

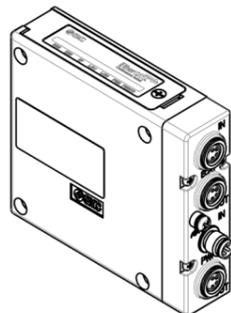


ORIGINAL INSTRUCTIONS

Instruction Manual

Fieldbus device - SI Unit for EtherCAT®

EX260-VEC1



The intended use of this product is to control pneumatic valves and I/O while connected to the EtherCAT® protocol.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)^{*)}, and other safety regulations.

^{*)} ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components.

ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components

IEC 60204-1: Safety of machinery - Electrical equipment of machines. Part 1: General requirements

ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Warning	Warning indicates a hazard with a medium level of risk which if not avoided could result in death or serious injury.
	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury

Warning

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

Caution

- **Provide grounding to assure the safety and noise resistance of the Fieldbus system.**
Individual grounding should be provided close to the product using a short cable.
- **When conformity to UL is required the SI Unit must be used with a UL1310 Class 2 power supply.**

2 Specifications

2.1 General specifications

Item	Specifications
Ambient temperature	0 to +50 °C
Ambient storage temperature	-20 to +60 °C
Ambient humidity	35 to 85%RH (no condensate)
Withstand voltage	500 VAC applied for 1 minute (between FE and terminals)
Insulation resistance	500 VDC, 10 MΩ or more (between FE and terminals)
Operating atmosphere	No corrosive gas
Enclosure	IP67 (IEC 60529) when connected to vacuum manifold
Dimensions (W x L x H) mm	25.5 x 98.7 x 76.5
Weight	150 g or less

2.2 Electrical specifications

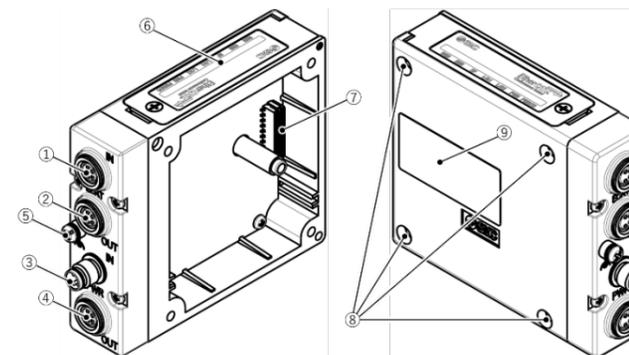
Item	Specifications	
For logic/input	Operating voltage	24 VDC ±10%
	Current consumption	100 mA or less (at 24 VDC)
	Under voltage detection	approx. 18 VDC
For output	Operating voltage	24 VDC +10% / -5%
Reverse polarity protection	Yes (PWR and PWR(V))	
Loop through current between power connectors	4 A	
Galvanic Isolation	Yes (PWR and PWR(V))	

2.3 Communication specifications

Item	Specifications
Bus protocol	EtherCAT®
Version	Conformance Test Record V2.3.0
Communication speed	100 Mbps
Communication medium	Standard Ethernet cable (CAT5) 100-Base-TX
FoE	Supported
CoE	Supported for parameter setting and diagnostics
Configuration (XML) file	SMC_EX260-VECx_V10.xml ^{*)}
Vendor ID	0x00000114
Product code	0x0100004F

^{*)} To configure the SI Unit with your EtherCAT® controller's software, the dedicated ESI (EtherCAT® Slave Information) file is required. The ESI file contains all necessary information to configure the SI Unit on your controller's software. Technical documentation giving detailed configuration information and the XML file can be found on the SMC website. (URL: <https://www.smcworld.com>)

3 Name and function of parts



No	Part	Description
1	Communication connector 1 (ECAT IN)	EtherCAT® connection. (M8 4-pin socket, A-code)
2	Communication connector 2 (ECAT OUT)	
3	Power connector 1 (PWR IN)	Power supply for logic/input and output.
4	Power connector 2 (PWR OUT)	(M8 4-pin plug / socket, A-code)
5	FE terminal	Functional earth. (M3 screw)
6	LED display	To indicate the status of the SI Unit.
7	Valve manifold connection	Connection for the vacuum manifold.
8	Mounting hole	Mounting hole for connection to the vacuum manifold.
9	Product label	Label to indicate the product software version, serial number etc..

4 Installation

4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- For further details on mounting and installation to the vacuum manifold, refer to the vacuum manifold operation manual.
- The SI Unit must be connected to a vacuum manifold before it is powered ON.

