
TECHNICAL INSTRUCTION MANUAL

S-LINK SI Unit

EX120-SSL1

EX120-SSL2

EX121-SSL1

EX121-SSL2

EX122-SSL1

EX122-SSL2

EX123-SSL1

EX123-SSL2

● Safety Instructions ●

(Be sure to read before handling)

Read this technical information and related manuals mentioned in this technical information. Follow the safety instructions and take necessary safety measures to use the products correctly and safely.

• Potential Hazard Level Indications



Warning : Operator error could result in serious injury or loss of life.



Caution : Operator error could result in injury or equipment damage.



Warning

- The products represented in this technical information are designed for use in general fully automatic equipment. Do not use the products for equipment that may be affecting human lives. Also, do not use the products for equipment that may incur considerable loss and damages due to its malfunction or failure.
- Do not disassemble or modify the product.



Caution

- Read this operation manual carefully to follow the safety instructions and use the products inside their design parameters.
- Before attempting any kind of maintenance (such as wiring and regular check), make sure the power supply to the products and system is shut off.
- Do not touch terminals and internal circuit boards during energization.
- Tighten wires securely with terminal screws.

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1. Outline

1 - 1. S-LINK System

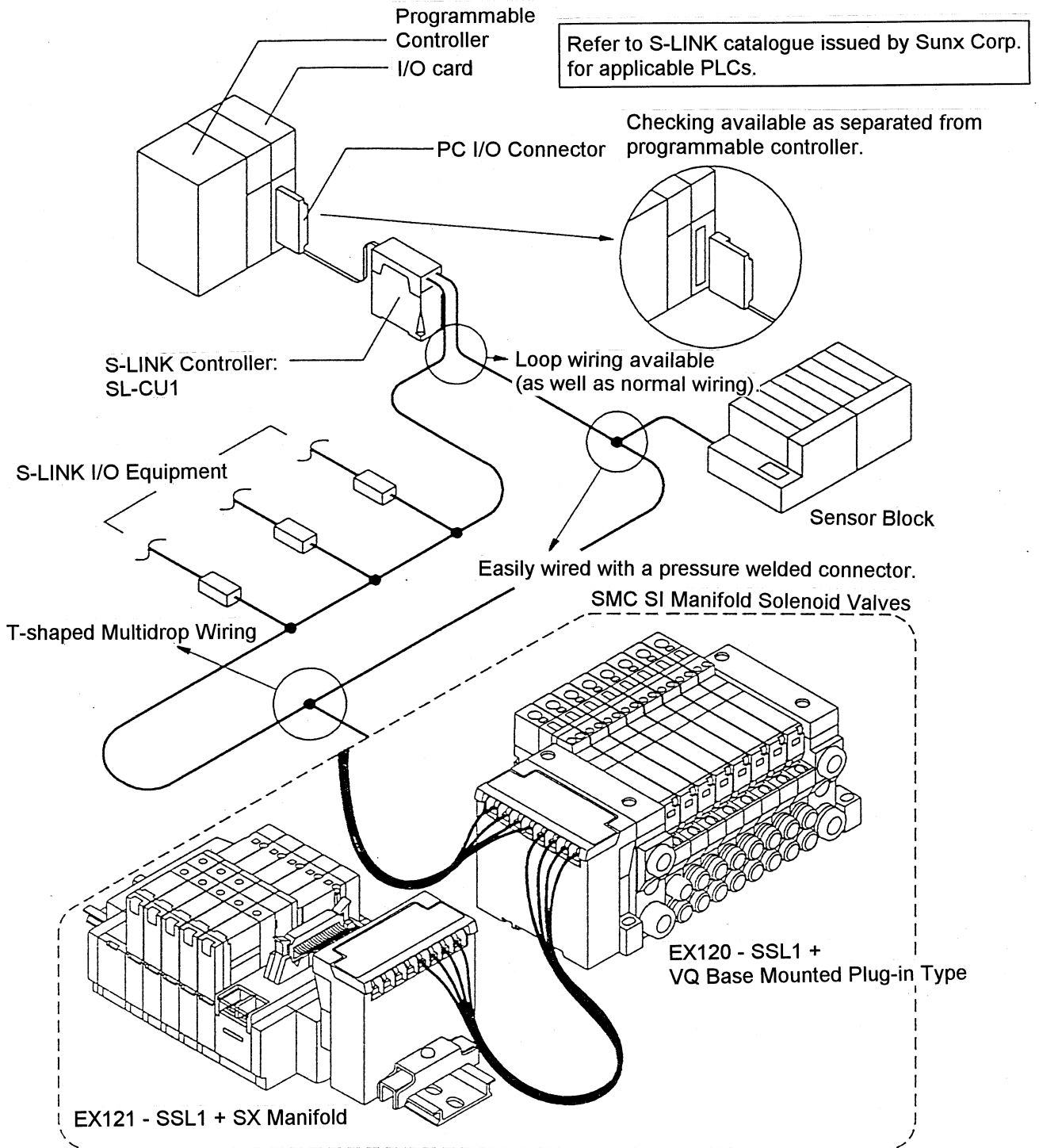
- (1) S-LINK system is a wire-saving system developed by Sunx Corporation.
- (2) 128 points of I/O can be transmitted for 200 m using two signal cables.
- (3) T-shaped multidrop wiring is available.
- (4) Programmable controller of any manufacturer can be used by connecting S-LINK PC I/O connector to I/O card of programmable controller.
- (5) Signal transmission is highly reliable due to loop wiring, display function for address 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.

