



Installation & Maintenance Manual

Gateway unit for DeviceNet

Type EX510-GDN1



Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and property damage. To ensure correct handling, please follow the instructions.

Please check that you fully understand the meaning of the following messages (signs) before going on to read the text, and always follow the instructions.

Please read the Installation & Maintenance Manual of related apparatus and understand it before operating the unit.

IMPORTANT MESSAGES

Read this manual and follow its instructions. Titles such as WARNING, CAUTION and NOTE, will be followed by important safety information which must be carefully followed.

⚠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	Gives 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 beyond the specification range.

Fire, malfunction or damage can result.

Only use the unit after confirming the specification.

Do not use the product in an environment of flammable, explosive or corrosive gas.

Otherwise fire, explosion or corrosion can result.

This product is not explosion-proof type.

For use in interlock circuit:

•Provide double interlock system by adding different type of protection (such as mechanical protection).

•Check the product regularly to ensure proper operation.

Otherwise accident caused by malfunction can result.

Before performing maintenance:

•Turn off the power supply.

•Stop air supply, exhaust compressed air in piping, and confirm the release to atmosphere.

Otherwise injury can result.

Safety Instructions (continued)

⚠CAUTION

Conduct proper functional inspection after completing maintenance.

In the case of abnormality such as unit does not work normally, stop the operation. Otherwise safety cannot be assured due to unintended malfunction.

Provide grounding to improve safety and noise resistance of reduced wiring system.

Provide grounding as close to the unit as possible to shorten distance for grounding.

NOTE

The direct-current power supply to combine should be UL authorization power supply.

1.A limited voltage/current circuit which conforms to UL508.

A circuit to which power is supplied by the secondary coil of a transformer that meets the following conditions.

- Maximum voltage (with no load) : less than 30Vrms (42.4V peak)
- Maximum 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

2.UL1310 Class 2 power supply unit or circuit of max.30Vrms (42.4Vpeak) or less using a UL1585 Class 2 transformer as power source.

Follow the instructions given below when handling the reduced wiring system.

Failure to follow instructions may damage the unit.

- Operate the unit within the specified voltage range.
- Reserve a space for maintenance.
- Do not remove labels.

- Do not drop, hit or apply excessive shock to the product.
- Follow the specified tightening torque.
- Do not bend or apply tensile force to cables, or apply force by placing 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 power cable or high-voltage cable in the same wiring route.
- Verify the insulation of wiring.
- Separate power cables for solenoid valves from power cables for Input and control unit.
- Take proper measurements against noise such as noise filter when the reduced wiring system is incorporated in equipment or devices.
- Select the proper type of protection according to the environment of operation.
- Take sufficient shielding measures when installing at the following place.
 - (1) A place where noise due to static electricity is generated
 - (2) A place where electric field strength is high
 - (3) A place where there is radioactive irradiation
 - (4) A place near power line
- Do not use the product nearby a place where electric surges are generated.
- Use reduced wiring system equipped with 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 this product.
- Do not expose the reduced wiring system to vibration and impact.
- Keep the specified ambient temperature range.
- Do not expose reduced wiring system to heat radiation from a heat source located nearby.
- Use a precision screwdriver with small flat blade when setting DIP switch.
- Perform maintenance and check regularly.
- Perform a proper functional check.
- Do not use the product with chemicals such as benzene and thinner.

Specification

Basic specifications

Rated voltage	24VDC
Range of power supply voltage	Power supply for input and controlling GW : 24VDC ± 10% Power supply for output : 24VDC +10%/-5% (Warning for voltage drop is given at approx. 20V) Power supply for DeviceNet : 11 to 25VDC
Rated current	Power supply for input and controlling GW : Max. 4.1A (Inside GW unit : 0.1A, input unit : 4A) Current for output : Max. 6A Power supply for DeviceNet : 50mA
Input/Output point	Input point : Max. 64, Output point : Max. 64 (Changeable by switch settings)
Weight	160g (Including accessories)

