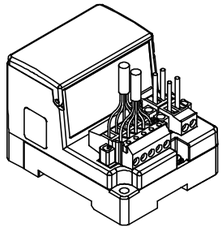
EX510-TF2Z137EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus - Gateway unit for DeviceNet®
EX510-GDN1



The intended use of this product is to control pneumatic valves and I/O while connected to the DeviceNet® 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) [*1)], and other safety regulations.

[*1)] ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots -Safety. etc.

- 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.

⚠ **Caution**	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ **Warning**	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Danger**	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious 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.
- Refer to the operation manual on the SMC website (URL: https://www.smcworld.com) for further Safety Instructions.

2 Specifications

2.1 General specifications

Item	Specifications
Rated voltage	24 VDC
Allowable instantaneous electrical stop	1 msec. or less
Enclosure rating	IP20
Withstand voltage	500 VAC for 1 minute (between FG and terminal block)
Insulation resistance	10 MΩ or more 500 VDC (between FG and terminal block)
Ambient temperature	Operating: -10 to +50 °C Storage: -20 to +60 °C
Ambient humidity	35 to 85% RH (no condensation)
Operating atmosphere	No corrosive gas

2 Specifications (continued)

2.2 Gateway specifications

Item	Specification
Power supply voltage	Power supply for control / inputs: 24 VDC ±10% Power supply for outputs: 24 VDC +10% / -5% (Warning for voltage drop at approx. 20 V)
Rated current	Power supply for control / inputs: 4.1 A max. (Inside GW unit: 0.1 A: Input units: 4 A) Power supply for outputs: 6 A max.
Inputs / Outputs	Inputs: 64 max. / Outputs: 64 max. (selectable by switch settings)
Weight	160 g (including accessories)

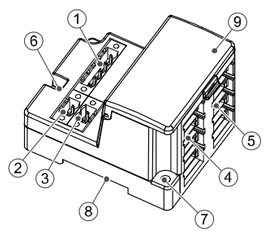
2.3 Higher level Communication

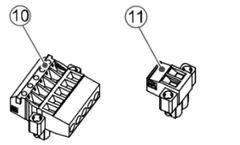
Item		Specifications		
Protocol		DeviceNet® Release 2.0		
Slave type		Group 2 Only Server		
MAC ID setting		0 to 63		
Device information		Vendor code: 7 (SMC Corporation) Product type: 12, Product code: 100		
I/O message size		Input: 8 bytes max., Output: 8 bytes max. (selectable by switch settings)		
Communication speed		125 kbps	250 kbps	500 kbps
Network length	Thick	500 m max.	250 m max.	100 m max.
	Thin	100 m max.		
Total extended cable length		156 m max.	78 m max.	39 m max.
		Max. extended cable length: 6 m		

2.4 Lower level Bus

Item	Specifications
Number of branches	Input: 4 branches / Output: 4 branches
Communication type	Communication protocol: dedicated for SMC Communication speed: 750 kbps
Current for input branch	Max. 1 A per branch
Current for output branch	Max. 1.5 A per branch
Branch cable length	20 m max.

3 Name and function of parts





Communication connector

Power Supply connector (2 pcs.)

Accessories

No	Part	Description
1	Communication socket (BUS)	Connection for DeviceNet® line using the communication connector.
2	Power supply socket (PWR(V))	Connection for power supply for outputs such as a solenoid valve.
3	Power supply socket (PWR)	Connection for power supply for control and inputs such as a sensor.
4	GW unit branch connector (for inputs)	Connection for an Input unit etc. using branch cables (EX510-FC##).
5	GW unit branch connector (for output)	Connection for SI unit (manifold valve) etc. using branch cables (EX510-FC##).
6	Functional Earth terminal (FE)	Used for ground connection.
7	Mounting hole	Used for direct mounting.
8	DIN rail mounting slot	Used for mounting on a DIN rail.
9	Display / switch setting	LED display and switch settings such as unit status, transmission speed, and occupied station number.
10	Mating communication connector	Connector for DeviceNet® communication (1 pc.).
11	Mating power supply connector	Connector for power supply (2 pcs.)

