

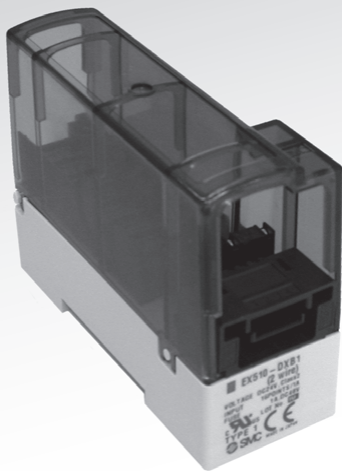
Reduced wiring system

EX510 Series Input unit



# Operation Manual

EX510-DX□1



# SMC Corporation

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

# Table of Contents

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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.

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# SAFETY

The reduced wiring system and this manual contain essential information to protect 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 manual 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.

<b>⚠ WARNING</b>	Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.
<b>⚠ CAUTION</b>	Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.
<b>NOTE</b>	Gives you helpful information.

## ⚠ WARNING

**Do not disassemble, retrofit (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 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 performance inspection after completing the maintenance check.**

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

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

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

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

**Note**

The direct-current power supply to combine should be 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 to 20[V]	5.0
above 20 to 30 [V]	100 / peak voltage

2. A circuit using max. 30 Vrms or less (42.4V peak), which power is supplied by Class-2 power supply unit in accordance with UL1310 or UL1585

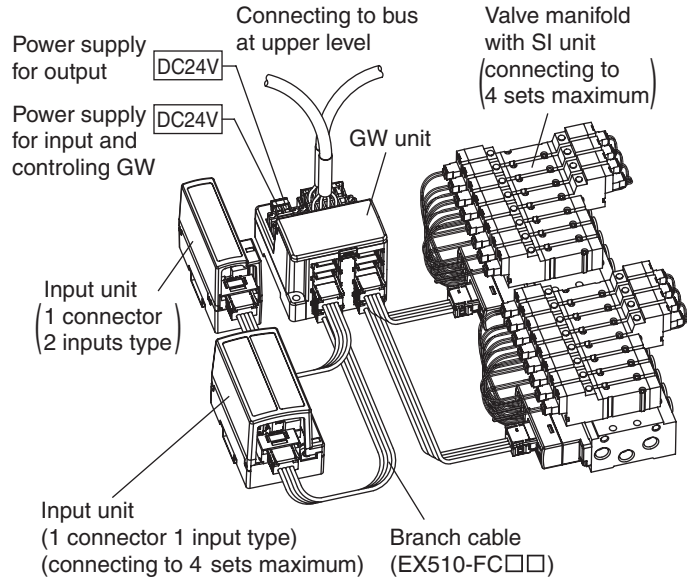
Follow the instructions given below when handling your reduced wiring system. Or, it will have a risk of being damaged and operating failure.

- 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 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 line or high-voltage line in the same wiring route.

- Verify the insulation of wiring.
- Separate power line 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 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 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.
- 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



The system which realizes wiring saving and distributed installation by connecting to fieldbus. The signal to fieldbus is transmitted by GW unit, and the signal to input/output device which is installed discretely is collected by GW unit.

The Input unit is used to connect various sensors and to send the signal from the sensors to GW unit.

## Model Indication Method

EX510-DX **N** 1

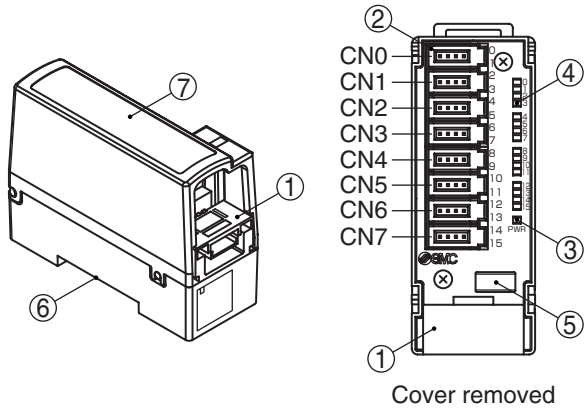
Unit type

1	1 connector 2 inputs type
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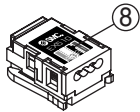
Applicable sensor

