

# HITACHI

USER'S MANUAL

OPTION

# SYS SW

(LQZ700)

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**R70 SIOV**

USER'S MANUAL

OPTION  
**SYS SW**  
(LQZ700)

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## SAFETY PRECAUTIONS

Be sure to read this manual and all other attached documents carefully before installing, operating inspecting or conducting maintenance on this unit. Always use this unit properly. Be sure to carefully read the information about the device, the safety information and precautions before using this unit. Be sure that the person(s) responsible for maintenance receives and understands this manual completely.

This manual divides the safety precautions into DANGERS and CAUTIONS.



: Failure to observe these warnings may result in death or serious injury.



: Failure to observe these cautions may result in injury or property damage.

Failure to observe any  may lead to serious consequences.

All of these DANGERS and CAUTIONS provide very important precautions and should always be observed.

Additional safety symbols representing a prohibition or a requirement are as follows:



: Prohibition. For example, “Do not disassemble” is represented by:



: Requirement. For example, if a ground is required, the following will be shown:



## 1. Installation Precautions



### **DANGER**

- If an emergency stop circuit, interlock circuit, or similar circuit is to be formulated, it must be positioned external to this module. If you do not observe this precaution, equipment damage or accident may occur when this module becomes defective.
- High voltages may cause electrical shock hazards. If you disconnect/connect the module or cable with the power supply switched on, you may inadvertently touch a power supply terminal and receive an electric shock or the equipment may become damaged due to short circuit or noise. Switch off the power supply before disconnecting/connecting the module or cable.



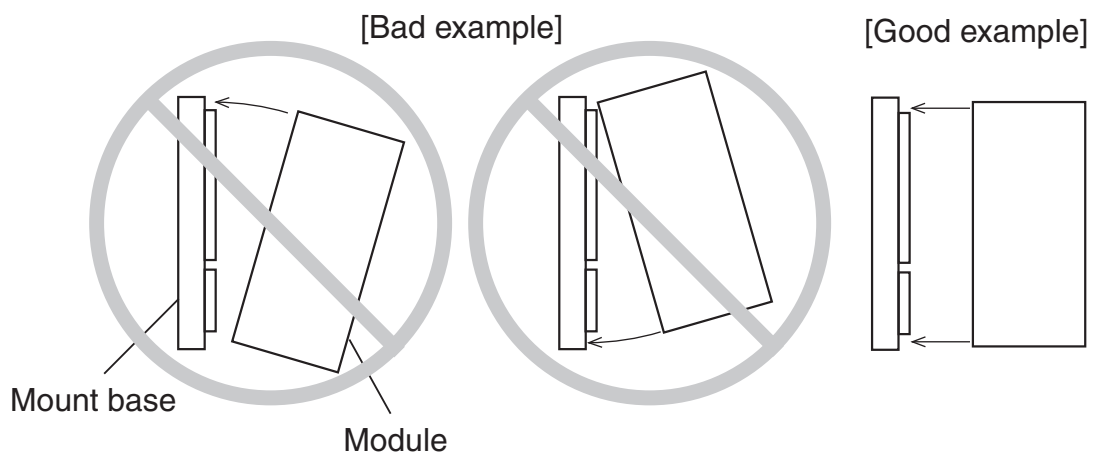
### **CAUTION**

- Use the module in an environment specified in the catalog and manual. If you use the module in an environment where the module is subjected to high temperature, high humidity, dust, corrosive gas, vibration, or impact, a risk of electric shock, fire, or malfunction may result.
- Observe the installation procedure stated in the manual. If the module is improperly installed, it may drop, become defective, or malfunction.
- Do not allow wire cuttings or other foreign matter to enter the module. The entry of foreign matter in the module may result in a fire or cause the module to become defective or malfunction.
- When the module is to be positioned at a location where it may become wet with water, place it within a drip-proof enclosure to prevent it from becoming defective.
- The module may become defective due to a high temperature, which may result from heat dissipation failure. It may also malfunction due to electromagnetic interference from nearby equipment. For heat dissipation and electromagnetic radiation minimization, provide the specified clearances among the module, its enclosure, and neighboring equipment.



## CAUTION

- The degree of temperature rise varies depending on how the module is mounted. The mounting intervals specified in the manual should be used as a guide only. While a test run is conducted after completion of mounting, measure the temperature near the module to check whether it is within the specified range. If the measured temperature is beyond the specified range, increase the mounting intervals or provide forced air cooling with a cooling fan.
- Dust or other foreign matter might accumulate on the connector, resulting in poor contact. Immediately after the module is unpacked, perform the mounting and wiring procedures.
- To prevent the module from being damaged, observe the following precautions when you mount or demount the module:
  - Before mounting the module to the mount base connector, check that the connector pins are properly aligned and not bent, broken, or soiled with dirt or the like.
  - Ensure that the module is parallel to the mount base vertical surface as shown below when mounting. If you connect a module to or disconnect it from its connector while it is tilted, the connector pins may become damaged.
  - If the mount base is positioned overhead due to the employed enclosure structure, use a stepladder or the like and mount the module squarely. If you mount the module obliquely, the connector may become damaged.





## REQUIREMENT

- Fasten the mount base to a vertical surface. Fastening the mount base to a horizontal surface lessens the heat dissipation effects and allows the temperature to rise, thereby rendering the module defective or incurring component parts deterioration.
- Before installing the module, discharge any static buildup from your body because static electricity may render the module defective.
- Properly tighten the screws. If they are inadequately tightened, malfunction, smoke emission, or combustion may occur.



## PROHIBITION

Do not disassemble or modify the module. Failure to observe this precaution may result in a fire or cause the module to become defective or malfunction.

## 2. Wiring Precautions



### **DANGER**

- Switch off the power supply before making connections to the terminal block. Making connections with the power supply being switched on may incur electrical shock hazards.
- Electric shock hazards exist so that you might suffer burns or become electrocuted. Further, the system might malfunction due to noise interference. Therefore, ground the line ground (LG), frame ground (FG), and shield wire (SHD).



### **REQUIREMENT**

- Insulate the mount base from the enclosure. To keep the mount base insulated, avoid removing the insulation sheets that are supplied with the mount base.
- The LG is a ground terminal for power supply noise. The FG and SHD are ground terminals for the noise in the remote I/O, communication module and other external interface lines. To avoid interference between the ground terminals, separately ground the LG and FG.



### **CAUTION**

- If the input voltage for the power supply module is within the specified range but close to the upper or lower limit, you should conclude that an input power problem exists, and ask the power supply facility manager to conduct an inspection.
- Be sure that the power source for supplying power to various modules is rated as specified. The use of a differently rated power source may cause a risk of fire.
- Only qualified personnel should be allowed to make cable connections. Incorrect wiring connections may cause a risk of fire, malfunction, or electric shock.





## REQUIREMENT

- Before supplying power to the equipment, thoroughly check the wiring connections.
- Before making power supply wiring connections, make sure that no voltage is applied to the power cable. Immediately after completion of power supply wiring, be sure to install the terminal cover.
- Ensure that the communication, power supply, motive power, and other cables are routed apart from each other. It is essential that the inverter, motor, power regulator, and other motive power cables be routed at least 300 mm away from the other types of cables. Also, be sure that the communication and motive power cables are routed within separate conduits.
- Provide with protect elements, such as a fuse and/or a circuit protector, in an external power supply for short circuit protection. Use the suitable protect elements for suited rating.



## PROHIBITION

To avoid noise-induced malfunction, do not bundle the 100 VAC/100 VDC wiring and network cable together, but route them at least 100 mm away from each other.

### 3. Operating Precautions



#### REQUIREMENT

The module could fire or fail under heat. When the temperature in the enclosure exceeds 48°C, the maximum output current flowing through the power module is limited. Its current is limited to 5.85 A at 55°C. Allowing for the environment in which the module is installed, install a cooling fan in the enclosure or limit the number of modules installed in it. For more information, refer to “USER’S MANUAL R70 BASIC MODULE (manual number SVE-1-111)” or “USER’S MANUAL BASIC MODULE (manual number SVE-1-100).”



