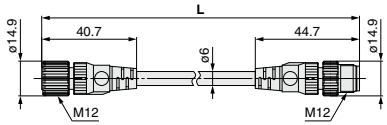
EX9-AC 005 -SSPS (With connector on both sides (Socket/Plug))

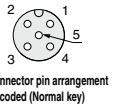
Cable length (L)

005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm

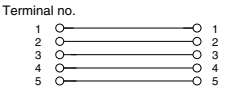


Socket connector pin arrangement
A-coded (Normal key)





Plug connector pin arrangement
A-coded (Normal key)



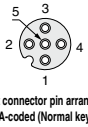
Connections

Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including conductor)	1.5 mm
Min. bending radius (Fixed)	40 mm

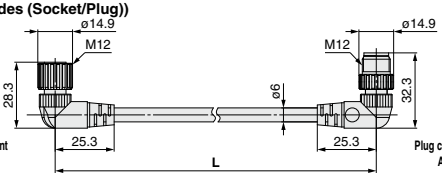
EX9-AC 005 -SAPA (With connector on both sides (Socket/Plug))

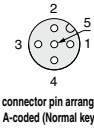
Cable length (L)

005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm

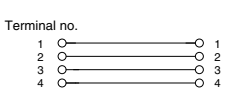


Socket connector pin arrangement
A-coded (Normal key)





Plug connector pin arrangement
A-coded (Normal key)

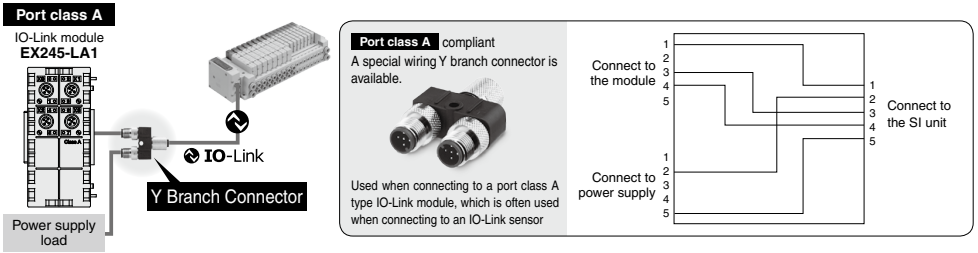


Connections

Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including conductor)	1.5 mm
Min. bending radius (Fixed)	40 mm

❼ I/O Cable with Connector, I/O Connector

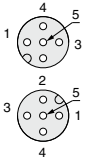
Connection Example



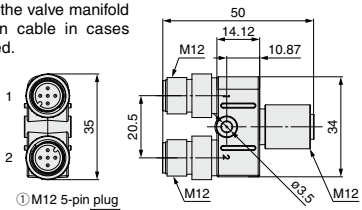
Y Branch Connector for IO-Link

This connector is used to supply power to the valve manifold by branching the IO-Link communication cable in cases where a port class A IO-Link module is used.

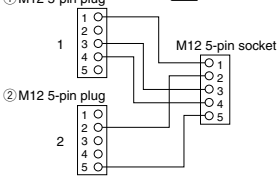
EX9-ACY02-S



Plug connector pin arrangement A-coded (Normal key)



Socket connector pin arrangement A-coded (Normal key)



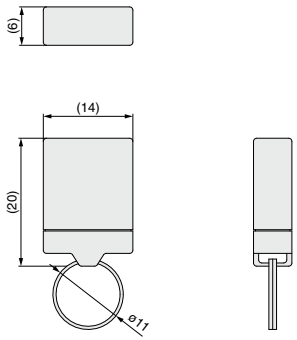
Solenoid valve power supply cable side pin arrangement when using a branch connector

1	—	Unused
2	SV24V	+24 V for solenoid valve
3	—	Unused
4	—	Unused
5	SV0V	0 V for solenoid valve

❽ IO-Link Device Tool License Key

USB dongle

EX9-ZSW-LDT1



EX245 Series
Specific Product Precautions

Be sure to read this before handling the products. Refer to page 7 for safety instructions and pages 15 to 17 for fieldbus system precautions.

Operating Environment

⚠ 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) Appropriately mount 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 that is exposed to water splashes, please take measures such as using a cover.