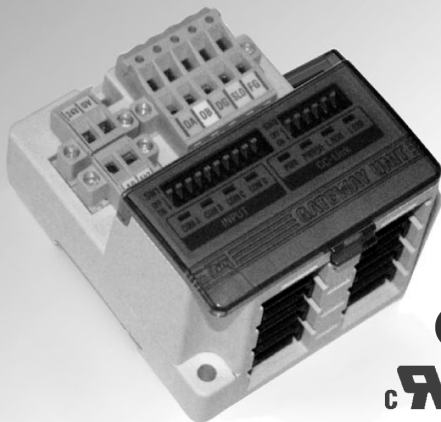


Reduced wiring system
CC-Link Compatible GW unit



Operation Manual

EX510-GMJ1



SMC Corporation

URL <http://www.smcworld.com>

Table of Contents

Thank you for purchasing the SMC reduced wiring system EX510 series.

Please read this manual carefully before operating the digital pressure switch and make sure you understand the digital pressure switch, its capabilities and limitations.

Please keep this manual handy for future reference.

OPERATOR

- This operation manual has been written for those who have knowledge of machinery and apparatuses that use reduced wiring units and have full knowledge of assembly, operation and maintenance of such equipment.
- Please read this operation manual carefully and understand it before assembling, operating or providing maintenance service to the actuator.

SAFETY 2

Product Summary 7

Name of Parts / Accessory 8

Dimensions 9

Setting 10

Specifications 12

Wiring 13

Display/ Switch Setting 20

Trouble shooting 24

Phone

- | | |
|--------------------------------|------------------------------------|
| AUSTRIA / (43) 2262-62 280 | ITALY / (39) 02-92711 |
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SAFETY

The reduced wiring and this manual contain essential information for the protection of users and others from possible injury and property damage and to ensure correct handling. Please check that you fully understand the definition of the following messages (signs) before going on to read the text, and always follow the instructions.

Please read the operation manuals of related apparatus and understand it before operating the actuator.

IMPORTANT MESSAGES

Read this manual and follow its 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

Gives you helpful information.

⚠WARNING

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

An injury or failure can result.

Do not operate beyond specification range.

Fire, malfunction or switch damage can result.
Please use it after confirming the specification.

Do not use the product in the environment with possible presence of flammable, explosive or corrosive gas with the product to prevent fire, explosion or corrosion.

Note the reduced wiring system doesn't have explosion proof construction.

These instructions must be followed when using the product in an interlocking circuit:

- **Provide double interlocking by 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 while in maintenance:

- **Turn off the power supply**
- **Stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance**

Otherwise it can cause injury.

⚠ CAUTION**Execute a proper vehicle performance inspection after completing the maintenance check.**

Please stop driving for abnormality as neither the device nor work normally.

There is a possibility that safety cannot be secured due to the malfunction not intended.

Provide grounding for improving safety and noise resistance of reduced wiring system.

Individual grounding is provided to the unit closely with short distance.

Note

Use following the direct-current power supply to combine should use UL authorization power supply.

1. Limited voltage current circuit in accordance with UL508

A circuit 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 -20 [V]	5.0
above 20 to 30 [V]	100 / peak voltage

2. A circuit using max. 30 Vrms or less (Class-2 circuit), which power is supplied by Class-2 power supply unit in accordance with UL1310 or Class-2 power supply unit in accordance with UL1585

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

Or, it will have a risk of being damaged and operating failure.

