Technical specification

Output block / Power block

EX9-OET1

EX9-OET2

EX9-OEP1

EX9-OEP2

EX9-PE1

SMC Corporation

Table of Contents

1.Safety instructions

This manual contains essential information for the protection of users and others from possible injury and damage to property and to ensure correct handling.
Please confirm that you fully understand the meaning of the following messages (signs) before reading the remaining text, and always follow the instructions.
Also carefully read the instruction manual for any relevant equipment or apparatus before use.

♦Indications

IMPORTANT MESSAGES	
Read this manual and follow the instructions. Signal words such as WARNING, CAUTION and NOTE, will be followed by important safety information that must be carefully reviewed.	
⚠WARNING	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
⚠CAUTION	Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.
NOTE	Provides helpful information.

♦Operator

- ♦This manual has been written for those who have knowledge of machinery and apparatuses that use pneumatic equipment and have full knowledge of assembly, operation and maintenance of such equipment.
- ♦Please carefully read and understand this manual before assembling, operating or performing maintenance on the product presented in this manual (output block and power block).

♦ Usage Restrictions

- ♦This product is designed to be used in general equipment for factory automation. Never use this product with an equipment or apparatus that directly concerns human life*1 or in which a malfunction or failure can cause a great loss.
  *1: Equipment or apparatus that directly concerns human life refers to means the following:
  - Medical equipment such as life support systems or equipment used in operating rooms
  - Compulsory equipment required by law such as the Fire Prevention Law, Construction Law, etc.
  - Equipment or apparatus that conforms with those mentioned above.
- ♦Contact our sales department when the product is planned to be used for a system*2 or equipment that concerns the safety of persons or that seriously affects the public. Such usuage requires special consideration*3.
  *2: A system or equipment that concerns the safety of persons or that seriously affects the public refers to the following:
  - Nuclear reactor control system in a nuclear power plant, safety protection systems or other systems important for safety in a nuclear power facility.
  - Driving control system for a mass transportation system, and flight control systems
  - Equipment or apparatuses that comes in contact with foods or beverages

  *3: Special consideration refers to discussing the usage with our engineers to establish a safe system which is designed as foolproof, fail-safe, redundant etc.
- ♦Special consideration*4 should be taken regarding safety or maintainability to prevent a failure or malfunction which can cause a hazard or loss. This is likely to occur under certain environmental stresses (deterioration).
  *4: Special consideration means fully review of the equipment or apparatus during the design stage and establishing of a backup system in advance, such as a redundant system or fail-safe system.

⚠WARNING

♦Do not disassemble, modify (including printed circuit board changes) or repair.
An injury or failure can result.

♦Do not operate the product outside of the specification range.
Operation in a range that exceeds the specification can cause a fire, malfunction, or damage to the product.
Verify the specifications before use.

♦Do not use the product in an atmosphere containing combustible, explosive or corrosive gas.
It can cause a fire, explosion or corrosion.
This product is not designed to be explosion-proof.

♦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 equipments 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 it can cause an injury.

⚠CAUTION

♦Perform proper functional checks after maintenance work.
Stop operation when an abnormality is observed such as the product not working properly.
Safety can not be assured due to unexpected malfunctions.

NOTE

♦Follow the instructions given below when selecting and handling your the product:

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

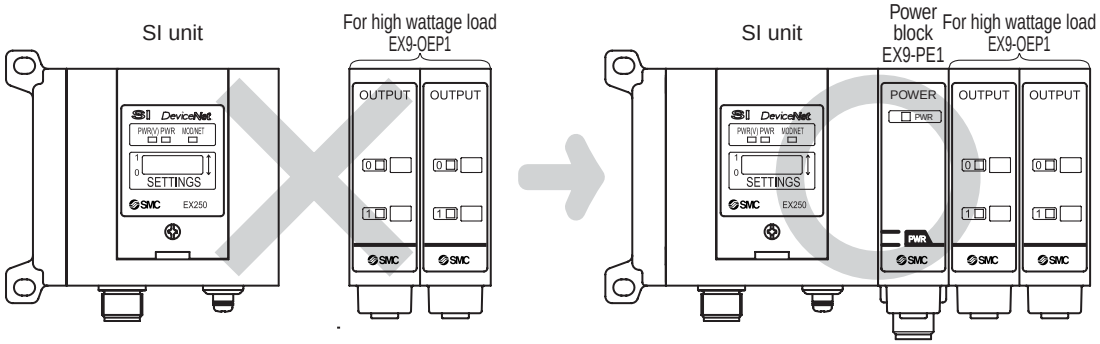
∗Product specifications

- Operate the product with the specified voltage.
  Operating with a voltage outside of the specification can cause a malfunction or damage to the unit.
- Reserve free space for maintenance
  Remember to leave free space for maintenance when designing a layout for the unit.
- Do not remove the labels.
  Otherwise in error during maintenance work or misreading of an operation manual can cause damage or malfunction. It may also result in the nonconformance to safety standards.

∗Selection

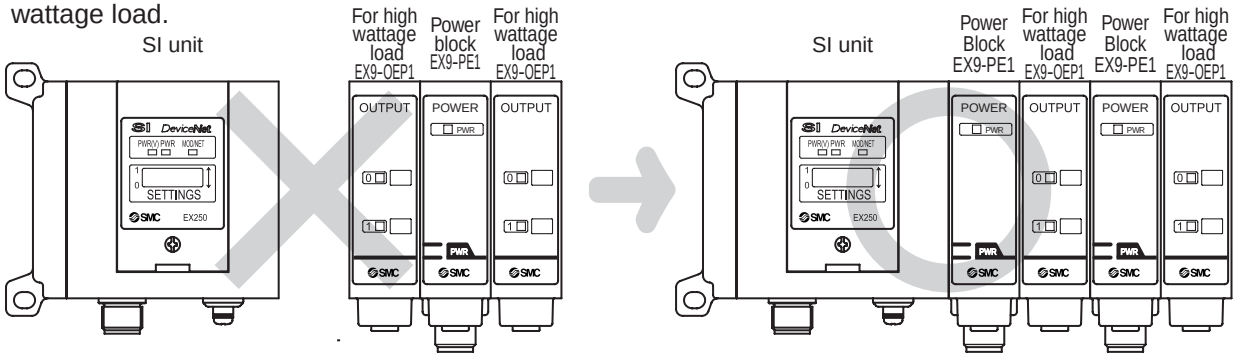
(1)Output block for high wattage load

The output block for high wattage load can't be used independently.
Be sure to combine with the power block for use.



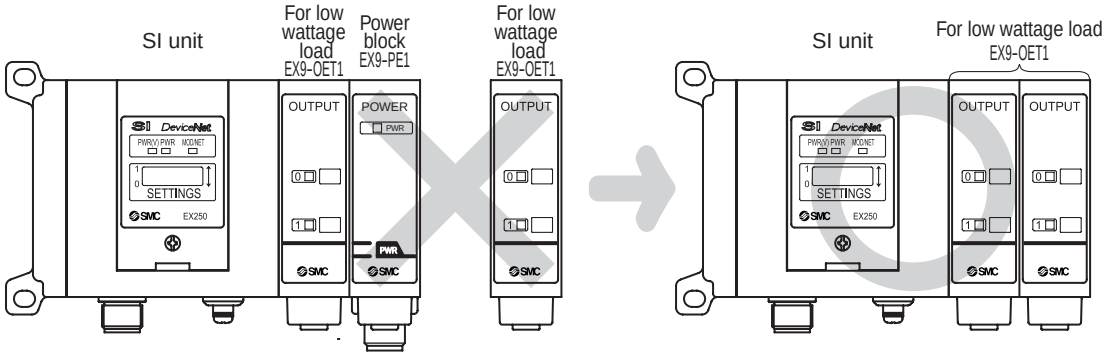
(2)Position of output block for high wattage load

The output block for high wattage load can't be mounted at the place nearer SI unit than the power block.
However, that place is acceptable if the power block is located between SI unit and the output block for high wattage load.



(3)Output block for low wattage load

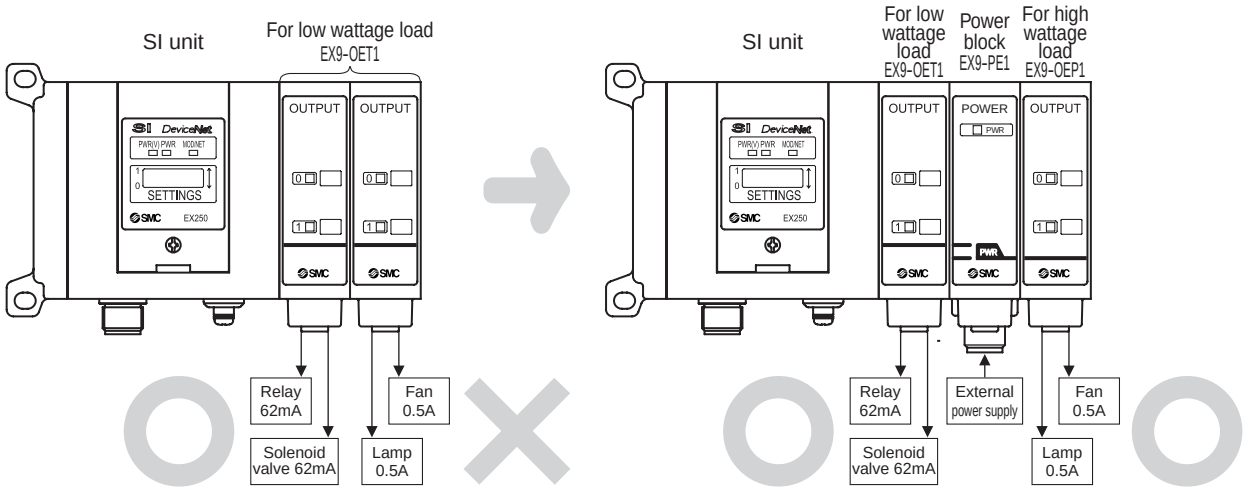
The output block for low wattage load can't be mounted at the right side of the power block.
Mount on to the place near SI unit rather than the power block.



(4)Load connected to output block for low wattage load

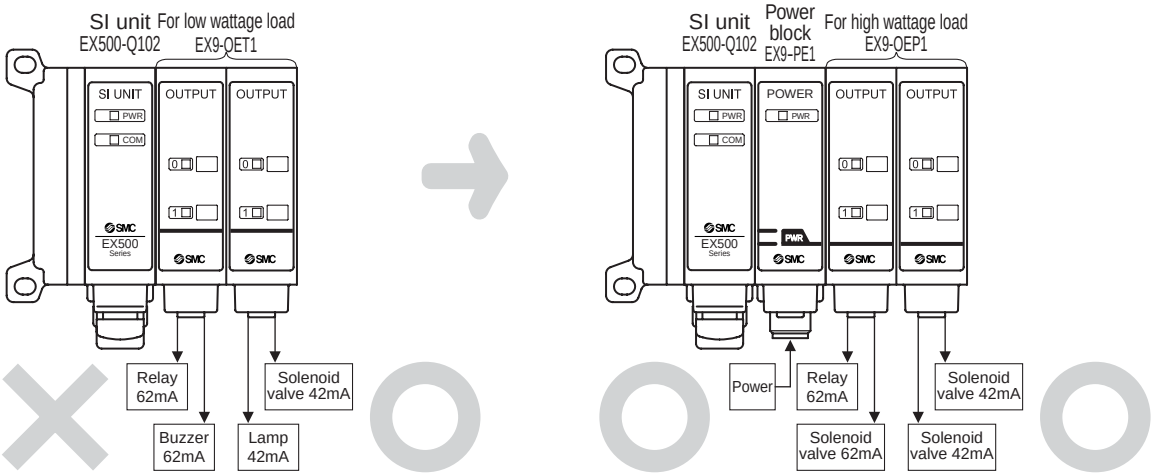
EX126/EX250 series (except for one power supply system of AS-i)

The load exceeding current 62mA [1.5W, DC24V] can't be connected.



