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Honeywell Process Solutions

Pnet Remote I/F Module
2MLL-PSRA
User's Guide

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About This Document

This document describes the product specification, performance and operation method needed to use PLC system composed of Pnet remote I/F module.

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References

The following list identifies all documents that may be source of reference for material discussed in this publication.

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SoftMaster User's Guide

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Symbol Definitions

The following table lists the symbols used in this document to denote certain conditions.

Symbol	Definition
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user, often in terms of performing a task.
	REFERENCE -EXTERNAL: Identifies an additional source of information outside of the bookset.
	REFERENCE - INTERNAL: Identifies an additional source of information within the bookset.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. CAUTION symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death. WARNING symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	WARNING, Risk of electrical shock: Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.

Symbol	Definition
	<p>ESD HAZARD: Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.</p>
	<p>Protective Earth (PE) terminal: Provided for connection of the protective earth (green or green/yellow) supply system conductor.</p>
	<p>Functional earth terminal: Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.</p>
	<p>Earth Ground: Functional earth connection. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.</p>
	<p>Chassis Ground: Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.</p>

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1. Introduction

1.1 Overview

This user's guide describes the specifications, handling, and programming of the 2MLL-PSRA Pnet remote I/F module.

1.2 Features

The characteristics of Pnet remote I/F module are as follows:

- Product design based on International Electrotechnical Commission (IEC 61131)
 - Easy support to programming device
 - Standard language (IEC 61131-3) provided (IL/LD/SFC)
- Supports International standard communication protocol based on open network.
- Communicates with the remote master module.
- Sets maximum 99 stations.
- Enables to save the cost for installation and maintenance.
- System configuration is simple for maintenance and repair.
- Compatible with third party's product.
- Easy to set the system by hardware station address setting.
- Supports various I/O like:
 - DC input 8/16/32/64 points, TR output 16/32/64 points, Relay output 8/16 points
 - Combined 32 point (DC input 16 point/ TR output 16 point)
 - Various special modules such as AD (analog input)/DA (analog voltage)/DC (analog current output)/RTD (Resistor temperature detector)/TC (Thermocouple)
- Easy to configure the system.
- Provides the online network status detection function.
 - Detects the remote module status through High-speed Link monitor.

1. Introduction
1.2. Features

- Verifies diverse modules instantly.
- High-speed communication.
- Flexible communication relation is available as the speed is set automatically according to the speed of master.
- Hot-Swap function available.
 - Module can be changed during the RUN mode. Operation of all I/O modules, except the module under change, is normal.
 - Before the module change, it communicates to BPMC about the module change using switch manipulation.
 - After the module change, restores the mode switch.
 - You can check the invalid module installation and replacement through operation of M_CHECK, M_CLO/SE at BPMC I/F program.

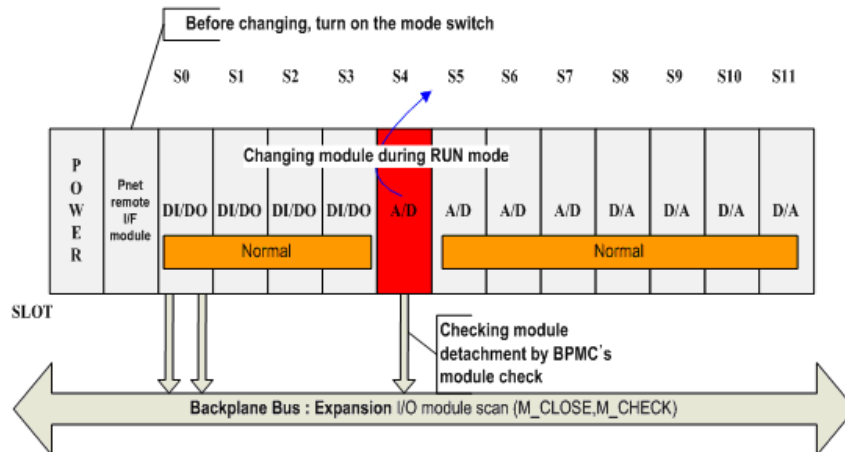


Figure 1 – Hot swap function

1.3 Product configuration

Digital I/O module

The following table displays the product configuration of digital I/O module.

Table 1 – Product configuration of digital I/O module

Name	Model	Contents
Digital input module	2MLI-D21A	DC 24V input, 8 points (current source / sink input)
	2MLI-D22A	DC 24V input, 16 points (current source / sink input)
	2MLI-D24A	DC 24V input, 32 points (current source / sink input)
	2MLI-D28A	DC 24V input, 64 points (current source / sink input)
	2MLI-D22B	DC 24V input, 16 points (current source input)
	2MLI-D24B	DC 24V input, 32 points (current source input)
	2MLI-D28B	DC 24V input, 64 points (current source input)
	2MLI-A12A	AC 110V input, 16 points
	2MLI-A21A	AC 220V input, 8 points
Digital output module	2MLQ-RY1A	Relay output, 8 points (2A, single COM)
	2MLQ-RY2A	Relay output, 16 points (2A)
	2MLQ-RY2B	Relay output, 16 points (2A), Varistor added
	2MLQ-TR2A	TR output, 16 points (0.5A, sink output)
	2MLQ-TR4A	TR output, 32 points (0.1A, sink output)
	2MLQ-TR8A	TR output, 64 points (0.1A, sink output)
	2MLQ-TR2B	TR output 16 points (0.5A, source output)
	2MLQ-TR4B	TR output 32 points (0.1A, source output)
	2MLQ-TR8B	TR output 64 points (0.1A, source output)
	2MLQ-SS2A	Triac output, 16 points (1A)
Dustproof module	2MLT-DMMA	Dustproof module for unused slot

1. Introduction

1.3. Product configuration

Analog I/O module

The following table displays the product configuration of analog I/O module.

Table 2 – Product configuration of analog I/O module

Name		Model	Contents
Special module	Analog input module	2MLF-AV8A	Voltage input: 8 channels
		2MLF-AC8A	Current input: 8 channels
		2MLF-AD8A	Voltage/Current input: 8 channels
		2MLF-AD4S	Voltage/Current input: 4 channels, Isolation between channels
		2MLF-AD16A	Voltage/Current input: 16 channels
	Analog output module	2MLF-DV4A	Voltage output: 4 channels DC 1 ~ 5V / 0 ~ 5V / 0 ~ 10V / -10 ~ +10V
		2MLF-DC4A	Current output: 4 channels DC 4 ~ 20mA / 0 ~ 20mA
		2MLF-DC4S	Current output: 4 channels, Isolation between channels
		2MLF-DV8A	Voltage output: 8 channels DC 1 ~ 5V / 0 ~ 5V / 0 ~ 10V / -10 ~ +10V
		2MLF-DC8A	Current output: 8 channels DC 4 ~ 20mA / 0 ~ 20mA
	Thermocouple input	2MLF-TC4S	T/C input, 4 channels, Isolation between channels
	RTD input module	2MLF-RD4A	RTD input, 4 channels

2. Product Specifications

2.1 General specification

The following lists the general specifications of Pnet remote I/F module.

Table 3 – General specifications of Pnet remote I/F module

Items	Specifications			Related standards
Ambient temperature	0 ~ 55 °C			
Storage temperature	-25 ~ +70 °C			
Ambient humidity	5 ~ 95%RH (Non-condensing)			
Storage humidity	5 ~ 95%RH (Non-condensing)			
Vibration resistance	Occasional vibration			-
	Frequency	Acceleration	Amplitude	times
	10 ≤ f < 57Hz	-	0.075mm	Ten times in each directions (X, Y, and Z)
	57 ≤ f ≤ 150Hz	9.8m/s ² (1G)	-	
	Continuous vibration			
	Frequency	Acceleration	Amplitude	
	10 ≤ f < 57Hz	-	0.035mm	
	57 ≤ f ≤ 150Hz	4.9m/s ² (0.5G)	-	
Shock resistance			IEC61131-2	
<ul style="list-style-type: none"> Peak acceleration: 147 m/s² (15G) Duration: 11ms Half-sine, 3 times each direction per each axis 			IEC61131-2	

2. Product Specifications

2.2. Pnet remote I/F module specification

Items	Specifications				Related standards
Noise resistance	Square wave Impulse noise	±1,500 V			Honeywell standard
	Electrostatic discharge	4kV (Contact discharge)			IEC61131-2, IEC61000-4-2
	Radiated electromagnetic field noise	80 ~ 1,000 MHz, 10V/m			IEC61131-2, IEC61000-4-3
	Fast transient/burst noise	Segment	Power supply module	Digital/analog input/output communication interface	
Voltage		2kV	1kV		
Environment	Free from corrosive gasses and excessive dust				
Altitude	Up to 2,000 ms				
Pollution degree	2 or less				
Cooling	Air-cooling				



ATTENTION

- IEC (International Electrotechnical Commission): An international non-governmental organization, which promotes internationally accepted standardization in electric/electronic field, publishes international standards, and manages applicable estimation system.
- Pollution degree: An index indicating pollution degree of the operating environment, which decides the Isolation performance of the devices. For instance, Pollution degree 2 indicates the state generally that only non-conductive pollution occurs. However, due to the dew produced, this state contains temporary conduction.

