No.EX##-OMD0001-A

Operation Manual

SI unit

PRODUCT NAME

EX140-SSL1
EX140-SSL2

MODEL/ Series

SMC Corporation

● Safety Instructions ●

(Be sure to read before operation)

Thoroughly read this technical instruction manual and related manuals mentioned here to ensure the safety and proper operation of the product.

Level of potential hazard

⚠	**Warning :** Operator error could result in serious injury or loss of life.
⚠	**Caution :** Operator error could result in injury or equipment damage.

⚠ Caution

① **Thoroughly read this manual before using.**
Thoroughly read this manual and operate the product within the specified range following the instructions.

② **Handle with care.**
Do not drop or give large impact to the product.

③ **Use within specified voltage range.**
Using out of specified voltage will cause malfunction, damage of unit, electric shock, and fire.

④ **Do not touch terminal and internal circuit board while they are energized.**
It may cause malfunction, damage of unit, and electric shock.

⑤ **Use within operating ambient temperature.**
Do not use where temperature may rapidly change even though it is within the specifications.

⑥ **Foreign material should not be contained inside of the product.**
Contamination of foreign material such as wire chips will cause fire, breakage, and malfunction.

⚠ Warning

① **The product specified here is designed to use in ordinary full automation equipment.**
Prevent the use in machinery and/or equipment where human life may be directly injured and malfunction or failure may cause enormous loss.

② **Do not disassemble.**
Do not disassemble the product to repair and modify.

Contents

1.Outline

● S-LINK System

(1) S-LINK system is a wire-saving system developed by Sunx Corporation.
(2) 128 points of I/O can be transmitted up to 200m using two signal wires.
(3) T-shaped multi-drop wiring is available.
(4) Programmable controller of any manufacturer can be used by connecting S-LINK PC I/O connector to I/O card of programmable controller.
(5) Signal transmission is highly reliable due to loop wiring, address displaying function of disconnected unit, and double signal checking.
(6) Delay of transmission is 3.9 mS when 32 points are in use and 10.7 mS when 128 points are in use.

● Manifold Solenoid Valve for S-LINK

(1) It is a manifold solenoid valve equipped Serial Transmission Unit (SI unit) connectable to S-LINK system.
(2) SI unit functions as output unit of S-LINK system.
(3) Functions of S-LINK system such as error address detection are available.
(4) Two different types of SI unit for S-LINK are available depending on mounting methods and number of output points.
EX140-SSL1 ··· 16 point outputs
EX140-SSL2 ··· 8 point outputs

2.Applicable solenoid valve

SQ1000, 2000
SZ3000

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3.Specifications

● General specifications

Item		Specification
Ambient Temperature		0 to +55°C (When max. 8 points are ON) 0 to +50°C (When all points are ON)
Ambient Humidity		10 to 90% RH (without dew condensation)
Vibration Resistance	Durability	At 10 ~150Hz, either of smaller value 0.75mm of single amplitude or 10G of acceleration. Sweep Time: 4 sweeps in 8 min.
	Malfunction	At 10~150Hz, either of smaller value 0.50mm of single amplitude or 7G of acceleration. Sweep Time: 4 sweeps in 8 min.
Shock Resistance		30G of peak acceleration, 3 directions, 3 times
Noise Resistance		1000Vp-p, 1 μs of pulse width, 1ns pulse on first transition
Withstand Voltage		Between external terminal package and case, 1500VAC for 1 min.
Insulation Resistance		Between external terminal package and case, 2MΩ or more by Insulation resistance tester of 500VDC.
Environment		No corrosive gas, No dust