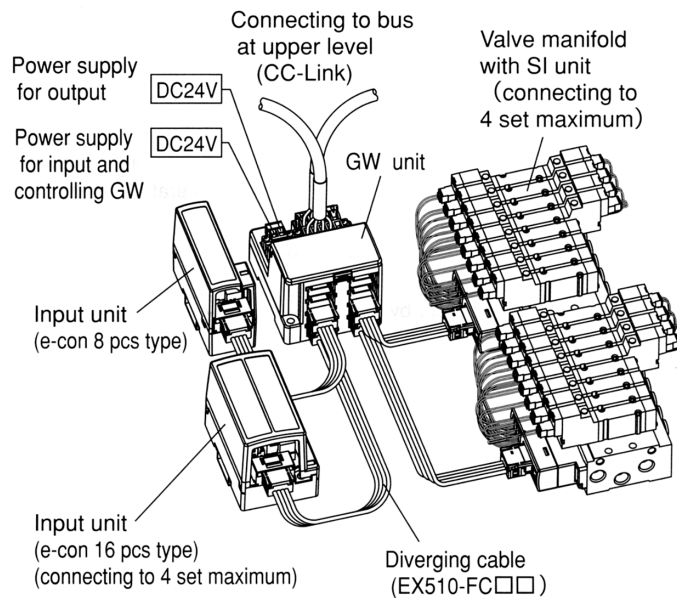
- Operate reduced wiring system with the specified voltage.
- Reserve a space for maintenance.
- Do not remove labels.
- Do not drop, hit or apply excessive shock to the unit.
- Follow the specified tightening torque.
- Do not bend or apply tensile force to cables, or apply force by placing heavy load 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.

SAFETY (continue)

- Verify the insulation of wiring.
- Separate power lines for solenoid valves from power line 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 install at a 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 near by a place where electric surges are generated.
- Use a 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 the reduced wiring system to heat radiation from a heat source located nearby.
- Use 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.

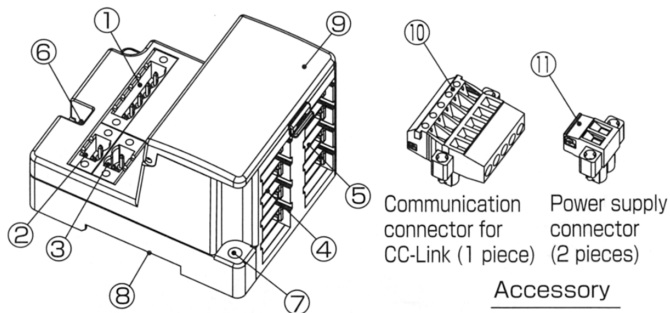
Product Summary

System structure



System in which realize wiring saving and distributed installation by connecting to Fieldbus. Signal to Fieldbus is transmitted by GW unit, and signal to input/output device which is installed distributed is collected by GW unit.

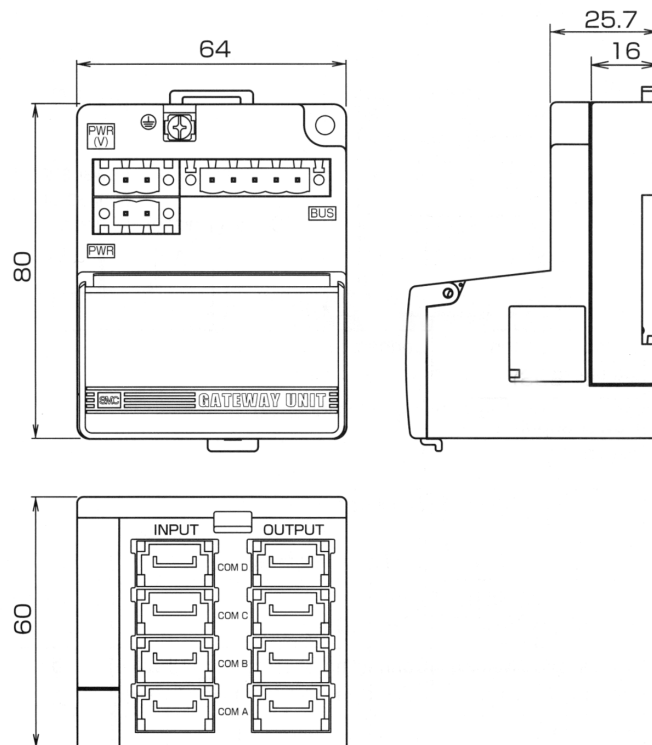
Name of Parts/ Accessory



No.	Parts	Purpose
1	Communication socket (BUS)	Connect to CC-Link line with an accessory connector for CC-Link (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)	Supply power for controlling GW and for input instruments such as a sensor with an accessory connector (⑪). *
4	GW unit side Diverging connector (for input)	Connecting an input unit etc. by using diverging cables (EX510-FC □□)
5	GW unit side Diverging connector (for output)	Connecting SI unit (manifold valve) etc. by using diverging cables (EX510-FC □□)
6	PE terminal	Used for grounding
7	Mounting hole	Used when an unit is mounted with 2 M4 screws.
8	DIN rail mounting slot	Used when Unit is mounted to DIN rail.
9	Display/ switch setting part	Switch setting such as LED display in unit state, transmission speed, and occupied station number.