Bus for upper level

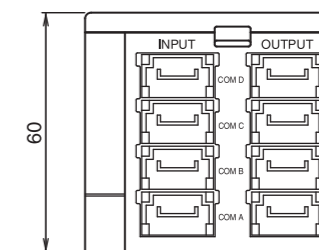
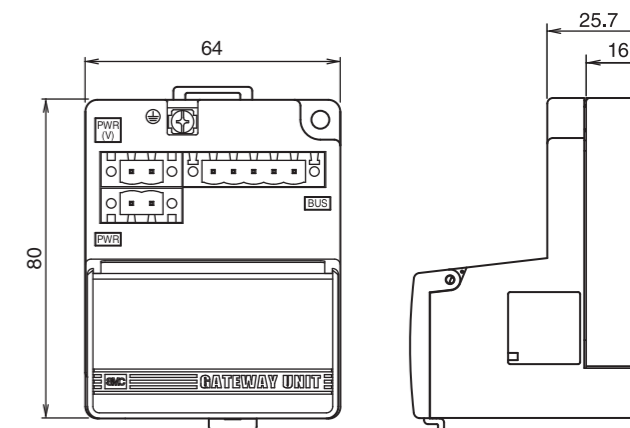
Compatible system	DeviceNet Release 2.0
Slave type	Group2 Only Server
MAC ID setting	0 to 63
Device information	Vender code : 7 (SMC Corp.) Product type : 12 Product code : 100
Applicable message	Duplicate MAC ID Check Message Group2 Only Unconnected Explicit Message Explicit Message, Poll/I/O Message
I/O message size	Input : Max. 8byte, Output : Max. 8byte (Changeable by switch settings)

Baud rate	125kbps	250kbps	500kbps	
Max. length of Network	Thick cable	500m or less	250m or less	100m or less
	Thin cable	100m or less		
Total extended cable length		156m or less	78m or less	39m or less
		Note : Max. extended cable length is 6m.		

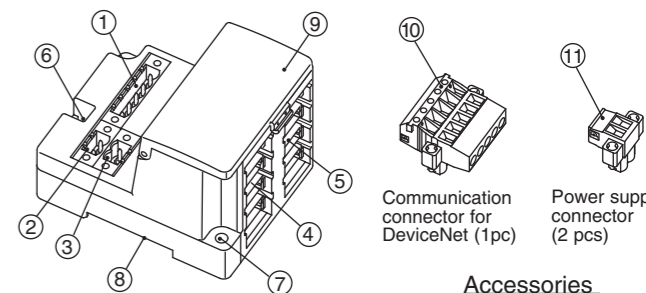
Lower level bus

Number of branches for input/output	4 branches for input 4 branches for output
Communication type	Communication protocol : dedicated for SMC Baud rate : 750kbps
Branch current for input	Max. 1A per branch
Branch current for output	Max. 1.5A per branch
Branch cable length	At 0.75A per branch : 20m or less At 1.0A per branch : 16m or less At 1.5A per branch : 10m or less

Outline with Dimensions (in mm)



Name of Parts / Accessories



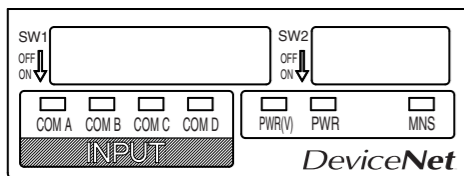
Accessories

No.	Parts	Purpose
1	Communication socket (BUS)	Connect to DeviceNet line with an accessory connector for DeviceNet (⑩). *
2	Power supply socket (PWR(V))	Supplying power for output instruments such as a solenoid valve with an accessory connector (⑪). *
3	Power supply socket (PWR)	Supplying power for controlling GW and for input instruments such as a sensor with an accessory connector (⑪). *
4	GW unit side branch connector (for input)	Connecting an input unit etc. by using branch cables (EX510-FC□□).
5	GW unit side branch connector (for output)	Connecting SI unit (manifold valve) etc. by using branch cables (EX510-FC□□).
6	PE terminal	Used for grounding.
7	Mounting hole	Used when a unit is mounted with 2 M4 screws.
8	DIN rail mounting slot	Used when a unit is mounted to DIN rail.
9	Display/setting switch area	Setting switch such as LED display of unit state, MAC ID, Baud rate and I/O point.

*Note : For wiring method, see "Wiring" section.

Name of Parts/Accessories (continued)

Setting for Display



Display	Meaning
PWR (V)	Light ON : The power for output is supplied with specified voltage Light OFF : The power for output is not supplied with specified voltage
PWR	Light ON : Power supply for DeviceNet is supplied Light OFF : Power supply for DeviceNet is not supplied
MNS	Light OFF : Power off, off line, or duplicate check MAC ID Green flashing : Waiting for I/O connection (online) Green Light ON : I/O connection completed (online) Red flashing : I/O connection time out (Light degree of communication error) Red Light ON : MAC ID duplicate error, or BUS OFF error (Heavy degree of communication error)
COM A	Light ON : COM A is receiving data * Light OFF : COM A has no data to receive
COM B	Light ON : COM B is receiving data * Light OFF : COM B has no data to receive
COM C	Light ON : COM C is receiving data * Light OFF : COM C has no data to receive
COM D	Light ON : COM D is receiving data * Light OFF : COM D has no data to receive

*Note : Lit when input unit is connected and communicating normally.