#### DANGER

- If the module emits smoke or foreign odor, immediately switch off the power supply and investigate the problem cause.
- Do not perform any installation, wiring, handling, or internal modification procedures other than stated in this manual. In no event will Hitachi be responsible for personal injury or death or any damage to Hitachi's product or peripheral equipment arising out of the use of such an unauthorized procedure.
- While the power is applied, never touch a terminal strip or connector pin. If you touch a terminal strip or connector pin while the power is applied, you may receive an electric shock.



#### CAUTION

- Before changing the program, generating a forced output, or performing the RUN, STOP, or like procedure during an operation, thoroughly verify the safety because the use of an incorrect procedure may cause equipment damage or other accident.
- When you switch on the power supply, follow the specified sequence. Failure to follow the specified sequence may cause equipment damage or other accident.
- Do not use a transceiver, cellular phone, or similar device near the module because module malfunction or system failure may occur due to noise.
- To avoid malfunction, ensure that the power supply is switched on and off at intervals of longer than 1 second.



## CAUTION

- The contents of the memory may become damaged due, for instance, to a module failure. Be sure to make a backup of important data.
- Before constructing a system, creating a program, or performing a similar procedure, thoroughly read this manual to become familiar with the contained instructions and precautions. If you perform any incorrect procedure, the system may malfunction.
- Store this manual at a predetermined place where it can readily be referred to whenever it is needed.
- If you have any doubt or question about the contents of this manual, contact your local source.
- Hitachi cannot be responsible for accidents or losses resulting from a customer's misuse.
- If the software supplied by Hitachi is modified for use, Hitachi cannot be responsible for accidents or losses resulting from such modification.
- Hitachi cannot be responsible for reliability if you use software other than supplied from Hitachi.
- Back up files on a daily basis. You might lose the contents of files due, for instance, to a file unit failure, power failure during a file access, or operating error. To provide against such contingencies, back up files according to an appropriate plan.
- When this product is to be discarded, ask a qualified industrial waste disposal contractor to properly dispose of it.

## WARRANTY AND SERVICING

Unless a special warranty contract has been arranged, the following warranty is applicable to this product.

### 1. Warranty period and scope

#### Warranty period

The warranty period for this product is for one year after the product has been delivered to the specified delivery site.

#### Scope

If a malfunction should occur during the above warranty period while using this product under normal product specification conditions as described in this manual, please deliver the malfunctioning part of the product to the dealer or Hitachi Engineering & Services Co., Ltd. The malfunctioning part will be replaced or repaired free of charge. If the malfunctioning is shipped, however, the shipment charge and packaging expenses must be paid for by the customer.

This warranty is not applicable if any of the following are true.

- The malfunction was caused by handling or use of the product in a manner not specified in the product specifications.
- The malfunction was caused by a unit other than that which was delivered.
- The malfunction was caused by modifications or repairs made by a vendor other than the vendor that delivered the unit.
- The malfunction was caused by a relay or other consumable which has passed the end of its service life.
- The malfunction was caused by a disaster, natural or otherwise, for which the vendor is not responsible.

The warranty mentioned here means the warranty for the individual product that is delivered. Therefore, we cannot be held responsible for any losses or lost profits that result from the operation of this product or from malfunctions of this product. This warranty is valid only in Japan and is not transferable.

### 2. Range of services

The price of the delivered product does not include on-site servicing fees by engineers. Extra fees will be charged for the following:

- Instruction for installation and adjustments, and witnessing trial operations.
- Inspections, maintenance and adjustments.
- Technical instruction, technical training and training schools.
- Examinations and repairs after the warranty period is concluded.
- Even if the warranty is valid, examination of malfunctions that are caused by reasons outside the above warranty scope.

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This manual provides information for the following hardware product:

<Hardware product>

SYS SW (LQZ700)

<Changes added to this manual>

Description of added changes	Page
Section 5.3, "Replacing Module" is newly added.	5-6

In addition to the above changes, all the unclear descriptions and typographical errors found are also corrected without prior notice.



## PREFACE

Thank you for purchasing the SYS SW module, which is an option for use with the R70 and S10V. This manual, named “USER’S MANUAL OPTION SYS SW,” describes how to use the SYS SW module. For proper use of the SYS SW module, it is requested that you thoroughly read this manual.

The R70 and S10V products are available in two types: standard model and environmentally resistant model. The environmentally resistant model has thicker platings and coatings than those for the standard model.

The model number of the environmentally resistant model is marked by adding the suffix “-Z” to the model number of the standard model.

(Example) Standard model: LQZ700

Environmentally resistant model: LQZ700-Z

This manual is applicable to both the standard model and environmentally resistant models. Although the descriptions contained in this manual are based on the standard model, follow the instructions set forth in this manual for proper use of the product even if you use the environmentally resistant model.

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- All trademarks are the properties of their respective companies.

### <Note for storage capacity calculations>

- Memory capacities and requirements, file sizes and storage requirements, etc. must be calculated according to the formula  $2^n$ . The following examples show the results of such calculations by  $2^n$  (to the right of the equals signs).
  - 1 KB (kilobyte) = 1,024 bytes
  - 1 MB (megabyte) = 1,048,576 bytes
  - 1 GB (gigabyte) = 1,073,741,824 bytes
- As for disk capacities, they must be calculated using the formula  $10^n$ . Listed below are the results of calculating the above example capacities using  $10^n$  in place of  $2^n$ .
  - 1 KB (kilobyte) = 1,000 bytes
  - 1 MB (megabyte) = 1,000<sup>2</sup> bytes
  - 1 GB (gigabyte) = 1,000<sup>3</sup> bytes



## CONTENTS

1	SPECIFICATIONS.....	1-1
1.1	Overview.....	1-2
1.2	Specifications.....	1-3
1.2.1	Module specifications.....	1-3
2	NAMES AND FUNCTIONS OF EACH PART.....	2-1
2.1	Names and Functions of Each Part.....	2-2
3	MOUNTING AND WIRING.....	3-1
3.1	Mount Base.....	3-2
3.2	Mounting the Module.....	3-2
3.3	Ground Wiring.....	3-4
3.4	Wiring.....	3-6
3.4.1	Remote I/O Cable Wiring.....	3-6
3.4.2	SYS SW module wiring.....	3-7
4	USER GUIDE.....	4-1
4.1	User Guide.....	4-2
4.1.1	SYS SW module operations.....	4-2
4.1.2	Startup procedure.....	4-4
4.1.3	Operation procedure at occurrence of an error.....	4-5
5	MAINTENANCE.....	5-1
5.1	Maintenance and Inspection.....	5-2
5.1.1	Periodic check.....	5-2
5.2	Troubleshooting.....	5-3
5.2.1	Procedure.....	5-3
5.2.2	Trouble detection and solution.....	5-4
5.3	Replacing Module.....	5-6
5.3.1	Procedure.....	5-6
5.4	Trouble Report.....	5-7

## FIGURES

Figure 1-1	System Configuration.....	1-2
Figure 3-1	Mounting the SYS SW Module .....	3-2
Figure 3-2	Ground Wiring .....	3-4
Figure 3-3	Remote I/O Cable Wiring .....	3-6
Figure 3-4	SYS SW Module Wiring .....	3-7
Figure 5-1	Troubleshooting Flow .....	5-3

## TABLES

Table 3-1	Mount Bases Applicable to the SYS SW Module .....	3-2
Table 5-1	Maintenance and Inspection Items.....	5-2
Table 5-2	Causes of the Failure in SYS SW Module Operation and Action To Be Taken.....	5-4

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# 1 SPECIFICATIONS

## 1.1 Overview

The SYS SW module (model: LQZ700) is a system changeover module to implement a multi-LPU (simplified duplex) configuration by connecting between two R70 units or S10V units by this module.

A standby duplex system for each unit is configured, and the running system is changed over to the standby system when a fault occurs in the running system.

This changeover is performed by the following causes.

- The PCs OK signal of the LPU has changed from the “ON” status into the “OFF” status.
- The PI/O output “PI/O OK” of the LPU has changed from the “ON” status into the “OFF” status.

This module (LQZ700) is not available for the CPU unit of the S10mini series.

The following figure shows a system configuration.

