EX230-TFK40GB

Installation and Maintenance Manual
SI unit - DeviceNet compatible
Type EX230-SDN1

EMC Directive 89/336/EEC
EN61000-6-2:2001: Electromagnetic Compatibility (EMC) - Immunity
EN55011:2001: Electromagnetic Compatibility (EMC) - Emission

1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety ISO4414: Pneumatic fluid power and JIS B 8370: Pneumatic system axiom must be observed, along with other relevant safety practices.

⚠ DANGER	In extreme conditions, there is a possibility of serious injury or loss of life.
⚠ WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

⚠ WARNING

- **Do not disassemble, modify (including change of printed circuit board) or repair the product.**
  An injury or product failure may result.
- **Do not operate the product beyond the specification range.**
  Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- **Do not use the product in the presence of flammable, explosive or corrosive gas.**
  Fire, explosion or corrosion may result. This product does not have an explosion proof construction.
- **When using the product as part of an interlocking system:**
  1) Provide a double interlocking system, for example a mechanical system.
  2) Check the product regularly to ensure proper operation.
- **Before performing maintenance, be sure of the following:**
  1) Turn off the power supply.
  2) Stop the air supply, exhaust the residual pressure and verify the release of air from the system.

⚠ CAUTION

- **Always perform a system check after maintenance.**
  Do not use the product if any error occurs.
  Safety cannot be assured if caused by un-intentional malfunction.
- **Provide grounding to ensure correct operation and to improve noise resistance of the product.**
  This product should be individually grounded using a short cable.
- **Follow the instructions given below when handling the product. Failing to do so may result in product damage.**
  - Maintenance space should always be provided around the product.
  - Do not remove labels from the product.
  - Do not drop, hit or apply excessive shock to the product.
  - Follow all specified tightening torques.

1 Safety Instructions (continued)

- Do not bend, apply tensile force, or apply force by placing heavy loads, on the cables.
- Connect wires and cables correctly, and do not connect while the power is ON.
- Do not route wires and cables together with power or high-voltage cables.
- Check the insulation of wires and cables.
- Take proper measures against noise, such as noise filters, when the product is incorporated in equipment or devices.
- Select the required protection (IP) rating according to the environment of operation.
- Take sufficient shielding measures when the product is to be used in the following conditions:
  (1) where noise due to static electricity is generated.
  (2) where electro-magnetic field strength is high.
  (3) where radioactivity is present.
  (4) where power lines are located.
- Do not use the product in a place where electric surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve is to be directly driven.
- Prevent any foreign matter from entering this product.
- Do not expose the product to vibration or impact.
- Use the product within the specified ambient temperature range.
- Do not expose the product to any heat radiation.
- Use a precision screwdriver with flat blade to adjust the DIP switch.
- Close the cover over the switches before power is applied.
- Do not clean the product with chemicals such as benzene or thinners.

- **Power Supply selection**
  A UL approved direct current (DC) power supply should be used with this product, as follows:
  1. A limited voltage / current supply in accordance with UL508.
     A circuit from which power is supplied by the secondary coil of a transformer according to the following:
     Maximum voltage (no load) : Less than 30Vrms (42.4V peak)
     Maximum current : (1) Less than 8A (including when short circuited)
     (2) Limited by circuit protection (such as a fuse) with the following rating.

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

  2. A Class 2 power supply unit in accordance with UL1310, or a power supply circuit of maximum 30Vrms (42.4V peak) or less, using a Class 2 transformer in accordance with UL1585 as power source.

2 Specifications

General specifications

Item	Specification
Protection class	IP65 to IEC60529 (NEMA4)
Operating ambient temperature	+5 to +45°C
Operating ambient humidity	35 to 85%RH (no condensation)
Vibration resistance	5G (10 to 55Hz at amplitude 0.50mm)
Shock resistance	Peak acceleration 10G
Voltage resistance	Between external terminal package and case, AC1000V, 50/60Hz, 1 minute
Isolation resistance	Between external terminal package and case, 10MΩ
Environment	No corrosive gas. No dust.