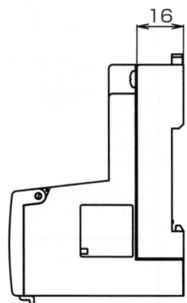
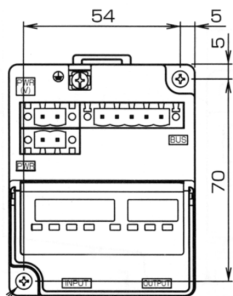
*Note: For wiring method, see "Wiring" in this operating technical data.

Dimension (in mm)



Setting

Mounted by screw

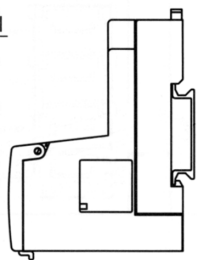
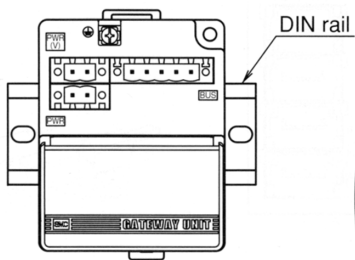


2-M4

*Tightening torque : 0.8N·m

Cover is perspective drawing (tolerance ± 0.2)

Mounted on DIN rail



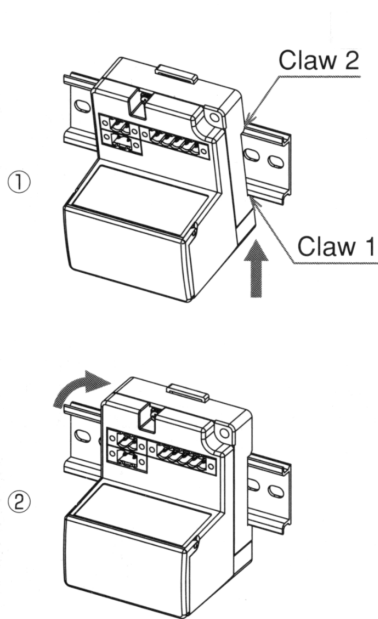
Put Claw 1 at the body under DIN rail and push it upward. Push down Claw 2 to the opposite rail until the claw clicked to be set stably.

(Mounting procedure ① and ②)

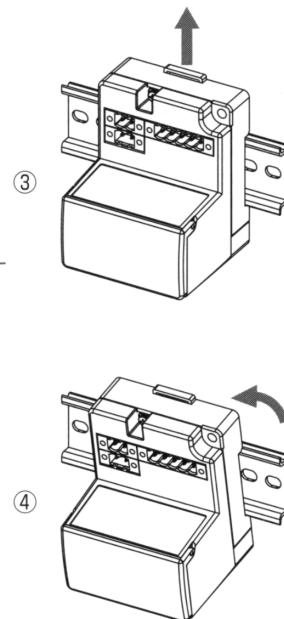
For removing, push up DIN rail fixing plate at the body with a minus screwdriver, and remove it by tilting Claw 2 side forward.