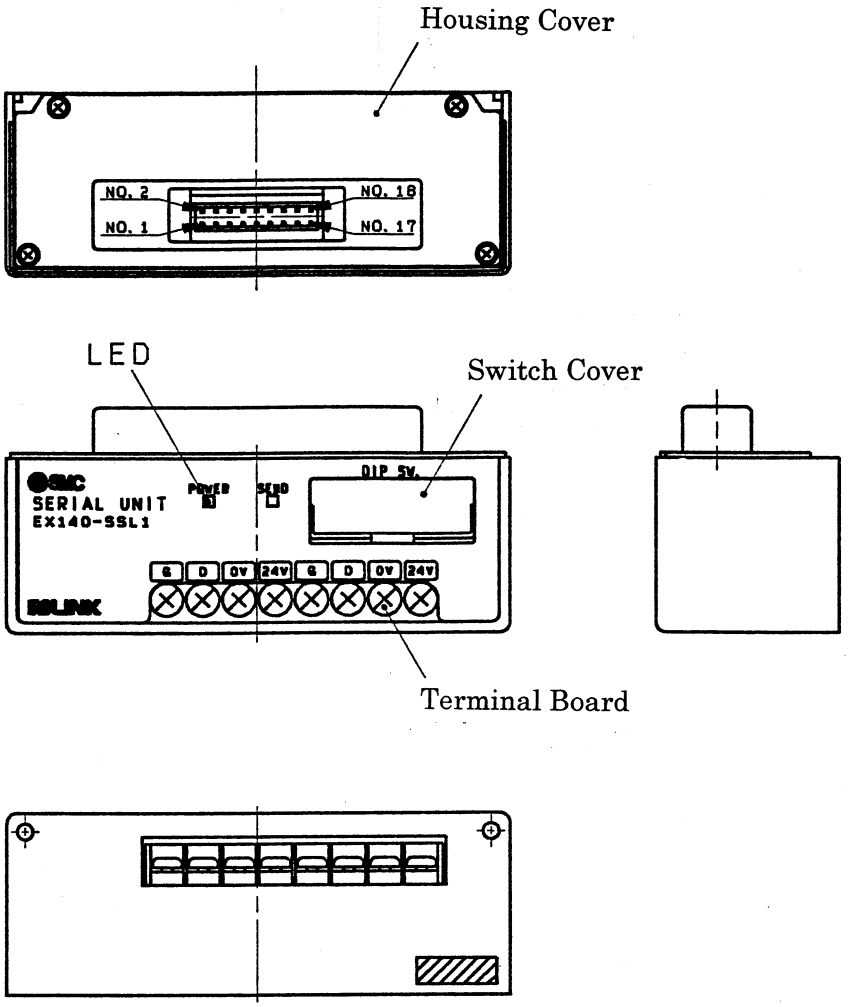
● Communication Specifications

Item	Specifications
Applicable System	S-LINK system (Superior interchangeability for sensor link system)
Transmission	Two-way time-division multiplex transmission
Synchronization	Bit synchronization, Frame synchronization
Transmission Procedure	S-LINK protocol
Transmission Lag	Max. 10.7 ms (Transmission speed: 28.5kbps)
Wiring	T-shape multi-drop wiring / Crossover wiring
Transmission Distance	Max. 200 m

● SI Unit Specifications

Unit	EX140-SSL1	EX140-SSL2
No. of Output Point	16 points	8 points
Output	Transistor (Open collector type)	
Connected Load	Solenoid valve with lamp surge voltage suppressor of 24VDCAnd 2.1W or less	
Residual Voltage	1 V or less	
Power Supply Voltage	24VDC $^{+10\%}_{-5\%}$	
Power Consumption	0.1 A (Unit inside)	
Weight	130 g or less	
Dimension (D×W×H)	43 × 94.5 × 34.4	

4.Descriptions & Functions



■ LED Indication

LED Name	Function
POWER	LED lights when power is supplied.
SEND	LED blinks for proper transmission. LED blinks slowly for transmission failure.

■ Terminal Block

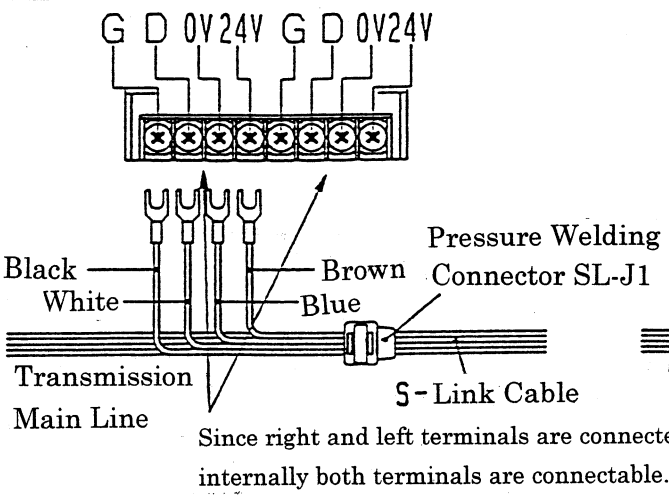
Terminal Name	Where to Connect
24V	24VDC Power Supply Line
0V	
D	Transmission Line D
G	Transmission Line G