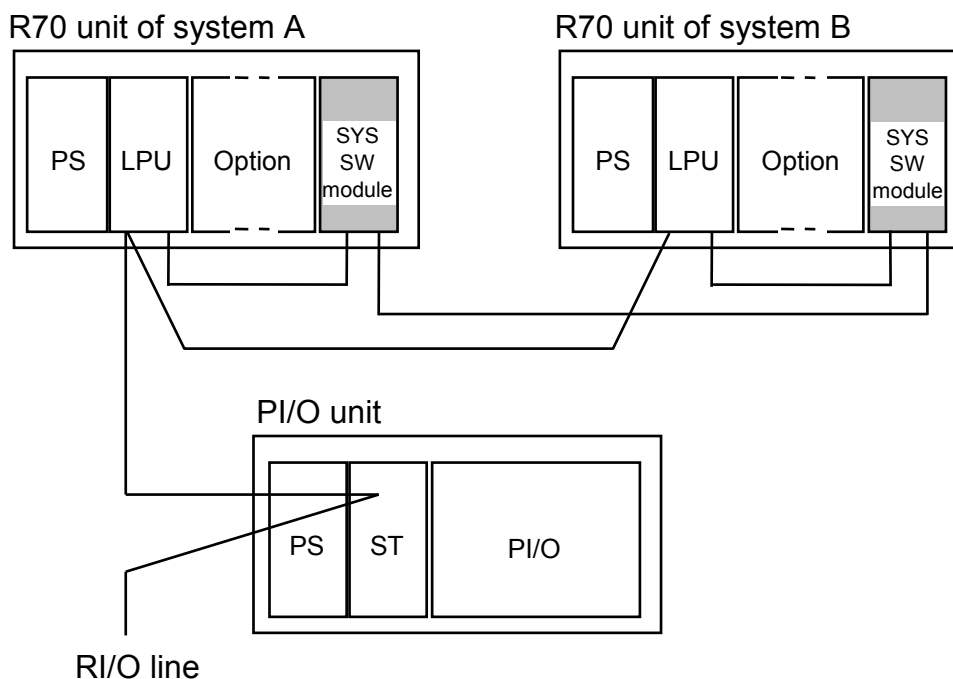


Figure 1-1 System Configuration

## 1.2 Specifications

### 1.2.1 Module specifications

Item	Specifications	
Module name	SYS SW (system switch) module	
Model	LQZ700	
Maximum number of modules mounted	1 module/LPU	
Input section • PCs OK (for PCs OK input of the self-system) • BUSY IN (for BUSY status input of the other system)	Number of inputs	2 inputs
	Input type	Contact input
	Insulation method	Photocoupler insulation
	Rated input voltage	100 VAC (50/60 Hz), 100 VDC
	Rated input current	Approx. 10 mA
	Input voltage range	85 to 121 VAC, 85 to 110 VDC
	ON voltage/current	85 VAC, 85 VDC or more/7.6 mA or more
	OFF voltage/current	12 VAC, 12 VDC or less/2 mA or less
	Input impedance	Approx. 11 k $\Omega$
Response time	25 ms or less	
Output section • BUSY OUT: Contact a (BUSY status output of the self-system) • PI/O OK: Contact a (PI/O OK output of the self-system) • STOP/RUN: Contact b (LPU STOP/RUN output of the self-system)	Number of outputs	Contact a: 2 outputs, Contact b: 1 output
	Output type	Relay output
	Insulation method	Relay insulation
	Rated output	100 VAC/2 A, 100 VDC/0.1 A
	Minimum output	100 VAC, 100 VDC/10 mA
	Maximum output	250 VAC, 125 VDC
	Maximum rush current	5 A, 100 ms or less
	Response time	15 ms or less
	Maximum opening/closing frequency	1,800 times/h
Service life (electrical) of relay	Approx. 70,000 cycles of make-and-break operation (2 A at 100 VAC [COS $\phi$ = 0.4], 2 A at 24 VDC [L/R = 7 ms], make-and-break operation frequency of 1,800 cycles per hour, normal temperature and normal humidity)	
Internal current consumption	150 mA or less	
Dielectric strength	1,500 VAC, for 1 minute (Between all external terminals and grounding)	
External wiring	Connection method	18 terminal block connectors (M3 screws)
	Applicable wire	0.3 to 1.25 mm <sup>2</sup>
	Tightening torque	0.71 to 1.02 N·m
	Allowable cable length	2 m
Mass	230 g	

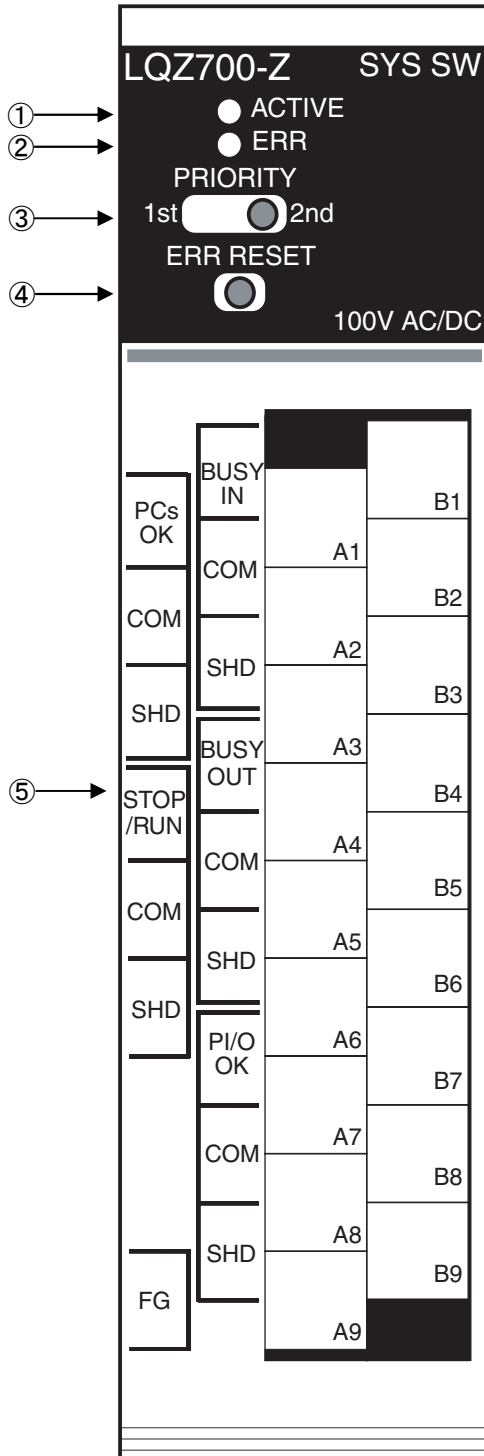
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## **2 NAMES AND FUNCTIONS OF EACH PART**



## 2 NAMES AND FUNCTIONS OF EACH PART

### 2.1 Names and Functions of Each Part



No.	Name	Function
①	ACTIVE LED indicator (green)	Lights up when the self-system LPU is operated as the running system.
②	ERR LED indicator (red)	Lights up as a running system error when the PCs OK signal of the self-system LPU changes from “ON” into “OFF” or the PI/O output “PI/O OK” changes from “ON” into “OFF.” This indicator is caused to go out by operating the “ERR RESET” switch.
③	PRIORITY setting switch	Used to set the priority to determine the LPU units of the running system (1st) and the standby system (2nd) when the power supplies of the units are simultaneously turned on. Perform a different setting for each unit. Do not perform the same setting for both units.
④	ERR RESET setting switch	Used to clear the error status of the self-system LPU. After removing the cause of error, clear the error status by using this switch.
⑤	TB (terminal block)	Used to wire the following signals. This adopts a connector type that permits connection/disconnection. <ul style="list-style-type: none"> <li>• PCs OK input terminal (A1, A2) Connects the PCs OK output of the self-system LPU.</li> <li>• BUSY IN input terminal (B1, B2) Connects the BUSY OUT output of the other system SYS SW.</li> <li>• STOP/RUN output terminal (A4, A5) Connects the ladder STOP/RUN and PI/O STOP inputs of the self-system LPU.</li> <li>• BUSY OUT output terminal (B4, B5) Connects BUSY IN of the other system SYS SW.</li> <li>• PI/O OK output terminal (B7, B8) Connects the PI/O normal output signal of the self-system.</li> <li>• SHD terminal (A3, A6, B3, B6, B9) Connects the shielding wire when the twisted pair cable with shielding is used.</li> <li>• FG terminal (A9) Connects the shielding (SHD) collectively to the FG terminal of the mount base.</li> </ul>

# **3 MOUNTING AND WIRING**

### 3.1 Mount Base

This module can be mounted in the mount bases as shown in Table 3-1.