2.2 Pnet remote I/F module specification

The following table lists the communication specifications of Pnet remote I/F module.

Table 4 – Communication specifications of Pnet remote I/F module

Items		Specifications				
Standard		EN50170 / DIN 19245				
Interface		RS-485 (electric)				
Media access		Polling				
Topology		Bus method				
Amplitude method		NRZ				
Communication interface		Auto baud rate				
Master/Slave		Slave				
Maximum station count per network		100 stations (including master and repeater)				
Maximum station count per segment		32 stations (including master and repeater)				
Cable		Twisted shielded cable				
Maximum communication data size		TX/RX each 244 byte				
I/O parameter setting		After writing I/O parameter using expansion adapter, download through USB				
Communication speed and distance	Speed (kbps)	9.6	19.2	93.75	187.5	500
	Distance (m)	1200	1200	1200	1000	400
	Speed (kbps)	1500	3000	6000	12000	-
	Distance (m)	200	100	100	100	-
Maximum node count		100 stations (setting range: 0 ~ 99)				
Maximum expansion module installation count		12 modules				

2. Product Specifications

2.3. Profibus-DP cable specification

Items	Specifications
Maximum digital I/O points	768 points (Input Maximum 768 points/output Maximum 768 points, 64-point module x 12 slots)
Maximum analog I/O channels	Input max 122 channels (Maximum TRX 244 byte/2) Output Maximum 96 channels (8 channels X 12 slots) - 1 word per channel
Internal consumption current (mA)	600
Weight (g)	114



ATTENTION

For more information on how to write the parameter of special module and I/O module through expansion adapter, refer to SoftMaster and special module manual.

2.3 Profibus-DP cable specification

Cable specification

The following table lists the Profibus-DP cable specification.

Table 5 – Profibus-DP cable specification

Classification	Contents	
Cable	BELDEN cable: Product name : 3077F, 3079A Tomas cable: Product name : Profibus-DP UNITRONIC-BUS L2/FIP/BUS	
AWG	22	
Type	BC (Bare copper)	
Isolation	PE (Polyethylene)	
Isolation intensity	0.035 (inch)	

Classification	Contents	
Shield	Aluminum Foil-Polyester Tape /Braid Shield	
Capacity	8500 pF/ft	
Characteristic impedance	150 Ω	
Core count	2 Core	

Connector's structure and connector wire method

- Input wire: green wire is connected to A1; red wire is connected to B1.
- Output wire: green wire is connected to A2; red wire is connected to B2.
- Shield is connected to connector's clamp.
- When installing the connector in terminal, connect the cable to A1 and B1.

The following figure displays the connector's structure.

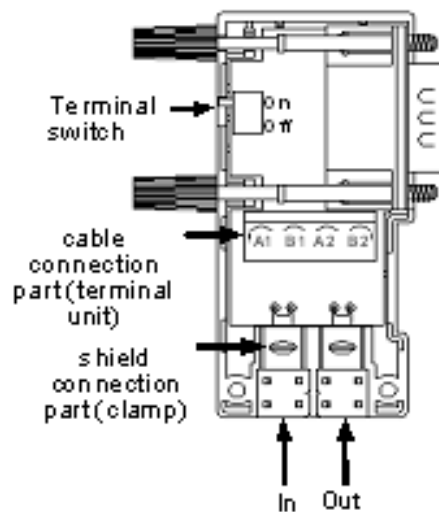


Figure 2 – Connector's structure

2. Product Specifications

2.3. Profibus-DP cable specification

The following figure displays the cable structure.

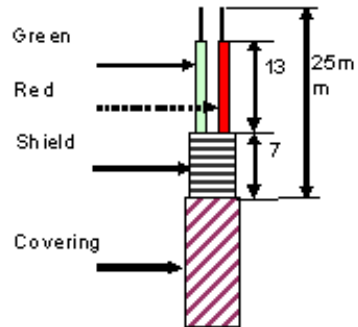


Figure 3 – Cable structure

The following figure displays the wire connection method.

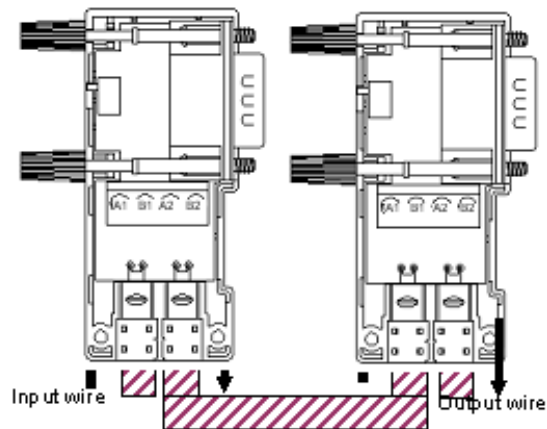


Figure 4 – Wire connection method

2.4 Pnet Terminating

The following figure displays Pnet termination.

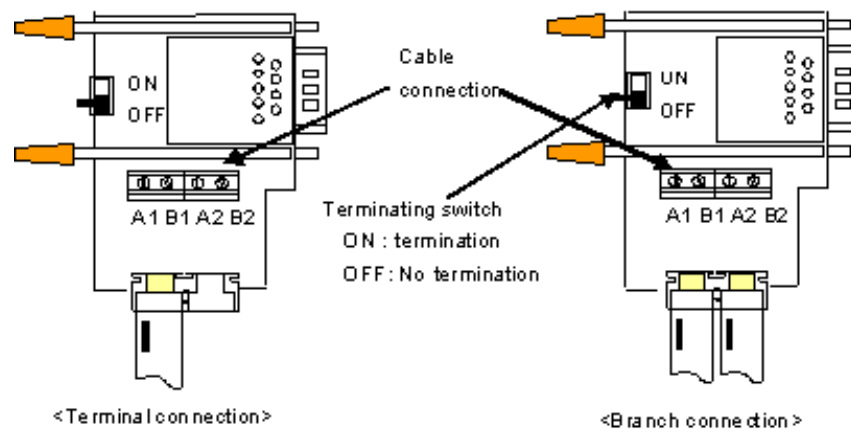


Figure 5 – Pnet termination

2. Product Specifications
2.4. Pnet Terminating

3. Installation and wiring

3.1 Installation

Installation environment

The 2MLL-PSRA module has high reliability regardless of their installation environment. The following factors ensure the system reliability and stability.

1. Environmental prerequisites

Avoid installing the module in places where it is subjected or exposed to:

- a) Water leakage and dust.
- b) Continuous shocks or vibrations.
- c) Direct sunlight.
- d) Dew condensation due to rapid temperature change.
- e) Temperature outside the range of 0 to 55°C.
- f) Relative humidity outside the range of 5 ~ 95%.
- g) Corrosive gas or combustible gas.

2. Installation guidelines

- a) Ensure that no external materials like wire scraps enter the upper part of the PLC during drilling or wiring.
- b) Ensure to install PLC in a location where it is easy for monitoring and use.
- c) Ensure that PLC is not located on the same panel where high voltage equipment is located.
- d) Ensure that the distance from the walls of duct to external equipment is 50mm or more.
- e) Ensure that the PLC is properly grounded to the locations that have good ambient noise immunity.

3. Installation and wiring

3.1. Installation

Precautions during installation of Profibus-DP module

Profibus-DP Smart I/O module can set maximum 126 stations (including master). However, for 2MLL-PSRA, station number 0~99 is available.

The following precautions must be taken during the installation of the 2MLL-PSRA module.

1. Verify the basic factors necessary for the system configuration and select the proper communication module.
2. Prepare the cable and accessories such as tab, terminal resistance, and so on to be used for this communication.
3. The station number of all other stations including this module should be different. If it is connected with more than one station number, it may cause the communication error.
4. In case of operating with normal communication, the mode switch of master module should be at RUN mode.
5. For communication cable, the designated standard cable should be used. If not, it may cause significant communication obstacle.
6. Before installation, verify if the communication cable is cut off or short-circuited.
7. Tighten the communication cable connector completely and fix the cable connection tightly. If the cable connection is not complete, it may cause significant communication obstacle.
8. If the communication cable is twisted or if the cable is not connected properly, it may cause communication error.
9. In case of connecting the long distance communication cable, the wiring should be far from the power line or inductive noise.
10. Do not remove the PCB from its case. It can result in damage or an abnormal operation.
11. If LED action is abnormal, refer to section Troubleshooting for causes.
12. Install the Profibus-DP module when the status of PLC power is 'OFF'.

Precautions while handling the product

The following precautions must be taken while handling the product.