5. Wiring method

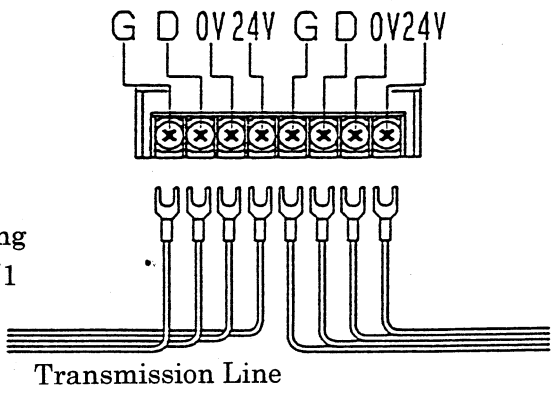
5-1. Wiring Configuration

For wiring, transmission lines (D, G) and power supply lines (24 V, 0 V) should be connected severally to the corresponding terminals. There are two types to connect SI unit to S-LINK transmission line, T-shaped multidrop wiring and crossover wiring. Each wiring method is shown below.

a) T-shaped Multidrop Wiring



b) Crossover Wiring

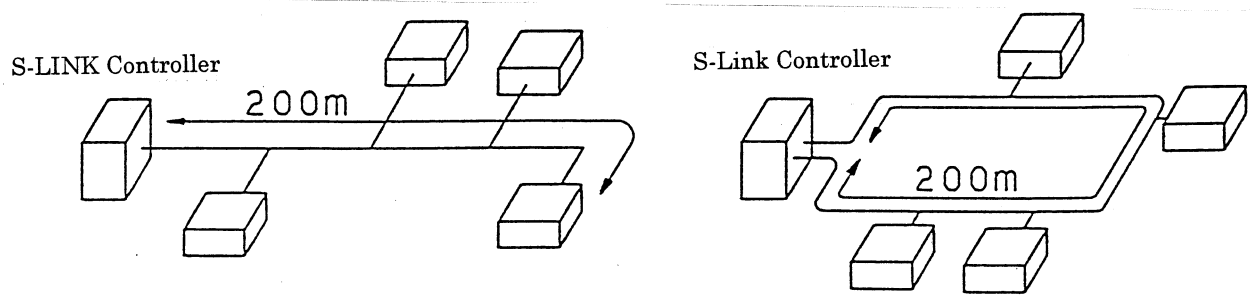


In the examples shown above, special flat cable for S-LINK, SL-ROM*00, is used.

* For connecting S-LINK system equipment to sensor link system, crossover wiring is recommended. If T-shaped multidrop wiring is done in sensor link system, disconnection in branch lines cannot be detected. Please keep branch lines as short as possible.

* Transmission Distance

1) Wiring length from S-LINK controller to the farthest unit is 200 m or less
2) For loop wiring, loop wiring length is 200 m or less
3) Total wiring length of trunk and branch lines is 400 m or less.



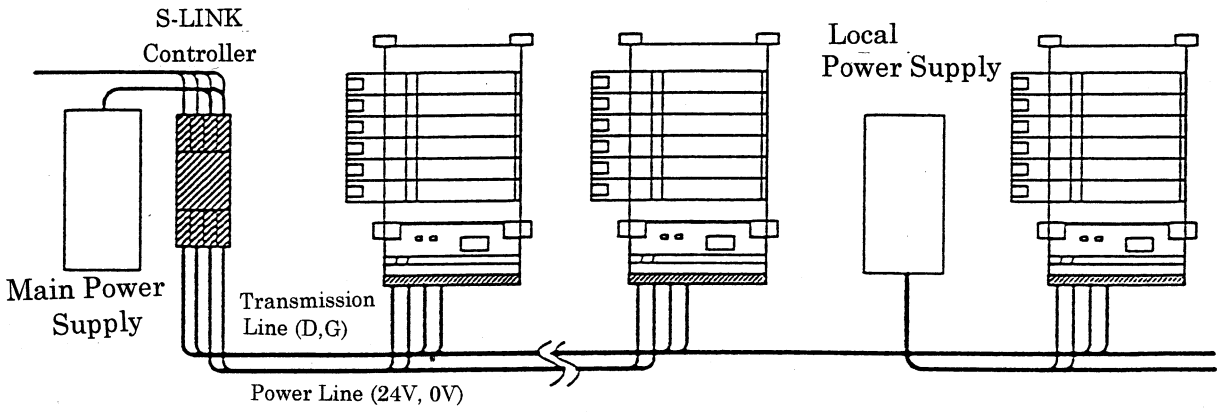
* Other than above factors, transmission distance is also restricted by the number of devices connected and voltage drop in power supply lines.
Please refer to the S-LINK Instruction Manual prepared by Sunx Corp. for details.