Caution

- Be sure to turn OFF the power.
- Check there is no foreign matter inside the SI Unit.
- Check there is no damage and no foreign matter on the gasket.
- If the SI Unit is not assembled correctly, the internal PCBs may be damaged or liquid and/or dust may enter into the unit.
- Tighten the screws with the specified tightening torque.

4.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

5 Wiring

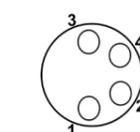
Connect the EtherCAT® communication cables, the power cables and the FE cable. Select the appropriate cables to mate with the connectors mounted on the SI Unit.

Caution

Pay attention not to confuse the communication connectors with the power connectors. Incorrect connection may result in SI Unit failure. Check the labels on the product.

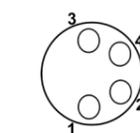
5.1 Communication connector

ECAT IN: M8 4-pin socket, A-code



No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	RD-	Receive Data -
4	TD-	Transmit Data -

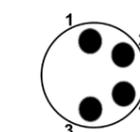
ECAT OUT: M8 4-pin socket, A-code



No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	RD-	Receive Data -
4	TD-	Transmit Data -

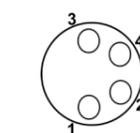
5.2 Power supply connector layout

PWR IN: M8 4-pin plug, A-code



No.	Designation	Description
1	24 V (PWR)	+24 V for logic/input
2	24 V (PWR(V))	+24 V for output
3	0 V (PWR)	0 V for logic/input
4	0 V (PWR(V))	0 V for output

PWR OUT: M8 4-pin socket, A-code



No.	Designation	Description
1	24 V (PWR)	+24 V for logic/input
2	24 V (PWR(V))	+24 V for output
3	0 V (PWR)	0 V for logic/input
4	0 V (PWR(V))	0 V for output

- The power supply for the solenoid valve and the SI Unit operation are isolated. Be sure to supply power respectively. Either single source power or two different power supplies can be used.
- The power supply PWR for logic/input and PWR(V) for output should be protected by an external fuse.
- The recommended tightening torque for the communication and power connectors is 0.2 N•m.

Warning

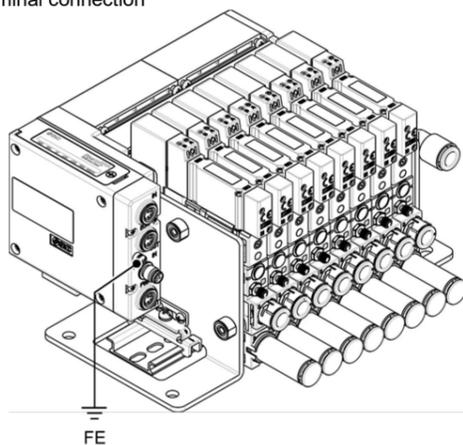
- Be sure to fit an M8 seal cap (EX9-AWES) on any unused communication and power connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.

5.3 FE Terminal

- The SI Unit must be connected to FE (Functional Earth) to divert electromagnetic interference.
- Connect a grounding cable from the FE terminal screw on the SI Unit to the nearest functional earth point.
- The grounding cable should be as thick and short as reasonably possible.
- The recommended tightening torque for the FE terminal is 0.3 N•m.

5 Wiring (continued)

- FE terminal connection



6 Settings

6.1 Vacuum manifold stations setting

- Set the number of vacuum manifold stations from the slot.
- Select according to the specifications of the connected vacuum manifold.

Slot name	Module name	ModuleIdent	Description
Vacuum manifold stations	Vacuum manifold 4-stations	0x00030001	4 stations of the vacuum manifold
	Vacuum manifold 8-stations	0x00030002	8 stations of the vacuum manifold
	Vacuum manifold 12-stations	0x00030003	12 stations of the vacuum manifold
	Vacuum manifold 16-stations	0x00030004	16 stations of the vacuum manifold

- Scan the SI Unit for first time configuration to automatically set the slot to match the actual vacuum manifold connected.
- If the vacuum manifold stations is not set or if the number of vacuum manifold actually connected does not match this setting, the Diagnostic history "Error" occurs and ERR LED blinks (2.5kHz). In addition, the SI Unit cannot shift to Operational or Safe-Operational status (AL Status Code: 0x0070).

6.2 Unit status setting

- Set Enable / Disable of unit status from the slot. The default setting is unit status enabled.
- If the module is deleted, the SI Unit will not have overall diagnostic information.