(Removal procedure ③ and ④)

Mounting



Removal



Specifications

Basic specifications

Rated voltage	DC24V
Range of power supply voltage	Power supply for input and controlling GW : DC24V \pm 10% Power supply for output:DC24V+10%/-5% (Warning for voltage decline is given at about 20V.)
Rated current	Power supply for input and controlling GW : 4.1A (Inside GW unit: 0.1A) (Input equipment: 4A) Current for output: 6A
Number of input/ output	Input: max. 64/ Output: max. 64

Bus for upper level

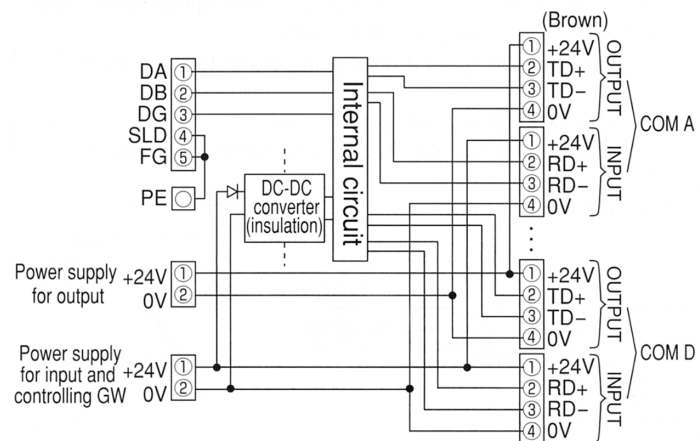
Compatible system	CC-Link Ver.1.10				
Number of station occupied	3 stations (it is possible to change for 2 stations)				
Station type	Remote device station				
Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
Cable length between stations	20 cm and over				
Maximum extended cable length	1200m	900m	400m	160m	100m

Lower level bus

Number of branches for input/ output	4 branches for input (16 points for each), 4 branches for output (16 points for each)
Communication type	Communication protocol: dedicated for SMC Communication speed :750kbps
Diverging current for input	Maximum 1[A] per diverging
Diverging current for output	Maximum 1.5[A] per diverging
Diverging cable length	At 0.75A per diverging: 20m and less At 1.0 A per diverging: 16m and less At 1.5 A per diverging: 10m and less

Wiring

Internal circuit



Wiring (continue)

Diverging wiring

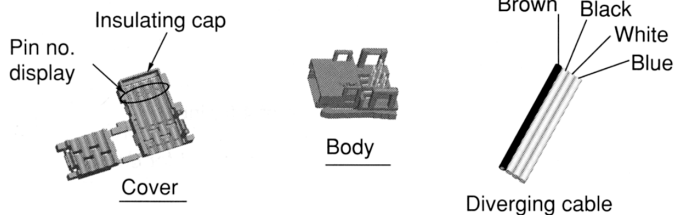
The wiring between each unit should use diverging cables, and connect them with diverging connectors.

SI unit and input unit have 2 diverging connectors for each.

Pressure welding for diverging connector

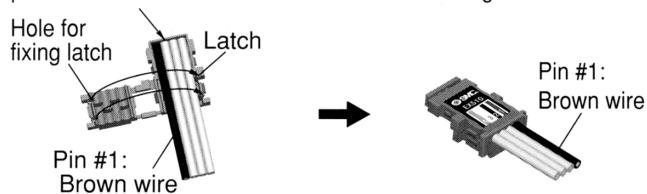
The method of pressure welding for diverging connector is explained.

(1) Components



(2) Working procedure

- ① Set an diverging cable to the over.
 - 1) Set the brown wire of the diverging cable so that it comes to the pin #1.
 - 2) Meet the cable end to the insulating cap at the cover.
- ② Fold the cover so that the diverging cable is put between the cover.
- ③ Fix the latch tip by inserting to a hole for fixing latch.



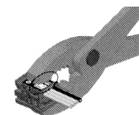
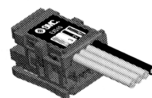
Note) Check the color of wire written on a diverging connector and the color of diverging cable are same.

② Tentative fixing to a body

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

③ Press fitting

Press the cover to the body with Prier etc.