Connectable Number of Units

Connectable number of units is defined according to decrease of output capacity due to FAN-IN, FAN-OUT and cable length of S-LINK devices. Refer to the S-LINK nstruction Manual prepared by Sunx Corp. for its calculation.

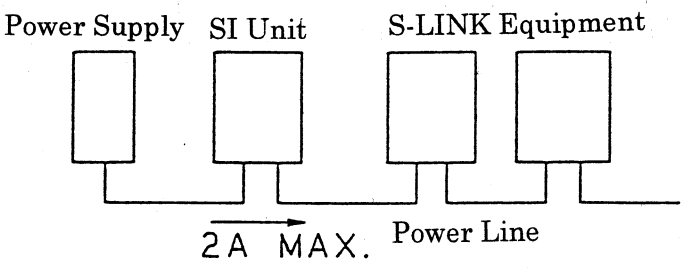
5-2. Power Supply

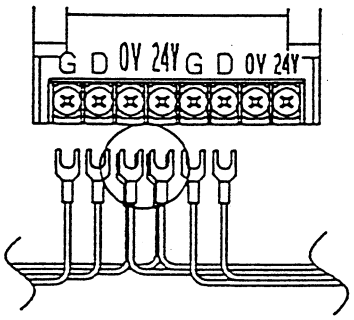
Please supply power of 24VDC$^{+10\%}_{-5\%}$. Power supply methods of S-LINK system are the centralized power supply and the local power supply. With the centralized power supply, electric power is delivered to all S-LINK I/O equipment from the power source connected to S-LINK controller. In this case, load is restricted according to voltage drop in power lines (relating to cross section of cables and wiring length), allowable current for cables and capacity of the main power supply.
If load capacity is large, provide the local power supply as well as the main power supply to avoid concentration of power.



* For crossover wiring, power supply current delivered to other equipment through SI unit should be 2A or less. If more than 2A of current is applied, please use T-shaped multidrop wiring or gather power supply terminals in one for wiring.

*When more than 2A of power supply current is applied by crossover wiring.





* Current consumption of SI manifold solenoid valve should be approximately 1A with VQ valves (1.5W type) and 4A with SX/SY valves when 16 points are turned on.

⚠ Caution at wiring

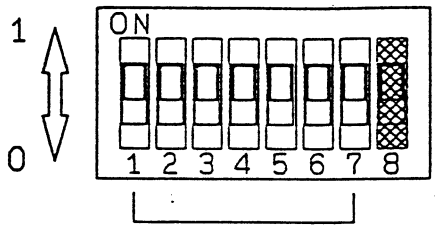
- Keep the voltage among power supply terminals of SI unit at 22.8 V (- 5% of supply voltage) or higher even when the maximum load is applied.
- Be sure to ground FG of power supply (switching power supply). In addition, separate wiring for power supply such as an inverter motor from that for S-LINK.
- The applicable screwdriver is a Phillips head screwdriver with end size of #2 and diameter of φ6 or less. The screws should be tightened securely with a tightening torque of 0.5 to 0.6 Nm.

6. DIP Switch Setting

6-1. Address Setting

S-LINK I/O device sets addresses to correspond to I/O card of PLC.
For SI unit, addresses are assigned by DIP switches. Addresses from 0 to 127 can be set by binary codes.
For each solenoid valve, the address of the unit is assigned to begin with, and then the address of solenoid valve with output No.0 is assigned and the rest follows it.
*Power of SI Unit should be turned off for setting DIP switch.

