



# Installation & Maintenance Manual

## Output block / Power block

### Type EX9-OET1/2, EX9-OEP1/2

#### EX9-PE1



## Safety Instructions

The unit and this manual contain the essential information to protect users and others from possible injury and property damage and to ensure correct handling.

Please confirm that you fully understand the meaning of the following messages ( signs ) before reading the text, and always follow the instructions.

Please read the Installation & Maintenance Manual for related apparatus and understand it before operating the equipment.

### IMPORTANT MESSAGES

Read this manual and follow its instructions. Signal words such as WARNING, CAUTION and NOTE will be followed by important safety information that must be reviewed carefully.

<b>⚠WARNING</b>	Indicates a potentially hazardous situation that could result in death or severe injury if you do not follow instructions.
<b>⚠CAUTION</b>	Indicates a potentially hazardous situation that, if not avoided, may result in minor injury or moderate injury.
<b>NOTE</b>	Provides helpful information.

### ⚠WARNING

**Do not disassemble, modify ( including modification of printed circuit board ) or repair.**

An injury or failure can result.

**Do not operate outside the specification range.**

Fire, malfunction or damage can result.  
Please use after confirming the specification.

**Do not use the product in environments with possible presence of flammable, explosive or corrosive gas.**

Fire, explosion or corrosion can result.  
This product is not designed to be explosion-proof.

**Do not apply voltages exceeding 250V between a lead wire and a metal fitting.**

Pay attention to perform an insulation test because it could damage the insulation of the lead wire and cause failure.

**These instructions must be followed when using the product in an interlocking circuit:**  
**Provide double interlocking through another system such as mechanical protection.**  
**Check the product regularly to ensure proper operation.**

Otherwise a malfunction can cause an accident.

**These instructions must be followed when performing maintenance work:**

- Turn off the power supply.
- Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work.
- Release all energy stored in the equipment or devices (hydraulic pressure, mechanical springs, electric capacitors or gravity force), verify that the energy is reset to zero, and then perform maintenance work.

Otherwise, injury can result.

## Safety Instructions (continue)

### ⚠CAUTION

**Perform proper functional checks after maintenance work.**

Stop operation when an abnormality is observed or the product is not working properly.

Safety can not be assured due to unexpected malfunctions.

### NOTE

Follow the instructions given below when handling the product. The instructions on selection (installation, wiring, operating environment, adjustment, operation and maintenance) described below must also be followed.

Failure to follow instructions may damage the unit.

#### Product specifications

Operate the product within the specified voltage range.

Reserve a space around the unit for maintenance.

Do not remove labels..

Instructions on handling

#### Installation

Do not drop, hit or apply excessive shock to the product.

Follow the specified tightening torque.

#### Wiring (including plugging in/out of connector)

Do not connect wires while the power is on.

Connect wires and cables correctly.

Do not bend or apply tensile force to cables, or apply force by placing a heavy load on them.

Do not lay wires or cables with the same wiring route as a power line or high-voltage line.

Verify the wiring insulation.

Separate the power lines for the solenoid valves from the power lines for the Input and control unit.

Take proper measurements against noise such as using a noise filter, when the product is incorporated in equipment or in devices.

#### ●Environment

- Select an operation environment according to enclosure. (IP67)
- Take sufficient shielding measures when installing the product at the following place.
  - ( 1 ) A place where noise is generated due to static electricity.
  - ( 2 ) A place where electric field strength is high
  - ( 3 ) A place where there is irradiation
  - ( 4 ) A place near a power cable.
- Verify the effect of the shielding measures after installation of the unit in equipment or in devices.
- Do not use the product nearby a place where electric surges are generated.
- Use the product equipped with a surge absorber when a surge generating load, such as a relay or solenoid valve, is directly driven.
- Prevent foreign matter such as remnant wires from entering this product.
- Do not expose the product to vibration and impact.
- Keep the specified ambient temperature range.
- Do not expose the product to heat radiation from a nearby heat source.

#### ●Maintenance

- Before performing maintenance work, make sure to turn off the power supply, stop air supply, release the residual air in the piping to atmosphere, and verify that the pneumatic system is open to the air.
- Perform maintenance and check at regular intervals.
- Perform a proper functional check.
- Do not use solvents such as benzene, thinner, etc., to clean the product.
- Use a soft cloth to remove stains. For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe the stains again with a dry cloth.