Table 3-1 Mount Bases Applicable to the SYS SW Module

Series	Name	Model	Specifications
S10V	4-slot mount base	HSC-1540	Power supply + LPU + 4 slots (option, for I/O)
R70, S10V	8-slot mount base	HSC-1580	Power supply + LPU + 8 slots (option, for I/O)

### 3.2 Mounting the Module

Mount the SYS SW module in the final option slot (slot No.3 or 7) of the mount base according to the following items.

- When mounting the module in the 4-slot mount base, mount it in slot No.3.
- When mounting the module in the 8-slot mount base, mount it in slot No.7.

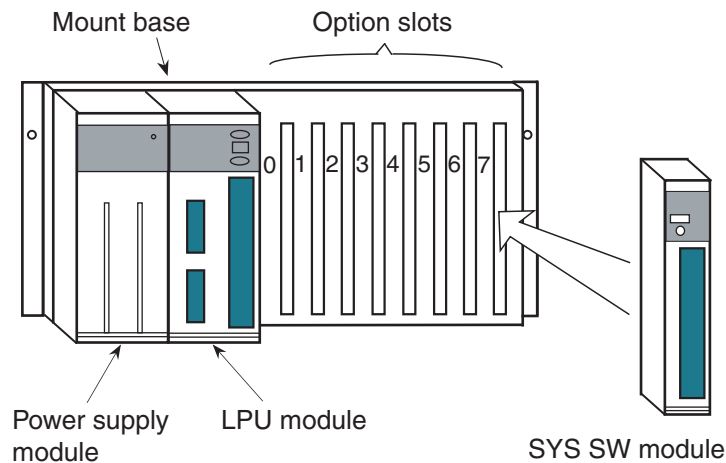
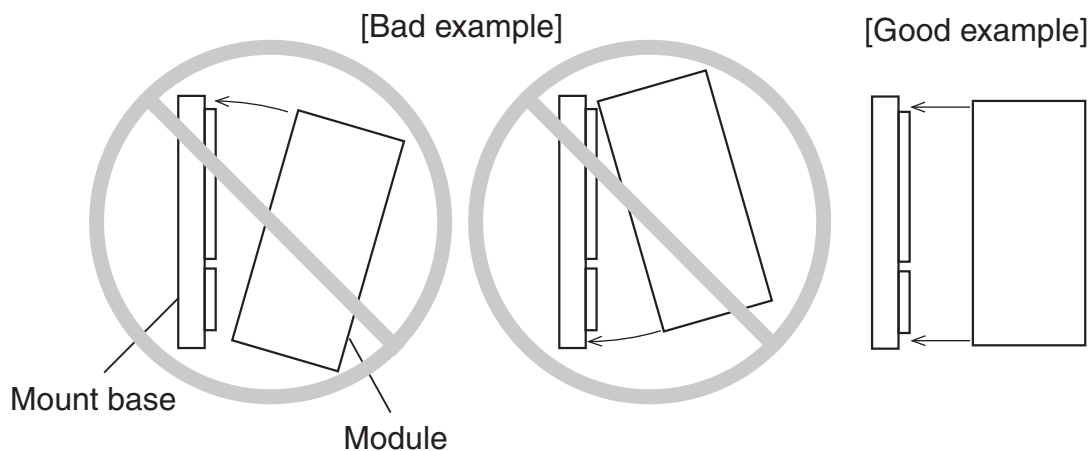


Figure 3-1 Mounting the SYS SW Module

**CAUTION**

- Dust or other foreign matter might accumulate on the connector, resulting in poor contact. Immediately after the module is unpacked, perform the mounting and wiring procedures.
- To prevent the module from being damaged, observe the following precautions when you mount or demount the module:
  - Before mounting the module to the mount base connector, check that the connector pins are properly aligned and not bent, broken, or soiled with dirt or the like.
  - Ensure that the module is parallel to the mount base vertical surface as shown below when mounting. If you connect a module to or disconnect it from its connector while it is tilted, the connector pins may become damaged.
  - If the mount base is positioned overhead due to the employed enclosure structure, use a stepladder or the like and mount the module squarely. If you mount the module obliquely, the connector may become damaged.



#### 3.3 Ground Wiring

Carry out ground wiring as shown in Figure 3-2 by following these steps:

- ① Connect the FG terminals of the power supply module, LPU module and option modules by crossover wiring to the mount base's grounding seat, a hexagon nut fitted to the mount base FG terminal (with a wire diameter of  $2.0 \text{ mm}^2$  or more).
  - The SYS SW module (LQZ700) does not need to have an FG terminal.
  - For information about other option modules, refer to the manuals supplied with the modules. (Some option modules do not have an FG terminal.)
- ② Wire the mount base FG terminal to the PCs unit grounding point of the enclosure in which the mount base is housed (with a wire diameter of  $2.0 \text{ mm}^2$  or more).
- ③ Perform Class D grounding\* from the PCs unit grounding point of the enclosure using a wire with a wire diameter of  $5.5 \text{ mm}^2$  or more.

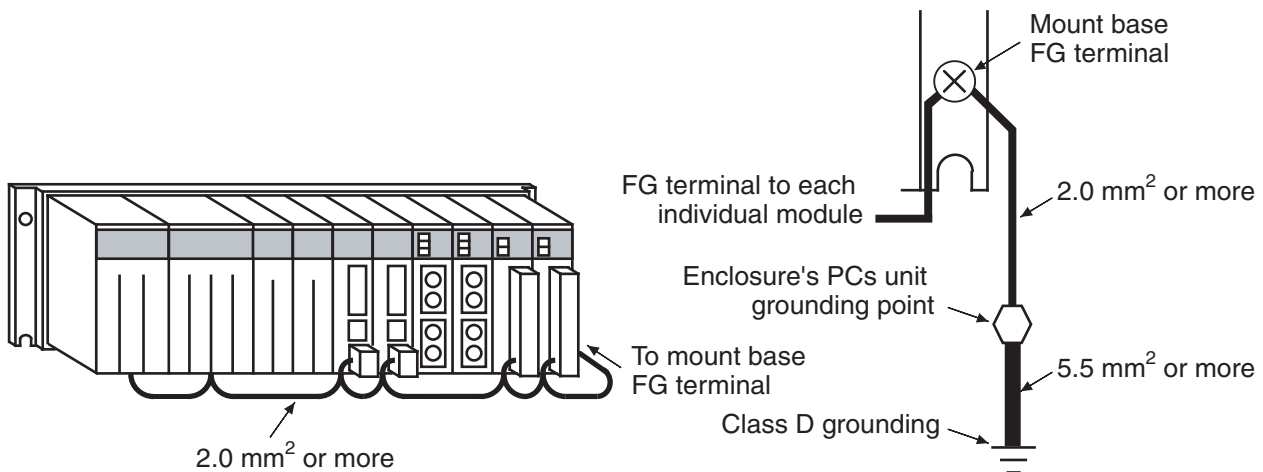


Figure 3-2 Ground Wiring

\* Class D grounding is defined in the Technical Standard for Electrical Facilities of Japan. This standard states that the grounding resistance must be 100 ohms or less for equipment operating on 300 VAC or less, and 500 ohms or less for devices that shut down automatically within 0.5 seconds when shorting occurs in low tension lines.

**DANGER**

- Switch off the power supply before making connections to the terminal block. Making connections with the power supply being switched on may incur electrical shock hazards.
- Electric shock hazards exist so that you might suffer burns or become electrocuted. Further, the system might malfunction due to noise interference. Therefore, ground the line ground (LG), frame ground (FG), and shield wire (SHD).

**REQUIREMENT**

- Insulate the mount base from the enclosure. To keep the mount base insulated, avoid removing the insulation sheets that are supplied with the mount base.
- The LG is a ground terminal for power supply noise. The FG and SHD are ground terminals for the noise in the remote I/O, communication module and other external interface lines. To avoid interference between the ground terminals, separately ground the LG and FG.

3.4 Wiring

3.4.1 Remote I/O Cable Wiring

The SYS SW module is a system changeover system for simplified duplexing of the LPU unit. The remote I/O unit cannot be duplexed. The remote I/O unit is shared. Regarding the remote I/O line, therefore, connect between each LPU unit and the remote I/O station by a remote I/O cable. At this time, be sure to provide a terminating resistor in the units at both ends of the remote I/O line. The connected remote I/O stations must all be used with an output hold setting of “HOLD”.