1. Recheck the I/O standard specification: Apply input voltage and output voltage as per standard specification. If the voltage exceeds the maximum capacity, it may cause failure, breakage, and fire.
2. Selection of wire: Select the wire considering the ambient temperature and allowable current. The minimum cable specification of the wire should be AWG24 (0.18mm²).
3. Environment: If the I/O wiring is close to a heat generating machine or material, or if the wiring is in direct contact with oil for a long time, it may cause short-circuit, breakage, and failure.
4. Polarity: Check the polarity before applying power to the terminal block. Do not wire the AC input power to the 24V DC external power supply terminal that is located on the edge of the basic unit input part. In case of DeviceNet, if you provide 24V power to the communication cable, then it is not necessary to wire separately.
5. Wiring
 - a) When wiring the I/O line with high voltage cable and the power cable together, induction obstacle occurs, and it may cause the failure and malfunction.
 - b) Do not pass the cable in front of I/O action indication part (LED). (Because it prevents from distinguishing the I/O indication.)
 - c) In case the inductive load is connected to the output part, connect the surge killer or diode to the load in parallel. Connect the cathode of the diode to the '+' side of the power.

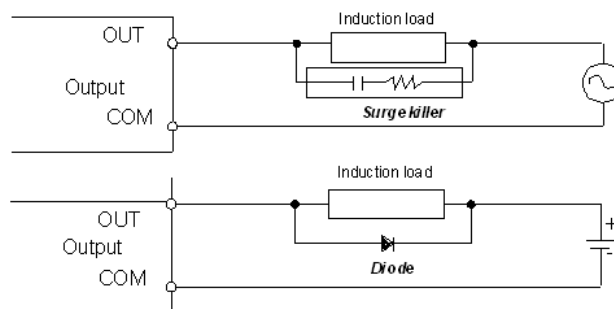


Figure 6 – Wiring the I/O line

3. Installation and wiring

3.1. Installation

6. Terminal block: Ensure that no external materials like wire scraps enter the upper part of the PLC while wiring the terminal block or while drilling a screw hole. It may cause malfunction and failure.

Precautions in attaching the PLC

The following precautions must be taken in attaching the PLC to the control panel.

1. Sufficient distance is required between well-ventilated room and PLC. It facilitates the exchange of the basic unit and the extended module. Maintain a distance of 100mm between the left side of the basic unit and the control panel. This distance is necessary for the exchange of battery, which is done once in three year.
2. To maximize the radiation effect, install PLC to the control panel as shown in the following figure.

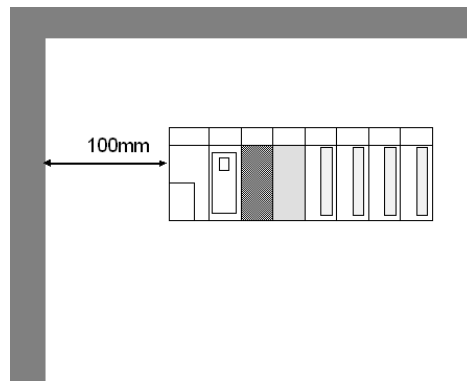


Figure 7 – Installing PLC to control panel

3. Use a different panel for large sized electronic contactor or the vibration source such as no-fuse breaker and install PLC separately.

4. Install the duct for wiring if necessary. But, if the distance between upper part or lower part of PLC and duct is smaller than the below figure, then you should consider the following:

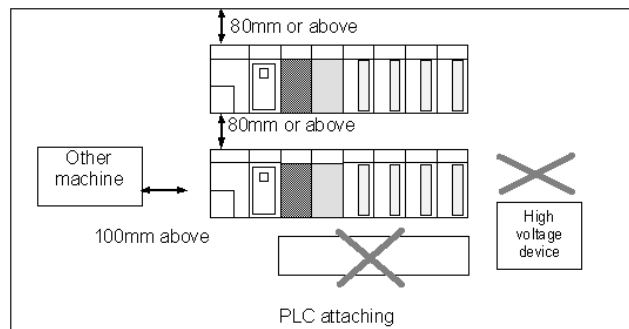


Figure 8 – Installing the duct

- a) In case of installing on the upper PLC, the height of wiring duct should be less than 80mm for good ventilation.
- b) In case of installing on the lower PLC, consider minimum radius of the cable.
5. In case the equipment is installed in front of the PLC (inside the door) to avoid the effect of radiant noise or the heat, separate it from the PLC of distance more than 100mm.

3. Installation and wiring

3.2. Wiring

3.2 Wiring

This section describes the precautions to be taken for wiring.

Power wiring

1. You must use 24V DC power supply.
2. If the power variation is more than the regular range, you must connect a constant voltage transformer.
3. To prevent noise from the power cable, twist the power cable as densely as possible and connect within the shortest distance.

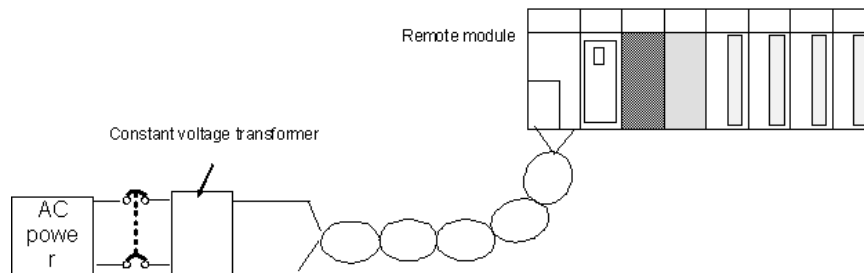
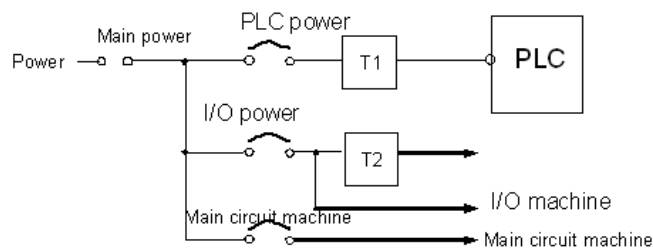


Figure 9 – Power wiring

4. Provide the power where the noise is lesser. (If there is much noise, connect the Isolation transformer.)
5. For PLC, I/O machine and power machine, it is required to divide the power as follows.



Where T1, T2: Constant voltage transformer

6. Use 2mm² thick power cable to reduce the voltage fluctuation.

7. Do not place the 24V DC power cable close to the main circuit or to the I/O signal cable. They should be placed at least 80mm away from each other.
8. Use the surge absorber to prevent the lightning as shown in the figure below.

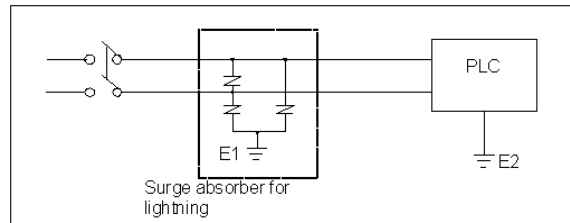


Figure 10 – Surge absorber



ATTENTION

- Separate the earth (E1) of the surge absorber for lightning and the earth (E2) of PLC.
- Select the surge absorber for lightning so that it does not exceed maximum allowable voltage of the absorber even when the power voltage is raising maximum.

9. Use the insulated transformer or the noise filter.
10. In case of the wiring, each input resource, the wiring of the insulated transformer or the noise filter is not allowed to pass the wiring duct.

I/O Device Wiring

1. For I/O wiring, it is recommended to use 0.5mm² cable, even though the specification is 0.18~2 mm².
2. Input cable and output cable should be separated for wiring.
3. While wiring, maintain a distance of 80mm between the I/O signal cable and the high-voltage, high-current main circuit cable.
4. To separate the main circuit cable and the power cable, you should use the shielded cable, and earth the PLC.

3. Installation and wiring

3.2. Wiring

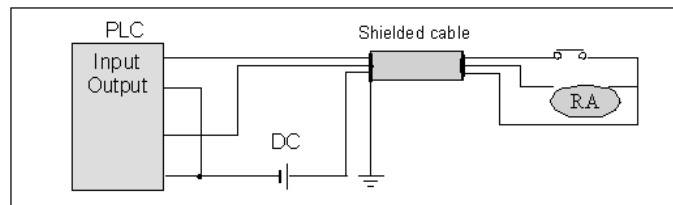


Figure 11 – I/O device wiring

5. Separate the 24V DC output cable from 110V AC cable and 220V AC cable.
6. In the cases where wiring is longer than 200m, error occurs depends upon the leakage current that is caused by interline capacity.

Grounding Wiring

If there is more noise, you have to use PLC with grounding. During grounding, refer to the following notices.

1. During grounding, use the exclusive grounding if possible. For the grounding construction, use the 3rd class grounding (grounding resistance less than 80Ω).
2. If the exclusive grounding is not possible to use, you can use the common grounding as shown on the figure (B).