1 - 2. SI Unit Manifold Solenoid Valve for S-LINK

- (1) Serial transmission unit (SI unit) connectable to S-LINK system is attached to manifold solenoid valve.
- (2) SI unit functions as output unit of S-LINK system.
- (3) Functions of S-LINK system such as error address detection are available.

2. System Structure & Features

2 - 1. System Structure & Features



SMC does not deal with equipment related to S-LINK except SI manifold solenoid valves. Contact any sales office or distributor of Sunx Corp. for orders and inquiries.

3. Specifications

3 - 1. General Specifications

Ambient Temperature		0 to +55°C (when a maximum of 8 points is ON) 0 to +50°C (when all the points are ON)
Ambient Humidity		10 to -90% RH (without dew condensation)
Vibration Resistance	Durability	10 - 150 Hz, Smaller value between 0.75mm of single amplitude and 10G of acceleration, 4 sweeps in 8 min. of sweep time
	Malfunction	10 - 150 Hz, Smaller value between 0.50mm of single amplitude and 7G of acceleration, 4 sweeps in 8 min. of sweep time
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 ground, AC1500V for 1 min.
Insulation Resistance		Between external terminal package and ground, DC500V, 2MΩ or more on insulation resistance tester
Environment		No corrosive gas, No dust

3 - 2. Communication 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 multidrop wiring / Crossover wiring
Transmission Distance	Max. 200 m

3 - 3. SI Unit Specifications

Unit	EX12※-SSL1	EX12※-SSL2
No. of Output Points	16 points	8 points
Output	Transistor (Open collector type)	
Connected Load	DC24V, Solenoid valve with 2.1 W or less of light & surge voltage suppressor	
Residual Voltage	1 V or less	
Power Supply Voltage	DC 24V ^{+10%} _{- 5%}	
Power consumption	0.1 A (Inside the unit)	

4. Applicable Solenoid Valves

4 - 1. Applicable Solenoid Valves

SI Unit	Applicable Solenoid Valves
EX120-SSL1 EX120-SSL2	VQ1000, VQ2000
EX121-SSL1 EX121-SSL2	VQ1000, VQ2000 SX3000, SX5000, SY3000, SY5000
EX122-SSL1 EX122-SSL2	SX3000, SX5000, SY3000, SY5000
EX123-SSL1 EX123-SSL2	VQ4000

- S Kit : Manifold solenoid valve with serial transmission unit for S-LINK can be ordered as "S Kit". Refer to the catalogue of each solenoid valve for details.



Caution !

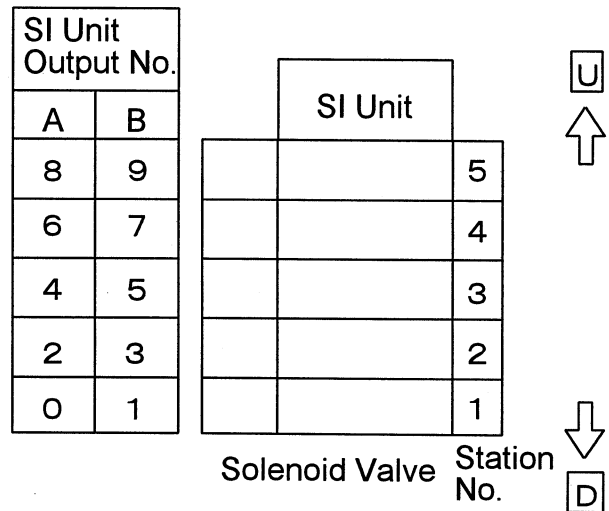
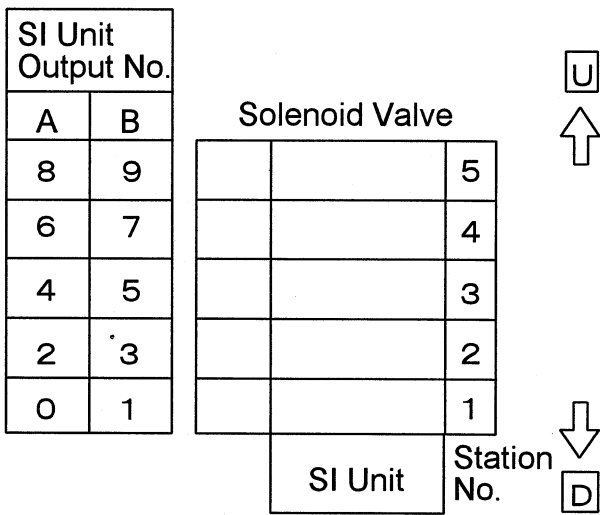
Series EX12※-SSL※ are specially designed for VQ / SX / SY solenoid valve with light and surge voltage suppressor (24V). We cannot guarantee these SI units against any malfunction and failure if other solenoid valves than the ones above, competitors' solenoid valves or other loads than solenoid valves are connected.