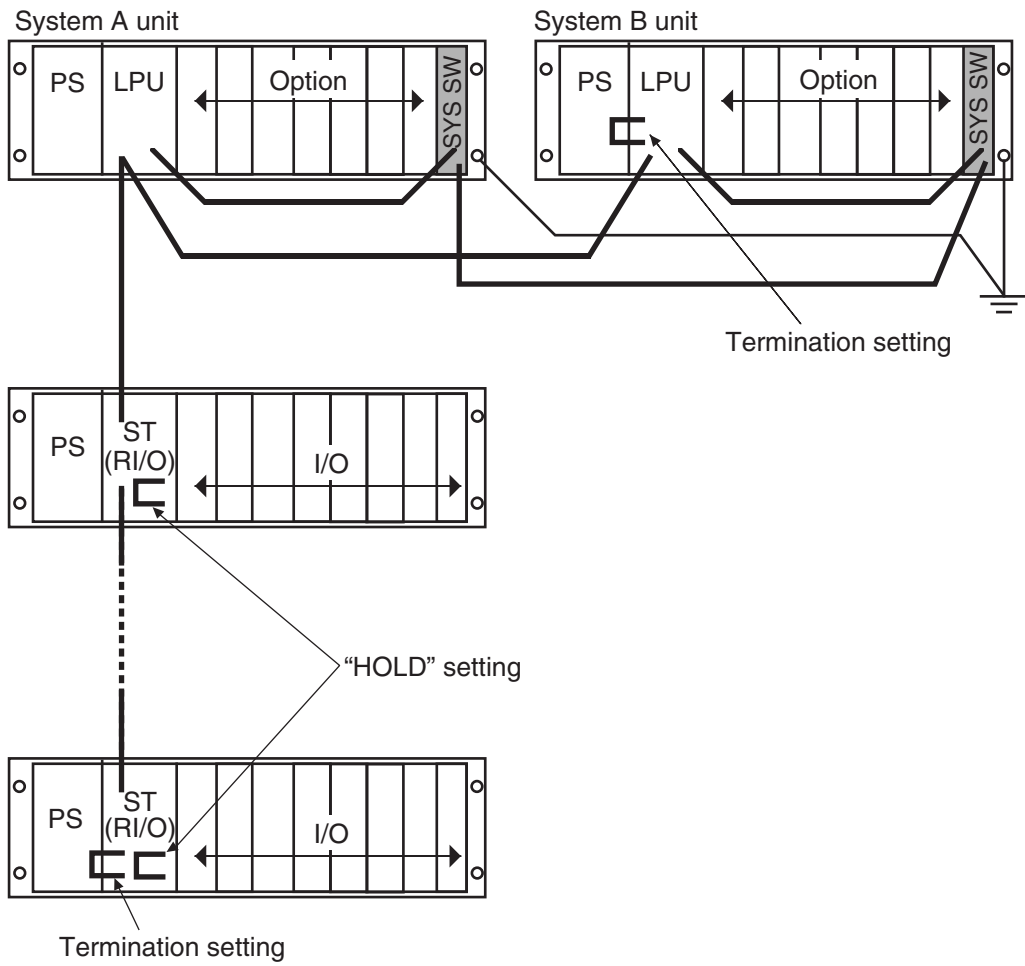


Figure 3-3 Remote I/O Cable Wiring

3.4.2 SYS SW module wiring

Perform wiring between the SYS SW module of each unit and the LPU module and between SYS SW modules as shown in the figure below.

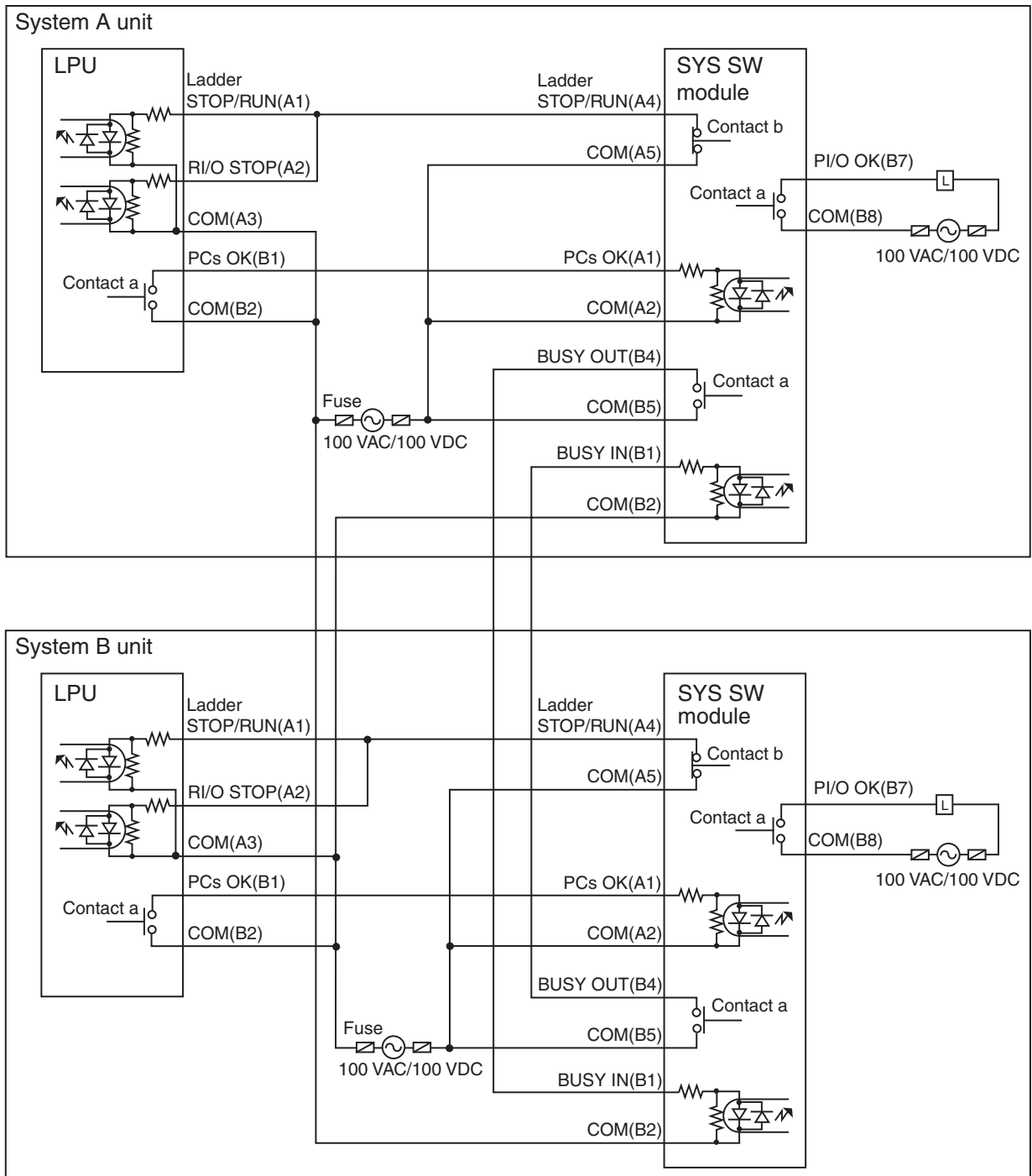


Figure 3-4 SYS SW Module Wiring



### 3 MOUNTING AND WIRING

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#### ■ Circuit protect fuse

To minimize the burn out or breakage failure of wiring of modules and connecting devices, mount a fuse to the power unit according to the table shown below.

Name of the output unit	Fuse rated breaking current	Place in which a fuse is mounted
<ul style="list-style-type: none"><li>• BUSY OUT</li><li>• STOP/RUN</li></ul>	3 A	Mount a fuse to one place of the external power unit In DC power supply use, a fuse is mounted in a plus side, and in the case of AC power supply, fuses are mounted in both sides.
<ul style="list-style-type: none"><li>• PI/O OK</li></ul>	5 A	Mount a fuse to one place of the external power unit In DC power supply use, a fuse is mounted in a plus side, and in the case of AC power supply, fuses are mounted in both sides.