N	NPN output
P	PNP output
B	2 wire type

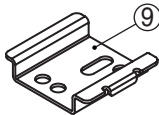
# Name of Parts/ Accessory



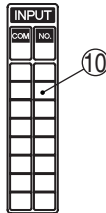
## Accessory



Branch connector  
(2 pieces)  
(EX510-LC1)



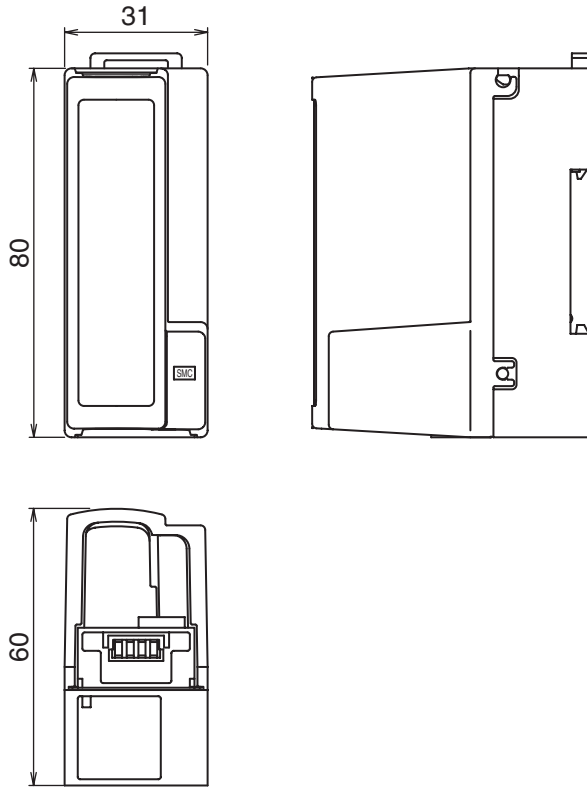
Bracket



Marker plate

No.	Parts	Purpose
1	Branch connector at Input unit	Used to crimp branch connector (⑧) into branch cable (EX510-FC □□) and connected them to GW unit.
2	e-con socket	The sensor is connected.
3	Power supply LED	Lights up : Power ON (normal) Goes off : Power OFF
4	Display LED	Lights up : Sensor signal input ON Goes off : Sensor signal input OFF
5	Fuse	Fuse is replaceable.
6	Mounting slot	Used to mount DIN rail on the unit and establish mounting by attached bracket (⑨) (and screws).
7	Cover	Used to protect sensor cable and provided with marker plate (⑩) on the top.

## Dimensions (in mm)

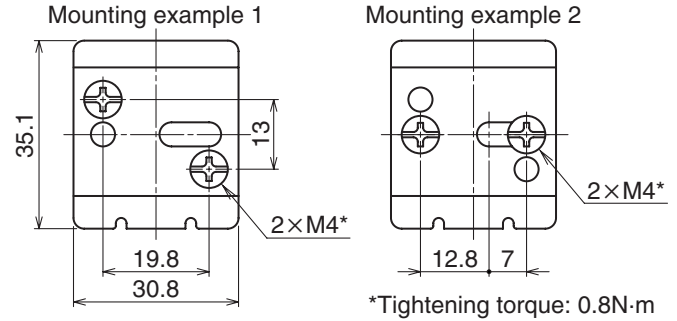


## Setting

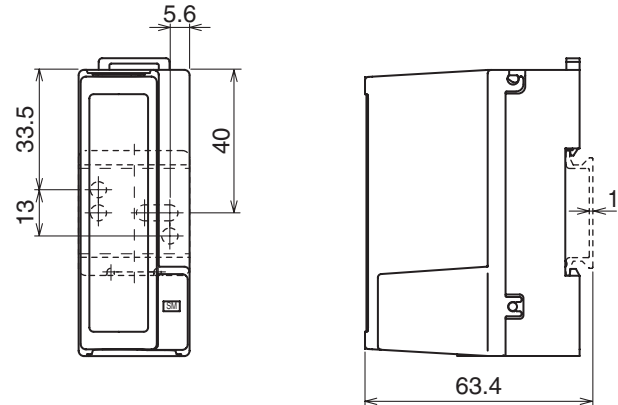
### Mounted by screw

(Tolerance  $\pm 0.2\text{mm}$ )

- ① Mount bracket with 2 pieces of M4 screw.