## Model indication method

### EX9-OE

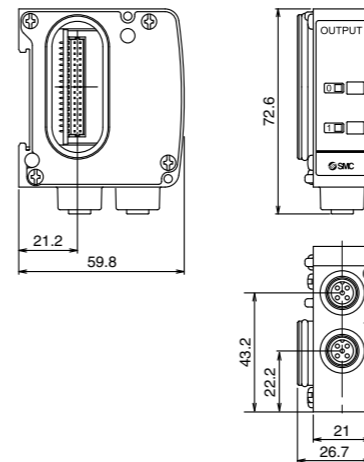
Output method

<b>T1</b>	N-ch MOS-FET High side switch (PNP output power supply from internal)
<b>T2</b>	N-ch MOS-FET Low side switch (NPN output power supply from internal)
<b>P1</b>	N-ch MOS-FET High side switch (PNP output power supply from external)
<b>P2</b>	N-ch MOS-FET Low side switch (NPN output power supply from external)

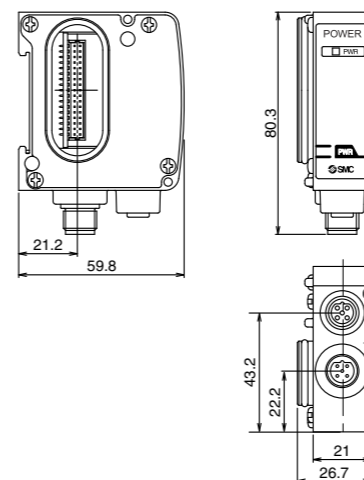
### EX9-PE1 : Power block

## Outline with Dimensions (in mm)

### EX9-OET1/EX9-OET2/EX9-OEP1/EX9-OEP2



### EX9-PE1



## Specification

### General specification

Item	Specification
Ambient temp.	-10 to +50°C (Solenoid valve type)
Ambient humidity	35 to 85% RH (No dew condensation)
Storage temp.	-20 to +60 °C
Vibration proof	10 to 55Hz 0.5mm (Constant vibration) 55 to 150Hz 50m/s <sup>2</sup> (Constant acceleration)
Impact proof	100m/s <sup>2</sup> (peak), 11ms x 3 in each direction ± X, Y and Z.
Withstand voltage	1500VAC for 1min (between external terminals and the case)
Insulation resistance	500VDC with 10M ohm or more (between external terminals and the case)
Operating environment	No corrosive gas
Enclosure	IP67
Weight	120g or less

### ●Electrical specifications

#### Output block

Item	Specification	
	EX9-OET1/2	EX9-OEP1/2
Output points	2 points	
Rated voltage	24VDC +10%/ -5%	
Internal voltage	Drop 1.2V or less	
Current consumption	20mA or less / point	
Rated load current	Max. 62mA/point*1	Max. 0.5A/point*2
Power supply	Internal power source	Package supply from external*3
Output	EX9-OET1, EX9-OEP1: N-ch MOS-FET High side switch (PNP output) EX9-OET2, EX9-OEP2: N-ch MOS-FET Low side switch (NPN output)	
Insulation	Opto-coupler insulation	Opto-coupler insulation

\*1 : Max. 42mA(1.0W)/point when connected to EX500 series.

\*2 : Max. supply current is 3.1A\* per power block.

\*3 : Combined with the power block for use.

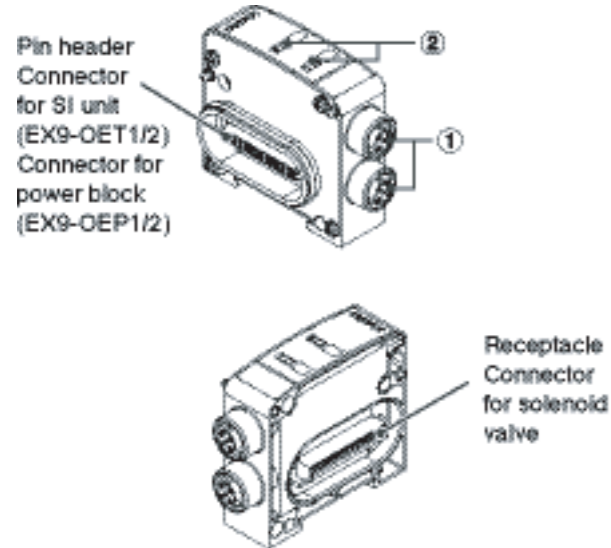
#### Power block specifications (EX9-PE1)

Item	Specification
Rated voltage	24VDC +10%/ -5%
Current consumption	20mA or less
Supply current	Max. 3.1A*4
Applicable output block	EX9-OEP1, EX9-OEP2

\*4 : If max. supply current (3.0 to 3.1A) is applied for operation, ensure ambient temperature does not exceed 40 °C and do not bundle the cable.