EX500series

The load exceeding current 42mA [1.0W, DC24V] can't be connected.



(5)The number of output point when the power block is used

When the power block is used, the number of output point including the solenoid valve positioned after the power block is as follows.

Table. Max. output point when the power block is used

Spec. of the SI unit	Pert No. of the SI unit	Max. output point when the power block is used
16 Output points	EX126D-SMJ1(Note 1)	16 points
32 Input/Output points	EX250-SDN1,SMJ2,SPR1,SCA1(Note 1)	24 points
4 Input/Output points	EX250-SAS5,SAS9	4 points
8 Input/Output points	EX250-SAS3,SAS7	8 points
Gateway type 16 Output points	EX500-Q002,Q102	16 points

(Note 1) If the output block is added to the EX250 series, it can be connected to the product with manufacturing lot GV (Aug. 2002) or later. In case of EX126 series, the output block can be connected to the plate assembly shipped in March 2004 or later. These products and assembly have the body to enable connection with the output block.

(6)Supply current (page 24 for detail)

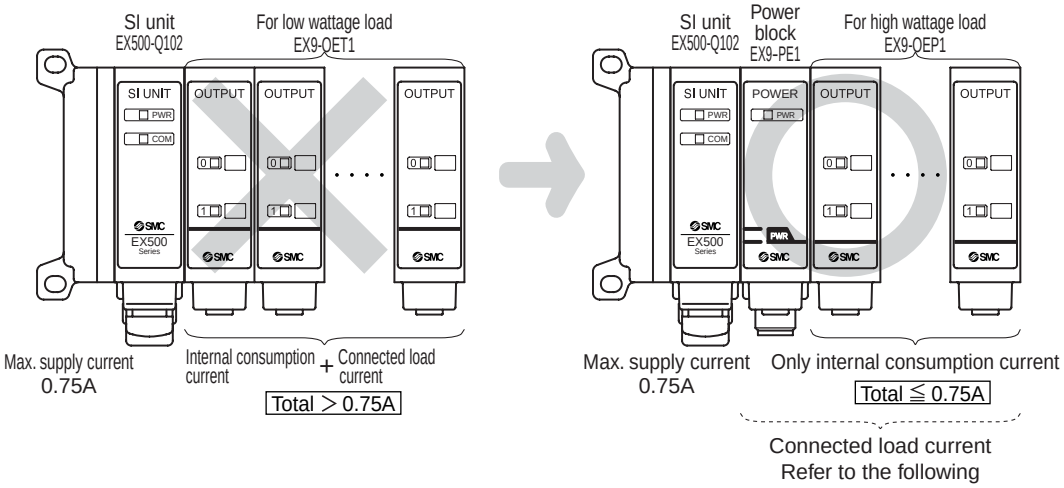
Supply current for SI unit

The max. supply current for each SI unit is as shown on the following table.
The current consumption of the output block for low wattage and high wattage is limited depending on the value of max. supply current. The max. supply current of SI unit must not be exceeded.

Table Max. supply current for SI unit

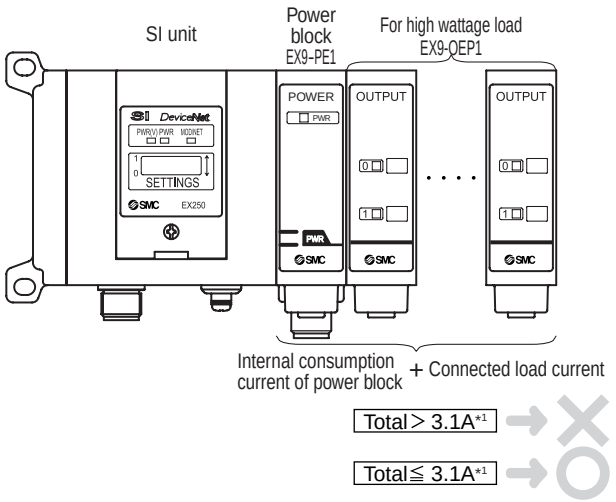
Spec. of SI unit	Part no. of SI unit	Output max supply current
16 outputs	EX126D-SMJ1	1.4A
32 inputs/outputs	EX250-SDN1,SMJ2,SPR1,SCA1	2A
2 power supply systems, 8 inputs/outputs	EX250-SAS3	0.5A
2 power supply system, 4 inputs/outputs	EX250-SAS5	0.25A
1 power supply systems, 8 inputs/outputs	EX250-SAS7	0.24A(Note 2)(Total of inputs/outputs)
1 power supply system, 4 inputs/outputs	EX250-SAS9	0.12A(Note 2)(Total of inputs/outputs)
Gateway type, 16 outputs	EX500-Q002,Q102	0.75A

(Note 2) For one power supply system of AS-i, the max. supply current in total of inputs/outputs is applicable.

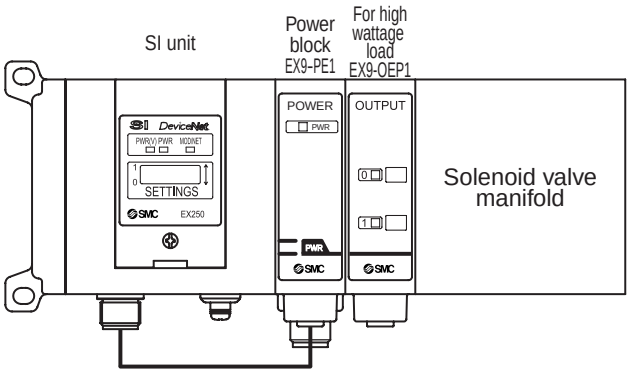


Supply current for power block

The max. supply current for the power block is 3.1A*1.
The max. supply current must not be exceeded.



Supply current between SI unit and power block



Power supply system for solenoid valve
Internal consumption current for high wattage load + Connected load current of Solenoid valve manifold

+

Power supply system for power block
Consumption current of power block + Connected load current

Total > 3.1A※1

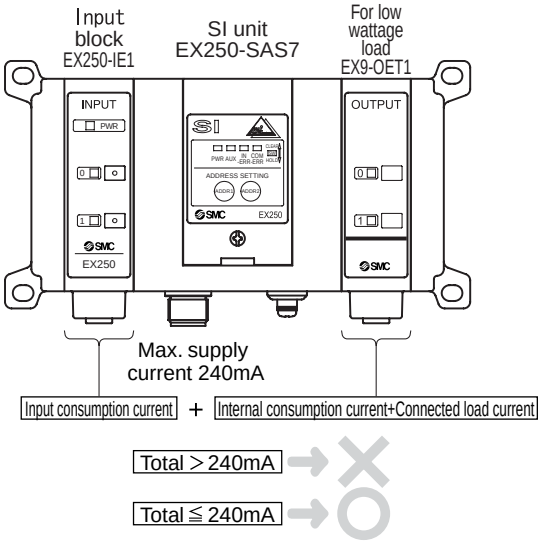
Total ≦ 3.1A※1

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

(7)One power supply system of AS-i

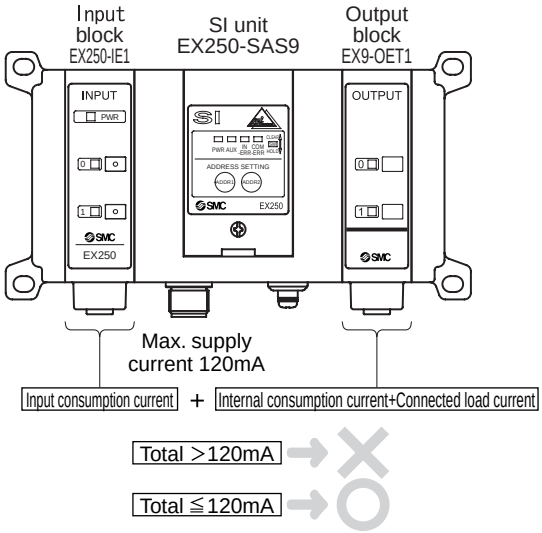
8 inputs/outputs [EX250-SAS7] (Max. 240mA)

The max. supply current (240mA) must not be exceeded. For detail, refer to page 25.



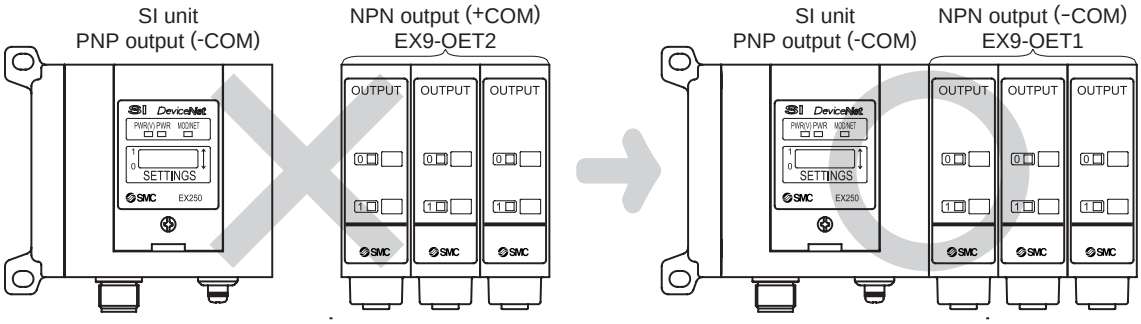
4 inputs/outputs [EX250-SAS9](MAX 120mA)

The max. supply current (120mA) must not be exceeded. For detail, refer to page 25.



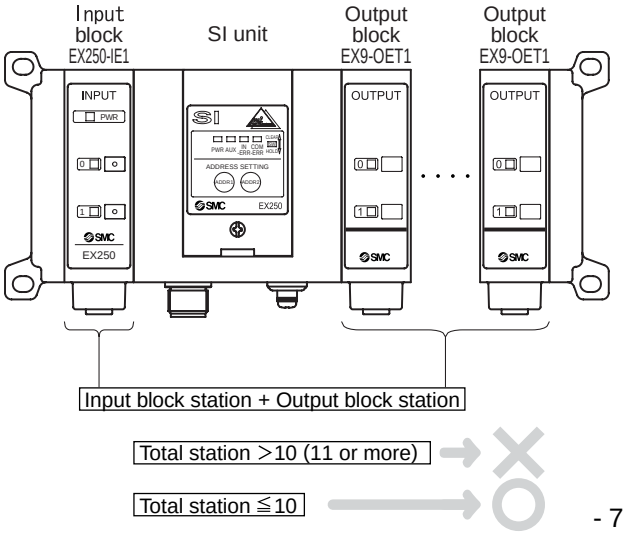
(8)Polarity of output block

If the polarity (output common) of the SI unit is different from the output polarity of connected output block, the normal operation can't be obtained. Be sure to make the output polarity of connected output block consistent with the polarity (output common) of the SI unit.