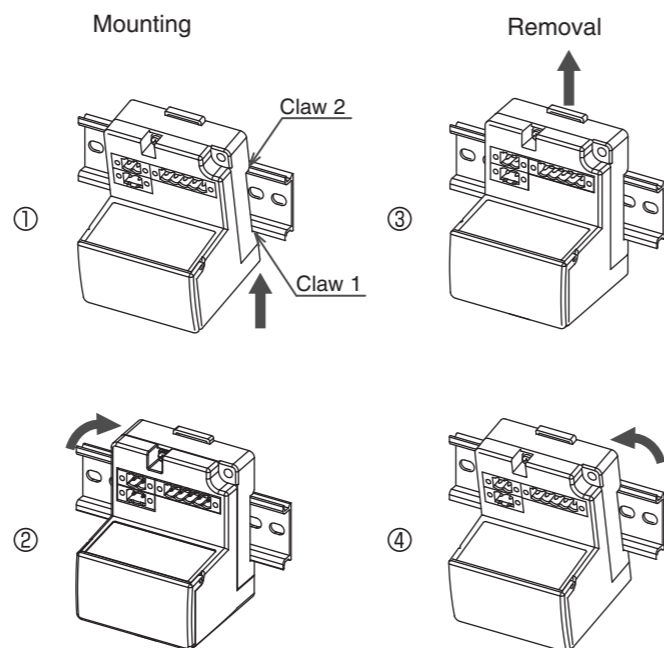
Installation (continued)

Put Claw 1 of the body under DIN rail and push it upward. Push down Claw 2 to the opposite rail until the claw clicks securely on to rail.

(Mounting procedure ① and ②)

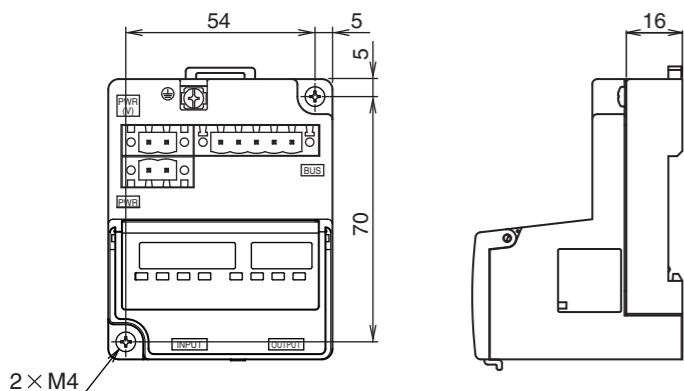
For removing, lever up the DIN rail fixing plate of the body with a flat blade screwdriver, and remove it by tilting Claw 2 side forward.

(Removal procedure ③ and ④)



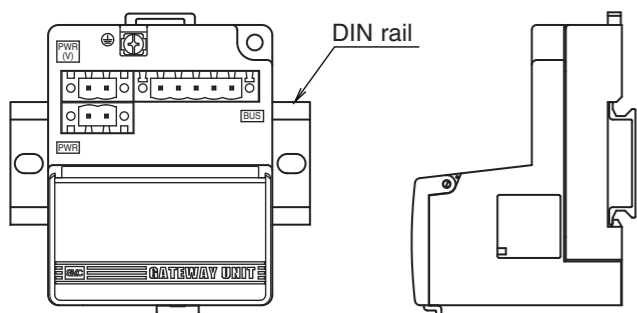
Installation

Screw installation



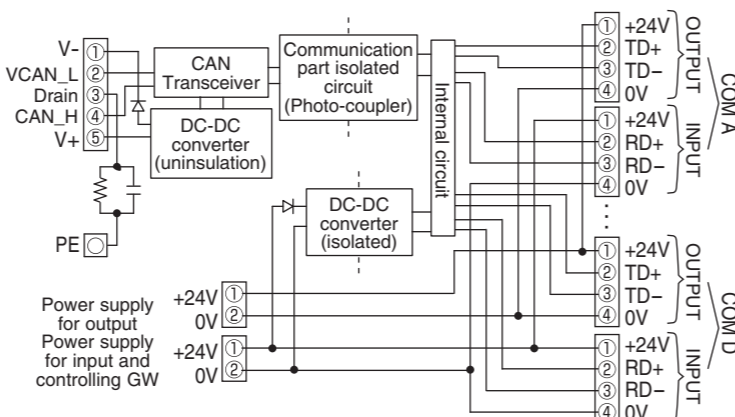
*Tightening torque : 0.8N•m (tolerance ±0.2)