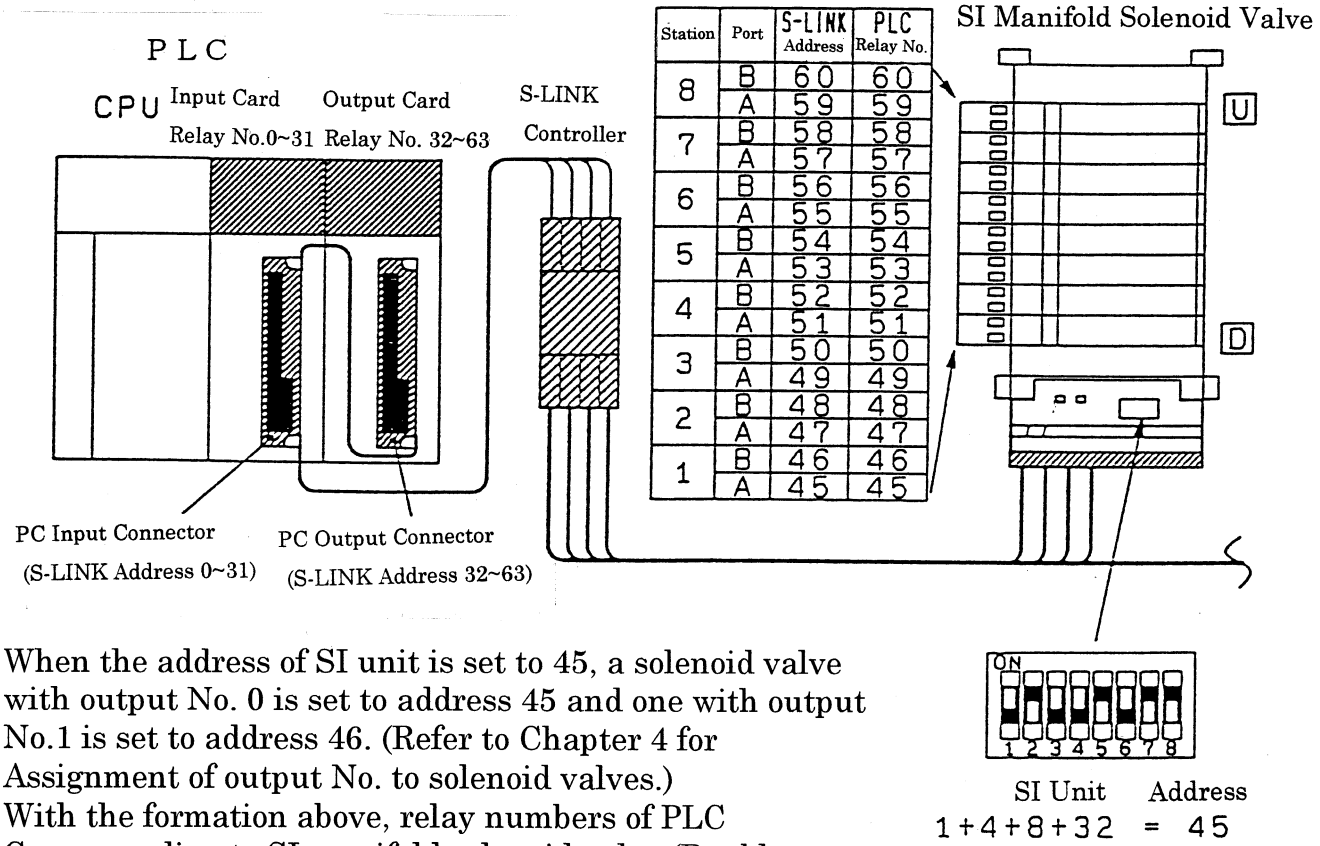
■ Relationship Between Address Set Value & Set Switch



Address Set Switch

Switch No.		1	2	3	4	5	6	7
Weight of bit		1	2	4	8	16	32	64
Address set value	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0
	2	0	1	0	0	0	0	0
	⟆							
	127	1	1	1	1	1	1	1

■ Example of Address Setting



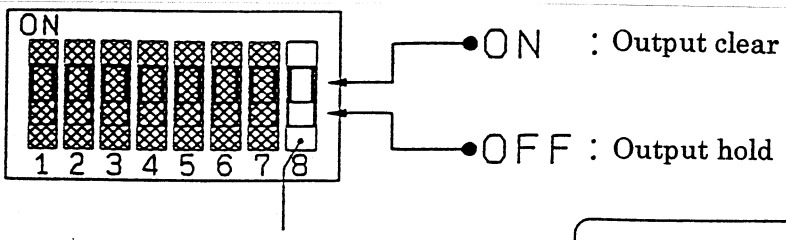
Station	Port	S-LINK Address	PLC Relay No.
8	B	60	60
	A	59	59
7	B	58	58
	A	57	57
6	B	56	56
	A	55	55
5	B	54	54
	A	53	53
4	B	52	52
	A	51	51
3	B	50	50
	A	49	49
2	B	48	48
	A	47	47
1	B	46	46
	A	45	45

When the address of SI unit is set to 45, a solenoid valve with output No. 0 is set to address 45 and one with output No.1 is set to address 46. (Refer to Chapter 4 for Assignment of output No. to solenoid valves.)
With the formation above, relay numbers of PLC Corresponding to SI manifold solenoid valve (Double, 8 stations, 16 points) are 45 to 60.