#### REQUIREMENT

Provide with protect elements, such as a fuse and/or a circuit protector, in an external power supply for short circuit protection. Use the suitable protect elements for suited rating.



#### CAUTION

- Connect cables to the TB after the power supplies of the R70 and S10V units and all the connected external power supplies are turned off.
- Check the screws of the TB periodically (every 3 to 6 months) and tighten them so as not to get loose.

# 4 USER GUIDE

### 4.1 User Guide

#### 4.1.1 SYS SW module operations

- Only the R70 (S10V) unit is duplexed in a simplified configuration but the PI/O unit is not duplexed in simplified configuration. (The PI/O unit is shared.)
- The SYS SW module mounted in each R70 (S10V) unit monitors the execution commands of the opposite LPU to exert LPU control (LPU STOP/RUN).
- When one unit is operated as the running system (LPU RUN and PI/O access enabled), the other is the standby system (LPU STOP and PI/O access disabled).
- When the running system has broken down or the “LADDER” switch of the running system LPU is operated from RUN to STOP, the standby system goes to the running system promptly.
- If a connected remote I/O station is used with an output hold setting of “RESET”, the outputs of its PI/O modules may be cleared when switching occurs from the running system to the standby system. To avoid this, be sure to use all the connected remote I/O stations with an output hold setting of “HOLD”, which can be made by shorting across the HOLD(A3) and COM(A2) terminals on the terminal block.
- At a startup, the side of which the power supply has been turned on earlier becomes the running system (on a first-come-first-served basis).

If the power supplies of both sides are simultaneously turned on, the side that is previously set to “1st” by the “PRIORITY” switch becomes the running system.

1st: When the power supplies are turned on with the same timing, the module set to “1st” becomes the running system.

2nd: When the power supplies are turned on with the same timing and yet the SYS SW module set to “1st” is faulty, the module set to “2nd” becomes the running system.

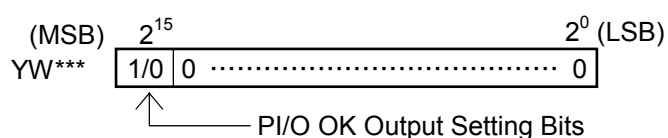
- When the running system has broken down or stopped due to a fault, a SYS SW module error occurs. The “ERR” LED comes on and the module is changed over to the standby system. This error status is kept without a changeover to the running system until the cause of the error is removed and the “ERR RESET” switch is pressed.

The SYS SW module detects an error in the following conditions.

- The PCs OK signal of the LPU has changed from the “ON” status into the “OFF” status.
- The PI/O output “PI/O OK” of the LPU has changed from the “ON” status into the “OFF” status.

(Note) The SYS SW module is not provided with a backup function at a blackout. If a blackout/power recovery is performed when one side or both sides are faulty, the faulty status holding function is cleared, so the LPU of the error system may become the running system.

- The PI/O OK output signal is output to the PI/O output (area Y) by an application such as ladder. The detailed contents are as follows.



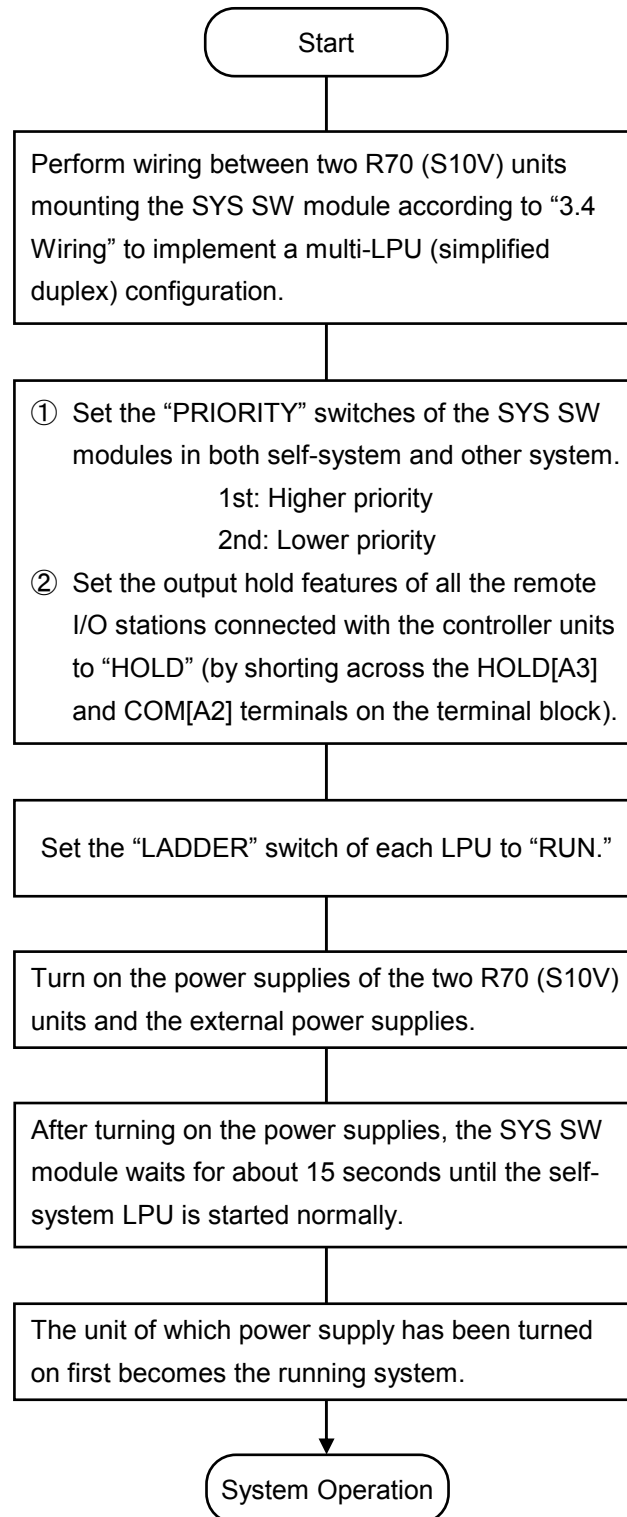
(Example) When the SYS SW module is mounted in slot No.7 of the 8-slot mount base (slots 0 to 7) and 16 outputs are set, the PI/O OK output signal is output to “Y070”.

(Note) When using the PI/O OK output, be sure to set the LPU to “PI/O mounting.”

For details, refer to “USER’S MANUAL R70 BASIC MODULE (manual number SVE-1-111)” or “USER’S MANUAL BASIC MODULE (manual number SVE-1-100).”

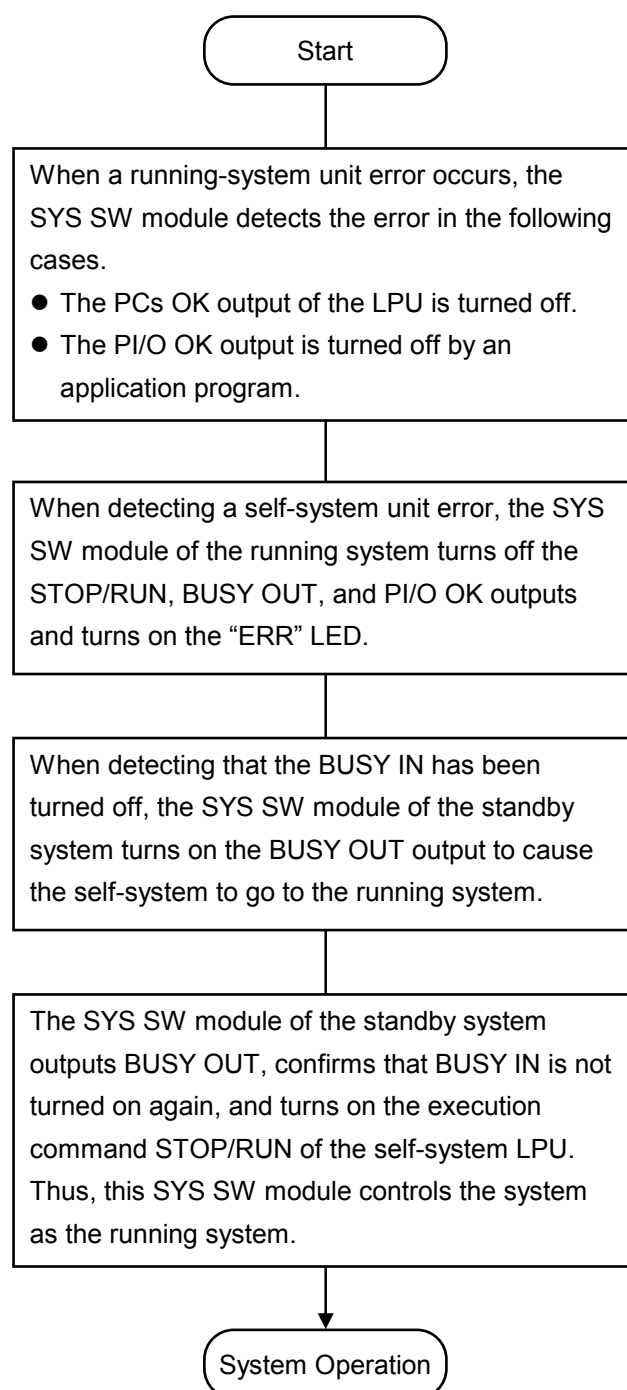
### 4.1.2 Startup procedure

The startup procedure for the SYS SW module is as follows.