Slot name	Module name	ModuleIdent	Description
Unit status	Overall diagnostics of the unit	0x00030100	Diagnostics relating to the whole unit.

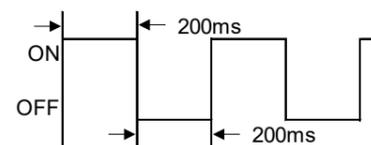
7 LED Indication



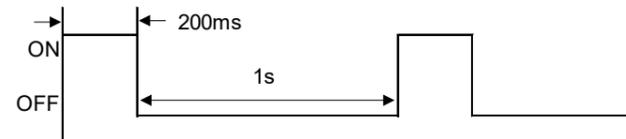
LED	LED Status	Description
RUN	OFF	Init
	Green Flashing (2.5 Hz)	Pre-Operational
	Green Single Flash	Safe-Operational
	Green Flickering (10 Hz)	Bootstrap
	Green ON	Operational
ERR	Red Double Flash	Process Data Watchdog Timeout / EtherCAT® Watchdog Timeout
	Red Single Flash	Local Error
	Red Flashing (2.5 Hz)	Invalid Configuration
	OFF	No Error
SF	Red ON	One of the following may have occurred. <ul style="list-style-type: none"> Valve has a short circuit. Pressure sensor has a short circuit. Pressure sensor has a failure / disconnection. No connection or a disconnection between the SI Unit and the vacuum manifold. A firmware error is occurring.
	Green Flashing (0.5 Hz)	One of the following may have occurred. <ul style="list-style-type: none"> The setting of the supply valve type has a mismatch. The setting of the pressure threshold / hysteresis has a failure. Valve protection function is operating.
	OFF	No diagnosis information.
L/A1	OFF	Port 1: No Link, No Activity
	Green ON	Port 1: Link, No Activity
	Green Flickering (10 Hz)	Port 1: Link, Activity
L/A2	OFF	Port 2: No Link, No Activity
	Green ON	Port 2: Link, No Activity
	Green Flickering (10 Hz)	Port 2: Link, Activity
PWR	OFF	Power supply for logic/input is not present.
	Green Flashing (0.5 Hz)	Power supply for logic/input is present but is low (< approx. 18 VDC).
	ON	Power supply for logic/input is present.
PWR(V)	OFF	Power supply for output is low or is not present.
	Green ON	Power supply for output is present.

7 LED Display (continued)

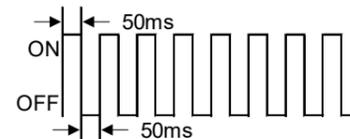
*1: Flashing pattern (2.5 Hz)



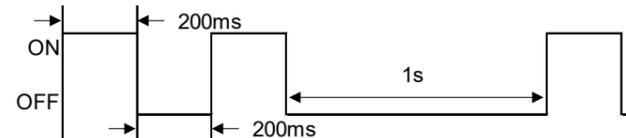
*2: Single flash pattern



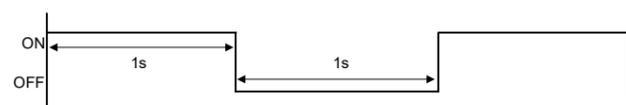
*3: Flickering pattern (10 Hz)



*4: Double flash pattern (10 Hz)



*5: Flashing pattern (0.5 Hz)



8 How to Order

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

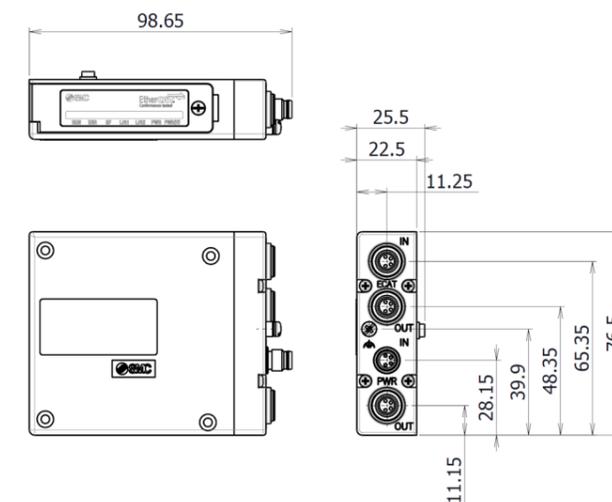
9 Maintenance

9.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions
- Stop operation if the product does not function correctly.

10 Outline Dimensions (mm)



11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements
Refer to Handling Precautions for SMC Products.

12 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

13 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
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