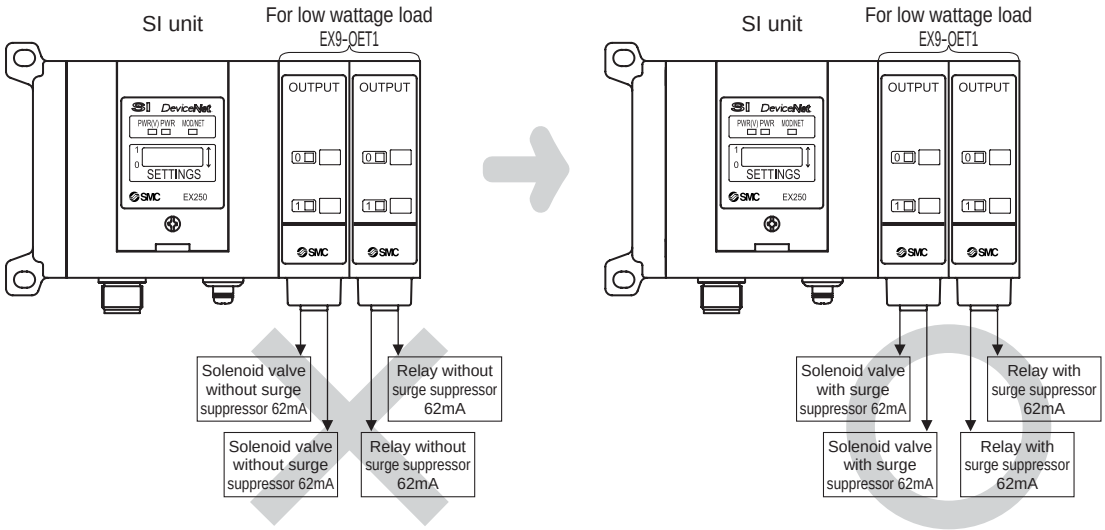
(9)The number of connected station

The max. connected station in total of input/output block (excluding SI unit) is 10.



⑽Connection of inductive load

If the connected load is an inductive type such as a solenoid valve and relay, be sure to select a built-in type surge voltage protective circuit (surge suppressor) or externally connect a protective circuit. Without it, a malfunction and or damage may occur.



♦Instructions on handling

∗Installation

- Do not drop, hit or apply excessive shock to the product.
  Otherwise, it the product can be damaged and have failure or malfunction.
- Follow the specified tightening torque.
  Excessive tightening torque can break the screws.
  Refer to “5-6 Installation and Maintenance” for installation.

∗Wiring (including plugging in/out of connector)

- Do not bend or apply tensile force to the cables, or apply force by placing a heavy load on them.
  Wiring that has bending or tensile stress can cause the cables to break.
- Connect wires and cables correctly.
  Miswiring can damage the product depending upon condition of the wiring.
- Do not connect wires while the power is on.
  Otherwise, it can damage the product or I/O devices and cause damage or malfunction.
- Do not lay wires or cables in the same wiring route as power cables or high voltage cables.
  Otherwise the wires to the product can be interfered with noise or induced surge voltage from power lines or high voltage lines, resulting in a malfunction.
  Lay the wires to the product and each I/O device in a wire duct or in a protective tube other than those for power lines or high voltage lines.
- Verify the wiring insulation.
  Poor insulation (interference with other circuits, poor insulation between terminals, etc.) can introduce excess voltage or current to the product or each I/O device causing damage.
- Separate the power lines for the solenoid valves from the power lines for the Input and control unit.
  Otherwise, the wires can be contaminated with noise or induced surge voltage, resulting in a malfunction.
- Take proper measurements against noise such as using a noise filter, when the product is incorporated in an equipment or device.
  Otherwise, interference from noise can cause a malfunction.

∗Environment

- Take sufficient measures with shielding, when installing in the following places.
  Insufficient measures can cause a malfunction or failure.
  Verify the effect of the shielding measures after installation of the unit in equipment or devices:
  (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 line
- Do not use the product near a place where electric surges are generated.
  Internal circuit elements of the product can deteriorate or become damaged when equipment generating a large surge (electromagnetic lifter, high frequency induction furnace, motor, etc.) is located near the product. Provide surge suppression, and avoid interference.
- Use the product equipped with a surge absorber when a surge the generating load, such as a relay or solenoid valve, is directly driven.
  Direct drive of a load generating surge voltage can damage the product.
- Prevent foreign matter such as remnant wires from entering this product.
  Take proper measures to prevent the foreign matter from entering the product in order to prevent a failure or malfunction.
- Do not expose the product to vibration and impact.
  Otherwise, it can cause a failure or malfunction.
- Maintain the specified ambient temperature range.
  Otherwise, it can cause a malfunction. Do not use the product in a place where the temperature abruptly changes even if it stays within the specified range.
- Do not expose the product to heat radiation from a heat source located nearby.
  This can cause a malfunction.

∗Maintenance

- Before performing maintenance work, make sure to turn of the power supply, stop air supply, release the residual air in the piping into the atmosphere, and verify that the pneumatic system is open to the air.
  Otherwise, an unexpected operation from a system component may occur.
- Perform maintenance and check regularly
  Otherwise, an unexpected malfunction of the system can occur due to a malfunction of the unit.
  Refer to “4-3.Installation and Maintenance” the maintenance and checking methods.
- Perform a proper functional check.
  Stop operation when an abnormality is observed in witch the device does not work properly.
  Otherwise, an unexpected malfunction of the system component can occur.
- Do not use solvents such as benzene, thinner, etc., to clean the product.
  It can damage the surface of the body and erase the indication on the body.
  Use a soft cloth to remove stains. For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe the stains again with a dry cloth.

2.Model

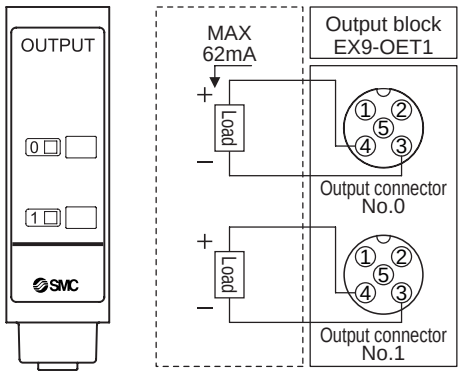
2-1.Output block for low wattage load

Electrical specifications

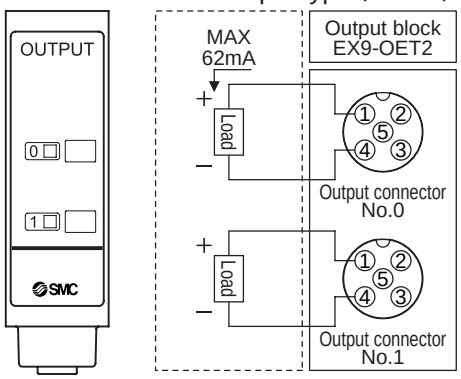
Power supply voltage[V]	Max. load current [mA]/point	Max. load current [W]/point	Internal consumption current [mA]/point	Output point [point/block]
DC24V	62mA*1	1.5W*1	20mA	2 points

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

EX9-OET1···PNP output type (−COM)



EX9-OET2···NPN output type (+COM)



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

NC: non-connection

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

NC: non-connection

*2:The pin No.2 of the output connector No.0 are connected to pin No.4 of the output connector No.1 inside respectively.

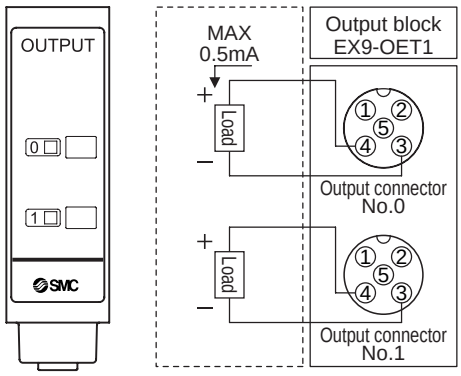
2-2.Output block for high wattage load*3

Electrical specifications

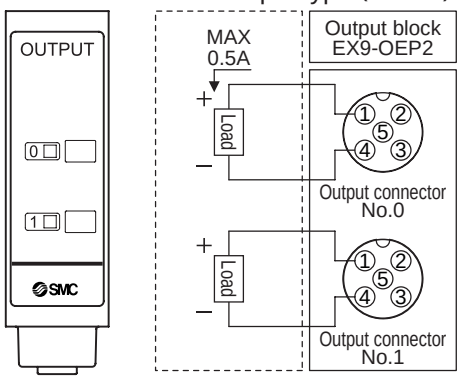
Power supply voltage[V]	Max. load current [A]/point	Max. load current [W]/point	Internal consumption current [mA]/point	Output point [point/block]
DC24V	0.5A	12W	20mA	2 points

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

EX9-OEP1···PNP output type (−COM)



EX9-OEP2···NPN output type (+COM)



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

NC: non-connection

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

NC: non-connection

*4:The pin No.2 of the output connector No.0 are connected to pin No.4 of the output connector No.1 inside respectively.

2-3.Power block

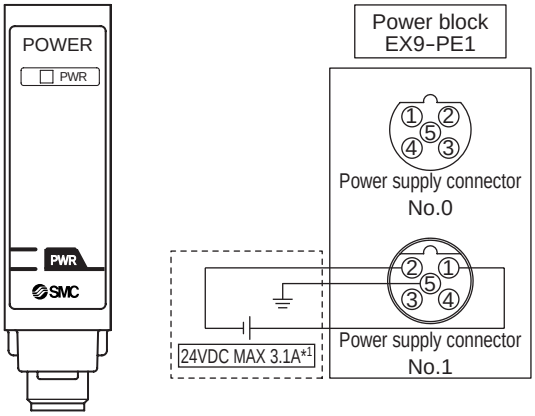
Electrical specification

Power supply voltage [V]	Max. load current [A]	Internal consumption current [mA]/unit
DC24V	3.1A*1	20mA

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

EX9-PE1

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

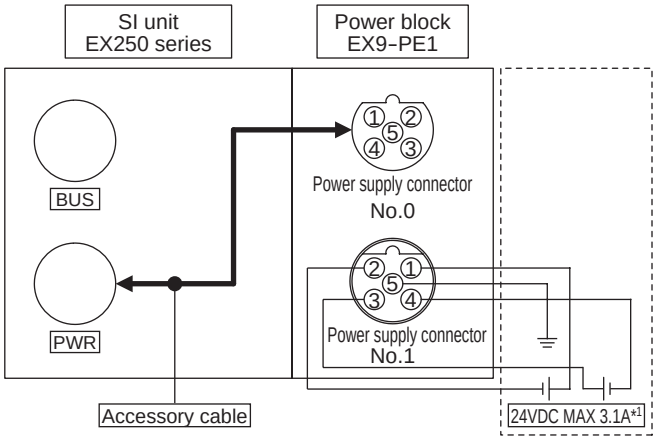


PIN No.	Power supply connector No.0	Power supply connector No.1
1	–	DC24V
2	–	DC0V
3	–	–
4	–	–
5	–	E

DC24V,0V: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 for power supply to SI unit because the power supply connector No.1 is connected to each PIN.
Only in case that SI unit is located next to the power block, dedicated accessory cable which is originally prepared for bypass connection can be used.