### 4.1.3 Operation procedure at occurrence of an error

When a SYS SW module error occurs, the operation procedure is as follows.



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# 5 MAINTENANCE




5.1 Maintenance and Inspection

5.1.1 Periodic check

To keep the module running in optimal condition, it requires checks. Make checks daily or periodically (twice a year or more often).

Table 5-1 Maintenance and Inspection Items

Item	Point to check
Module appearance	Check the module case for cracks, flaws and other defects. Such defects can be a sign of breakage in the internal circuitry, causing the system to malfunction.
LED	Check to see if the module ERR LED has not glowed.
Looseness of mounting screws	Check the module and communications cable mounting screws for tightness. Give additional tightening to screws found loose. Loose screws could cause the system to malfunction and lead to burnouts after heating.
Cable sheath condition	Check cable coverings for defects. A cable covering out of position could cause the system to malfunction, incur electrical shock hazards, or develop short circuits, resulting in burnouts.
Dust sticking condition	Check to see if the module has not caught dust. If dust is noticed, remove it with a vacuum cleaner or other apparatus. Dust could cause short circuits in its internal circuitry, resulting in burnouts.
Module replacement	Replacing the module without switching it off could cause damage to its hardware and software. Before replacing the module, switch it off first.
Connector condition	Connectors might have their characteristics degraded to cause failures if their contacts catch dust or foreign matter. Cover connectors out of use with the protective cap supplied.

 <b>DANGER</b>
<ul style="list-style-type: none"> <li>● Static electricity may damage the module. Before starting the work, discharge all electrostatic charge from your body.</li> <li>● Before replacing the module, switch it off to avoid electrical shock hazards and also to prevent it from being damaged or malfunctioning.</li> </ul>

## 5.2 Troubleshooting

### 5.2.1 Procedure

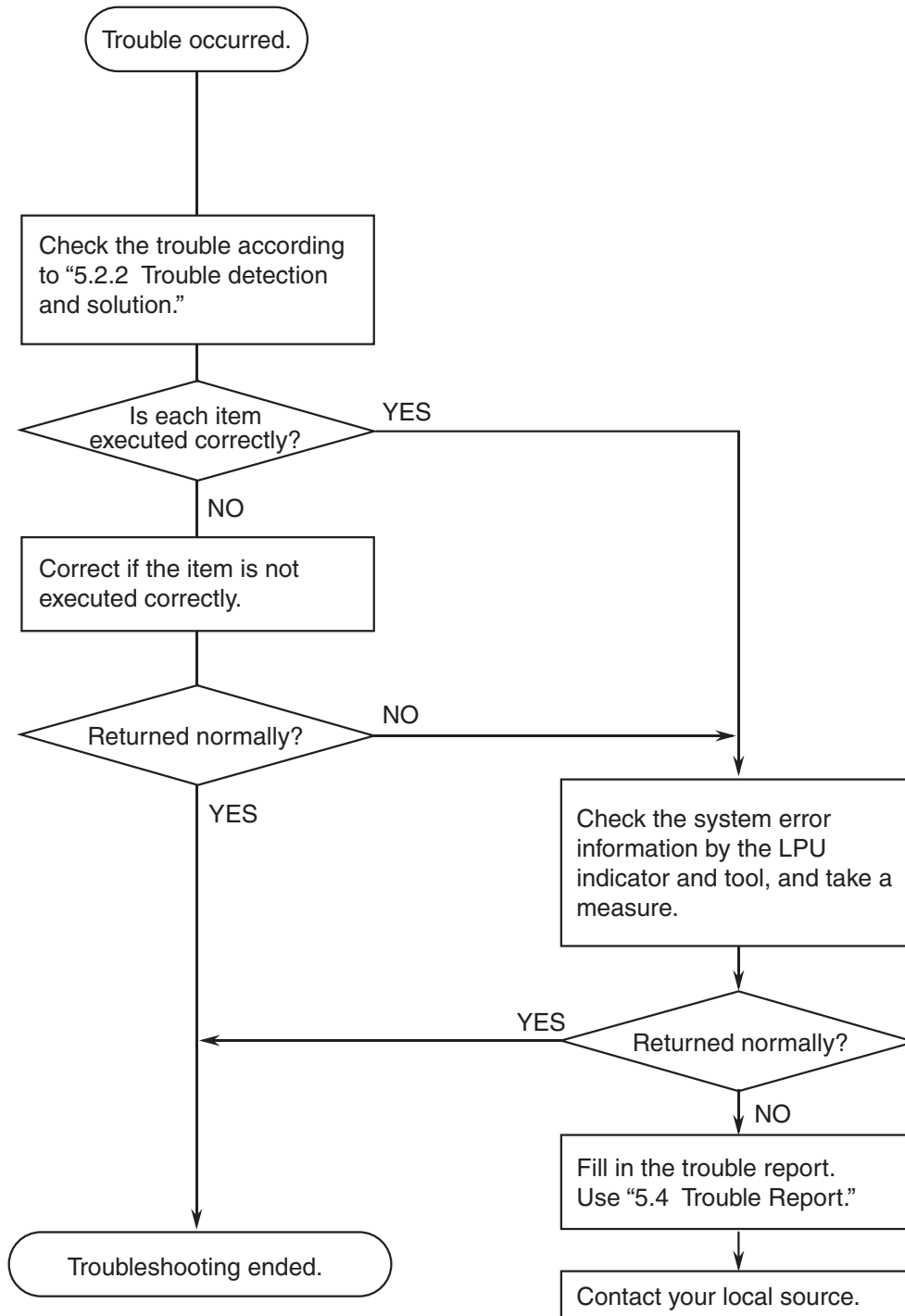


Figure 5-1 Troubleshooting Flow

## 5 MAINTENANCE

### 5.2.2 Trouble detection and solution

(1) Causes of the failure in SYS SW module operation

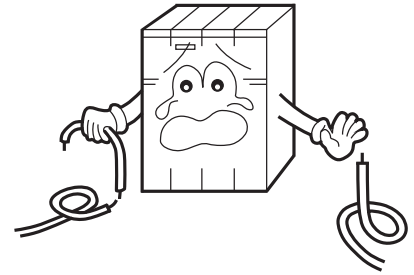
The causes of the failure in SYS SW module operation are as follows. When one of these causes is applicable to the case, take a measure according to Action.