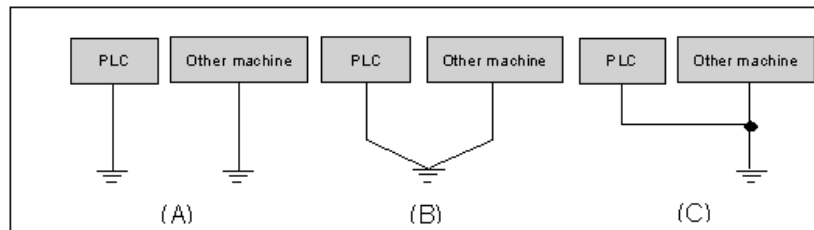


Figure 12 – Grounding wiring

(A): exclusive grounding: Excellent

(B): common grounding: Good

(C): common grounding: Bad

3. For grounding, use the electric wire that is more than 2mm^2 of thickness. Place the grounding point near this PLC if possible and shorten the length of the grounding cable.

- a) When connecting the extended base, connect the extended connector accurately.
- b) Do not remove the PCB from the module case and do not modify the module.
- c) When attaching/removing the module, the power should be OFF.
- d) Use the cellular phone or radiophone 30mm away from the product.
- e) I/O signal cable and communication cable should be at least 100mm apart from the high voltage cable or the power cable to avoid the effect caused by the noise or the change of magnetic field.

Cable specification for wiring

The cable specification to be used for the wiring is as follows:

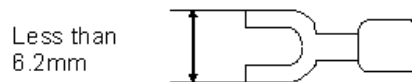
Table 6 – Cable specification for wiring

External connection type	Cable specification (mm ²)	
	Low limit	High limit
Digital input	0.18 (AWG24)	1.5 (AWG16)
Digital output	0.18 (AWG24)	2.0 (AWG14)
Analog I/O	0.18 (AWG24)	1.5 (AWG16)
Communication	0.18 (AWG24)	1.5 (AWG16)
Main power resource	1.5 (AWG16)	2.5 (AWG12)
Protection grounding	1.5 (AWG16)	2.5 (AWG12)

For the power and I/O wiring of Smart I/O, it is required to use the compressed terminal.

- Use ‘M3’ type screw for the terminal.
- Tighten the terminal screw with 6~9 kgcm torque.
- Use the fork type screw for the compressed terminal.

The following figure is an example of the proper compressed terminal (fork type).



3. Installation and wiring

3.2. Wiring

4. System Configuration

4.1 Overview

This chapter describes the system configuration method and its characteristics. Consider the following factors while selecting the digital I/O module, which is used for Remote I/O.

1. Digital input types contain the current sink input and current source input. In case of DC input module, the wiring method is as follows:
 - a) Connect the sink type external connection machine to the source type DC input module as shown below.

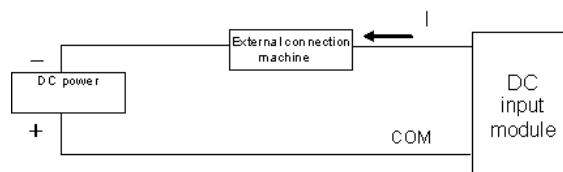
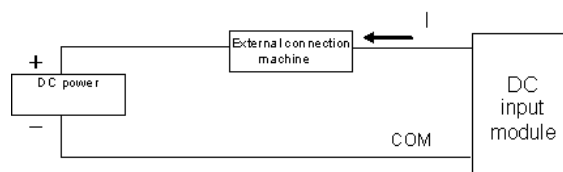


Figure 13 – Wiring for DC input module

- External connection machine is located between the DC power and the (-) terminal of DC input module terminal.
 - Hence, when the power is ON, the current flows from the DC input module terminal to the external connection machine.
- b) Connect the source type external connection machine to the sink type DC input module as shown below.



- External connection machine is located between the DC power and the (+) terminal of DC input module terminal.
- Hence, when the power is ON, the current flows from external connection machine to DC input module terminal.

4. System Configuration

4.1. Overview

2. In case the open/close frequency is high or module is used to open/close the conductive load, use the transistor output module.

Basic System Configuration

The 2MLL-PSRA communicates with master and controls expansion I/O module through Backplane Bus.

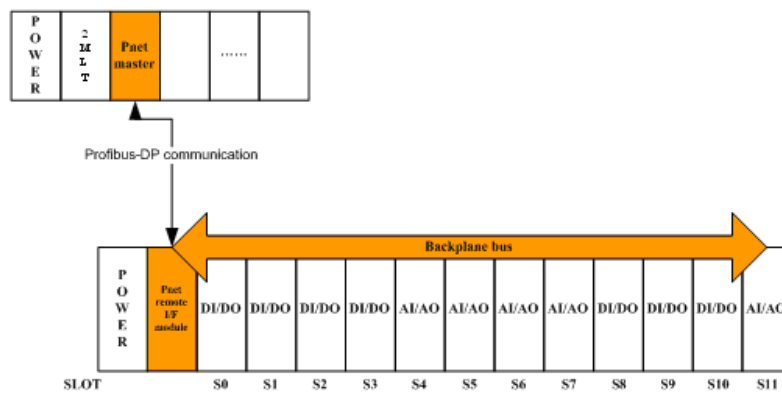


Figure 14 – Basic system configuration

4.2 Part names and functions

The following figure illustrates the part names and functions of Pnet remote I/F module.

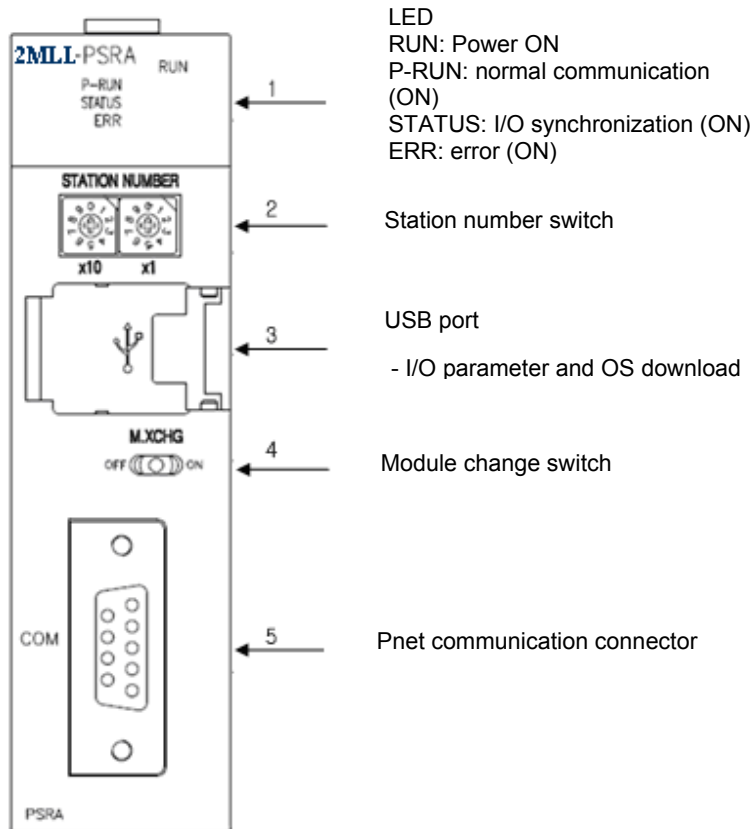


Figure 15 – Part names and functions

4. System Configuration
4.2. Part names and functions

The following table indicates the LED status.

Table 7 – LED status

Item	Name	Normal	Abnormal	LED indication
1	RUN	On	-	Module normal (Normal operation of system O/S)
		-	Off	O/S is not operating (O/S operation error by H/W error)
2	P-RUN	On		Pnet communication normal
		-	Off	Not connected with master or not communicating with master
3	STATUS	On	-	System configuration of master is same as I/O configuration of slave, so communication is normal.
		-	Off	System configuration of master is not same as I/O configuration of slave, so communication is not normal.
4	ERR	-	On	Refer to section Error type.
		Off	-	No error

Error type

1. Module detachment error: Module is detached from base while M.XCHG switch is off.
2. Invalid module is attached: Invalid module such as communication module, High Speed Counter module, and so on is attached at Base.
3. Out of I/O points: I/O module configuration is exceeding maximum data size (244 byte) or no I/O data.

4. I/O parameter error: I/O parameter set by user is different with actual I/O configuration.
 - When different parameter is downloaded during communication, ERR LED is OFF.
 - When different parameter is downloaded during not communicating, ERR LED is ON.

Available Product List

The following table displays the power module list.

Table 8 – Product list

Model	Specification
2MLP-ACF1	AC100V - AC240V, 3A
2MLP-ACF2	AC100V - AC240V, 6A
2MLP-AC23	AC200V - AC240V, 8.5A
2MLP-DC42	DC24V, 6A

The following table displays the base list.