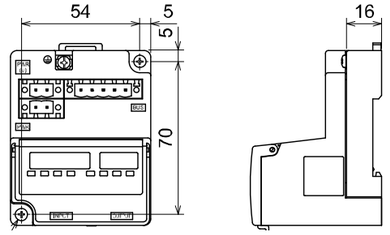
4 Installation

4.1 Installation

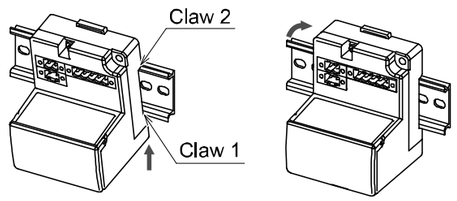
⚠ Warning

Do not install the product unless the safety instructions have been read and understood.

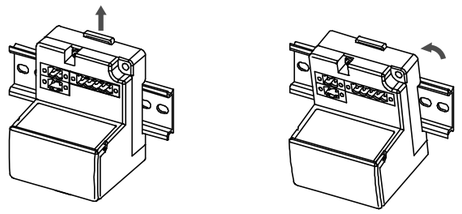
- **Direct mounting**
  Install the product using 2 x M4 screws.
  (Tightening torque: 0.8 N•m).



- **DIN rail mounting**
  To mount the product put claw 1 of the body under the DIN rail and push it upward. Push down claw 2 to the opposite side of the rail until the claw clicks securely on to rail.



For removing, lever up the DIN rail fixing plate of the body with a flat blade screwdriver, and remove it by tilting claw 2 side forward.



4.2 Environment

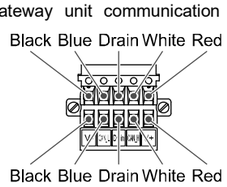
⚠ Warning

- 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 specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product specifications.

5 Wiring

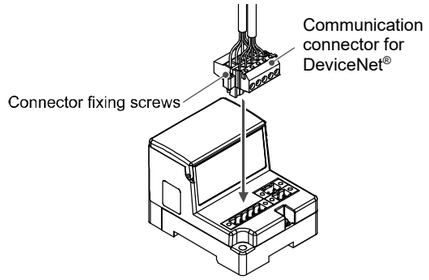
5.1 Communication wiring

- Connections should be made with the power supply turned OFF.
- Connect DeviceNet® cables to the Gateway unit communication connector for DeviceNet®.
- Make sure to connect the signal cables to the designated pins.
- The connector is suitable for use with wire sizes AWG24 to AWG12 (0.2 mm^2 to 2.5 mm^2).
- The required tightening torque of the terminal screws is 0.5 to 0.6 N•m.



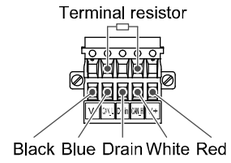
5 Wiring (continued)

- When inserting the communication connector to the Gateway unit, tighten the connector fixing screws (M2.5 slotted head screws) firmly with a tightening torque of 0.2 to 0.3 N•m.



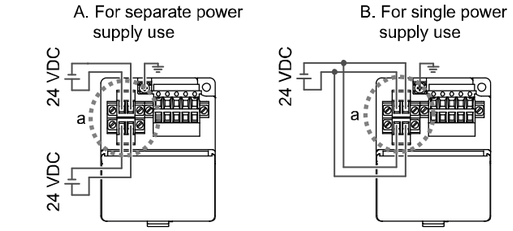
5.1.1 Terminating resistor

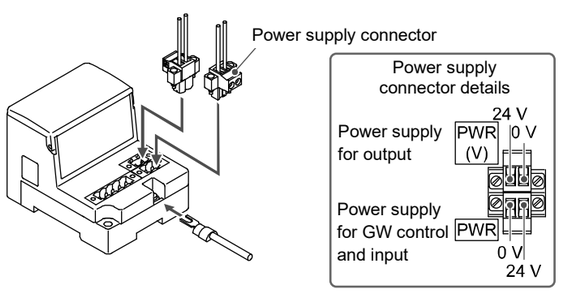
- Make sure to connect a terminating resistor between terminals "CAN_H"-"CAN_L" on the communication connector at both ends of the system.
- The connected terminating resistor value is 121 Ω ±1%, 1/4 W.