DIN rail installation



Wiring

Internal circuit



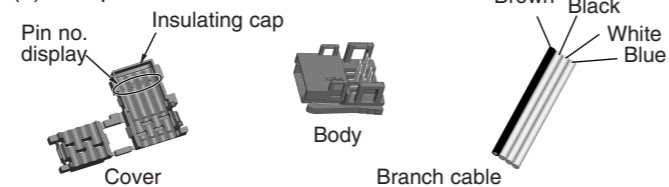
Branch cable wiring

The wiring between each unit should use branch cables, and be connected with branch connectors. The SI unit and input unit have 2 branch connectors each.

Pressure welding for branch connector

The method of pressure assembly of the branch connector is explained.

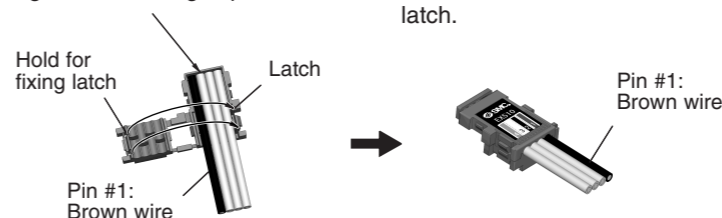
(1) Components



Wiring (continued)

(2) Working procedure

- 1) Set a branch cable in the cover. 3) Fold the cover so that the branch cable is trapped between the cover.
- 2) Push the 4 cable ends securely against insulating cap in cover. 4) Fix the latch tip by inserting through the hole for the fixing latch.



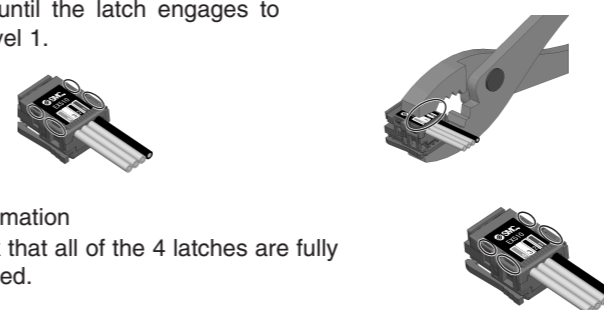
Note) Check the color of the wires printed on the branch connector and the color of the cables are the same.

② Tentative fixing to the body

Fit 4 latches on the body to 4 ditches on the cover, and press them until the latch engages to the level 1.

③ Press fitting

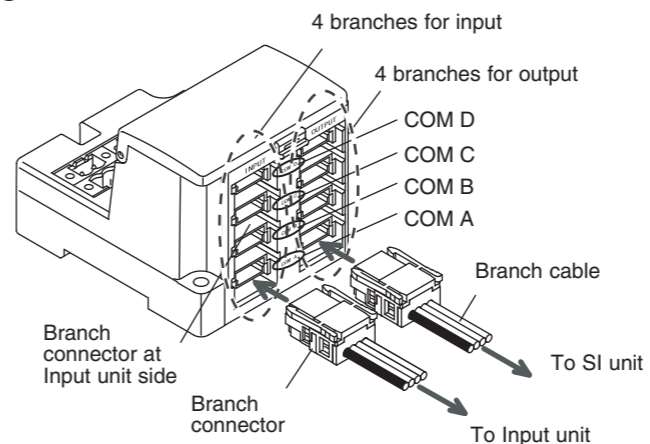
Press the cover to the body with suitable pliers.



④ Confirmation

Check that all of the 4 latches are fully engaged.

Wiring of branch cables

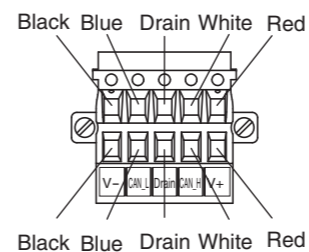


Insert branch cable connectors from the bottom (COM A, B, C, D at the side of the GW unit).