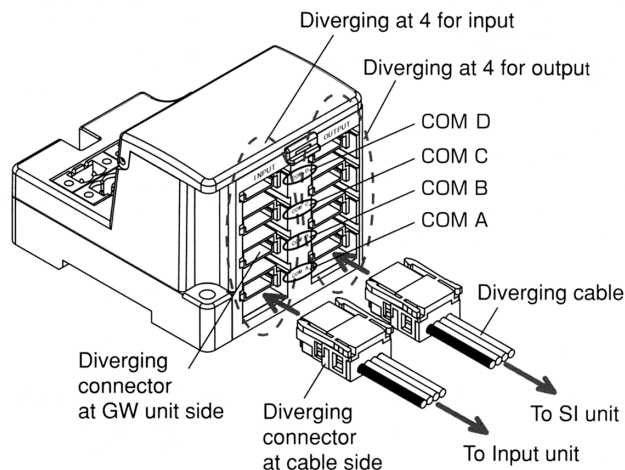


④ Confirmation

It is completed with a check on 4 latches engaging.



Wiring of diverging cables



Insert branching connector on the table side from the bottom (COM A, B, C, D of branching connector of GW unit side).

Communication wiring

Connect CC-Link dedicated cables to the communication connector for CC-Link.

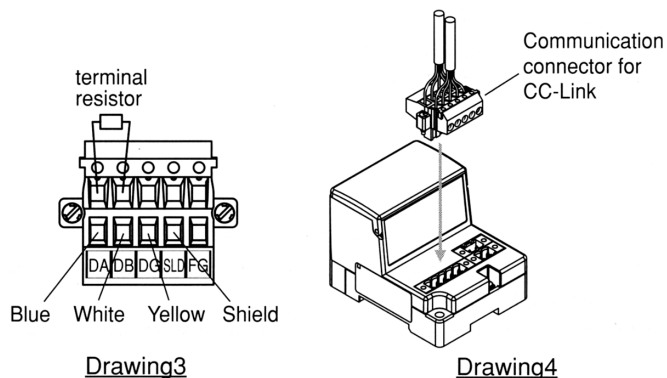
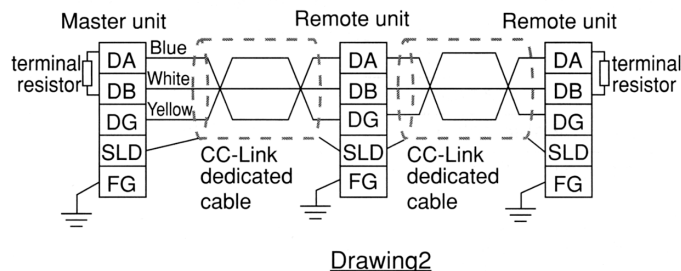
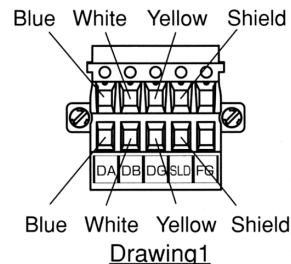
- (1) Make sure to connect the signal cables to designated pins (Refer to Drawing 1)
- (2) Make sure to connect "terminal resistor" to the units at the both ends of the system (Refer to Drawing 2).
Connect the terminal resistor between "DA"-"DB" (Refer to Drawing 3).
- (3) The terminal resistor to connect differs depending on a cable to use at CC-Link system. See the table below.

Cable type	terminal resistor
CC-Link dedicated cable	110 Ω 1/2W (brown, brown, brown)
CC-Link dedicated cable compatible to Ver.1.10	
CC-Link dedicated high performance cable	130 Ω 1/2W (brown, orange, brown)

- (4) Refer to Drawing 4 about how to connecting.

Note

1. CC-Link dedicated high performance cable cannot be mixed with other cables (CC-Link dedicated cable, CC-Link dedicated cable compatible to Ver.1.10). If mixed, transmission of normal data cannot be secure.
2. Connect the shield line of CC-Link dedicated cable to "SLD" at each unit.

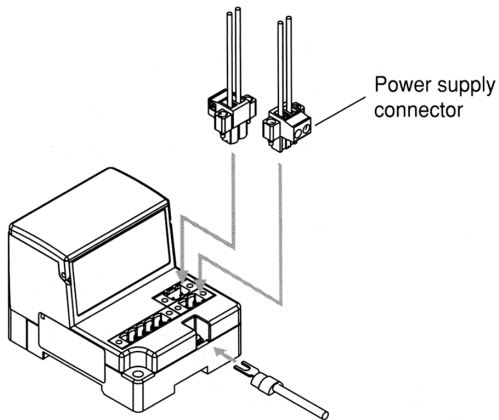


Power supply wiring

Connect power supply wiring to the two power supply connectors which have 2 pins. Power supply structure consists of 2 systems, but it can be used with both single power supply and another power supply.