PIN No.	Power supply connector No.0	Power supply connector No.1
1	SV 24V_SI	DC24V
2	SV 0V_SI	DC0V
3	SW 24V_SI	DC24V
4	SW 0V_SI	DC0V
5	E_SI	E

SV24V,0V_SI:Output (solenoid valve) side power supply
SW24V,0V_SI:Input/control side power supply
E, E_SI:Earth

2-4.Accessory cable

EX9 - AC 010 - 1 — Cable type

SI unit accessory

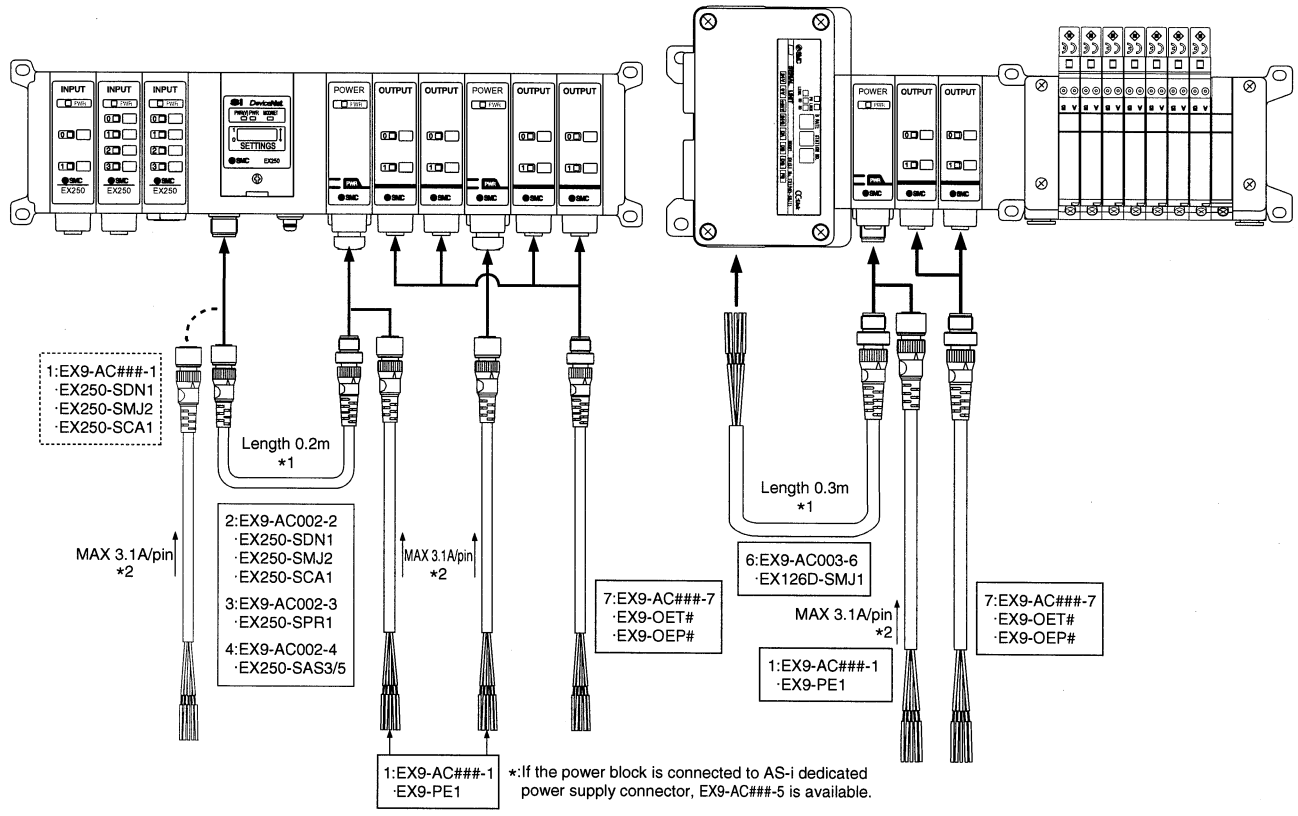
Accessory cable

Length of cable

Symbol	Cable type	Connected object		Cable part no.
		Connected from	Connected to	
1	Connection cable for power block and SI unit (DeviceNet,CC-Link,CANopen)	EX9-PE1 / EX250-SDN1 / EX250-SMJ2 / EX250-SCA1	DC24V power supply	EX9-AC###-1
2	Connection cable for power block and SI unit (DeviceNet,CC-Link,CANopen)	EX9-PE1	EX250-SDN1 EX250-SMJ2 EX250-SCA1	EX9-AC002-2
3	Connection cable for power block and SI unit (PROFIBUS-DP)	EX9-PE1	EX250-SPR1	EX9-AC002-3
4	Connection cable for power block and SI unit (AS-i)	EX9-PE1	EX250-SAS3/5	EX9-AC002-4
5	AS-i power supply cable	EX9-PE1	AS-i power supply cable	EX9-AC###-5
6	Connection cable for power block and SI unit (CC-Link)	EX9-PE1	EX126D-SMJ1	EX9-AC003-6
7	Connection cable for output block and operating load	EX9-OET# EX9-OEP#	Operating load	EX9-AC###-7

Symbol ###	Length	Applicable cable part No.						
		EX9-AC###-1	EX9-AC002-2	EX9-AC002-3	EX9-AC002-4	EX9-AC###-5	EX9-AC003-6	EX9-AC###-7
002	0.2m	—	O	O	O	—	—	—
003	0.3m	—	—	—	—	—	O	—
010	1.0m	O	—	—	—	O	—	O
030	3.0m	O	—	—	—	O	—	O
050	5.0m	O	—	—	—	O	—	—

O:Applicable
—:Inapplicable



*1: This cable is a bypass cable used for the layout where the power block is located to the right of the SI unit.
*2: If max. supply current (3.0 to 3.1A) is applied for operation, do not make the ambient temperature exceed 40℃ and bundle the cable.
Note: The cable and the power block allow the current up to 3.1A*2.
If the power supply connector (supplemental) for the power block is used, ensure that total current consumed by output block (20mA per point), output load and solenoid valve manifold doesn't exceed 3.1A*2.
If the current more than 3.1A*2 can't be avoided, supply the power to the power block and SI unit (solenoid valve manifold) by different cable.

2-5.Option

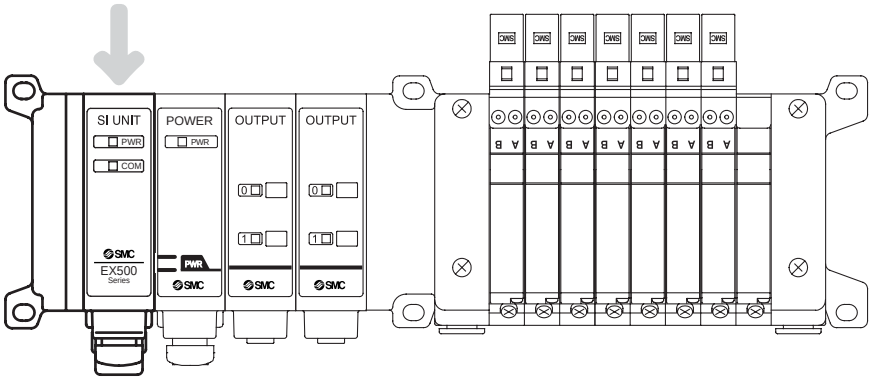
EX500 series for mounting of output block

This is EX500 series specific for mounting of output block.
*Only VQC series solenoid valve is applicable.

EX500 – Q 0 0 2

- SI unit series
- SI unit for grounding VQC
- SI unit COM.
- SI unit for mounting of output block

symbol	COM.
0	+COM.
1	−COM.



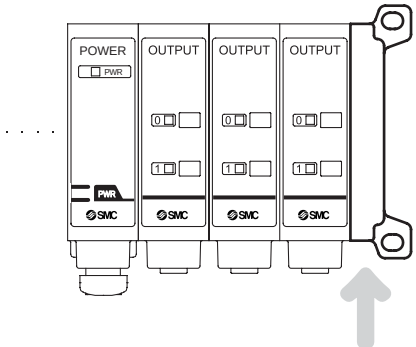
End plate

This is the end plate without solenoid valve used.

EX9 – EA 03

- SI unit series
- End plate
- Type

Symbol	Type
03	Output side end plate
04	Output side end plate (with DIN rail mounting bracket)



3.Specifications

3-1.General specifications

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^2 (constant acceleration)
Impact proof	100m/s^2 (peak), 11ms × 3 times in each direction ±X,Y,Z
Withstand voltage	AC 1500V for 1min (between external terminals and the case)
Insulation resistance	DC500V with 10Mohm or more (between external terminals and the case)
Operating environment	No corrosive gas
Enclosure	IP67
Weight	120g or less

3-2.Electrical specifications

3-2-1.Output block

Item	Specification	
	EX9-OET1/2	EX9-OEP1/2
Output points	2 points	
Rated voltage	DC24V	
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. 40mA(1.0W)/point when connected to EX500 series.
*2:Max. supply current is 3.1A*4 per power block.
*3:Combined with the power block for use.

3-2-2.Power block specifications (EX9-PE1)

Item	Specification
Rated voltage	24V DC
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, do not make the ambient temperature exceed 40°C and bundle the cable.

3-3.Applicable SI unit / solenoid valve series

3-3-1.Applicable SI unit*5

Output block	Applicable SI unit
EX9-OET1, EX9-OEP1	EX250-SDN1, EX250-SPR1, EX250-SAS3, EX250-SAS5, EX250-SAS7*6, EX250-SAS9*6, EX250-SCA1, EX500-Q102
EX9-OET2, EX9-OEP2	EX126D-SMJ1, EX250-SMJ2, EX500-Q002

*5:If the output block is added to the EX250 series, it can be connected to the product with manufacturing lot GV (Aug. 2002) or later. In case of EX126 series, the output block can be connected to the plate assembly shipped in March 2004 or later. These products and assembly have the body to enable connection with the output block.
*6:In one power supply system of AS-i, since supply current is limited, it is necessary to calculate the supply current. Refer to the section showing calculation of supply current in one power supply system of AS-i.