Table 9 – Base list

Model	Specification	Remark
2MLB-M04A	4-slot main base	Up to 12 slots are available and expansion base through expansion cable is not supported.
2MLB-M06A	6-slot main base	
2MLB-M08A	8-slot main base	
2MLB-M12A	12-slot main base	

4. System Configuration
4.2. Part names and functions

The following table displays the digital I/O module list.

Table 10 – Digital I/O module list

	Model	Specification
Input module	2MLI-A12A	AC110V, 16 point
	2MLI -A21A	AC220V, 8 point
	2MLI -D21A	DC24V, 8 point
	2MLI -D22A	DC24V, 16 point, sink/source
	2MLI -D22B	DC24V, 16 point, sink
	2MLI -D24A	DC24V, 32 point, sink/source
	2MLI -D24B	DC24V, 32 point, sink
	2MLI -D28A	DC24V, 64 point, sink/source
	2MLI -D28B	DC24V, 64 point, sink
Output module	2MLQ-RY1A	Relay, 8 point
	2MLQ -RY2A	Relay, 16 point
	2MLQ -RY2B	Relay, 16 point, Built-in surge killer
	2MLQ -SS2A	Triac, 16 point
	2MLQ -TR2A	TR, 16 point, sink
	2MLQ -TR2B	TR, 16 point, source
	2MLQ -TR4A	TR, 32 point, sink
	2MLQ -TR4B	TR, 32 point, source
	2MLQ -TR8A	TR, 64 point, sink
2MLQ -TR8B	TR, 64 point, source	
I/O module	2MLH-DT4A	DC24V, 16 point input / TR 16 point, sink



ATTENTION

For more information on specification of I/O module, refer to 2MLI-CPU user guide.

The following table displays the Analog I/O module list.

Table 11 – Analog I/O module list

	Model	Specification
Analog input	2MLF-AV8A	Voltage input: 8 channels
	2MLF-AC8A	Current input: 8 channels
	2MLF-AD8A	Voltage/current input: 8 channels
	2MLF-AD4S	Voltage/current input: 4 channels, Isolation between channels
	2MLF-AD16A	Voltage/current input: 16 channels
Analog output	2MLF-DV4A	Voltage output type, 4 channels
	2MLF-DC4A	Current output type, 4 channels
	2MLF-DV8A	Voltage output type, 8 channels
	2MLF-DC8A	Current output type, 8 channels
	2MLF-DC4S	Current output type, 4 channels, Isolation type
Temp. conversion	2MLF-TC4S	Thermocouple input, 4 channels, Isolation type
	2MLF-RD4A	RTD input, 4 channels



ATTENTION

For more information on specification of analog I/O module, refer to respective product's user manual.

4.3 Example for system configuration

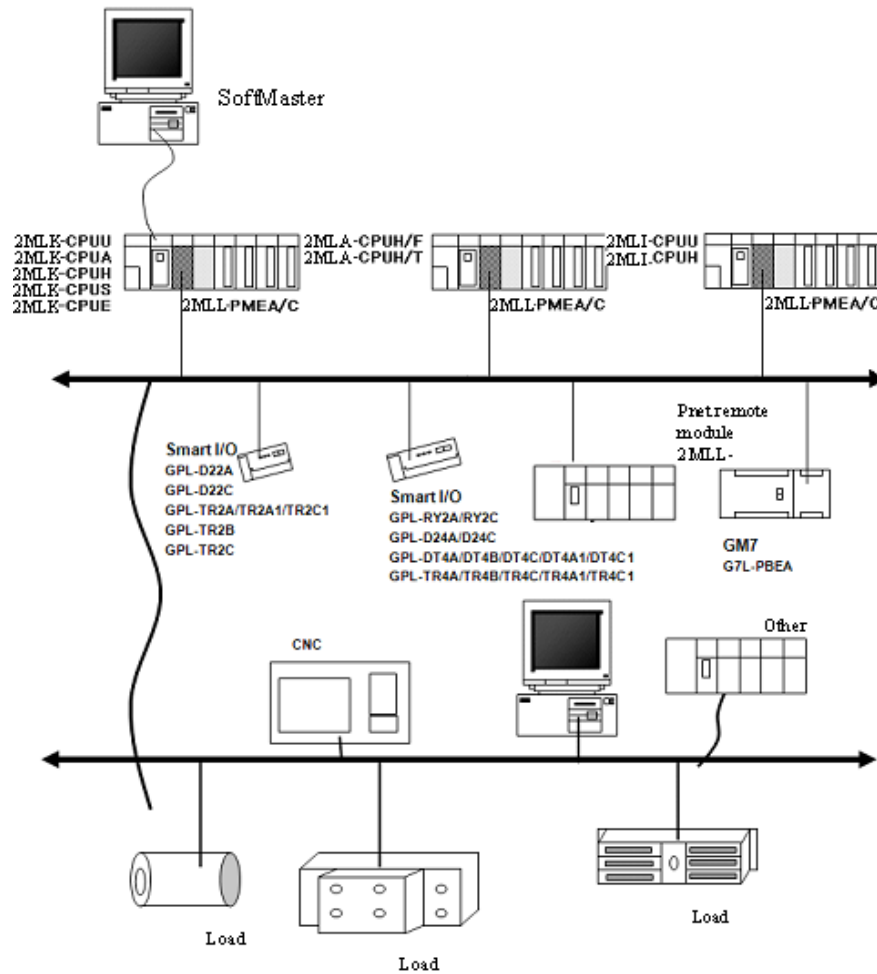


Figure 16 – Example for system configuration

5. Communication Programming

5.1 How to set master module

This section describes how to set master module to use Pnet remote I/F module.

High-speed Link

High-speed Link is used when other station's data or information is periodically exchanged at specific interval. By referring to the data exchange of its own station or other station periodically, utilize the data effectively. It communicates the data by setting the simple parameter.

The setting method is to designate its own area and the area of other station, data size, and station number (for 2MLT in SoftMaster-NM) and then communicate. Data size is from minimum 1 byte (8 bits) to maximum 244 byte and communication period is from minimum 10ms to maximum 10s according to communication contents.

As it is possible to communicate with other station by simple parameter setting, it is easy to use High-speed Link. The High-speed Link process of internal data enables periodic, simultaneous processing of huge data.

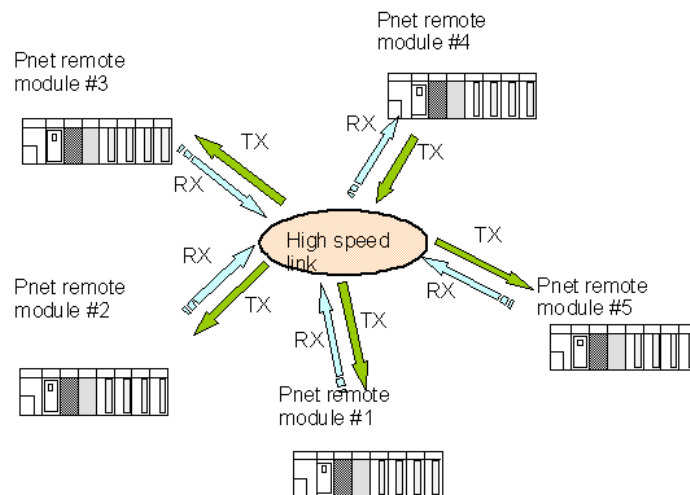


Figure 17 – High-speed Link process

5. Communication Programming

5.1. How to set master module

SoftMaster-NM Link Parameter setting

When using Pnet master module, it is easy to set device region and data size to communicate between CPU module and communication module (Master module and Slave module) by using SoftMaster-NM.

The following table describes Pnet High-speed Link setting contents.

Table 12 – Pnet High-speed Link setting contents

Contents		High-speed Link			
Communication module setting	Communication module setting	Module Type	Select Pnet		
		Base No.	Maximum: 0 ~ 7, Setting range differ according to CPU module.		
		Slot No.	Maximum: 0 ~ 11, Setting range differ according to base Type.		
	Communication period setting (Period Type)	Select among 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s - default is 10ms.			
	Output data setting when emergency	CPU Error	Latch	Maintain previous output status.	
			Clear	Clear all output.	
		CPU Stop	Latch	Maintain previous output status.	
			Clear	Clear all output.	
	Mode	Sending: transfers data from Master module to Slave module. Receiving: transfers data from Slave module to Master module.			
	Station Number	Slave Station Number (Range: 1 ~ 99)			
Communication type	Indicate communication type between Master and Slave. (Poll, Bit-Strobe, COS, Cyclic)				
Read area (Master module → Slave module)	Address	first device of TX devices Refer to <i>ML200R User's Guide</i> for memory address.			
	Size (Byte)	Indicate I/O point into Byte. - Consider less than 8 bit I/O module as 1 Byte			

5. Communication Programming
5.1. How to set master module

Contents		High-speed Link	
	Save area (Slave module)	Address	first device of RX devices Refer to <i>ML200R User's Guide</i> for memory address.
	→ Master module)	Size (Byte)	Indicate Slave module's I/O point into Byte. - Consider less than 8 bit I/O module as 1 Byte
PLC connection		CPU module's RS-232C or USB port	
Control condition		Control is available regardless of location (RUN, STOP) of mode switch of CPU module.	
Maximum communication point		TX 28,672 point, RX 28,672 point each 3584 byte	
Maximum Block Number		126 (0~125)	
Maximum point per block		244	
High-speed Link setting count		Maximum 12	






ATTENTION

1. The above category is not set in SoftMaster-NM.
2. This data is the uploaded value from Pnet, which is set in SyCon.
 - When you change High-speed Link contents, you should download the parameter again.
 - It is possible to set and use only one High-speed Link per communication module.
 - Written parameter (basic, High-speed Link, P2P) is stored in the CPU module.
 - When changing the CPU module, download backup parameter set in SoftMaster-NM and write it to the new CPU module.
3. For more details on SyCon, refer to section Profibus-DP Communication.