Communication wiring

Connect DeviceNet dedicated cables to the communication connector for DeviceNet.

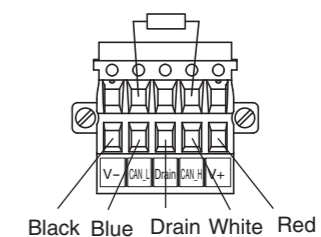
- (1) Make sure to connect the signal cables to designated pins (Refer to Drawing 1). And tighten the connector surely to 0.5 to 0.6N•m tightening torque.



Drawing1

Wiring (continued)

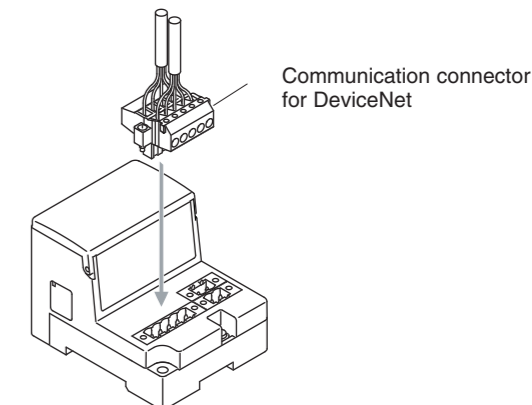
- (2) Make sure to connect a "terminating resistor" between "CAN_H"- "CAN_L" to the units at both ends of the system. (Refer to Drawing 2).



Terminating resistor : 121Ω± 1%, 1/4W

Drawing2

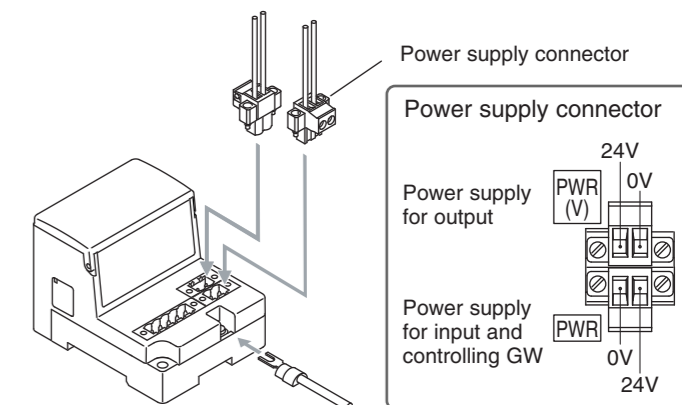
- (3) Refer to Drawing 3 about how to connect to the unit.



Drawing3

Power supply wiring

Connect power supply wiring to the two power supply 2pin connectors. Power supply structure consists of 2 systems, but it can be used with both single power supply and dual power supply. Individual power supply for other units is not necessary. Make sure to connect the designated pin. Tighten the connector securely to 0.5 to 0.6N•m tightening torque.



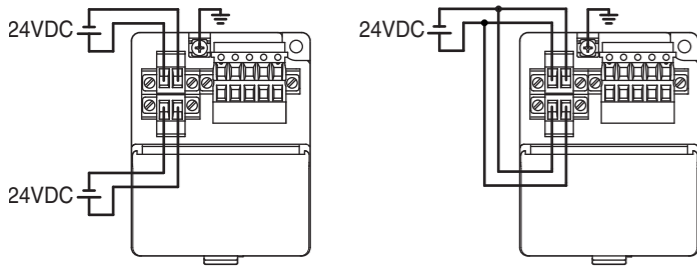
Note

1. A secure earth connection (Protection class 3) should be made for PE terminal.

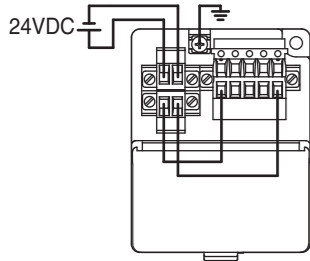
Wiring (continued)

A. For dual power supply use

B. For single power supply use



C. When used as power supply for DeviceNet (Power supply for output is another one.)



SW setting (continued)

MAC ID setting (switch No.1 to 6)

All of the settings when shipped from plant are turned ON and the station number is set 63. Make sure to set the station number 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

Baud rate setting (switch No. 7 to 8)

Make sure to set the baud rate in the range as follows. All of the settings when shipped from plant are turned OFF, set to 125kbps.