3-3-2.Applicable solenoid valve series

Applicable solenoid valve series	•VQC1000, 2000, 4000 series •SV1000, 2000, 3000 series (EX500 series except)

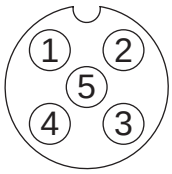
4.Wiring and Setting

4-1.Output connector and circuit construction

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

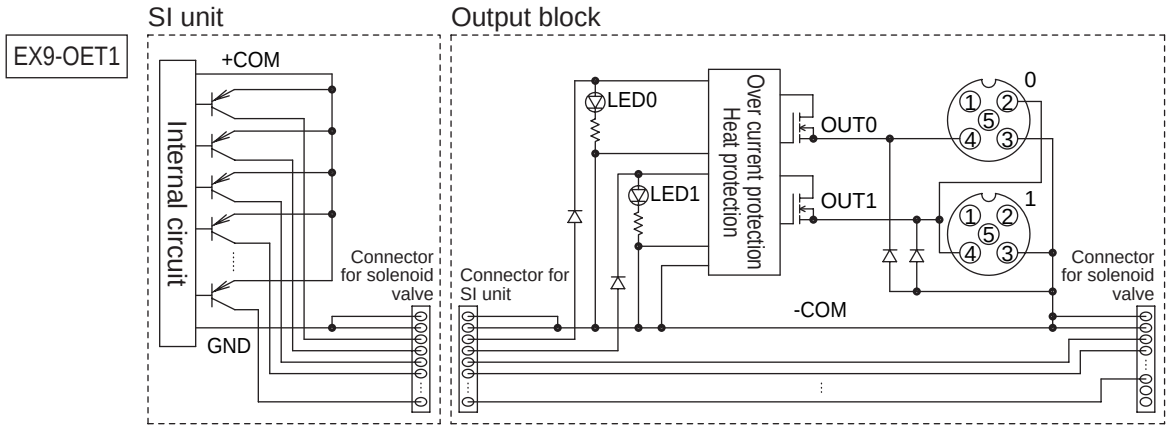


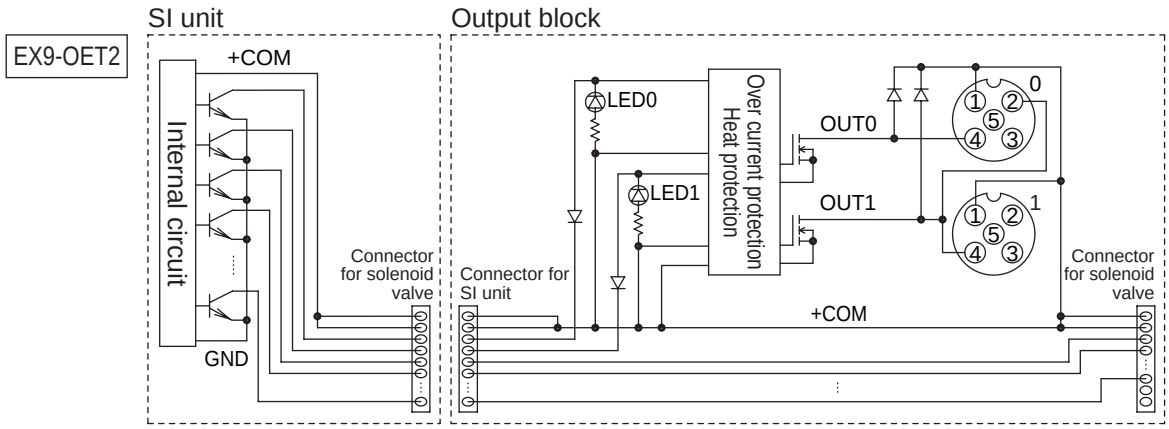
PIN No.	EX9-OET1		EX9-OET2	
	Output connector No.0	Output connector No.1	Output connector No.0	Output connector No.1
1	NC	NC	DC24V	DC24V
2	OUT1	NC	OUT1	NC
3	GND	GND	NC	NC
4	OUT0	OUT1	OUT0	OUT1
5	NC	NC	NC	NC

NC: Non-connection

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

Circuit construction

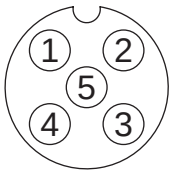




EX9-OEP1/EX9-OEP2

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

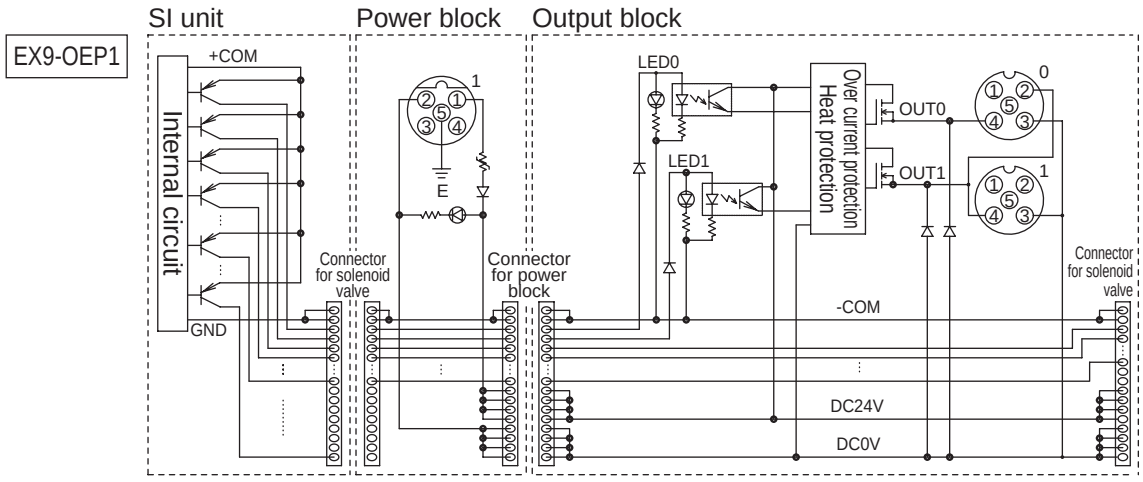


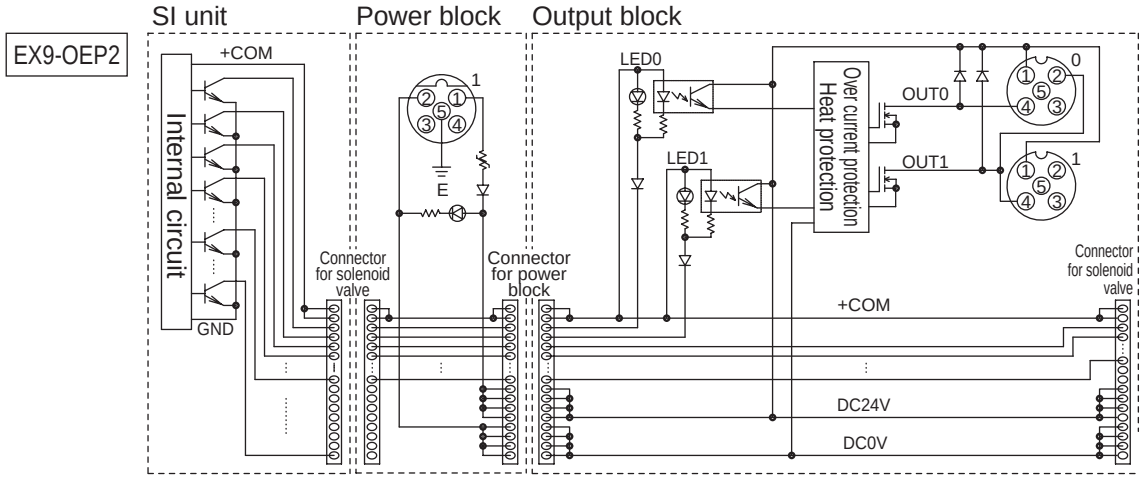
PIN No.	EX9-OEP1		EX9-OEP2	
	Output connector No.0	Output connector No.1	Output connector No.0	Output connector No.1
1	NC	NC	DC24V	DC24V
2	OUT1	NC	OUT1	NC
3	DC0V	DC0V	NC	NC
4	OUT0	OUT1	OUT0	OUT1
5	NC	NC	NC	NC

NC: Non-connection

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

Circuit construction

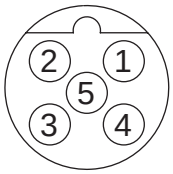




EX9-PE1

Power supply input connector No.1　M12 5 poles reverse (Male)

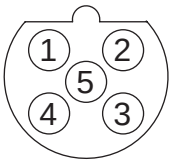
Example of connector cable: SMC EX9-AC###-1 etc.



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 connector cable: SMC 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:The power supply connector is prepared for supplementation and not used basically. If the power block is connectedright next to EX250 series in manifold, the connector is used as jumper to power supply for SI unit. If the enclosure equivalent to IP67 is required, be sure to mount waterproof cap on unused connector. The water proof cap is attached as accessory to power supply connector side.

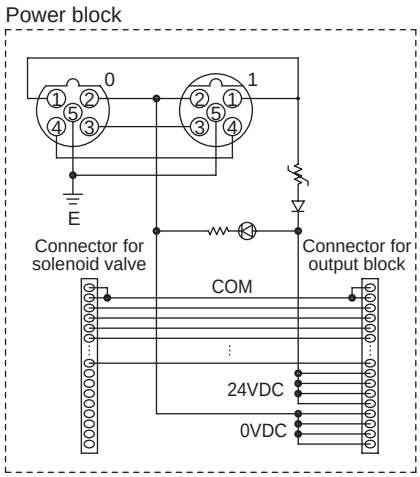
*2:If max. supply current (3.0 to 3.1A) is applied for operation, do not make the ambient temperature exceed 40℃ and bundle the cable.

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

The max. allowable current per 1 pin of M12 connector mounted on power supply is 3.1A*2. For detail, refer to the section for supply current calculation(Page 24).

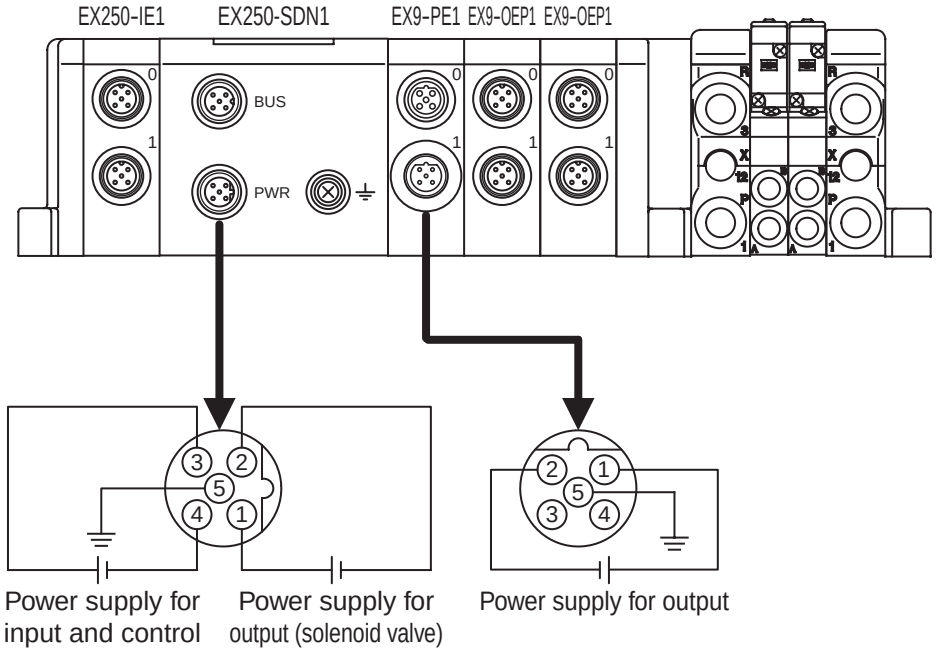
Circuit construction

EX9-PE1



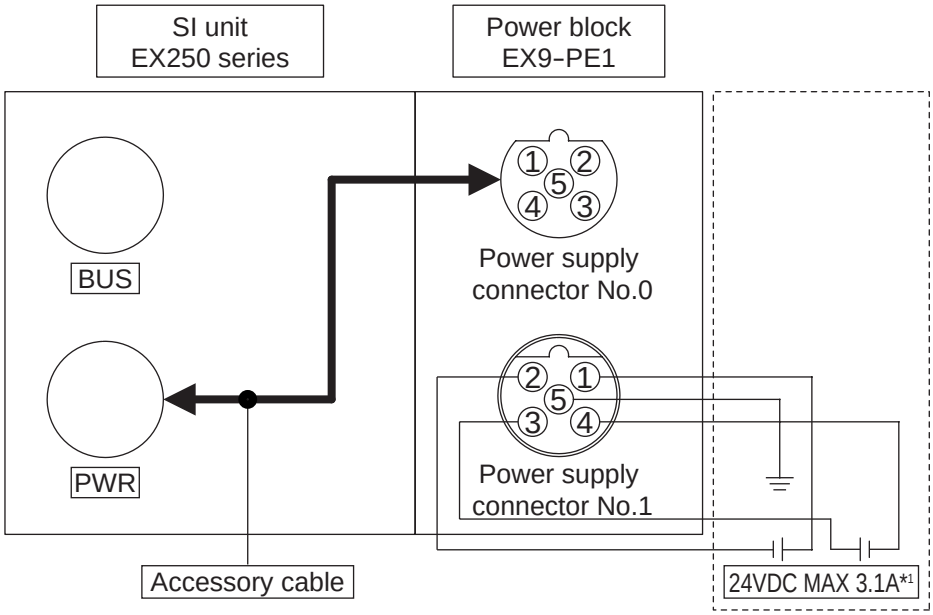
4-2. Power wiring

A. The power supply for SI unit is separate from power block.



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

The power supply connector No. 0 is available for power supply to SI unit because power supply connector No. 1 is connected to each PIN.
Only in case that SI unit is located next to the power block, dedicated accessory cable which is originally prepared for bypass connection can be used.