5.2 Power Supply wiring

- Connect the power supply wiring to the two power supply connectors which have 2-pins. The power supply structure consists of 2 systems, which can be used with either a single or dual power supply.
- Individual power supplies for other units are not necessary.
- Make sure to connect to the designated pin.
- The power supply connector is suitable for use with wire sizes from AWG24 to AWG12 (0.2 mm^2 to 2.5 mm^2).
- Tighten the connector securely to 0.5 to 0.6 N•m tightening torque.





5 Wiring (continued)

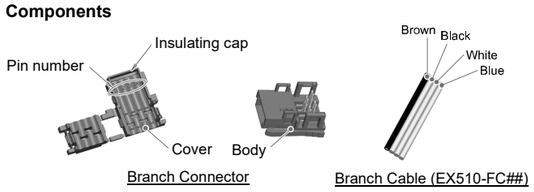
5.3 Branch cable wiring

The wiring between each unit should use branch cables (EX510-FC##) and branch connectors (EX510-LC1). The SI unit and input unit have 2 branch connectors each.

5.3.1 Pressure welding the branch connector

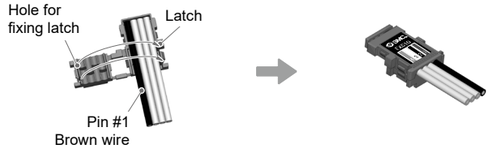
The pressure welding assembly method of the branch connector is described below.

- **Components**



- **Assembly procedure**

1) Set a branch cable into the cover with the Brown wire to pin #1.
2) Push the cable end up to the insulating cap on the cover.
3) Fold the cover so that the branch cable is trapped between the cover.
4) Fix the latch tip by inserting it through the fixing latch hole.



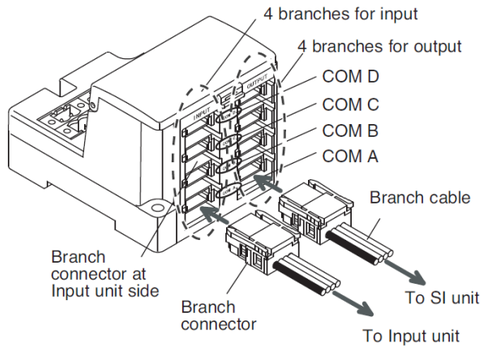
5) Check that the wire colour marked on the branch connector is the same as the branch cable wire colour.

- **Cable clamping**

1) Tentatively fix the Body. Fit the 4 latches on the body to the 4 ditches in the cover and press them until the latch engages.
2) Press fit the cover to the body using suitable pliers.
3) Check that all of the 4 latches are fully engaged.

5.3.2 Connection of Branch cables

Insert the branch cables in order from the bottom to the top (COM A, B, C, D) at the side of the Gateway unit.



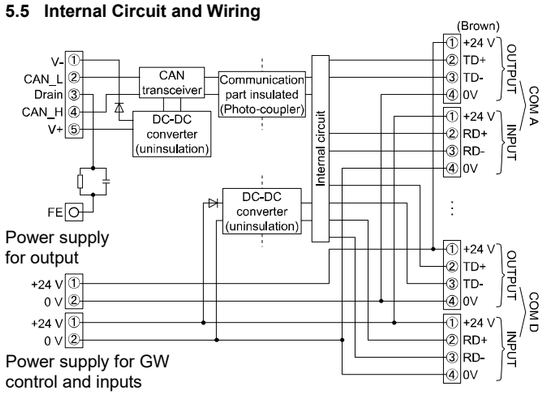
5.4 Ground connection

Caution

A secure earth connection (protection class 3) should be made from the FE terminal to a Ground connection point.

5 Wiring (continued)

5.5 Internal Circuit and Wiring

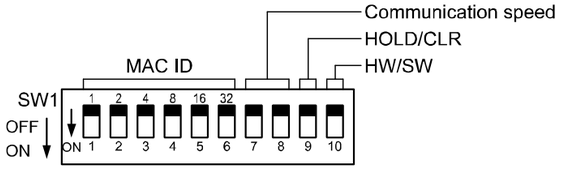


6 Setting

6.1 Switch Setting

(1) Switch setting must be performed with power supply turned OFF.
(2) Open the display cover.
(3) Set the switches using a small flat blade screwdriver.