## Names and Functions of individual parts

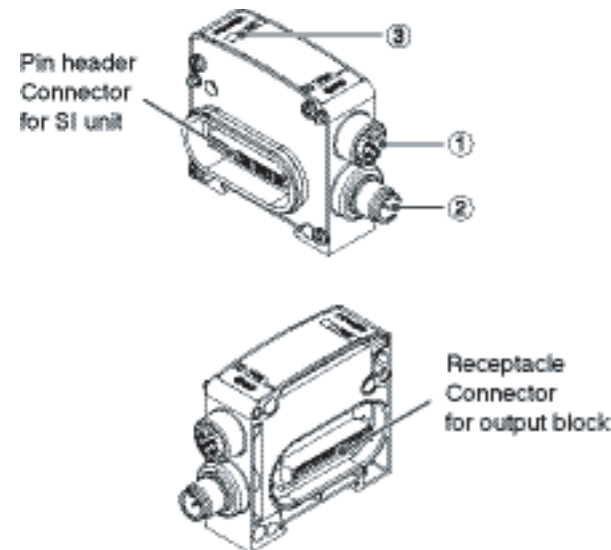
### EX9-OET1/EX9-OET2/EX9-OEP1/EX9-OEP2



No.	Part name	Application
1	Output connector	Connects with output device.*1
2	Indicator LED	Indicates the output status.*2

\*1 : For wiring method, refer to subsection "Wiring" in this manual.  
 \*2 : For display, refer to subsection "Display" in this manual.

### EX9-PE1



No.	Part name	Application
1	Power supply connector	Supplies power for SI unit. *1
2	Power input connector	Supplies power for output devices.*2
3	Power LED	Indicates the power supply status.*3

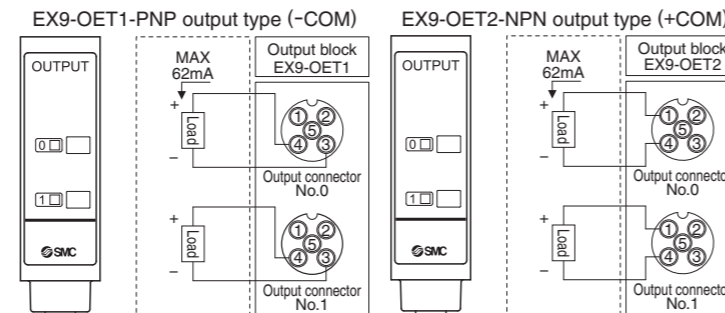
\*1 : If the power block is connected next to a manifold (EX250 or EX126), the connector is used as a jumper for the power supply to the SI unit. If an enclosure equivalent to IP67 is used, be sure to mount a waterproof cap on the unused connector.  
 The waterproof cap is attached to the power supply on the connector side, as an accessory.  
 \*2 : For wiring method, refer to subsection "Wiring" in this manual.  
 \*3 : For display, refer to subsection "Display" in this manual.

## Wiring

### Output block for low wattage load Electrical specifications

Power supply voltage[V]	Max. load current		Internal consumption current [mA]/point	Output point [point/block]
	[mA]/point	[W]/point		
24VDC	62mA*1	1.5W*1	20mA	2 points

\*1 : 42mA and 1W for connection to EX500 series.



PIN No.	Output connector No.0	Output connector No.1	PIN No.	Output connector No.0	Output connector No.1
1	NC	NC	1	24VDC	24VDC
2	OUT1*2	NC	2	OUT1*2	NC
3	GND	GND	3	NC	NC
4	OUT0	OUT1*2	4	OUT0	OUT1*2
5	NC	NC	5	NC	NC

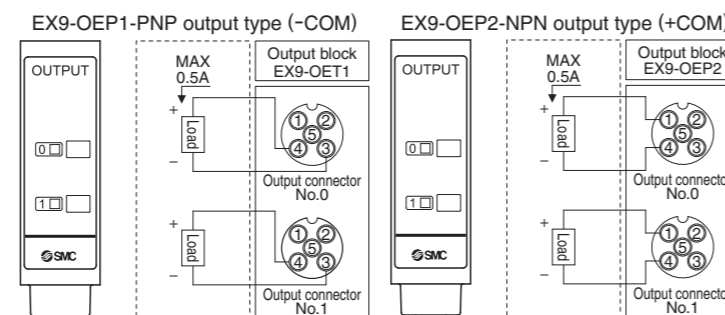
NC : no connection

\*2 : Pin 2 of the connector No.0 is connected to pin 4 of output connector No.1, internally.