Individual power supply for other units is not necessary. Make sure to connect the designated pin.

See "Safety instruction for supplying power" for selecting supplying power.

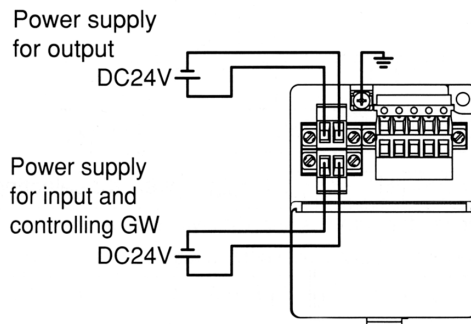


Note

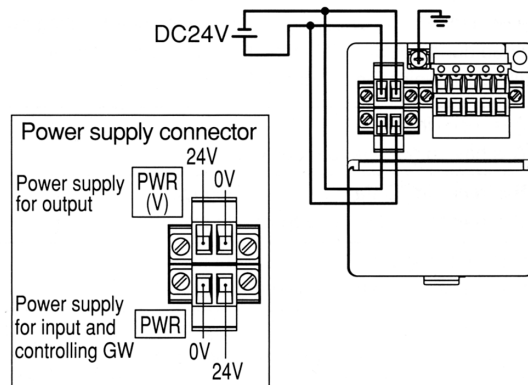
1.D type grounding (Third-type grounding) should be performed for PE terminal.

(SLD, FG, and PE terminal in CC-Link are connected inside of GW unit.)

A. When uses another power supply

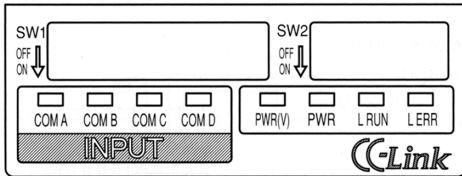


B. When uses single power supply



Display/ Switch Setting

Setting for Display



Display	Meaning
PWR (V)	The power for output is supplied with specified voltage : Lights The power for output is not supplied with specified voltage : Lights off
PWR	Power supply for input and controlling GW is turned supply : Lights Power supply for input and controlling GW is turned not supply : Lighten-off
L RUN	Normally communicating : Lights Communication intercepted : Lights off
L ERR	Communication error : Lights Setting of station number setting/ transmitting speed setting switch is changed during powered: Lights (Blink with 0.4s interval) Normally communicating : Lights off
COM.A	COM.A is receiving Date : Lights. * COM.A is having no data to receive : Lights off
COM.B	COM.B is receiving Date : Lights. * COM.B is having no data to receive : Lights off
COM.C	COM.C is receiving Date : Lights. * COM.C is having no data to receive : Lights off
COM.D	COM.D is receiving Date : Lights. * COM.D is having no data to receive : Lights off

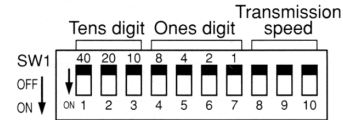
*Note: It is lighten with inputting unit (inputting equipment) connected and normally communicating.

Switch setting

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

Setting of station number/ transmitting speed (SW1)

Setting of station number/ transmitting speed is done at SW1.



Station number setting (switch No.1 to 7)

Set the number of tens for station number at STATION NO. "10", "20", and "40", and set the unit for the station number at STATION NO. "1", "2", "4", and "8".

The all setting when shipped from a plant is turned OFF and no station number is set. Make sure to set the station number in the range of 1 to 62 (with 3 stations occupied).

