



Installation & Maintenance Manual

SI unit - DeviceNet compatible

Type EX250-SDN1/EX250-SDN1-X102



Safety Instructions

The unit and this manual contain 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 actuator.

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 reviewed carefully.

▲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 you helpful information.

▲WARNING

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

An injury or failure can result.

Do not operate outside of the specification range.

Fire, malfunction or damage can result.

Please use it after confirming the specification.

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

Otherwise fire, explosion or corrosion can result.

The 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 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.

Otherwise it can cause injury.

Safety Instructions (continue)

▲CAUTION

Perform a proper functional check after completing maintenance work.

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

Safety cannot be assured due to unexpected malfunctions.

NOTE

The direct-current power supply should be a UL authorized power supply.

- Limited voltage current circuit in accordance with UL508
A circuit to which power is supplied by the secondary coil of a transformer that meets the following conditions.
 - Max. voltage(with no load): less than 30Vrms(42.4V peak)
 - Max. current:(1)less than 8A(including when short circuited)
(2)limited by circuit protector (such as fuse) with the following ratings

No load voltage (V peak)	Max.current rating (A)
0 to 20 [V]	5.0
20 to 30 [V]	100 / peak voltage

- UL1310 compatible class 2 power supply unit or circuit of max. 30Vrms (42.4V peak) or less using a UL1585 compatible class 2 transformer as power supply. (Class 2 circuit)

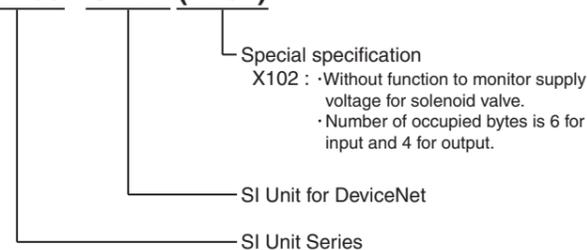
Follow the instructions given below when handling the product. Failure to follow instructions may damage the unit.

- Operate the product within the specified voltage range.
- Reserve a space around the unit for maintenance.
- Do not remove labels.
- Do not drop, hit or apply excessive shock to the product.
- Do not bend or apply tensile force to cables, or apply a force by placing a heavy load on them.

- Connect wires and cables correctly.
- Do not connect wires while the power is on.
- Do not lay wires or cables with the same wiring route as a power line or high-voltage line.
- Verify the insulation of the wiring.
- Take proper measures against noise such as a noise filter when the product is incorporated in equipment or devices.
- Select an operation environment according to enclosure(IP67).
- Take sufficient shielding measures when installing the product at the following place.
 - (1)A place where a noise due to static electricity etc. is generated
 - (2)A place of high electric field strength
 - (3)A place possibly exposed to radioactivity
 - (4)A place near power cable
- Do not use the product nearby a place where an electric surge is generated.
- Use the product equipped with a surge absorber when a surge-generating load such as a solenoid valve is driven directly.
- Prevent foreign matter such as remnant of wires from entering the product.
- Do not expose the product to vibration and impact.
- Keep the specified ambient temperature range (+5 to +45 °C).
- Do not expose the product to heat radiation from a heat source located nearby.
- Use a precision screw driver with small flat blade when setting rotary switch and DIP switch.
- Perform maintenance and check at regular intervals.
- Perform a proper functional check.
- Do not clean the product with chemicals such as benzine and thinner.

Model Indication Method

EX250 - SDN1 (X102)



Specification

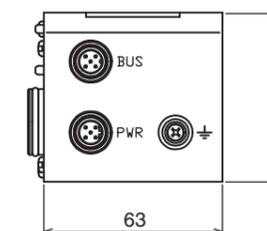
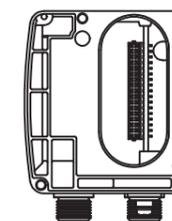
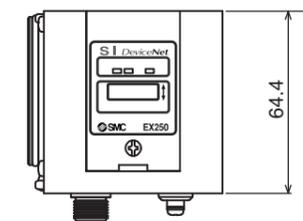
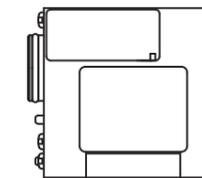
General specification

Item	Specification
Operating ambient temp.	+5 to +45 °C
Operating ambient humidity	35 to 85% RH (No dew condensation)
Storage ambient temp.	-20 to +60 °C
Vibration proof	10 to 57Hz 0.35mm (Constant amplitude) 57 to 150Hz 50m/s ² (Constant acceleration)
Impact proof	150m/s ² (peak), 11ms × three times in each direction ± X, Y and Z.
Noise immunity	Normal mode : ±1500V Pulse duration 1us Common mode : ±1500V Pulse duration 1us Radiation : ±1000V Pulse duration 1us
Withstand voltage	500V AC for 1min.
Insulation resistance	500V DC min10M ohm
Operating environment	No corrosive gas and no dust