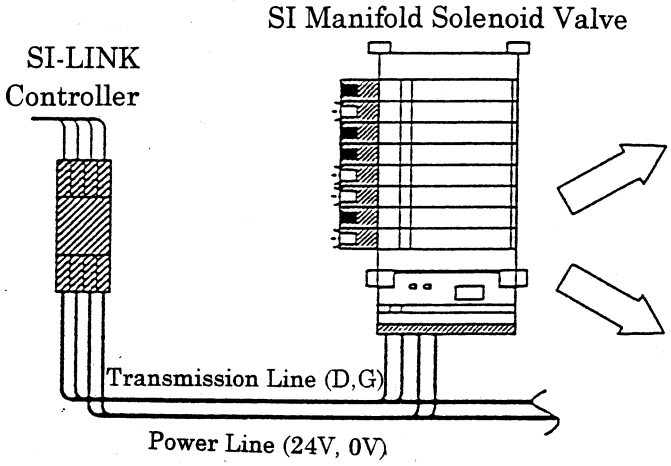
SI Unit Address
1+4+8+32 = 45

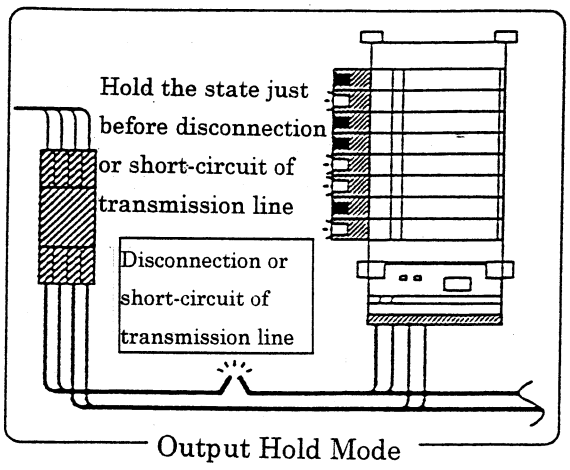
6-2. Output Hold Setting

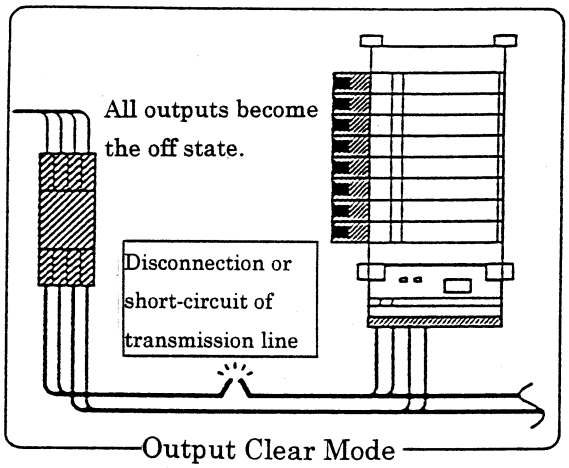
It can be selected if output of SI unit is held as the state just before transmission line failure (output hold) or completely cleared off (output clear) when transmission line (D,G) is disconnected or short-circuited. Use DIP switch No.8 for this setting.



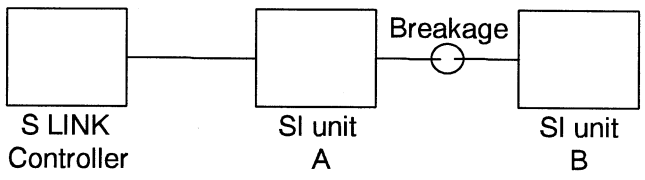
Output clear/hold function set switch







At transmission line failure, output hold/ clear function works only for a unit which signals from S-LINK controllercannot be sent. When transmission line is broken as shown below, output hold/ clear function in SI unit B works , but SI unit A does not.