4 - 2. Correspondence of SI Unit Output Numbers & Solenoid Valve Coils

Outputs of SI unit are assigned to solenoid valves in order starting from the one at D side. In case of VQ manifold solenoid valve, output numbering starts from D side whereby SI unit is attached.

For SX and SY manifold solenoid valves, SI unit can be attached to either side: D or U. When SI unit is attached to U side, output assignment starts from a solenoid valve opposite to SI unit. (When SI unit is located at D side, output numbering starts from D side.)

〈Example〉



VQ Manifold Solenoid Valve
 SX / SY Manifold Solenoid Valve
 (SI unit at D side.)

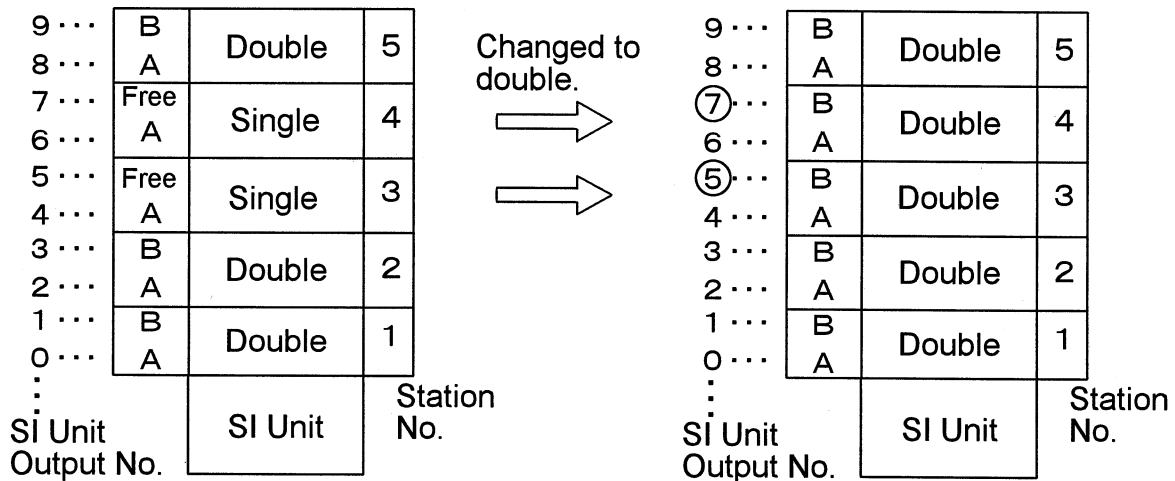
SX / SY Manifold Solenoid Valve
 (SI unit at U side.)

4 - 3. Solenoid Valve Wiring Specifications

- Standard Wiring (Double Wiring)

When there are 8 stations or less of solenoid valves, double wiring is standardized for manifold internal wiring. If any single solenoid valve is used, there will be a free SI unit output. For example, in the following wiring, output no. 5 and 7 are free.