Electrical and network

Item	Specification	
Part No.	EX250-SDN1 EX250-SDN1-X102	
Applicable system	DeviceNet Release 2.0	
Power voltage range Current consumption	Power for SI unit Current consumption	11 to 25V DC 100mA or less
	Power for Input Block Current consumption	19.2 to 28.8V DC Depending on the number of Input Block stations and sensor specifications. Max 1A or less
	Power for solenoid valve Current consumption	21.6 to 26.4V DC (Power reduction alarm occurs at approx. 19V DC.) Depending on number of Solenoid valve station and specifications Max 2.5A or less
Solenoid valve connection spec.	Output type	P-ch MOS-FET Open drain type
	Connection load	Solenoid valve with protection circuit for 24V DC and 1.5W or less surge voltage. (made by SMC)
	Insulation type	Opto coupler type
Residual voltage	0.3V DC or less	
Network connection spec.	MAC ID setting range	0 to 63 (Set by DIP / retain address information when setting power is shut off via network.)
	Baud Rate (Transmission speed)	500kbps, 250kbps, 125kbps (Set by DIP / hold address information when setting power is shut off via network.)
	Slave (branch station) type	Group 2 only server
	Connection type	T branch type, Multi drop type
	Device type	27
	Product code	2401 2404
	Revision	Refer to EDS file
	Vendor ID	7
	Consumed connection size (Receiving byte)	4 (Polled I/O connection : Occupy 4 byte)
	Produced connection size (Sending byte)	4 (Polled I/O connection : Occupy 4 byte) 6 (Polled I/O connection : Occupy 6 byte)
	Correspond message	Polled command (I/O message), Explicit message.

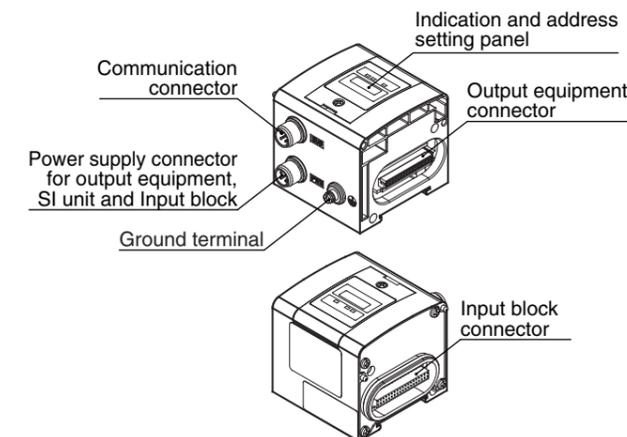
Outline with Dimensions (in mm)



Names and Functions of Individual Parts

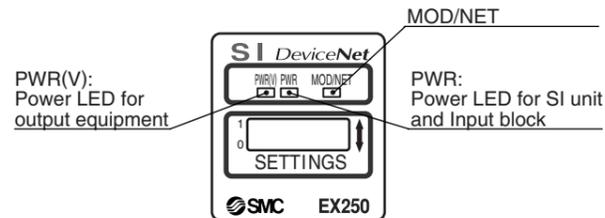
Body

- Communication connector
To send and receive communication signals through DeviceNet line.
- Power supply connector for output equipment, SI unit and Input block
To supply power to the output equipment such as a solenoid valve, and output block, SI unit and Input block.
- Output equipment connector
To connect the output equipment such as a solenoid valve and output block.
- Input block connector
To connect the Input block.
- Indication and address setting panel
To provide LED's to indicate the condition of the unit, and the setting of address and HOLD/CLEAR functions.
- Ground terminal
To be connected to the ground.



Names and Functions of Individual Parts (continue)

LED indication



Indication	Contents	
PWR (V)	Light ON when power for solenoid valve is supplied.	
PWR	Light ON when power for DeviceNet line is supplied.	
MOD / NET	Light OFF	Power off, off line or Duplicate MAC ID.
	Green flashing	Waiting for connection (ON line)
	Green Light ON	Connection completed (ON line)
	Red flashing	Connection timed out (Minor communication error)
	Red Light ON	MAC ID duplication error or BUS OFF error (Major communication error)

SW Setting

Address setting

When DIP switch is to be set, turn OFF power supply to SI unit.

Address	SW1	SW2	SW3	SW4	SW5	SW6
#0	0	0	0	0	0	0
#1	1	0	0	0	0	0
#2	0	1	0	0	0	0
⋮						
#62	0	1	1	1	1	1
#63	1	1	1	1	1	1

Setting	Baud rate (kbps)
SW7 SW8	
0 0	125
1 0	250
0 1	500
1 1	Not used

SW9	Solenoid output state
1	HOLD All solenoid valve outputs are held before communication fault. (Fault state=1, Fault value=0)
0	CLEAR All solenoid outputs are reset to zero. (Fault state=0, Fault value=0)

Mode setting

Setting	Mode
0	HW mode Set address and Baud rate by SW1 to 8
1	SW mode Set address and Baud rate by network. SW1 to 8 are invalid.