6.2 Setting of MAC ID, Communication speed, HOLD/CLR, HW/SW mode (SW1)



6.2.1 MAC ID setting (SW1 switch No. 1 to 6)

- All setting are turned ON at shipment and the MAC ID is set to 63. Make sure to set the MAC ID in the range of 0 to 63.

MAC ID	1 (No.1)	2 (No.2)	4 (No.3)	8 (No.4)	16 (No.5)	32 (No.6)
0	OFF	OFF	OFF	OFF	OFF	OFF
1	**ON**	OFF	OFF	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF	OFF	OFF
3	**ON**	**ON**	OFF	OFF	OFF	OFF
:	:	:	:	:	:	:
10	OFF	**ON**	OFF	**ON**	OFF	OFF
11	**ON**	**ON**	OFF	**ON**	OFF	OFF
:	:	:	:	:	:	:
62	OFF	**ON**	**ON**	**ON**	**ON**	**ON**
63	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**

6.2.2 Communication speed setting (SW1 switch No. 7 to 8)

- Select the communication speed for DeviceNet®. Make sure to set the communication speed in the range as follows. All setting are turned OFF at shipment, set to 125 kbps.

Communication speed	No.7	No.8
125 kbps	OFF	OFF
250 kbps	**ON**	OFF
500 kbps	OFF	**ON**
-	**ON**	**ON**

6 Setting (continued)

6.2.3 HOLD/CLR setting (SW1 switch No.9)

The setting is as follows.
The setting at shipment is turned OFF, set to CLR.

HOLD/CLR	No.9	Function
CLR	OFF	Output is cleared when an error occurs.
HOLD	**ON**	Output is held when an error occurs.

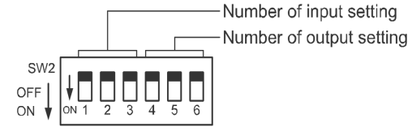
6.2.4 HW / SW mode setting (SW1 switch No.10)

The setting is as follows.
The setting at shipment is turned OFF, set to HW mode.

Mode	No.10	Function
HW	**OFF**	Set MAC ID and communication speed using SW1 to 8.
SW	ON	MAC ID and communication speed are set by network. * SW1 switch No.1 to 8 are ignored.

6.3 Flexible setting of I/O points (SW2)

The I/O points can be changed using SW2.



Refer to the operation manual on the SMC website (URL: https://www.smcworld.com) for further details of the switch selection for Input and Output settings.

7 How to Order

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

8 Outline Dimensions (mm)

Refer to the operation manual on the SMC website (URL: https://www.smcworld.com) for outline dimensions.

9 Limitations of Use

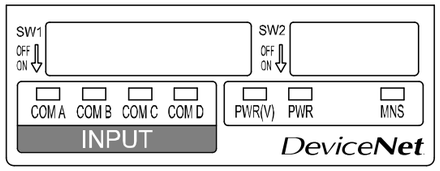
9.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

10 Product disposal

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

11 LED Display



LED		Contents
PWR(V)	ON	Power for outputs is supplied at the specified voltage.
	OFF	Power for outputs is not supplied at specified voltage.
PWR	ON	Power for DeviceNet® is supplied.
	OFF	Power for DeviceNet® is not supplied.
MNS	OFF	Power OFF, Off-line, or Duplicate MAC ID.
	Green flashing	Waiting for I/O connection (online).
	Green ON	I/O connection completed (online).
	Red flashing	I/O connection time out (Light degree of communication error).
	Red ON	MAC ID duplicate error or BUS OFF error (Heavy degree of communication error).
COM A	ON	COM A is receiving data.
	OFF	COM A has no data received.
COM B	ON	COM B is receiving data.
	OFF	COM B has no data received.
COM C	ON	COM C is receiving data.
	OFF	COM C has no data received.
COM D	ON	COM D is receiving data.
	OFF	COM D has no data received.

* Only when Input unit (equipment) is connected and communicated normally. COM A-D LED does not light up if the port is not set to be “used” in settings.

12 Maintenance

12.1 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.

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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