〈Example〉 VQ Manifold Solenoid Valve

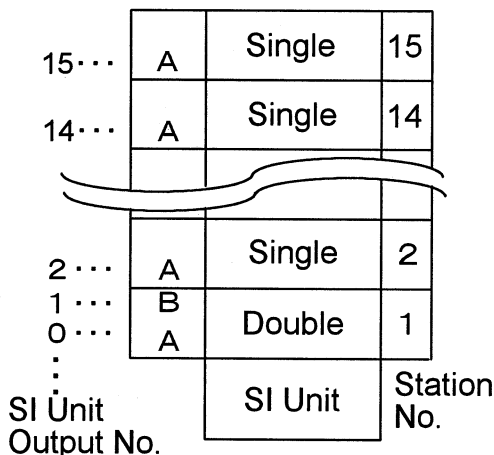


For double wiring, it is possible to change a single solenoid valve to double one. In the wiring above, No.3 and 4 solenoid valves can be changed to double solenoid valves. If do so, B of 3rd station will have no. 5 output and B of 4th station no.7.

- Semi-standard Wiring (Multiple wiring)

Wiring should be specified in manifold specifications when there are 9 to 16 stations of solenoid valves or continuous addresses are desired for 8 stations or less of manifold which includes single solenoid valves.

〈Example〉 VQ Manifold Solenoid Valve



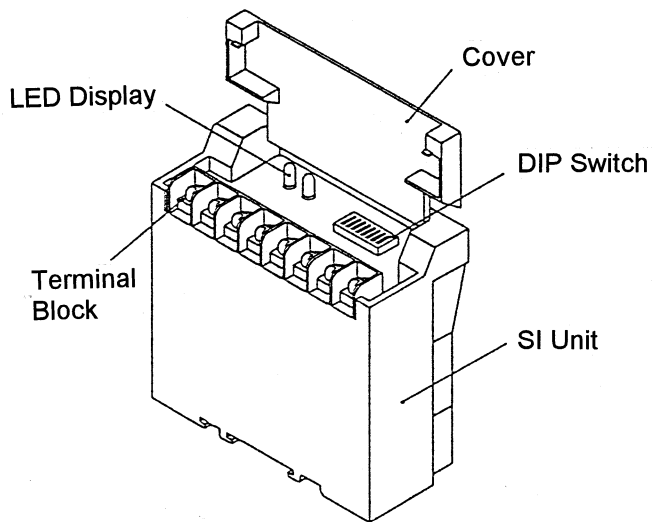
Internal wiring of manifold should be fixed depending on the type of solenoid valves to be mounted: single or double.

In this case, SI unit cannot output due to lack of internal wiring to solenoid B even if single solenoid valves are changed to double ones.

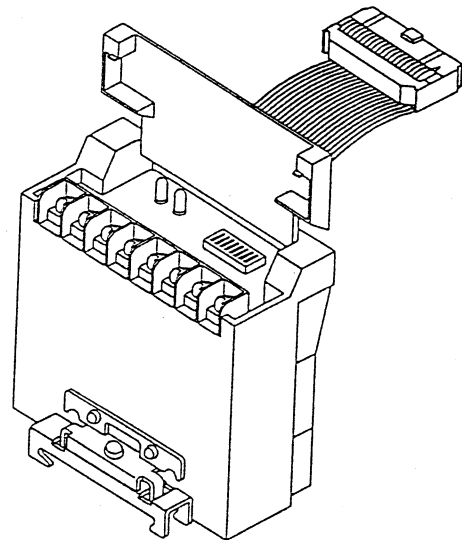
16 stations can be added to a manifold at the maximum if all the solenoid valves are single.