5. Communication Programming

5.1. How to set master module

To use SoftMaster-NM for Pnet remote I/F module, perform the following steps.

Step	Action
1	Execute SoftMaster-NM.
2	Click Online > Read IO Information or click  . You can read the I/O information of the Pnet remote I/F module.
3	Connect Pnet remote I/F module to read I/O information from High-speed Link.
4	Designate device and address used in program to connect I/O point to the slave module, which is composed in SyCon with PLC program.
5	Click Online > Write Parameter (Standard Settings, HS Link, P2P) or click  . It starts writing High-speed Link parameter to Pnet remote I/F Module.
6	Click Online > Enable Link (HS Link, P2P) or click  . It enables Pnet remote I/F module's communication.

High-speed Link communication status flag information

The following table indicates the communication flag list corresponding to High-speed Link Number.

Table 13 – Communication flag list

No.	Keyword	Type	Contents	Description
L000000	_HS1_RLINK	Bit	All stations of High-speed Link No.1 are normal.	It indicates normal status of all stations, which operate according to parameter set in the High-speed Link. If the following condition are met, it would be turned ON. a) All stations set in parameter are RUN mode and there is no Error. b) All data blocks set in parameter operate properly.

5. Communication Programming
5.1. How to set master module

No.	Keyword	Type	Contents	Description
				c) When parameter of each station in parameter communicates normally, after Run_Link is ON, Run_Link maintains ON continuously unless disabled.
L000001	_HS1_LTRBL	Bit	Indicates abnormal After _HS1RLINK ON	When _HSmRLINK Flag is ON, if station set in parameter and communication status is same as the following, this flag is turned ON. a) Station set in parameter is not RUN mode. b) Station set in parameter has Error. c) Communication status of data block set in parameter is not proper. If above condition is met, Link_Trouble set ON. If condition is normal, Link_Trouble set OFF.
L000020 ~ L00009F	_HS1_STATE[k] (k=000~127)	Bit Array	Indicates High-speed Parameter No.1 Kth Block's total status	It indicates total status about each data block set in parameter. HS1STATE[k]=HS1MOD[k]&_HS1TRX[k]&(~_HSmERR[k])
L000100 ~L00017 F	_HS1_MOD[k] (k=000~127)	Bit Array	Run Mode of High-speed Parameter No.1 Kth Block	It indicates operation mode of station set in Kth block of parameter.
L000180 ~ L00025F	_HS1_TRX[k] (k=000~127)	Bit Array	Indicates normal Communication status with High-speed Parameter No.1 Kth Block	It indicates whether communication status of parameter's Kth data block operates normally or not according to setting.
L000260 ~ L00033F	_HS1_ERR[k] (k=000~127)	Bit Array	Error Mode of High-speed Parameter No.1 Kth Block	It indicates whether communication status of parameter's Kth data block has error or not.
L000340 ~ L00041F	_HS1_SETBLOCK[k]	Bit Array	Indicates setting of High-speed Parameter No.1 Kth Block	It indicates whether Kth data block of parameter is set or not.

Note: In case of Pnet, Kth block indicates slave's station number.

5. Communication Programming

5.2. How to register Profibus-DP remote module



ATTENTION

High-speed Link Number	L Region Address Number	Reference
2	L000500~ L00099F	In the above table, when High-speed Link is 1, other Flag address number is as follows according to simple calculation. *Calculation: L region address number = L000000 + 500 X (High-speed Link Number-1) In the case of using the High-speed Link Flag for the program and monitoring, use Flag Map registered in the SoftMaster.
3	L001000~ L00149F	
4	L001500~ L00199F	
5	L002000~ L00249F	
6	L002500~ L00299F	
7	L003000~ L00349F	
8	L003500~ L00399F	
9	L004000~ L00449F	
10	L004500~ L00499F	
11	L005000~ L00549F	

K indicates information about 128 Blocks from Block No.000 to 127 through 8 word (Each word consist of 16 block).

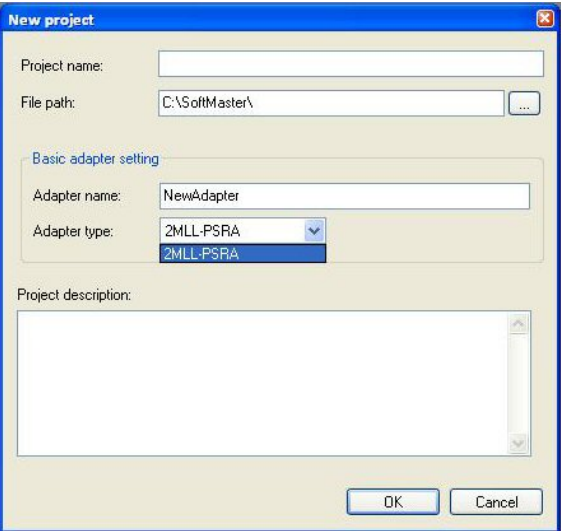
For example, mode information (`_HS1MOD`) has information about block 0 ~15 in the L00010. (16~31, 32~47, 48~63, 64~79, 80~95, 96~111, 112~127 in the L00011, L00012, L00013, L00014, L00015, L00016, L00017). So block no. 55's mode information in the L000137.

5.2 How to register Profibus-DP remote module

In order to use Profibus-DP remote module, you have to register an extended module parameter by using Extended Adapter.

Creating a new project

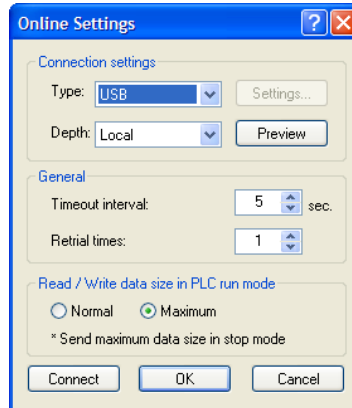
To create a new project, perform the following steps.

Step	Action
1	<p>In the SoftMaster-NA, click File > New File.</p> <p>The New project dialog box appears.</p> 
2	<p>From the Adapter type list, select 2MLL-PSRA and click OK.</p> <p>After connecting USB cable to Profibus-DP remote module, turn on the power.</p>
3	<p>Click Online > Connection Settings.</p> <p>The Online Settings dialog box appears.</p>

5. Communication Programming

5.2. How to register Profibus-DP remote module

Step	Action
------	--------



- 4 Select the **Type** as **USB** and **Depth** as **Local**.
- 5 Click **Connect**. The connection is established.

Setting I/O parameter

If I/O parameter is different from the actual system configuration in main base, Profibus-DP remote module indicates Module type mismatch error. At this time, STATUS LED is OFF.

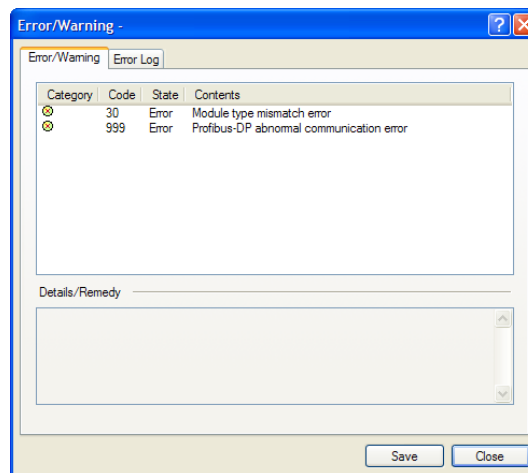
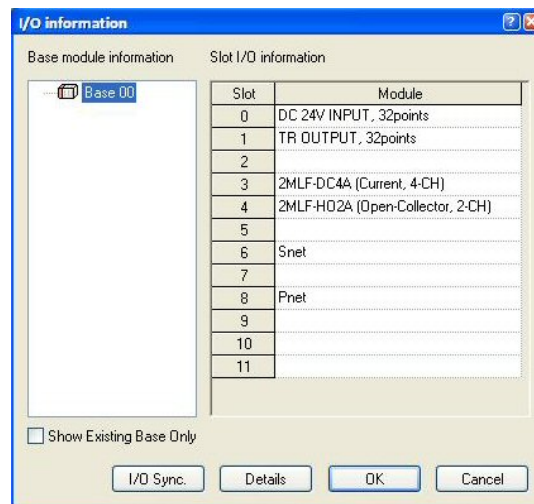


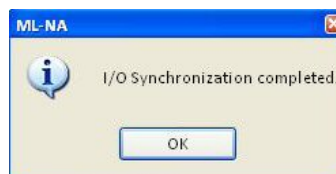
Figure 18 – Error log

To set I/O parameter, perform the following steps.