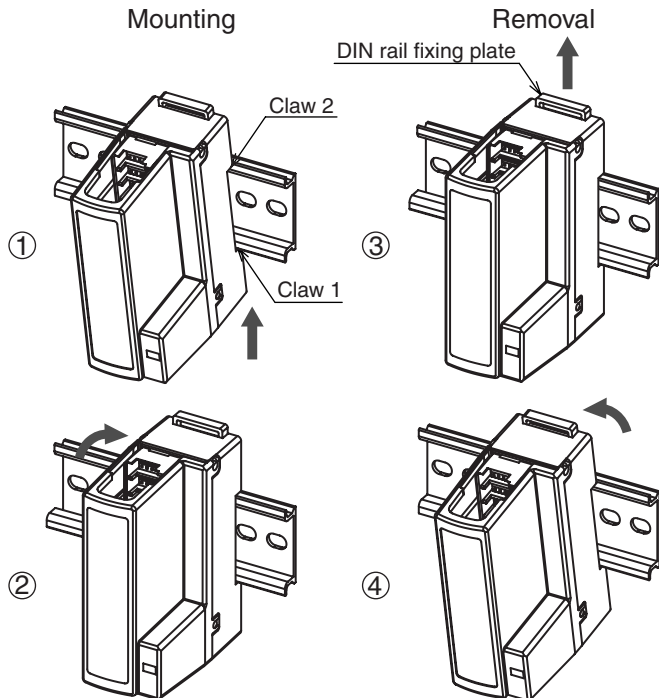


- ② Mount Input unit on bracket. Mounting and removal method are the same as "Mounted on DIN rail" in the next item.



## Setting (continued)

### Mounted on DIN rail



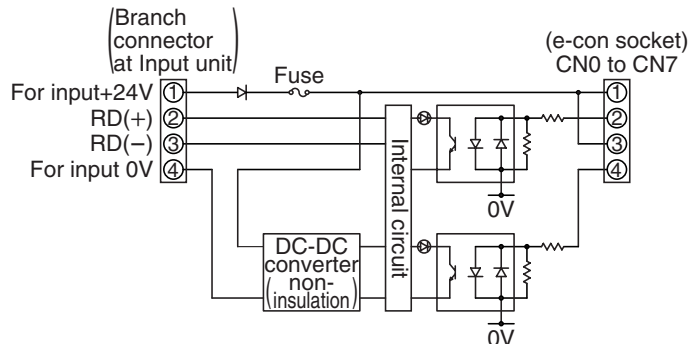
Put claw 1 at the body under DIN rail or bracket and push it upward. Push down claw 2 to the opposite rail until the claw clicks to be set stably. (Mounting procedure ① and ②)

For removing, push up DIN rail fixing plate at the body with a flat screwdriver, and remove it by tilting Claw 2 side forward. (Removal procedure ③ and ④)

## Wiring

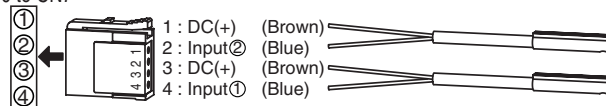
### EX510-DXB1: Input unit for 2-wire type (1 connector 2 inputs type)