5.Components

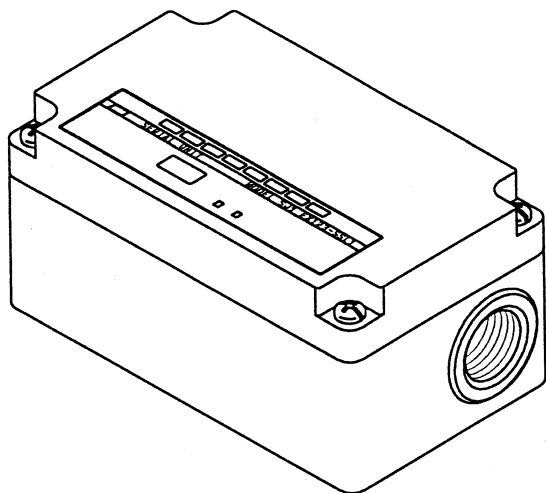
5 - 1. Descriptions & Functions



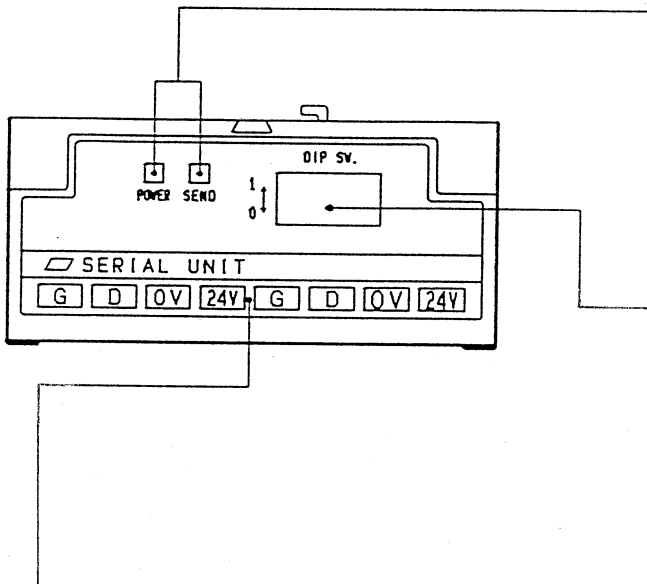
EX120-SSL※



EX121-SSL※



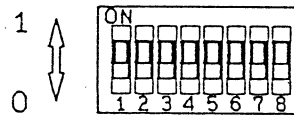
EX123-SSL※



● LED Display

LED	Function
POWER	Lights up while power is supplied.
SEND	Blinks for proper transmission. Blinks slowly for transmission failure.

● DIP Switch



No.	Function
1 to 7	Address Setting
8	Output Hold Setting

● Terminal Block

Terminal	Where to Connect
24V	DC24V Power Supply Line
0V	
D	Transmission Line D
G	Transmission Line G

6. Switch Setting

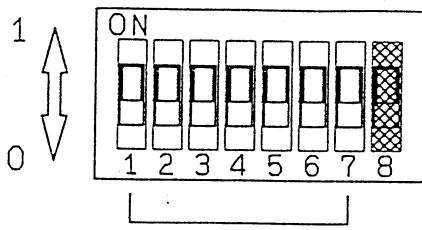
6 - 1. Address Setting

S-LINK I/O equipment sets addresses to correspond with PLC I/O card.

For SI unit, address assignment is done using DIP switches. 0 to 127 of addresses can be set with binary codes.

For manifold, an address is assigned to each solenoid valve. First of all, SI unit address is directed to a solenoid valve with output no. 0 and the rest follows it.

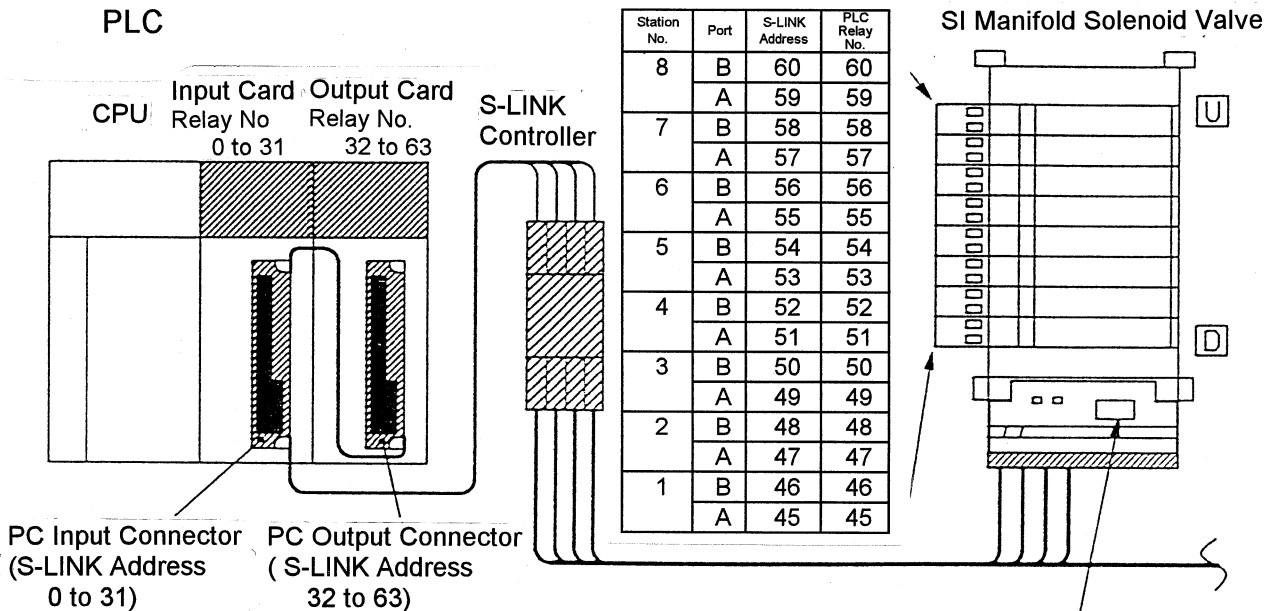
Relationship Between Address & Set Switch



Address Set Switch

Switch No.	1	2	3	4	5	6	7
Weight of Bits	1	2	4	8	16	32	64
Address Set Value	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0	1	0	0	0	0
	⋮						
127	1	1	1	1	1	1	1

Example



When SI unit address is set to 45, a solenoid valve whose output no. is 0 will have address 45 and the one with output no. 1 address 46. (Refer to Chapter 4 for output number assignment to solenoid valves.)