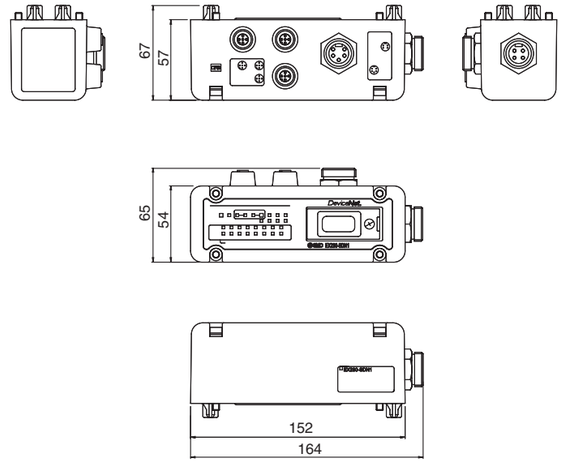
Communication specification

Item	Specification
Applicable system	DeviceNet
Node address	0 to 63
Communication speed	125k, 250k, 500kbit/sec

SI unit specification

Item	Specification
Output points	16 points
Output type	PNP transistor, open collector type (with over current protection)
Connection load	Solenoid valve with 24VDC, 2.8W or less of light and surge voltage protection
Input points	32 points
Input contents	0 to 15 : Over current detection status 16 : PWR VLV status 17 to 21 : Sensor input 22, 23 : EPR input 24 to 31 : Not used
Power supply voltage, consumption current	11 to 25VDC (for DeviceNet), 0.5A(Max): with sensor not connected
	20 to 25VDC (for DeviceNet), 0.5A(Max): with sensor connected
	20 to 26.4VDC (for Solenoid valve), 2.0A(Max)
Weight	600g or less
External dimensions (D x W x H)	65 x 164 x 57

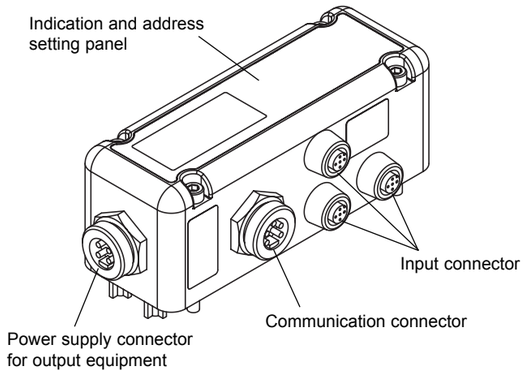
3 Outline dimensions (mm)

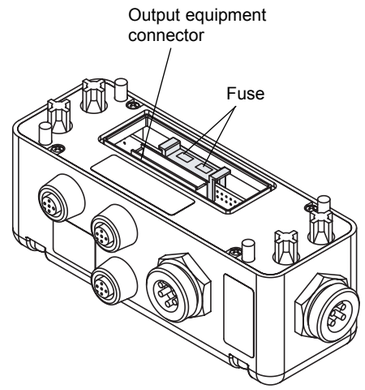


4 Names / Functions of Individual Parts

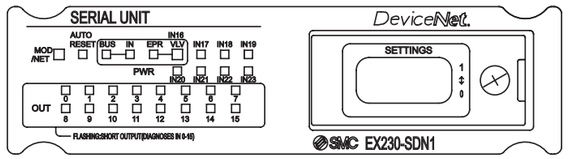
- Input connector
  To connect the sensors.
- Communication connector
  To send and receive communication signals through DeviceNet line.
- Output equipment connector
  To connect the output equipment such as a solenoid valve.
- Power supply connector for output equipment
  To supply power to the output equipment such as a solenoid valve.
- Indication and address setting panel
  To provide LED's to indicate the condition of the unit and the setting of address, Hold / Clear functions and auto reset functions.
- Fuse
  In the power supply for the sensor SI unit and output equipment, if an over current flows because of short circuit etc., the power supply will be disconnected by the fuse.
  In this case, the user must fix the cause of the short circuit before exchanging the fuse.