Baud rate	No.7	No.8
125kbps	OFF	OFF
250kbps	ON	OFF
500kbps	OFF	ON
—	ON	ON

HOLD/CLR setting (switch No. 9)

The setting is as follows.

The setting when shipped from plant 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.

HW/SW mode setting (switch No. 10)

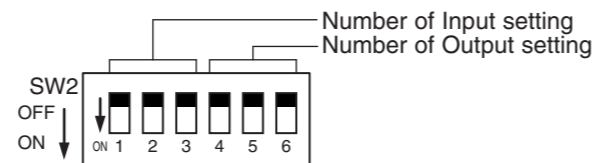
The setting is as follows.

The setting when shipped from plant is turned OFF, set to HW mode.

Mode	No.10	Function
HW	OFF	Set MAC ID and baud rate with SW1 to 8.
SW	ON	MAC ID and baud rate are set by network. Note: SW1 to 8 are ignored.

Input/Output Setting (SW2)

Input/Output Setting is done with SW2.



SW setting (continued)

Input setting (switch No. 1 to 3), Output setting (switch No. 4 to 6)

The setting is as follows. All of the settings when shipped from plant are turned OFF, 64 I/O points.

No.1	No.2	No.3	Input point	COM A	COM B	COM C	COM D	
OFF	OFF	OFF	64	16	16	16	16	
OFF	OFF	ON	0	—	—	—	—	
OFF	ON	OFF	16	8	8	—	—	
OFF	ON	ON	16	16	—	—	—	
ON	OFF	OFF	32	8	8	8	8	
ON	OFF	ON	32	16	16	—	—	
ON	ON	OFF	Reserve					
ON	ON	ON	Reserve					

No.4	No.5	No.6	Output point	COM A	COM B	COM C	COM D	
OFF	OFF	OFF	64	16	16	16	16	
OFF	OFF	ON	0	—	—	—	—	
OFF	ON	OFF	16	8	8	—	—	
OFF	ON	ON	16	16	—	—	—	
ON	OFF	OFF	32	8	8	8	8	
ON	OFF	ON	32	16	16	—	—	
ON	ON	OFF	Reserve					
ON	ON	ON	Reserve					

Trouble shooting

Overall system

No.	Item	Remedy/Disposal
1	Solenoid valve is not working	<ul style="list-style-type: none"> Check the power for output (24VDC) is supplied. Check the branch cable is connected to SI unit. Check the LED for power supply (PWR) and the LED for communication (COM) at SI unit are ON. Ensure output branch current does not exceed the specification range.
2	Valve is not working as program directs	<ul style="list-style-type: none"> Program it after checking the wiring specification of manifold block assembly.
3	Signals cannot be received even with a sensor	<ul style="list-style-type: none"> Check the power for input and controlling GW (24VDC) is supplied. Check the input unit indication LED is ON. Ensure input branch current does not exceed the specification range.
4	COM A-D is not LIT	<ul style="list-style-type: none"> Check the connection of UNLIT COM port branch to input unit.

Trouble shooting (continued)

DeviceNet compatible communication

No.	Item	Remedy/Disposal
1	PWR LED is UNLIT	<ul style="list-style-type: none"> Check the power supply for DeviceNet is supplied.
2	PWR(V) LED is UNLIT	<ul style="list-style-type: none"> Check the power for output (24VDC) is supplied. Check the power supply voltage for output is above 20V. Check the power for input and controlling GW (24V DC) is supplied.
3	The status of MNS LED Not online : Light off Online, not allocated : Green flashing Online, allocated : Green light Light degree of communication error : Red flashing Heavy degree of communication error : Red light	<ul style="list-style-type: none"> Check the signal line from PLC is correctly connected. Check the wiring and pin numbers. Check the baud rate and MAC ID setting is correct.

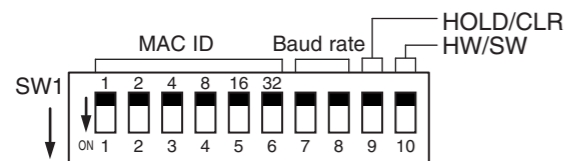
SW setting

Switch setting

Make sure that switch setting is done with power supply turned off. Open the cover, and set DIP switch with a small flat blade screwdriver, etc.

Setting of MAC ID, Baud rate, HOLD/CLR, HW/SW mode (SW1)

These setting are done with SW1.



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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