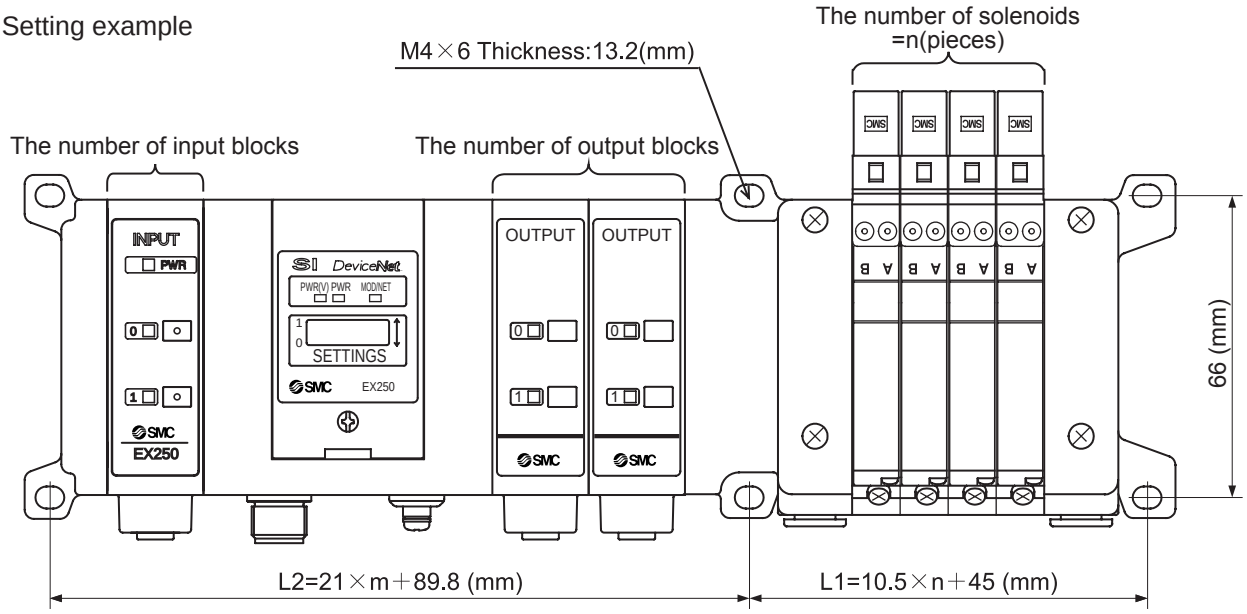
*1:If max. supply current (3.0 to 3.1A) is applied for operation, do not make the ambient temperature exceed 40℃ and bundle the cable.

4-3.Installation and maintenance

How to set

Output block and power block can't installed and controlled independently. Be sure to connect SI unit to them.

Setting example



*The number of input blocks+The number of output blocks+The number of power blocks=m(pieces)

L \ n m	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L1	45	55.5	66	76.5	87	97.5	108	118.5	129	139.5	150	160.5	171	181.5	192	202.5	213
L2	89.8	110.8	131.8	152.8	173.8	194.8	215.8	236.8	257.8	278.8	299.8	–	–	–	–	–	–

(mm)

∗Each dimension is for the condition with VQC1000 series solenoid valve and EX250 series connected.
With regards to the dimension L2, the standard setting is what makes the relation, m≦10.
For setting of pieces over 10, consult with SMC sales.
For the dimension with other series of solenoid valve and SI unit connected, refer to specifications of individual product.

Wiring (for power supply, communication and input) and piping are done on only one side, make a space for wiring and piping.

Maintenance

Be sure to turn off the power supply before the maintenance.

Addition of output block

·Remove screws from end plate.
·Release connection among input block (if connected), SI unit and valve manifold (if connected).
·Mount attached tie rod.
·Connect additional output block.
·Mount removed input block (if connected), SI unit and valve manifold (if connected).
·Connect end plate and tighten removed screws at specified torque.(0.6 N·m)

Replacement of output block

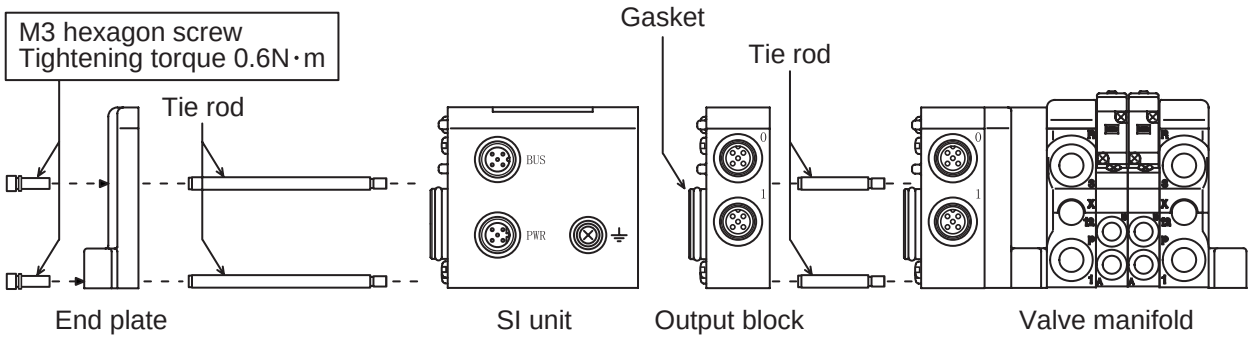
·Remove screws from end plate and release connection among input block (if connected), SI unit and valve manifold (if connected).
·Replace old output block with new one. (Tie rod does not need to be removed.)
·Mount removed input block (if connected), SI unit and valve manifold (if connected).
·Put back end plate and screws and tighten the screws at specified torque.(0.6 N·m)

⚠CAUTION

For maintenance

(1) Be sure to turn off all power supplies.
(2) Be sure that there is no foreign matter in any of products.
(3) Be sure that there is no foreign matter attached on the gasket.
(4) Be sure that tightening torque is according to specification.
If these items are not kept, it may lead to the breakage of board or intrusion of liquid or dust into the products.

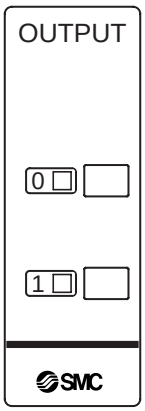
Assembly and disconnection of the product



5.LED display and Dimensions

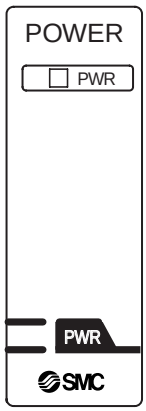
5-1.LED display

EX9-OET1, EX9-OET2
EX9-OEP1, EX9-OEP2



Name	Contents
0, 1	Each LED lights up when OUT0 and OUT1 output.