#### Internal circuit

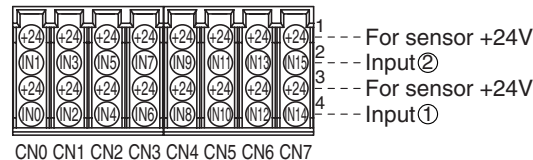


#### Example of wiring: D-M9B (2-wire type auto switch)

(e-con socket)  
CN0 to CN7



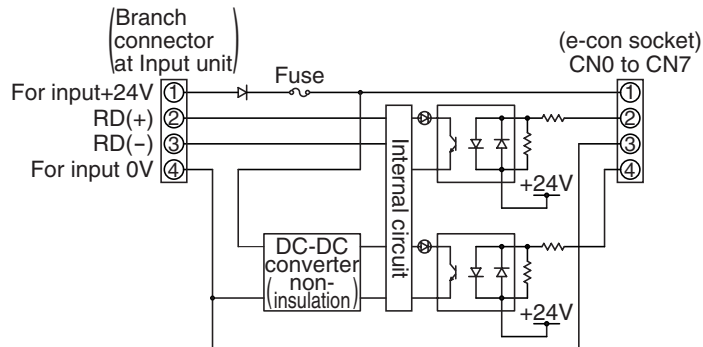
Refer to the following figure for the pin assignment of e-con socket.





**EX510-DXN1: Input unit for NPN (1 connector 2 inputs type)**

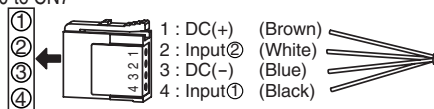
**Internal circuit**



**Example of wiring: ZSE40**

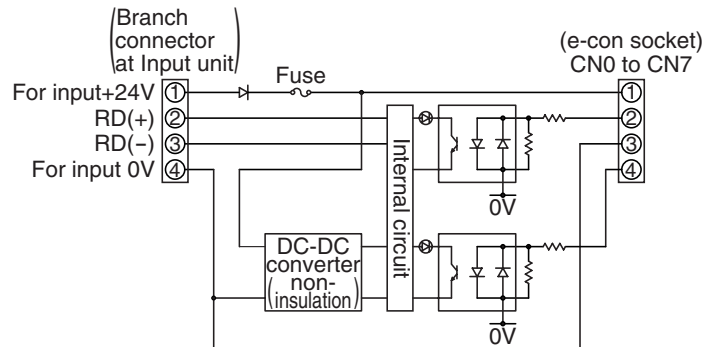
(e-con socket)  
CN0 to CN7

(Pressure switch, NPN, 2 outputs)



**EX510-DXP1: Input unit for PNP (1 connector 2 inputs type)**

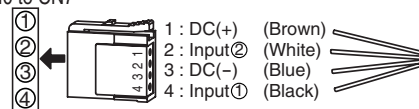
**Internal circuit**



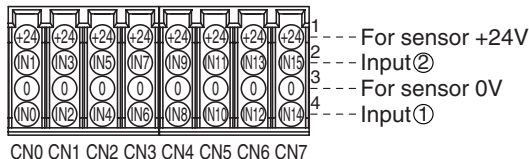
**Example of wiring: ZSE40**

(e-con socket)  
CN0 to CN7

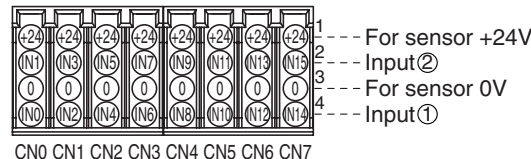
(Pressure switch, PNP, 2 outputs)



Refer to the following figure for the pin assignment of e-con socket.



Refer to the following figure for the pin assignment of e-con socket.



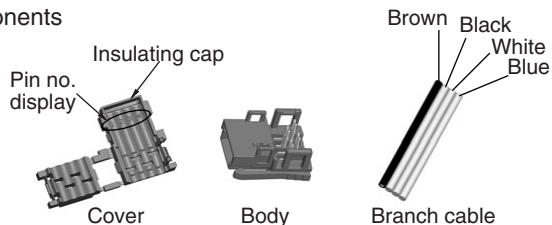
### Branch wiring

Input unit and GW unit are connected with branch cable and branch connector.  
SI unit and Input unit have 2 branch connectors for each.

### Pressure welding for branch connector

The method of pressure welding for branch connector is explained.

#### (1) Components



#### (2) Working procedure

##### ① Set a branch cable to the cover.

1) Set the brown wire of the branch cable so that it comes to the pin #1.

2) Meet the cable end to the insulating cap at the cover.