### Output block for high wattage load\*3 Electrical specifications

Power supply voltage[V]	Max. load current		Internal consumption current [mA]/point	Output point [point/block]
	[A]/point	[W]/point		
24VDC	0.5A	12W	20mA	2 points

\*3 : Combined with power block EX9-PE1 for use.



PIN No.	Output connector No.0	Output connector No.1	PIN No.	Output connector No.0	Output connector No.1
1	NC	NC	1	24VDC	24VDC
2	OUT1*4	NC	2	OUT1*4	NC
3	GND	GND	3	NC	NC
4	OUT0	OUT1*4	4	OUT0	OUT1*4
5	NC	NC	5	NC	NC

NC : no connection

\*4 : Pin 2 of output connector No.0 is connected to pin 4 of output connector No.1, internally.

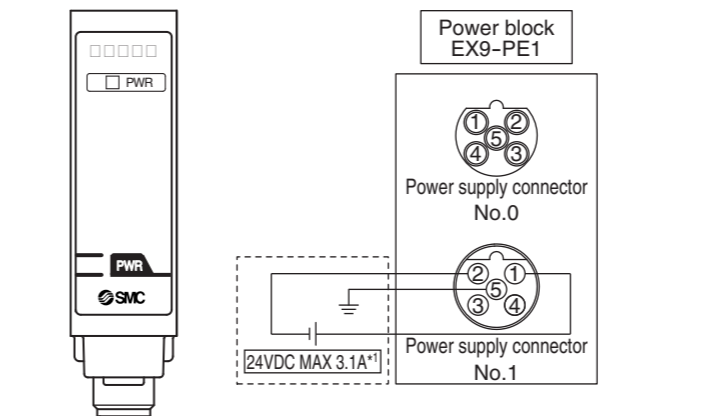
### Power block Electrical specifications

Power supply voltage[V]	Max. load current [A]	Internal consumption current [mA]/unit
24VDC	3.1A*1	20mA

\*1 : If max. supply current (3.0 to 3.1A) is applied for operation, ensure ambient temperature does not exceed 40 °C and do not bundle the cable.

#### EX9-PE1

##### A. Wiring to connect the power block with the power supply

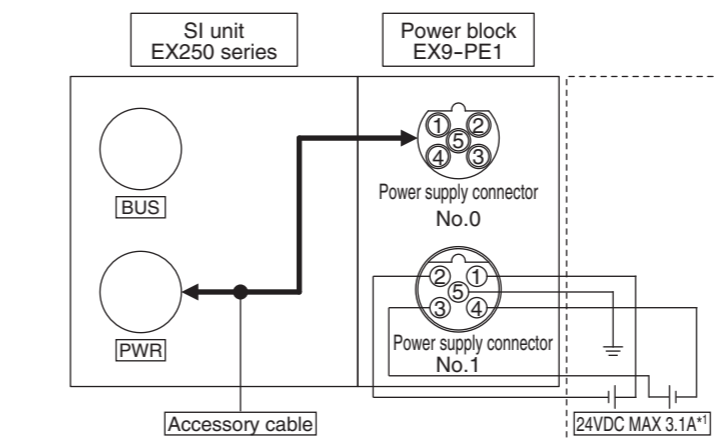


	Power supply connector No.0	Power supply connector No.1
1	—	24VDC
2	—	0VDC
3	—	—
4	—	—
5	—	E

24VDC, 0VDC : Output side power supply  
 E : Earth  
 — : Unused

##### B. The supply of power from the power block connector to the SI unit

The power supply connector No.0 is available to supply power to the SI unit because the power supply connector No.1 is connected to each PIN. Only when the SI unit is located next to the power block, can the accessory cable be used.