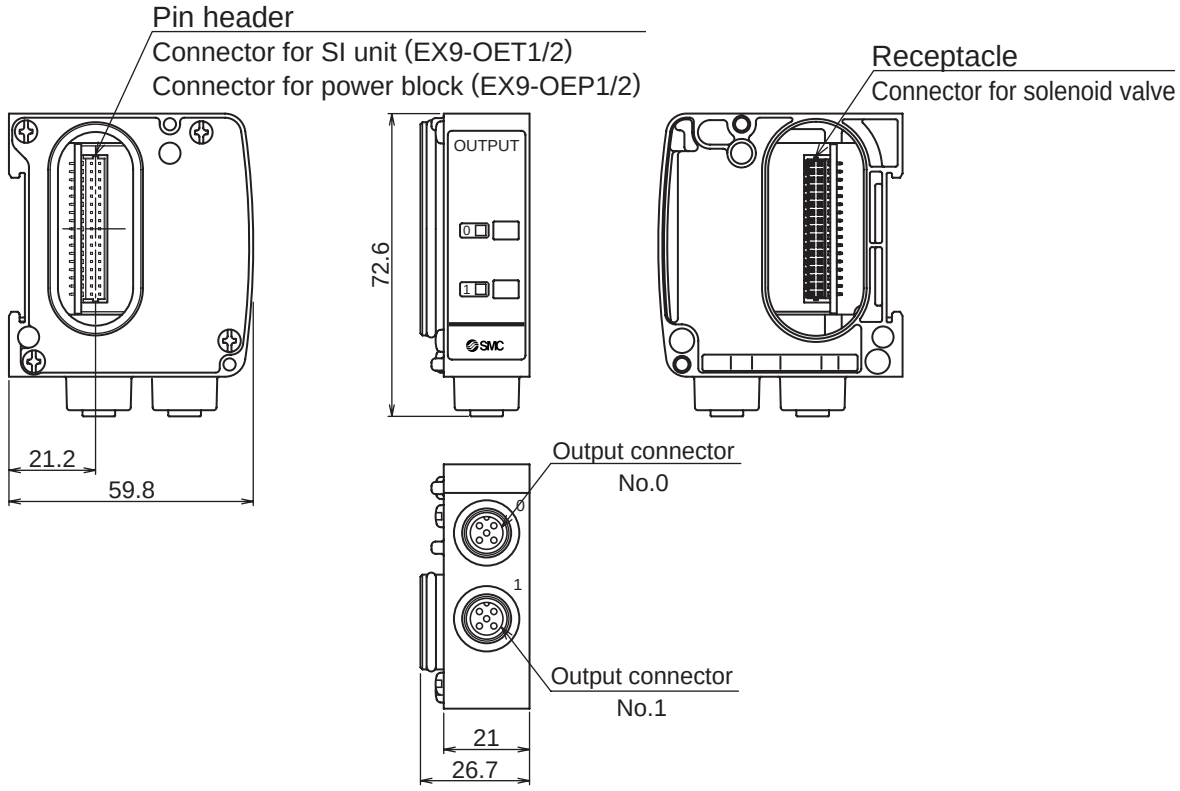
EX9-PE1



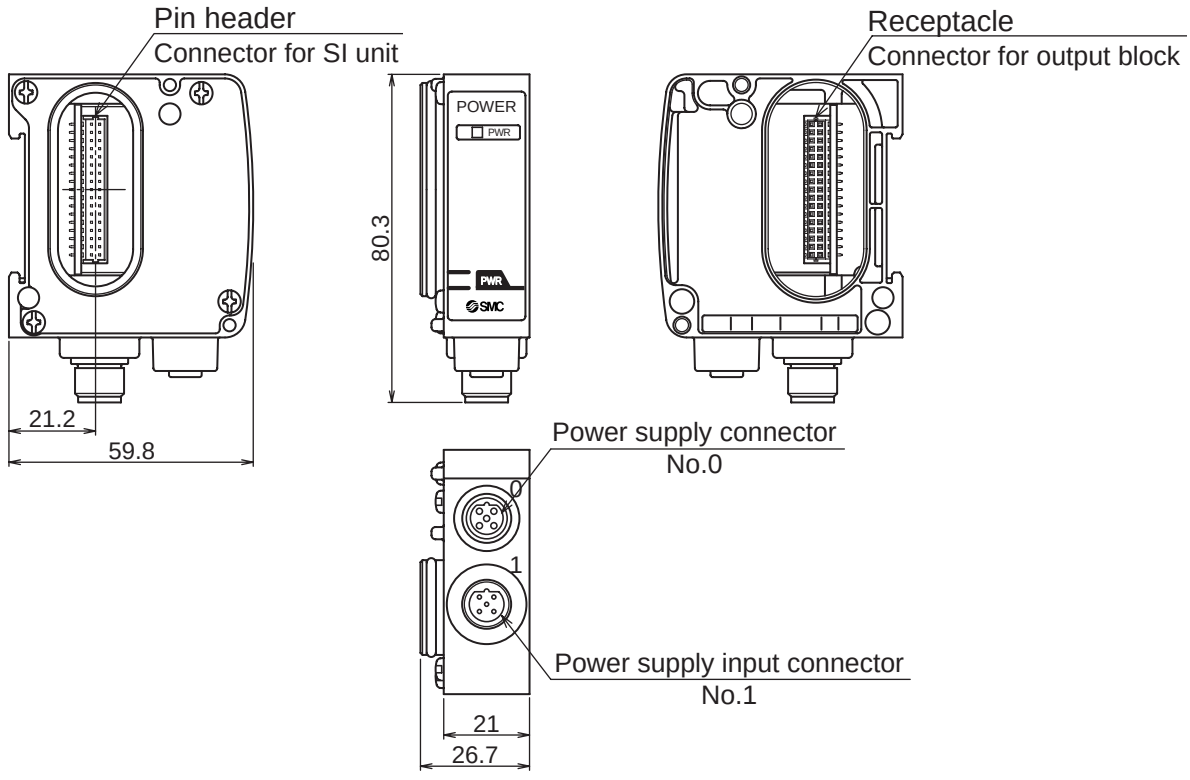
Name	Contents
PWR	Lights up when external power is supplied.

5-2.Dimensions

EX9-OET1, EX9-OET2
EX9-OEP1, EX9-OEP2



EX9-PE1



6.Troubleshooting

Output block

0 to 1 LED	Output signal ON/OFF LED
Yellow doesn't light up. Yellow doesn't goes off.	[Countermeasure] ·Check mounting condition of connector. ·Check type of output block (PNP/NPN). ·Replace operating load and try again. ·Replace output block. ·Replace SI unit.

Power block

PWR LED	Power supply ON/OFF LED
Green doesn't light up.	[Countermeasure] ·Check external power supply (DC24V). ·Replace power block.

7.Attachment

Power supply system diagram

①The power to the output block for low wattage load is supplied from SI unit like the solenoid valve manifold.
②The power to the output block for high wattage load is supplied from the power block.
③Addition of the power block enables separation of the power supply for high wattage solenoid valve from the one for fan.

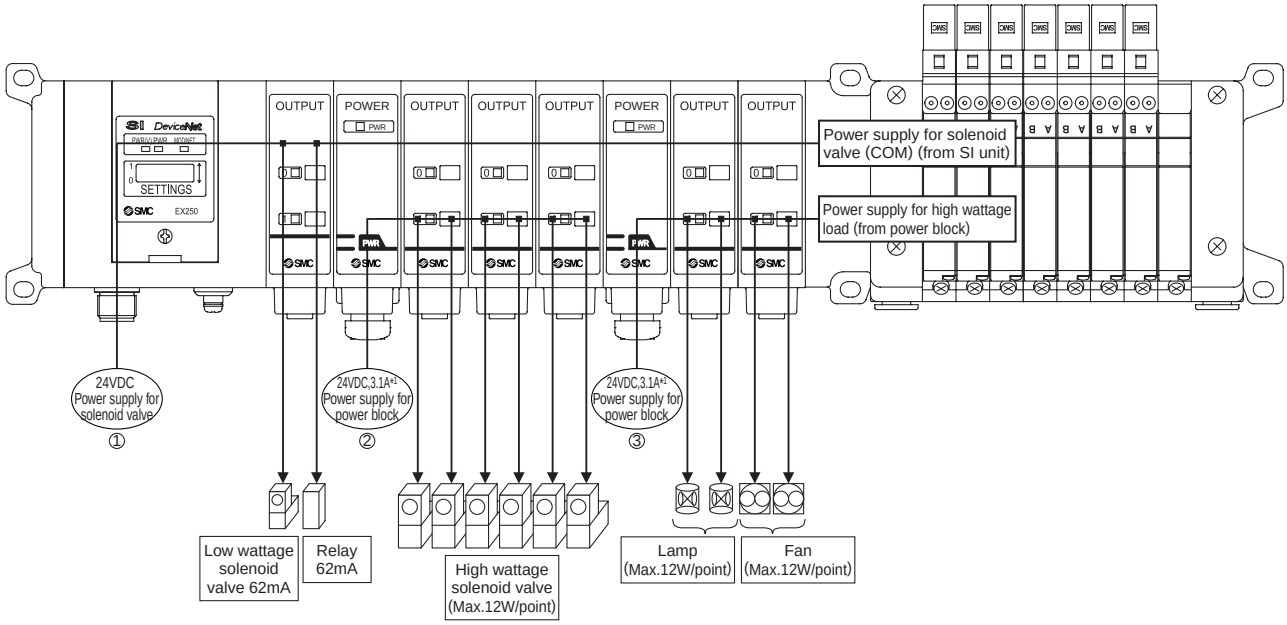


Fig. Power supply system diagram for output block

∗1:If max. supply current (3.0 to 3.1A) is applied for operation, do not make the ambient temperature exceed 40℃ and bundle the cable.

①:Power supply system for low wattage load and solenoid valve
②:Power supply system 1 for high wattage load
③:Power supply system 2 for high wattage load

Supply Current Calculation

The power supply system of SI unit depends on max. current of each SI unit. (Refer to the following table.)
The max. allowable current for the power block is 3.1A*1.

①:Power supply system for solenoid valve and low wattage load SI unit: EX250-SDN1(MAX.2A)

・Internal consumption current・・・Output points of output block (sum of the block for low wattage and high wattage loads) x Consumption current(@20mA)
Example 12 points x 20mA=240mA

・Load consumption current・・・・・・Consumption current of manifold valve + Capacity of load connected to output block for low wattage load
Example (42mA x 7st.) + (62mA x 2) = 418mA

Total: Internal consumption current + Load consumption current Example 240mA + 418mA = 0.7A ≦ 2A ⇒OK
Criterion

②:Power supply system 1 for power block Power block (MAX.3.1A*1)

・Internal consumption current・・・Power block consumption current = 20mA

・Load consumption current・・・・・・Capacity of load connected to output block for high wattage load (0.5A x 6) = 3A

Total: Internal consumption current + Load consumption current Example 20mA + 3A = 3.02A ≦ 3.1A*1 ⇒OK
Criterion

③:Power supply system 2 for power block Power block (MAX.3.1A*1)

・Internal consumption current・・・Power block consumption current = 20mA

・Load consumption current・・・・・・Capacity of load connected to output block for high wattage load (0.5A x 4) = 2A

Total: Internal consumption current + Load consumption current Example 20mA + 2A = 2.02A ≦ 3.1A*1⇒OK
Criterion

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

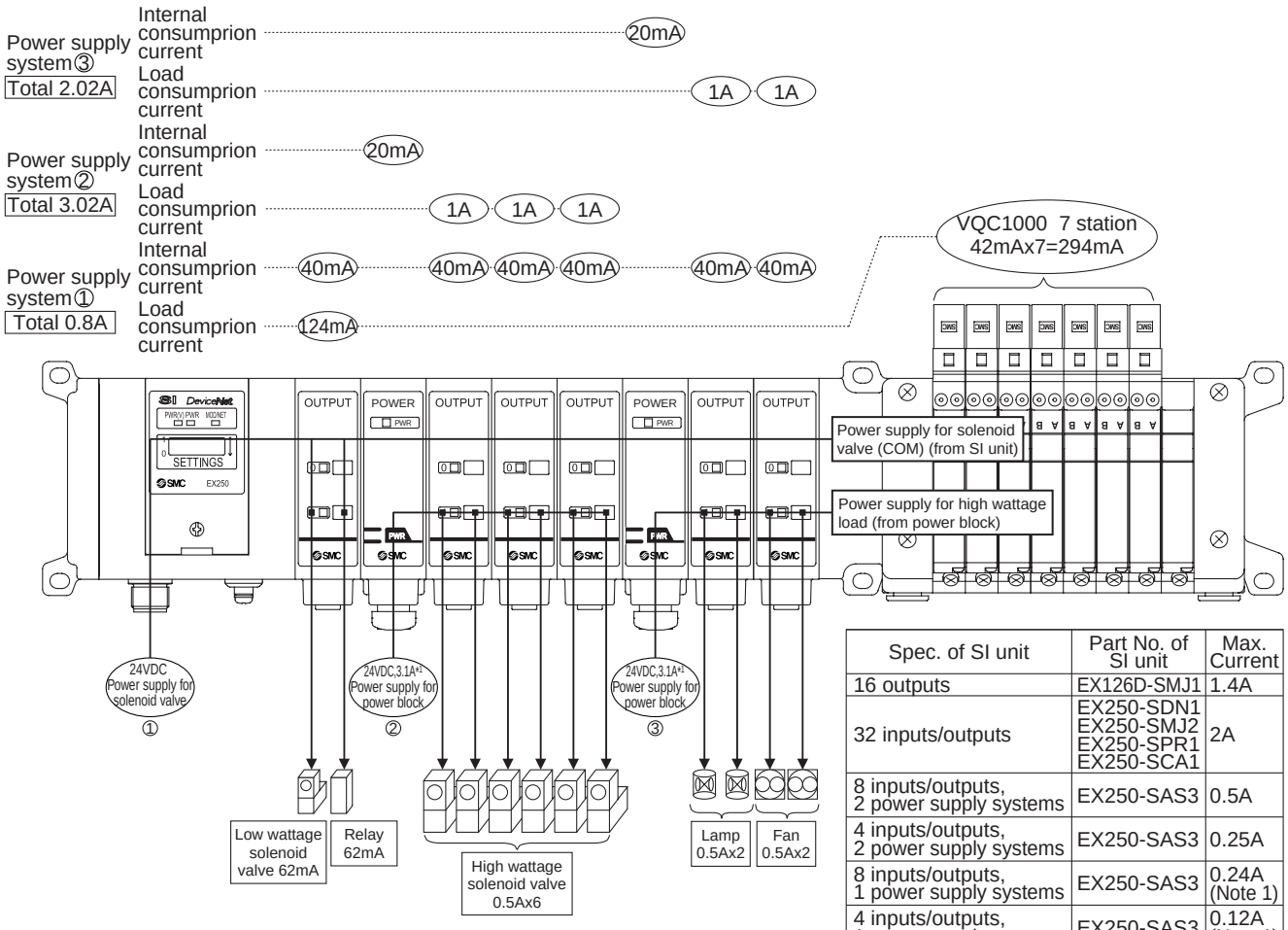


Fig.Current applied to each power supply system

Spec. of SI unit	Part No. of SI unit	Max. Current
16 outputs	EX126D-SMJ1	1.4A
32 inputs/outputs	EX250-SDN1 EX250-SMJ2 EX250-SPR1 EX250-SCA1	2A
8 inputs/outputs, 2 power supply systems	EX250-SAS3	0.5A
4 inputs/outputs, 2 power supply systems	EX250-SAS3	0.25A
8 inputs/outputs, 1 power supply systems	EX250-SAS3	0.24A (Note 1)
4 inputs/outputs, 1 power supply systems	EX250-SAS3	0.12A (Note 1)
Gatewey, 16 outputs	EX250-SAS3	0.75A

Note) For one power supply system of AS-i , the max. supply current in total of inputs/outputs is applicable.