Station number	Tens digit (switch No.)			Ones digit (switch No.)			
	40(No.1)	20(No.2)	10(No.3)	8(No.4)	4(No.5)	2(No.6)	1(No.7)
1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	ON	ON
4	OFF	OFF	OFF	OFF	ON	OFF	OFF
:	:	:	:	:	:	:	:
10	OFF	OFF	ON	OFF	OFF	OFF	ON
11	OFF	OFF	ON	OFF	OFF	OFF	OFF
:	:	:	:	:	:	:	:
62	ON	ON	OFF	OFF	OFF	ON	OFF
63	ON	ON	OFF	OFF	OFF	ON	ON

*: with 2 stations occupied

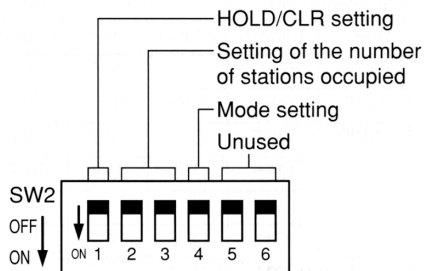
Transmitting speed setting (switch No. 8 to 10)

Make sure to set the transmitting speed in the range as follows. The all setting when shipped from a plant is turned OFF, and it is 156kbps.

Transmitting speed	No.8	No.9	No.10
156 kbps	OFF	OFF	OFF
625 kbps	OFF	OFF	ON
2.5Mbps	OFF	ON	OFF
5Mbps	OFF	ON	ON
10Mbps	ON	OFF	OFF

HOLD/CLR setting/ Setting of the number of stations occupied/ Mode setting (SW2)

HOLD/CLR setting/ Setting of the number of stations occupied/ Mode setting is performed with SW2.



* Switch No. 5 and 6 is unused (Turn it off).

HOLD/CLR setting (switch No.1)

The setting is as follows.

The setting when shipped from a plant is turned OFF, and it means the setting is turned CLR at the same time.

HOLD/CLR	No.1	Function
CLR	OFF	Output is cleared when an error occurs.
HOLD	ON	Output is held when an error occurs.

Setting of the number of stations occupied (Switch No. 2 to 3)

The setting of the number of stations occupied is performed with switch No. 2 to 3.

It is set as 3 station-occupied when the product is shipped.

Station setting	No.2	No.3	Number of output/ input
2 station-occupied	OFF	ON	Input 32/ output 32
3 station-occupied	ON	OFF	Input 64/ output 64

Mode setting (switch No. 4)

Port mode setting is available when two stations are occupied. No. 4 is used for mode setting.

A mode is assigned when shipping out.

Mode	No.4	Number of branch	Valid port
A	OFF	16 points per port	COM.A,B
B	ON	8 points per port	COM.A-D

* See operating technical data for details.

Trouble shooting

Overall system

No.	Item	Remedy/ Disposal
1	Solenoid valve is not worked.	<ul style="list-style-type: none"> • Check the power for output (DC24V) is supplied. • Check the diverging cable is connected to SI unit. • Check the LED for power supply (PWR) and the LED for communication (COM) at SI unit is lightened. • Ensure output branching current does not exceed the specification range.
2	Valve is not worked as program directs	<ul style="list-style-type: none"> • Program it after checking the wiring specification of manifold block ass'y.
3	Signals cannot be received even with a sensor	<ul style="list-style-type: none"> • Check the power for input and controlling GW (DC24V) is supplied. • Check the LED for indication is lightened. • Ensure input branching current does not exceed the specification range.
4	COM A-D is not lightened	<ul style="list-style-type: none"> • Check the connection of not-lightened COM port branch to input unit.

CC-Link compatible communication

No.	Item	Remedy/ Disposal
1	PWR LED is turned off	<ul style="list-style-type: none"> • Check the power for input and controlling GW (DC24V) is supplied.
2	PWR(V) is turned off	<ul style="list-style-type: none"> • Check the power for output (DC24V) is supplied. • Check the power supply voltage for output is getting as low as under 20V.
3	RUN LED is turned off / ERR LED is turned on	<ul style="list-style-type: none"> • Check the signal line from PLC is correctly connected. • Check the wiring and pin numbers. • Check the address setting is correct.
4	ERR LED is flushing	<ul style="list-style-type: none"> • Check the communication speed setting/ station number setting is changed halfway.