4 Names / Functions of Individual Parts (continued)





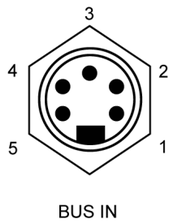
LED indication



Indication	Contents
MOD / NET	Displays the status of communication to DeviceNet
AUTORESET	When shorted at the output, the output turns OFF. When the SI unit recovers automatically, this LED will remain steady.
PWR BUS	Displays the power supply status supplied to the DeviceNet.
PWR IN	Displays the power supply status supplied to the Sensors.
PWR EPR	Displays the power supply status supplied to the EPR.
PWR VLV	Displays the power supply status supplied to the Solenoid valve.
IN 17 to 21	Displays the status of the Sensor inputs.
IN 22, 23	Displays the status of the EPR input.
OUT 0 to F	Display the status of the Outputs.

5 Wiring

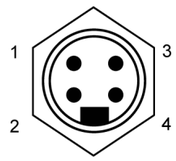
BUS connector specification



BUS IN

No.	Description	Function
1	Drain / Shield	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

VLV PWR IN connector specification

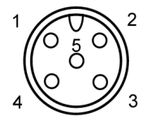


VLV PWR IN

No.	Description	Function
1	24V	For solenoid valve +24VDC
2	NC	No connection
4	NC	No connection
6	0V	For solenoid valve 0V

Sensor connectors

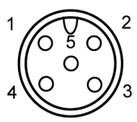
Connector description : 5-pin connector (M12) Female



IN 18/17

No.	Description	Function
1	24VDC (for sensor)	24VDC for sensor
2	IN 17	Sensor 17 input signal
3	0V (for sensor)	0V for sensor
4	IN 18	Sensor 18 input signal
5	PE (Protective Earth)	Protective Earth

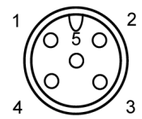
Connector description : 5-pin connector (M12) Female



IN 19

No.	Description	Function
1	24V DC (for sensor)	24VDC for sensor
2	NC	No connection
3	0V (for sensor)	0V for sensor
4	IN 19	Sensor 19 input signal
5	PE (Protective Earth)	Protective Earth

Connector description : 5-pin connector (M12) Female



IN 20/21

No.	Description	Function
1	24V DC (for sensor)	24VDC for sensor
2	IN 21	Sensor 21 input signal
3	0V (for sensor)	0V for sensor
4	IN 20	Sensor 20 input signal
5	PE (Protective Earth)	Protective Earth

6 Switch Setting

Address setting

When DIP switches are to be set, turn OFF power supply to SI unit.

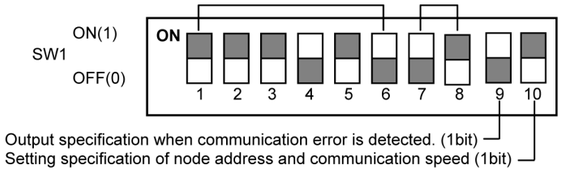
2x DIP switches (SW1:10bit,SW2:4bit) are mounted under the display of the SI unit.

To set switches, remove the fixing screw for the switch cover, open cover and set each switch. Replace cover after setting.

How to set SW1

SW1 No.			1	2	3	4	5	6	7	8	9
Node address		1	2	4	8	16	32				
	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				
Communication speed (BAUD RATE)	125k							0	0		
	250k							1	0		
	500k							0	1		
	---							1	1		
Output specification when communication error is detected.	CLEAR									0	
	HOLD									1	
Setting mode	HW										0
	SW										1

Setting of node address(6bit) Setting of communication speed (2bit)



How to set SW2

SW2 No.		1	2	3	4
AUTORESET	OFF	0			
	ON	1			
RESERVE	OFF		0		
RESERVE	OFF			0	
RESERVE	OFF				0

Setting of recovery from over current protection

7 Contacts

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BELGIUM	(32) 3-355 1464	**NETHERLANDS**	(31) 20-531 8888
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