- | Step | Action |
|------|---|
| 1 | <p>In the SoftMaster-NA, click Online > I/O Information.</p> <p>The I/O information dialog box appears.</p> <p>Verify whether the I/O information matches with the actual system configuration.</p> <p>The following figure shows the I/O information.</p> |



- | | |
|---|---|
| 2 | <p>If the I/O information matches with the actual module configuration, click the I/O Sync. button and match the I/O information.</p> <p>After synchronization, the following message appears.</p> |
|---|---|

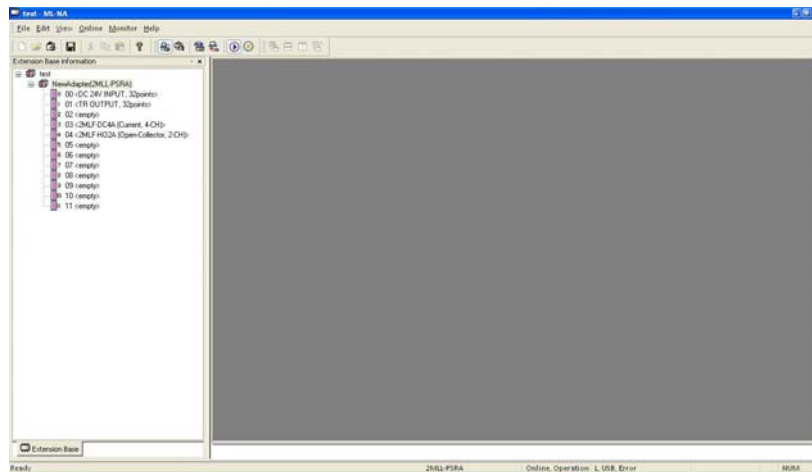


- | | |
|---|--|
| 3 | <p>If module mismatch error appears, verify whether ERR LED is off or not.</p> <p>Check whether all the modules are registered at project window.</p> |
|---|--|

5. Communication Programming

5.2. How to register Profibus-DP remote module

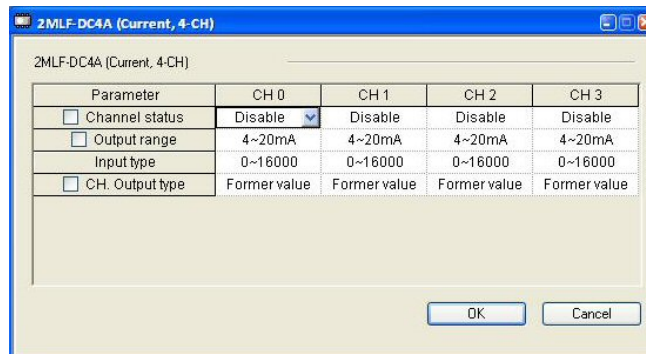
Step	Action
------	--------



- 4 **Analog module parameter setting:** To set a detail parameter on the module, double-click the module at project window.

The parameter window, which appears when you double click 2MLF DC4A, is given below.

For detail on the each parameter, refer to the product's manual.



After completing the parameter setting, download the parameter through **Online > Write Parameter**.

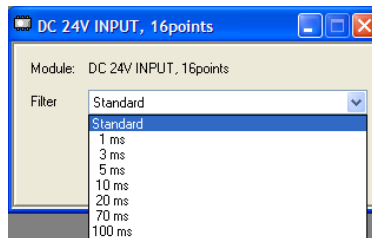
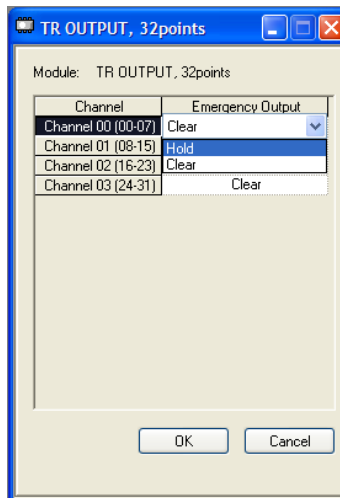
- 5 **Digital I/O module parameter setting:** If you double-click the digital I/O module, emergency output setting window appears for the output module, and input filter setting window appears for input module. In case of remote

Step

Action

error, emergency output sets the output status for output module.

If emergency output is **Clear**, output becomes '0' in case of error. If emergency output is **Hold**, output holds the last output data.



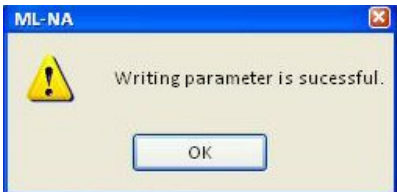
6 Before downloading, save the project and write the parameter.

After completing the parameter setting, click **Online > Write Parameter** to download parameter.

After download is complete, the following message appears.

5. Communication Programming

5.2. How to register Profibus-DP remote module

Step	Action
	



ATTENTION

- Parameter is saved in flash memory permanently.
 - Emergency parameter is applied when communication with master is not normal.
 - Emergency output data is not maintained when power is off. If the power is turned OFF and ON when the emergency output is set as HOLD, it leads to an error, and the emergency output data is not saved.
 - Communication may stop if you download parameter, read I/O, and synchronize I/O during communication.
-

6. Profibus-DP Communication

6.1 Overview

Profibus is an open type field bus that the manufacturer selects independently (Vendor-independence). In addition, it is used widely for processing automation. Profibus-DP is the most frequently used Communication profile and the network suitable for FA environment of Field Level and it is suitable for master-slave communication between the master automation machine and the distribution slave I/O machine. It is designed to install with low cost and is the most suitable item to replace the existing system such as Hart system together with 24V parallel signal transmission to the production automation system.

6.2 Communication Specification

The following table provides information about the Profibus-DP classification.

Table 14 – Profibus-DP classification

Classification	Profibus-DP	
Module type	Pnet remote I/F module	
Network type	Profibus-DP	
Slave protocol	DP-V0	
Standard	EN 50170 / DIN 19245	
Media access	Logical Token Ring	
Communication method	RS-485 (Electric)	
Topology	Bus	
Modulation method	NRZ (Non Return to Zero)	
MAX (media access method)	Local token ring	
Communication distance and transfer speed	Distance (m)	Transfer speed (bps)
	1,200	9.6k/19.2k/93.7k/187.5k
	400	500k

6. Profibus-DP Communication

6.3. Basic Performance

Classification	Profibus-DP	
	200	1.5M
	100	3M/6M/12M
Maximum Node/network	126 Stations	
Maximum Node/segment	32 Stations	
Cable	Electric twisted shielded pair cable	
Maximum I/O data/slave	244 byte	
Maximum I/O module installation count	12	
Installation position	CPU slot	

6.3 Basic Performance

Overview

Profibus-DP Master module sets the following functions.

1. Supports only High-speed Link communication.
2. Uses parameter setting in SoftMaster-NM and Configuration Tool (Honeywell provided tool: SyCon).
3. Sets only sending/receiving area from SoftMaster-NM High-speed Link parameter setting.
4. Sending/receiving data is saved continuously from the setting area and sent. (this is similar to the continued MAP of MASTER-K.)
5. Uses SyCon to set sending/receiving number and slave area per slave station and uses Configuration Port to download the master module.
6. Sending/receiving number is available up to 512bytes/3,584bytes respectively according to the type of Daughter board.
7. Sending/receiving number per slave station is set as byte unit (set in SyCon). Communication begins through SoftMaster-NM High-speed Link enable set.

Operation by High-speed Link

If Master module is the product of Honeywell (2MLL-PMEA), it configures Profibus Network using SyCon.

1. Download Profibus Network Configuration to master module.
2. Set High-speed Link parameter of master in 2MLL-PMEA and download it.
3. Enable High-speed Link.
4. If using third party's product as Master, configure Profibus Network using Configuration Tool of the corresponding product.

How to establish Pnet communication

Master communicates with Pnet expansion I/O module based on the downloaded setting information.

1. After writing parameter and checking, I/O data communication starts.
2. If it fails when processing each step, diagnosis is executed.
3. Initial sequence operation to establish communication is as follows.