Supply Current Calculation for One Power Supply System of AS-i

In one power supply system of AS-i, since the current supplied for input and output equipment is limited, it is necessary to calculate the current consumed by these equipment.

EX250-SAS7

·Max. supply current : 240mA

·Internal consumption current···Output points of output block (sum of the block for low wattage and high wattage loads) x Consumption current (@20mA)
Example 6 points x 20mA=120mA

·Load consumption current·····Sensor consumption current+Capacity of load connected to output block for low wattage load+Solenoid valve consumption current
Example 10mA+(20mA+20mA+40mA)+20.8mA=110.8mA

Total: Internal consumption current + Load consumption current Example 120mA+110.8mA=230.8mA≦240mA⇒OK

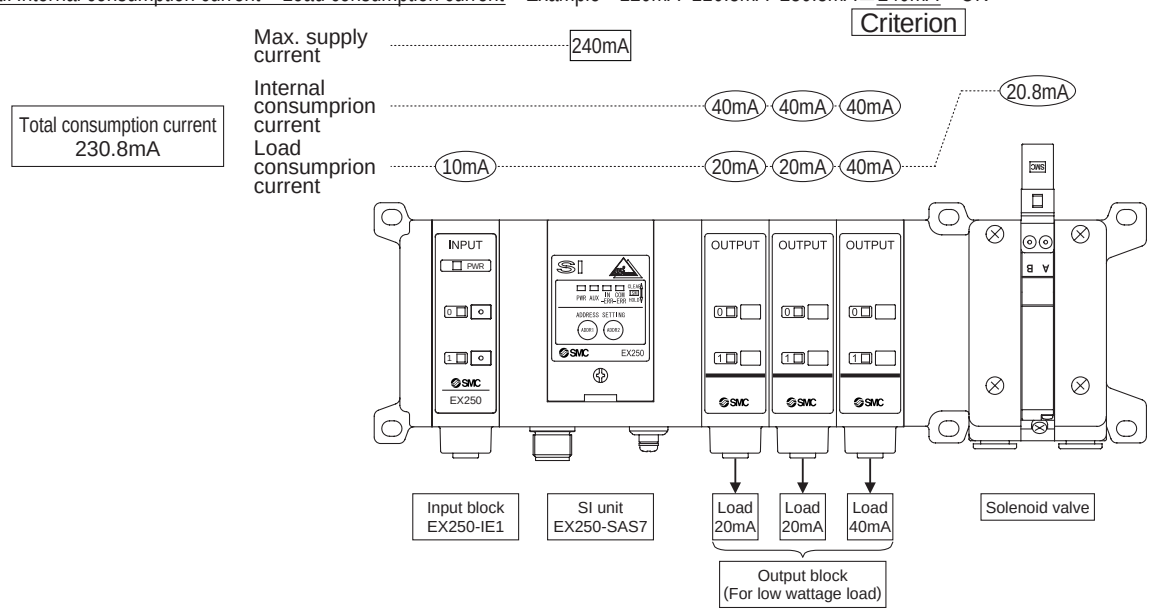


Fig. Consumption current in EX250-SAS7

EX250-SAS9

·Max. supply current: 120mA

·Internal consumption current···Output point of output block (sum of the block for low and high wattage load) x Consumption current (@20mA)
Example 2 points x 20mA = 40mA

·Load consumption current·····Sensor consumption current + Capacity of load connected to low wattage load + Solenoid valve consumption current
Example 10mA+40mA+20.8mA=70.8mA

Total: Internal consumption current + Load consumption current Example 40mA + 70.8mA = 110.8mA≦120mA⇒OK

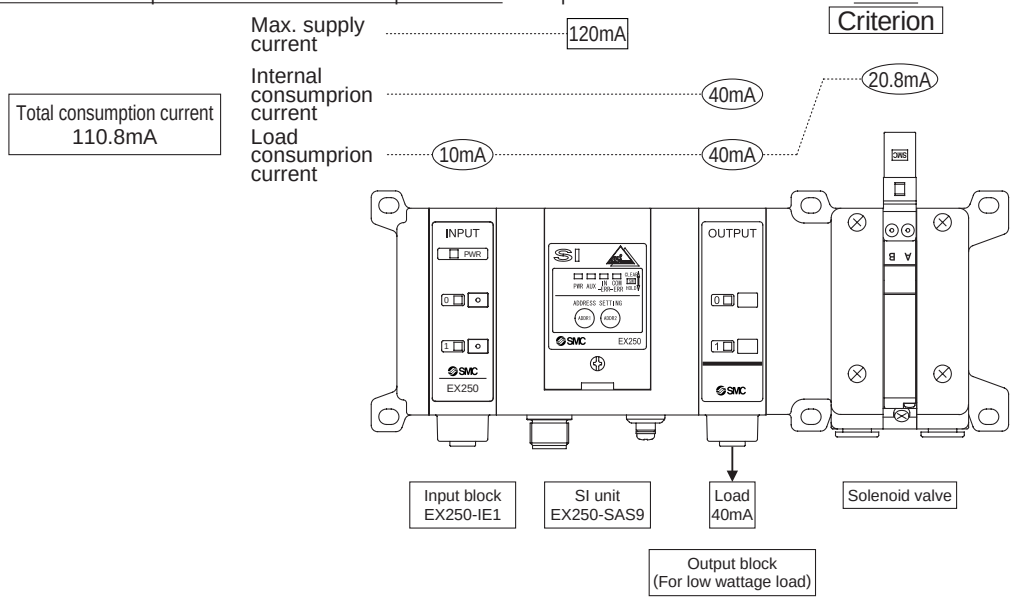


Fig. Consumption current in EX250-SAS9

Connector Wiring Diagram between Output Blocks

The output block for low wattage load is applicable to 32 output signals at max. through internal connectors (No.3 to 34). However, the power block and output block for high wattage load use the output signals (No.27 to 34) at low side to supply the power from the power block to the output block for high wattage load and so are applicable to 24 output signals at max. (32 minus 8 = 24).

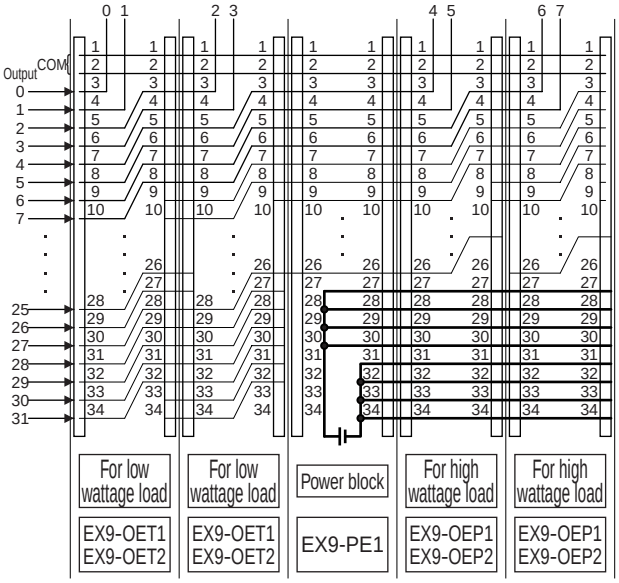


Fig. Connector wiring between output blocks

The example of calculating the number of output

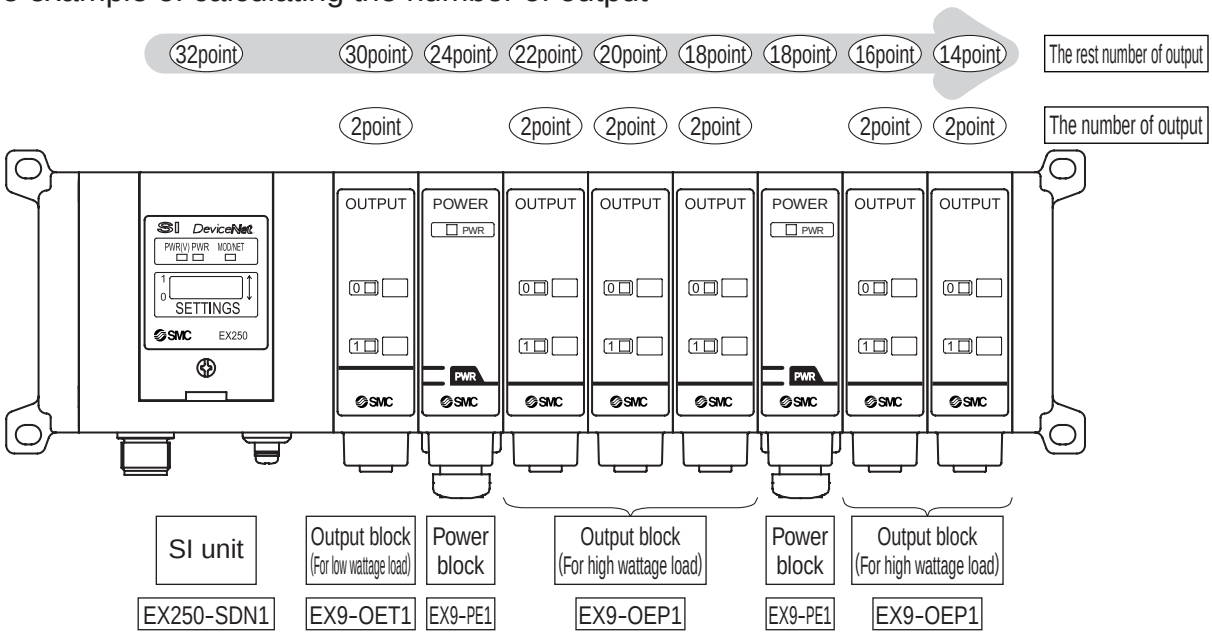


Fig. Example of calculating the number of output