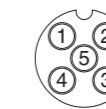


PIN No.	Power supply connector No.0	Power supply connector No.1
1	SV 24V_SI	24VDC
2	SV 0V_SI	0VDC
3	SW 24V_SI	24VDC
4	SW 0V_SI	0VDC
5	E_SI	E

SV 24V, 0V\_SI : Output (solenoid valve) side power supply  
 SW 24V, 0V\_SI : Input/control side power supply  
 E, E\_SI : Earth

### Output connector EX9-OET1 / EX9-OET2

Output connector M12 5 poles (Female)  
 Example of connector : Omron Corp. XS2H, XS2G etc.  
 Franz Binder Series 713,763  
 Example of connected cable : SMC's part No.EX9-AC###-7



PIN No.	EX9-OET1		EX9-OET2	
	Output connector No.0	Output connector No.1	Output connector No.0	Output connector No.1
1	NC	NC	24VDC	24VDC
2	OUT1	NC	OUT1	NC
3	GND	GND	NC	NC
4	OUT0	OUT1	OUT0	OUT1
5	NC	NC	NC	NC

NC : no connection

Output connector No.0 provides 2 outputs. If an enclosure equivalent to IP67 is used, be sure to mount a waterproof cap on the unused connector. The waterproof cap needs to be prepared separately. (SMC's part No. EX500-AWTS etc)

### EX9-OEP1 / EX9-OEP2

Output connector M12 5 poles (Female)  
 Example of connector : Omron Corp. XS2H, XS2G etc.  
 Franz Binder Series 713,763  
 Example of connected cable : SMC's part No.EX9-AC###-7



PIN No.	EX9-OEP1		EX9-OEP2	
	Output connector No.0	Output connector No.1	Output connector No.0	Output connector No.1
1	NC	NC	24VDC	24VDC
2	OUT1	NC	OUT1	NC
3	0VDC	0VDC	NC	NC
4	OUT0	OUT1	OUT0	OUT1
5	NC	NC	NC	NC

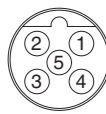
NC : no connection

Output connector No.0 provides 2 outputs. If an enclosure equivalent to IP67 is used, be sure to mount a waterproof cap on the unused connector. The waterproof cap needs to be prepared separately. (SMC's part No. EX500-AWTS etc)

## Wiring (continue)

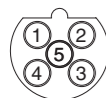
### EX9-PE1

Power supply input connector No.1 M12 5 poles reverse (Male)  
Example of connected cable : SMC's part No.EX9-AC###-1 etc.



PIN No.	Power supply connector No.1
1	SV 24V
2	SV 0V
3	(SV 24V)*1
4	(SV 0V)*1
5	E

Power supply connector No.1 M12 5 poles reverse (Female)  
Example of connected cable : SMC's part No.EX9-AC###-2,3,4,6 etc.



PIN No.	Power supply connector No.1
1	(SV 24V_SI)*1
2	(SV 0V_SI)*1
3	(SW 24V_SI)*1
4	(SW 0V_SI)*1
5	(E_SI)*1

\*1 : If the power block is connected next to a manifold (EX250 or EX126), the connector is used as a jumper for the power supply to the SI unit.  
If an enclosure equivalent to IP67 is used, be sure to mount a waterproof cap on the unused connector.

The waterproof cap is attached to the power supply on the connector side, as an accessory.

\*2 : If max. supply current (3.0 to 3.1A) is applied for operation, ensure ambient temperature does not exceed 40 °C and do not bundle the cable.

Note : The max. allowable current of power block is 3.1A\*2.

The max. allowable current per pin of M12 connector mounted on power supply is 3.1A\*2.

## Error display function

### Output block

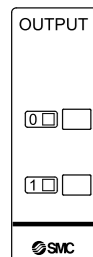
0 to 1 LED	Output signal ON/OFF LED
Yellow does not light up. Yellow does not go off.	[Countermeasure] Check mounting condition of connector. Check type of output block (PNP/NPN). [Corrective action] Replace operating load and try again. Replace output block. Replace SI unit.

### Power block

PWR LED	Power supply ON/OFF LED
Green does not light up.	[Countermeasure] ● Check external power supply (24VDC). [Corrective action] ● Replace power block.

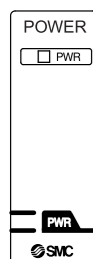
## Display

### EX9-OET1/EX9-OET2/EX9-OEP1/EX9-OEP2



Display	Description
0	Lights ON: Output ( OUT 0 ) is ON. Lights OFF: Output ( OUT 0 ) is OFF.
1	Lights ON: Output ( OUT 1 ) is ON. Lights OFF: Output ( OUT 1 ) is OFF.

### EX9-PE1



Display	Description
PWR	Lights ON: Power is supplied from external power supply. Lights OFF: Power is not supplied from external power supply.

## Contact

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
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## SMC Corporation

URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

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