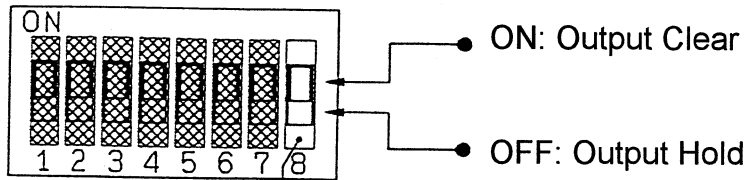
With the formation above, PLC relay numbers corresponding to SI manifold solenoid valve (Double, 8 stations, 16 points) will be 45 to 60.



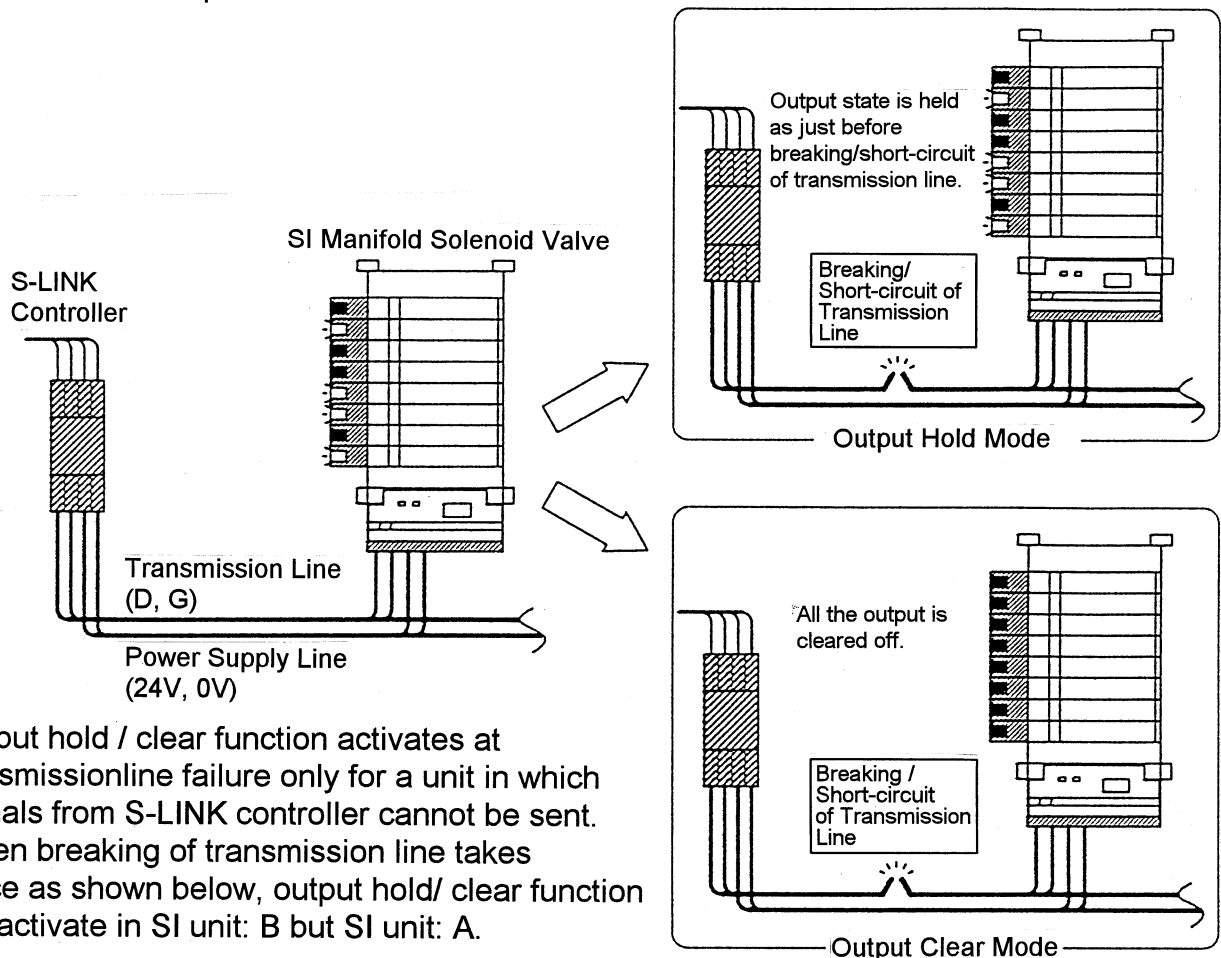
SI Unit Address
 $1 + 4 + 8 + 32 = 45$

6 - 2. Output Hold Setting

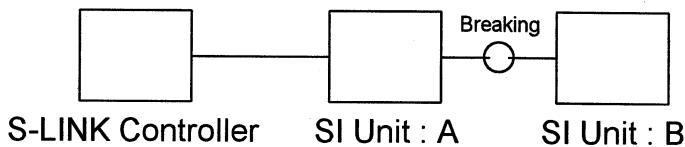
Output of SI unit can be hold as it was before transmission line failure (output hold) or cleared off completely (output clear) when transmission lines (D, G) are disconnected/shorted. Chose either of them and set with No. 8 DIP switch.



Set Switch for Output Hold/Clear Function



Output hold / clear function activates at transmissionline failure only for a unit in which signals from S-LINK controller cannot be sent. When breaking of transmission line takes place as shown below, output hold/ clear function will activate in SI unit: B but SI unit: A.