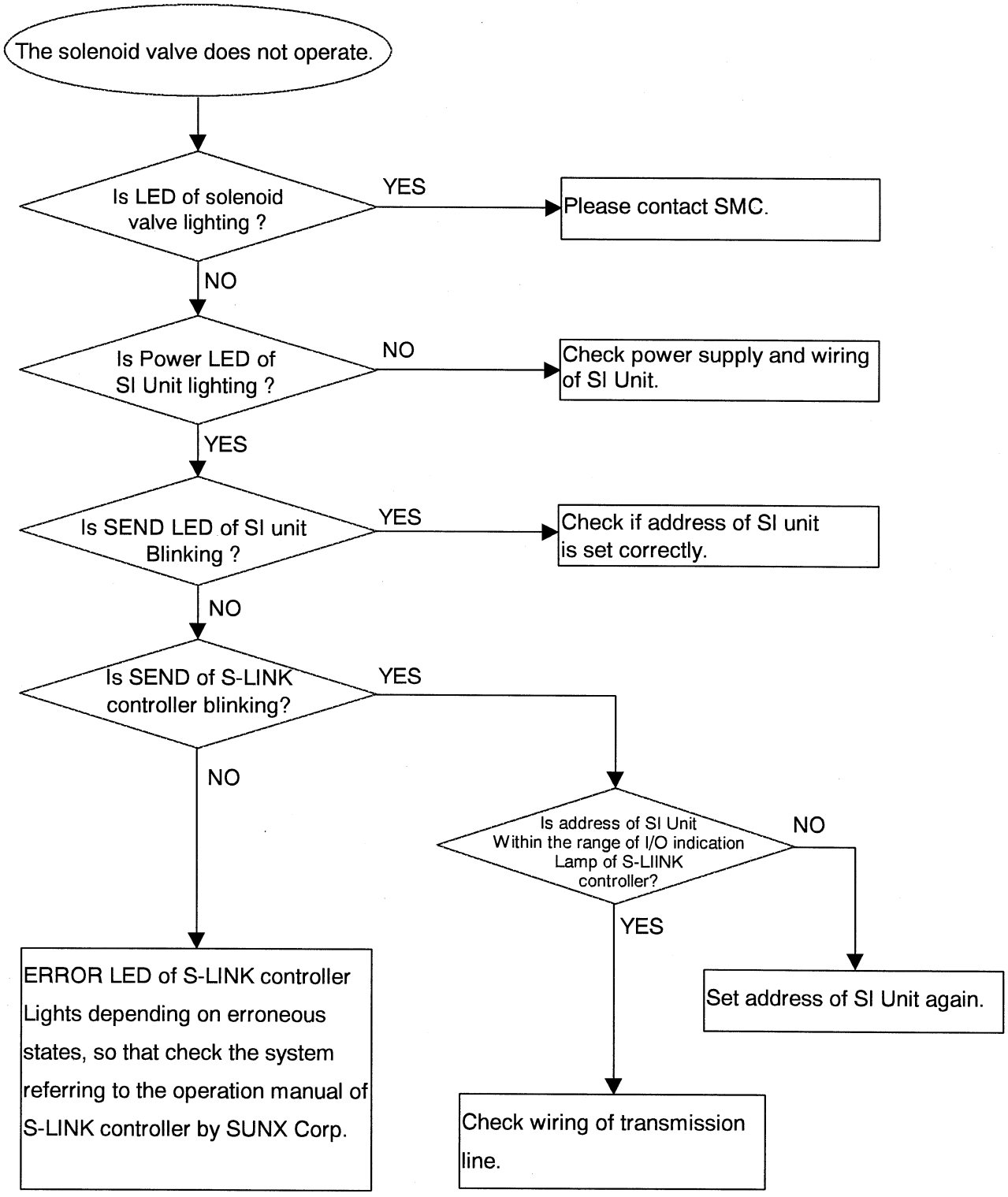


⚠ Caution at wiring

If transmission line is reset without turning off the power after output hold / clear function has worked, output may be wrong. Be sure to turn off the power before reset.

7. Troubleshooting

The following flow shows how to cope with inappropriate operation of SI Unit.
Refer to the Instruction Manual prepared by Sunx Corp. when the whole system needs troubleshooting.



Revision history
A: Add the direction for the applicable screwdriver.

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