Wiring

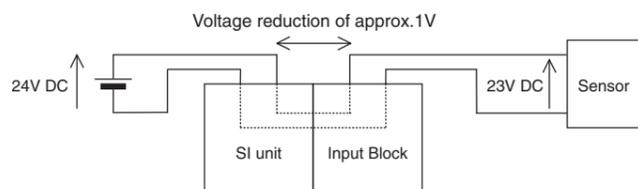
Wiring of power supply

The Power supply connection inside the unit has individual power supplies for solenoid valve actuation (SV power supply) and for Sensor (SW power supply). Supply 24V DC for each of them.

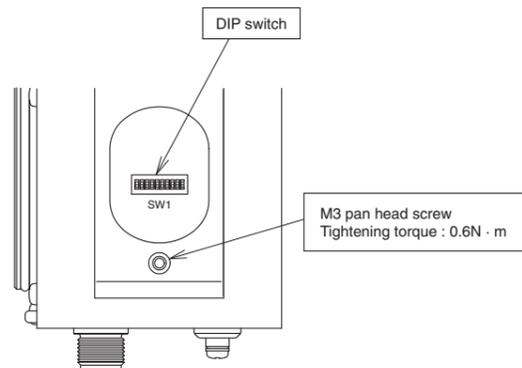
Either single or dual power supply is available. Wiring is not necessary for SW power supply when no Input Blocks are used.

*In case of single power supply, pay attention to the range of each supply voltage.

Power for a sensor is supplied to the sensor connected to an Input Block. There will be a voltage drop of up to approx. 1V inside the SI unit, therefore select a sensor which will operate with the resultant voltage. If a sensor requires 24V, it is necessary to lower power supply voltage for sensor slightly or secure a power supply for sensor separately without going through the SI unit so that sensor input voltage can be 24V with actual loading (allowable voltage of sensor power supply : 19.2V to 28.8V).

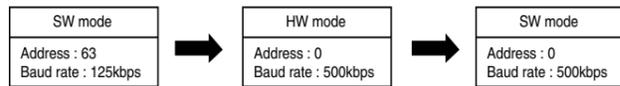


Position of DIP switch



- Default value of address and baud rate. Node address and baud rate are preset to 63, 125kbps respectively at the shipment in either HW mode or SW mode.
- In SW mode, setting value of address and baud rate are retained even after power supply is off.
- In HW mode, once power supply is turned off and turned on again, then setting value of address and baud rate in S/W mode are erased. Address and baud rate can be set again by setting switch SW1.

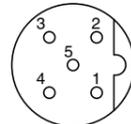
Example



- Output with communication stopped is set to 0 (full output clear mode) at shipment from factory. It is possible to change setting of single output when communication stopped. In this case, setting of SW1-9 becomes invalid.

Power supply connector

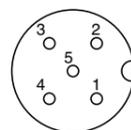
M12 5pin (Plug)



No.	Description	Function
1	SV 24V	For solenoid valve +24V
2	SV 0V	For solenoid valve 0V
3	SW 24V	For sensor unit +24V
4	SW 0V	For sensor unit 0V
5	E	Earth

Communication connector

M12 5pin (Plug) [Special for DeviceNet]



No.	Description	Function
1	Drain	Drain / Shield
2	V +	Power supply + for circuit
3	V -	Power supply - for circuit
4	CAN_H	Signal wire H
5	CAN_L	Signal wire L

Error Display Function (continue)

Red Light ON	Node address overlapping error <Countermeasure> Confirm there is no overlapping on the node address.
	BUS OFF error Detects communication error. <Countermeasure> Case 1 Communication error due to noise. Confirm there is no component or high voltage cable that generates noise around communication wire. Make some distances between communication wire and noise source. Case2 Communication cable problem Confirm terminal resistance (121ohm) is connected to both ends of DeviceNet communication wire.
	If red MOD/NET LED is still ON despite above countermeasures, exchange SI unit.

When red MOD/NET LED is ON, even if cause is solved, the SI unit does not perform auto-recovery. In this case, please reset the power to SI unit circuit (Communication/Internal power supply).

Error Display Function

MOD/NET LED	Cause & Countermeasure
Light OFF	PWR LED Light OFF <Countermeasure> Confirm that power for SI unit circuit is supplied. Confirm correct wiring for circuit. If above countermeasures do not improve status, please exchange SI unit. PWR LED Light ON <Countermeasure> Confirm that baud rate is set correctly. If MOD/NET LED light is OFF in spite of baud rate is set correctly, exchange SI unit.
Green flashing	Connection waiting Shows communication waiting status between SI unit and master. <Countermeasure> Confirm master is operating correctly. If using scan list, ensure slave is recorded to scan list correctly.
Red flashing	Communication wire disconnected error Warning for SV supply voltage drop (Except for EX250-SDN1-X102) <Countermeasure> Confirm communication wire is connected. Confirm SV power supply voltage is according to specification. (21.6 to 26.4V) (Except for EX250-SDN1-X102) <Remark> Red flashing if master power source is turned off during communication.

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
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