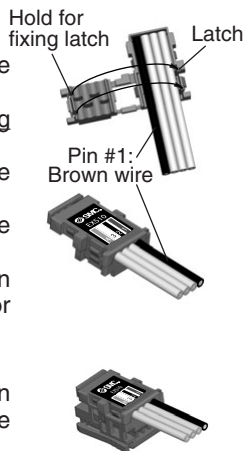
3) Fold the cover so that the branch cable can be put between the cover.

4) Fix the latch tip by inserting to a hole for fixing latch.

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

##### ② Fix to a body tentatively.

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



##### ③ Press fitting

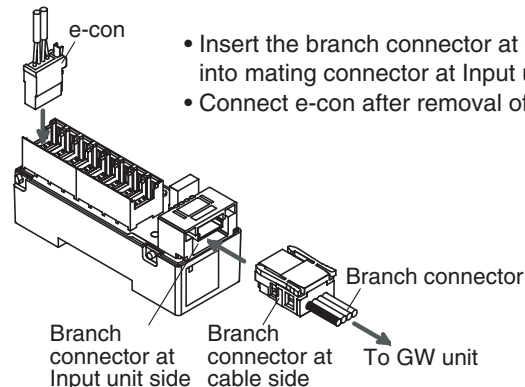
Press the cover to the body with plier etc.

##### ④ Confirmation

It is completed with a check on 4 latches engaging.



### Wiring of branch cables and e-con



- Insert the branch connector at cable side into mating connector at Input unit side.
- Connect e-con after removal of cover.

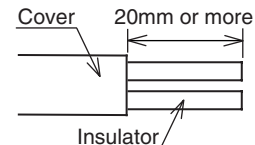
### Sensor connection

Utilize e-con to connect the sensor to the Input unit.

#### Attaching the e-con to the lead wire for sensor

- Strip the sensor wire as shown in the right figure.

(Refer to P18 "Lead wire table" for connector and applicable electrical wire size.)



## Wiring (continued)

Lead wire table

SMC product No. (1 piece)	Color of cover	Applicable gauge of cable( $\phi$ )	Competitor's model No.
ZS-28-CA-1	Orange	0.6 to 0.9 <sup>*1</sup>	3-1473562-4(AMP)
ZS-28-CA-2	Red	0.9 to 1.0 <sup>*1</sup>	1-1473562-4(AMP)
ZS-28-CA-3	Yellow	1.0 to 1.15 <sup>*1</sup>	1473562-4(AMP)
ZS-28-CA-4	Blue	1.15 to 1.35 <sup>*1</sup>	2-1473562-4(AMP)
ZS-28-CA-5	Green	1.35 to 1.60 <sup>*1</sup>	4-1473562-4(AMP)
ZS-28-C	Red	0.8 to 1.0 <sup>*2</sup>	37104-3101-000FL (Sumitomo 3M)
ZS-28-C-1	Yellow	1.0 to 1.2 <sup>*2</sup>	37104-3122-000FL (Sumitomo 3M)
—	Transparency	to 1.5 <sup>*3</sup>	XN2A-1430 <sup>*4</sup> (OMRON)

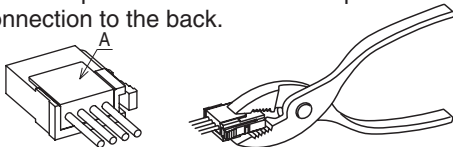
\*1: Nominal sectional area 0.1 to 0.5mm<sup>2</sup> (AWG26 to 20)

\*2: Nominal sectional area 0.14 to 0.3mm<sup>2</sup> (AWG26 to 24)

\*3: Nominal sectional area 0.08 to 0.5mm<sup>2</sup> (AWG28 to 20)

\*4: If cable tensile strength becomes more than 12N, a cable may separate from it.

- The core of the corresponding color shown on page 13 to 15 are put into the pin of the number stamped on the e-con for sensor connection to the back.



- It checks that the above-mentioned preparation work has been performed correctly, and A part shown in right figure is pushed by hand and makes temporary connection.
- A part center is straightly pushed in by tools, such as pliers.
- e-con is not allowable to be reused once crimped for connection. For the connection failure such as incorrect order of wire and incomplete insertion, please use the new e-con for sensor.