Caution !

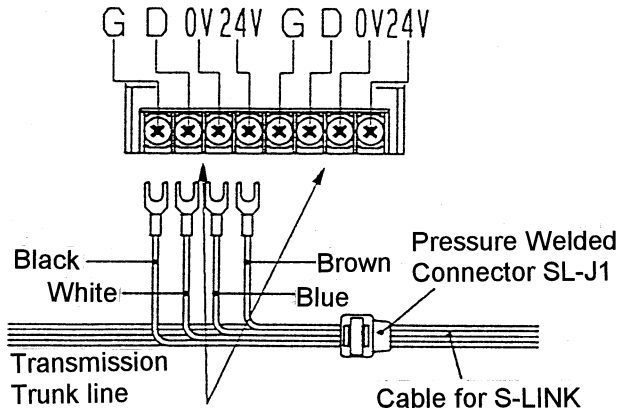
SI controller may output incorrectly if transmission line is returned without turning off the power once output hold / clear function activates. Make sure to turn the power off before reset.

7. Wiring

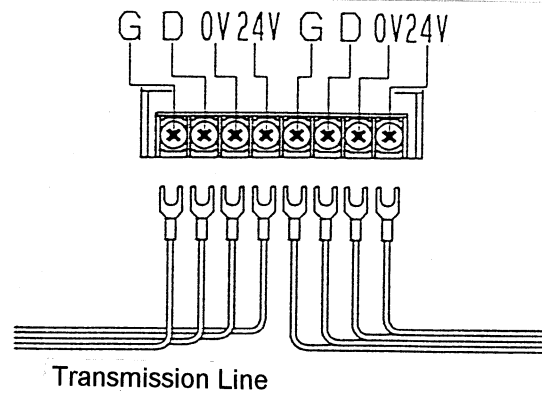
7-1. Wiring Method

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 ways of connecting SI unit to S-LINK transmission lines; T-shaped multidrop wiring and crossover wiring. Each wiring method is shown below.

a) T-shaped Multidrop Wiring



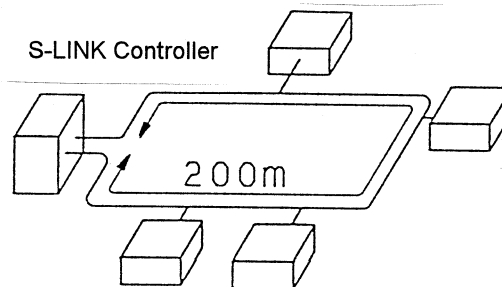
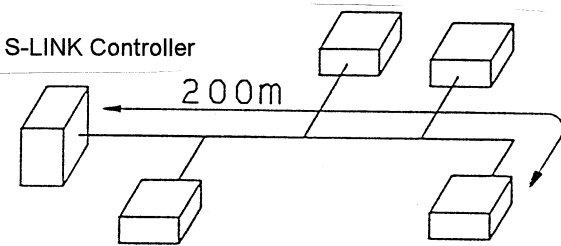
b) Crossover Wiring



Connectable to either side, since both right and left terminals are connected internally.

In the examples above, special flat cables for S-LINK: SL-RCM*00 are used.