Table 5-2 Causes of the Failure in SYS SW Module Operation and Action To Be Taken

Cause of failure in operation	Action
The ERR LED comes on.	<ul style="list-style-type: none"> <li>• The external power supply (100 VAC (50/60 Hz) or 100 VDC) is not connected correctly. According to “3.4 Wiring,” connect it correctly.</li> <li>• Wiring is not performed correctly. According to “3.4 Wiring,” perform wiring correctly.</li> <li>• The ladder program run switch “LADDER” of the LPU is not set to “RUN.” Set the ladder program run switch “LADDER” to “RUN.”</li> <li>• The “PI/O OK signal” of the PI/O output has changed from ON into OFF. Find out the cause of OFF and take a measure. (See “The PI/O OK output has changed from ON into OFF” in the following field.)</li> <li>• The LPU is faulty. (PCs OK is not output.) Investigate the LPU status and take a measure.</li> </ul>
The PI/O OK output has changed from “ON” into “OFF.” (The ERR LED comes on, too.)	<ul style="list-style-type: none"> <li>• The LPU is faulty. Investigate the LPU status and take a measure.</li> <li>• Application error. Find out the cause of the application that turns off PI/O OK and take a measure. (If PI/O OK has not been turned on yet, this is not applicable to the case.)</li> </ul>
The ERR LEDs of both systems A and B blink.	<ul style="list-style-type: none"> <li>• The PRIORITY setting switches of both systems A and B are set to “1st.” Set one of them to “2nd.”</li> </ul>
Though the running system has broken down, it is not changed over to the standby system.	<ul style="list-style-type: none"> <li>• The external power supply (100 VAC (50/60 Hz) or 100 VDC) is not connected correctly. Connect it correctly according to “3.4 Wiring.”</li> <li>• Wiring is not performed correctly. Perform wiring correctly according to “3.4 Wiring.”</li> <li>• The LPU is faulty. (PCs OK is not output.) Investigate the LPU status and take a measure.</li> </ul>

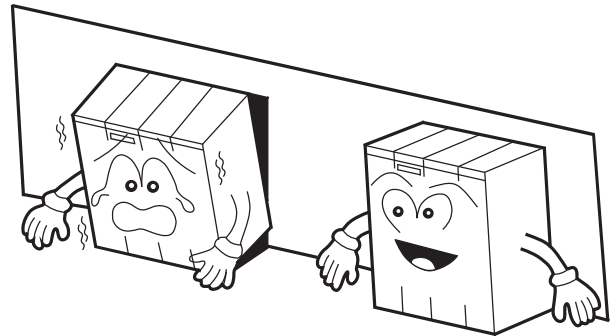
## (2) Is the cabling correctly?

Check cables for disconnection or incorrect connection.



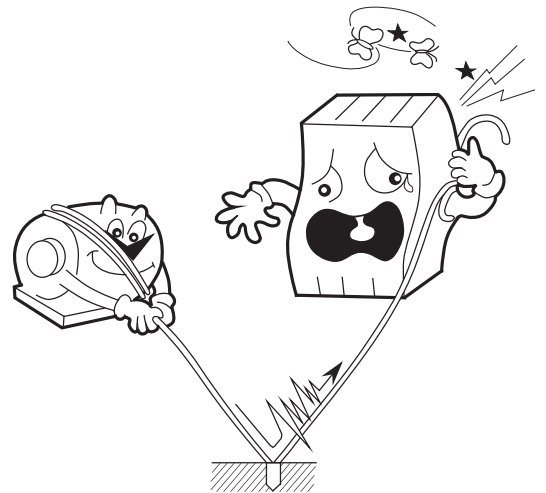
## (3) Are the modules mounted correctly?

Check if the SYS SW module is mounted at the correct position or if any setscrew is not loose.



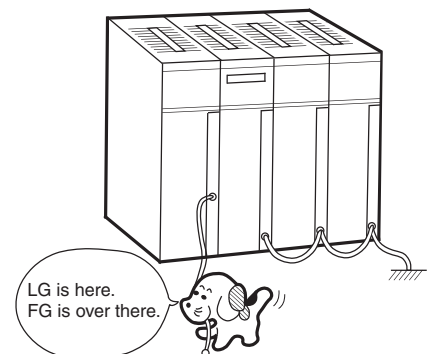
## (4) Is grounding correctly?

- Do not ground the SYS SW module in the same place where high-voltage equipment is grounded. They must be grounded in separate places.
- Perform grounding work conforming to Class D grounding or higher.



## (5) Are LG and FG separated?

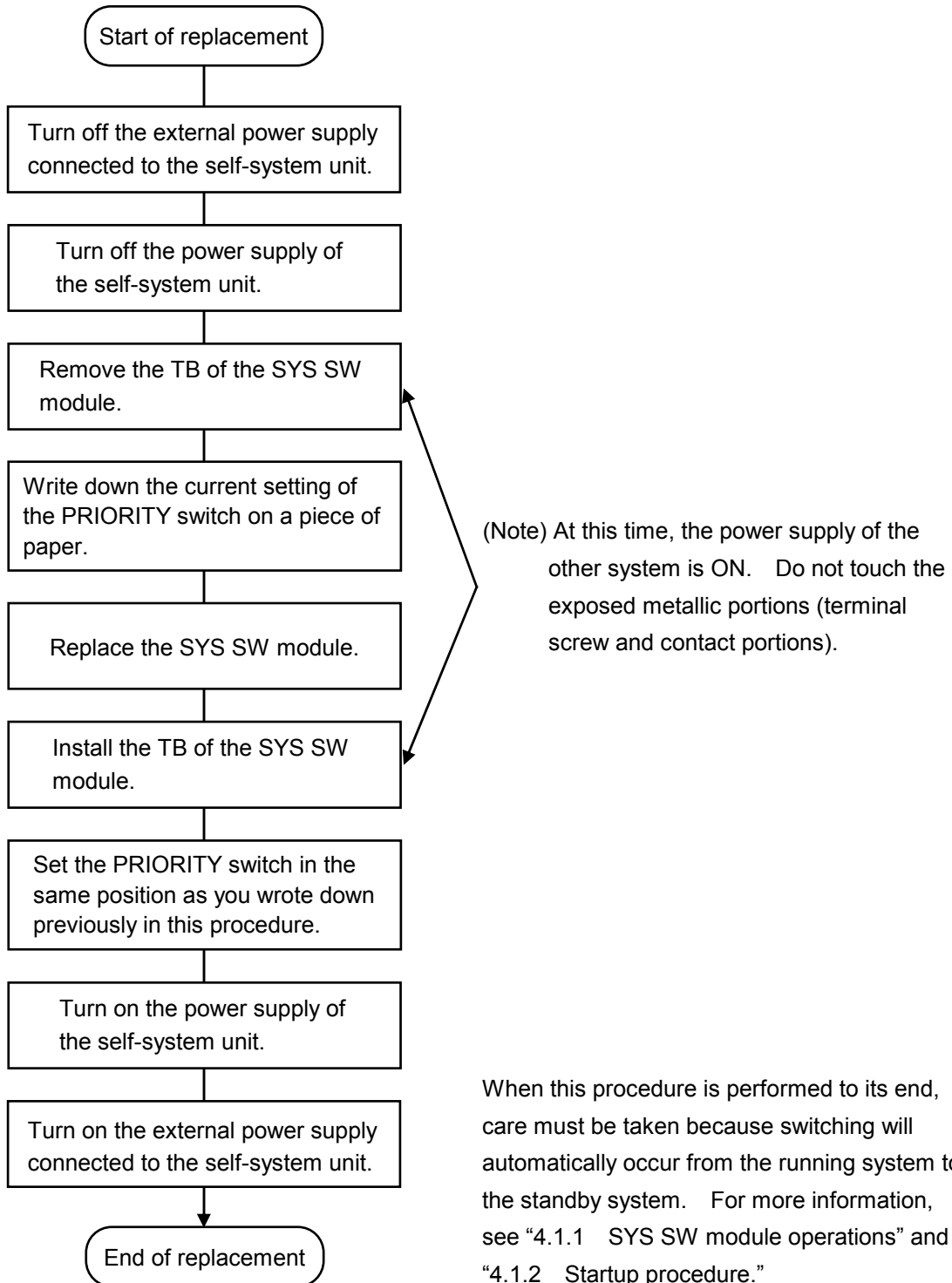
- Be sure to separate the LG from the FG or vice versa because power noise enters the FG via the LG. Failure to observe this rule may result in an equipment malfunction.
- Ground the LG at the power supply side.



### 5.3 Replacing Module

#### 5.3.1 Procedure

The procedure for replacing the SYS SW module is as follows.



## 5.4 Trouble Report

Fill out this form and submit it to local source.

Your company name				Person in charge		
Data and time of occurrence	(year / month / day / hour / minute)					
Where to make contact	Address					
	Telephone					
	FAX					
	E-mail					
Model of defective module				LPU model		
OS	Ver.	Rev.	Program name:		Ver.	Rev.
Support program			Program name:		Ver.	Rev.
Symptom of defect						
Connection load	Type					
	Model					
	Wiring state					
System configuration and switch setting						
Space for correspondence						

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