- For connection of S-LINK system equipment and sensor link system, crossover wiring is recommended. If T-shaped multidrop wiring is done in sensor link system, disconnection of branch lines cannot be detected. Keep branch lines as short as possible.
- Transmission Distance
 - 1) 200 m or less of cables from S-LINK controller to the farthest unit.
 - 2) 200 m or less of cables in case of loop wiring.
 - 3) 400 m or less of total length of trunk and branch lines.



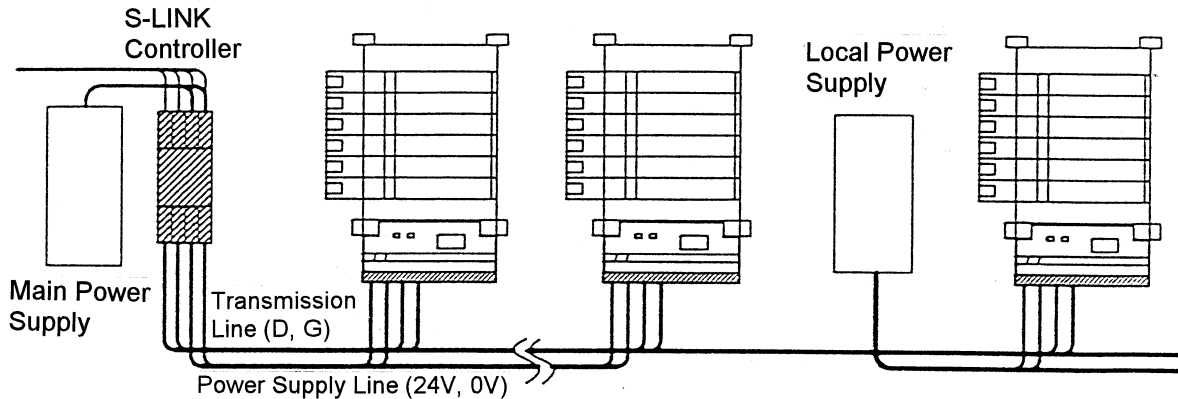
- Transmission distance is also constrained by the number of units connected and voltage drop in power supply lines. Refer to the S-LINK Instruction Manual prepared by Sunx Corp. for details.

Connectable Number of Units

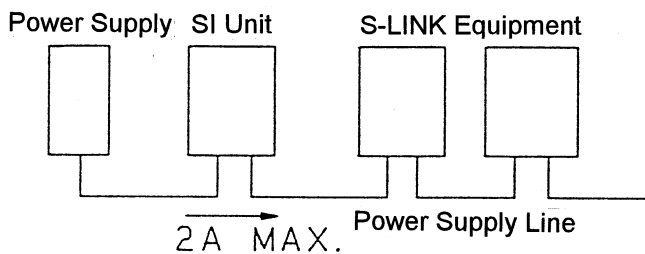
Connectable number of units is defined according to decrease of output capacity due to FAN-IN, FAN-OUT and cable length of S-LINK components. Refer to the S-LINK Instruction Manual prepared by Sunx Corp. for its calculation.

7 - 2. Power Supply

Supply DC24V $\begin{matrix} +10\% \\ -5\% \end{matrix}$ as a power source. S-LINK system has two ways of supplying power: centralized power supply and local power supply. With centralized power supply, electric power is delivered to all the S-LINK I/O equipment from a power source connected to S-LINK controller. In this case, load is constrained according to voltage drop in power lines (relating to cross section and length of cables), allowable current for cable and capacity of the main power supply. If load capacity is large, provide local power supply as well as the main power supply to avoid concentration of power source.

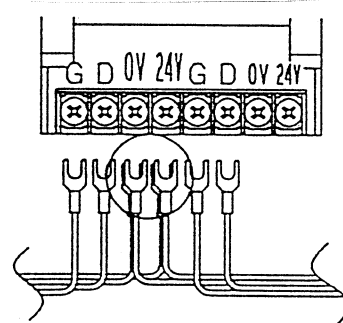


For crossover wiring, power supply current delivered to other equipment through a SI unit should be 2A or less. If more than 2A of current is required, connect cables in T-shaped multidrop wiring or wire all the power supply terminals in one.



- When more than 2A of power supply current is applied via crossover wiring.

- Current consumption of SI manifold solenoid valve should be approximately 1A with VQ valves (1.5W type) and 0.4A with SX/SY valves as turning on 16 points.



Caution !

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.

Never fail to ground FG of power supply (switching power supply). Also, keep cables for power supply, an inverter motor for instance, and S-LINK apart.

8. Maintenance

8 - 1. Troubleshooting

The following flow shows how to cope with improper operation of SI unit.

Refer to the Instruction Manual prepared by Sunx Corp. when the whole system needs troubleshooting.