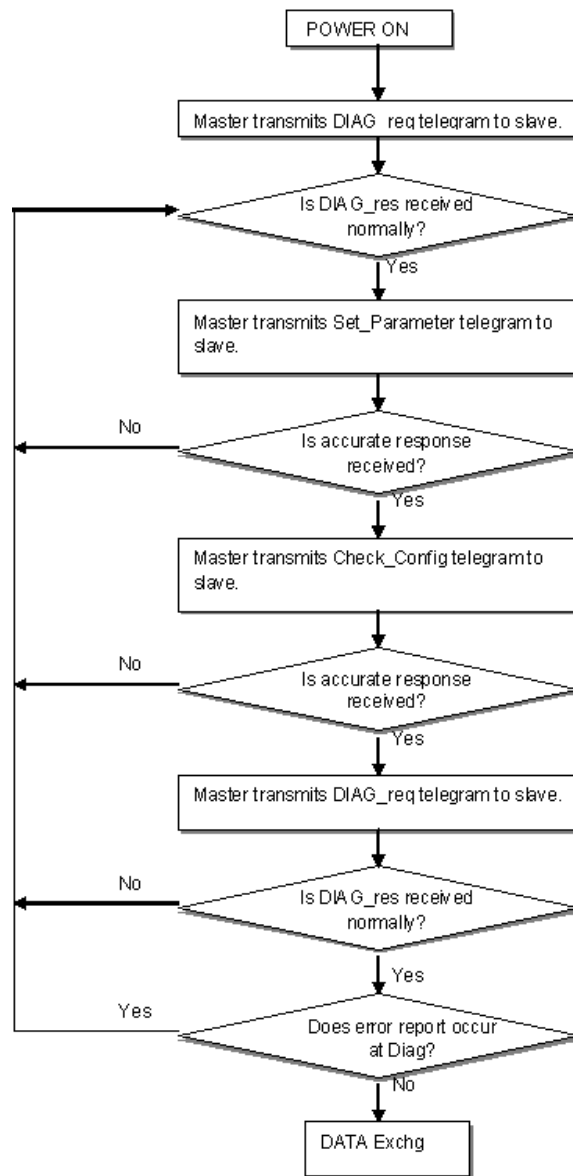


Figure 19 – Sequence operation to establish communication

I/O data Communication

1. Expansion I/O modules are communicating with master by using backplane bus.
2. Maximum TRX data is 244 byte.

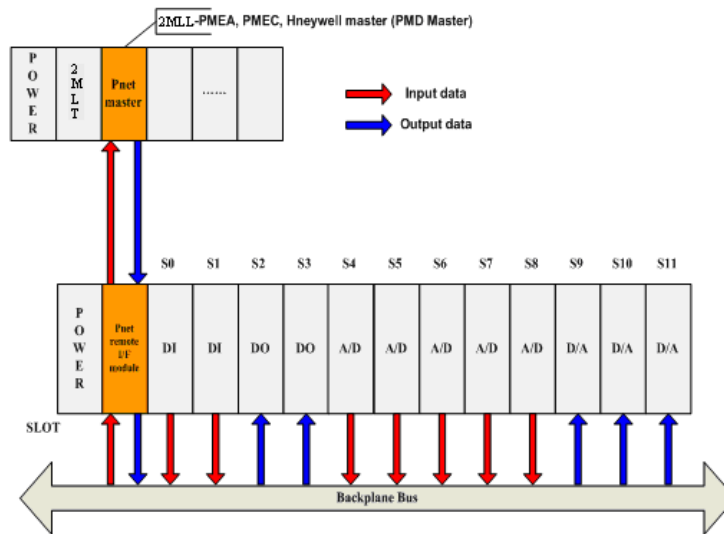


Figure 20 – I/O data Communication through backplane bus

3. For expansion I/O module, write parameter through local USB connection.

6. Profibus-DP Communication
6.4. Tool for Communication Setting

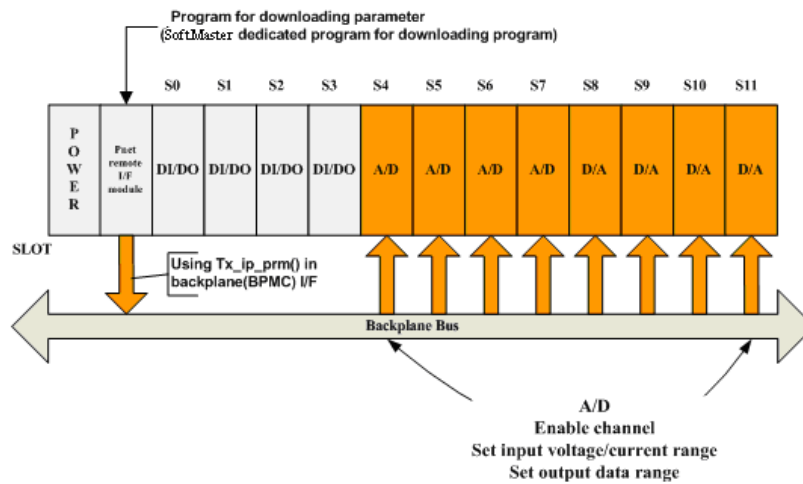



Figure 21 – I/O data Communication through local USB

6.4 Tool for Communication Setting

Communication setting by SyCon

If using master module provided by Honeywell (2MLL-PMEA), configure Profibus network using SyCon and download the information to the corresponding master module. As Profibus Network Configuration Tool is different for each master module, and if you are using Honeywell master module (2MLL-PMEA), use only SyCon.

For communication setting, perform the following steps.

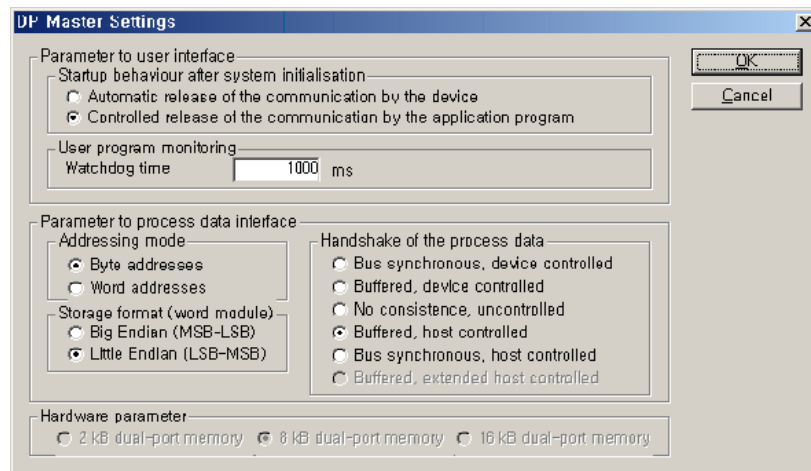
Step	Action
1	Start the SyCon tool.
2	Click Insert > Master or select  from the top left tool bar to insert Master module. The Insert Master dialog box appears.

6. Profibus-DP Communication


6.4. Tool for Communication Setting

Step	Action
------	--------

- | | |
|---|--|
| 5 | Master module setting: If you right-click the inserted master module and select Master Settings... from the context menu, the following dialog box appears. |
|---|--|

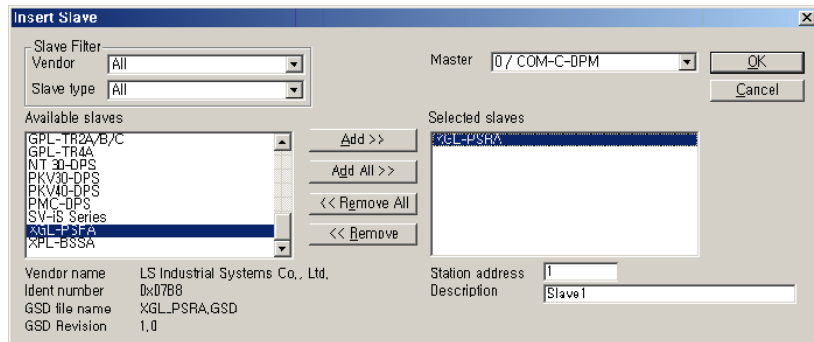


Perform the following steps in order.

- Click **Controlled release of the communication by the application program** under **Parameter to user interface**.
 - Click **Little Endian (LSB-MSB)** under **Storage format (word module)**.
 - Click **Buffered, host controlled** under **Handshake of the process data**.
 - Click **OK**.
- 6 Click **Insert > Slave** or select  from top left toolbar and click master to insert slave.

The **Insert Slave** dialog box appears.

Step Action



- 7 In the **Available slaves** list, select 2MLL-PSRA and click the **Add** button if you are using 2MLL-PSRA. If there are several masters, select one from the **Master** and confirm **Station address** and **Description**, and then click **OK**.



ATTENTION

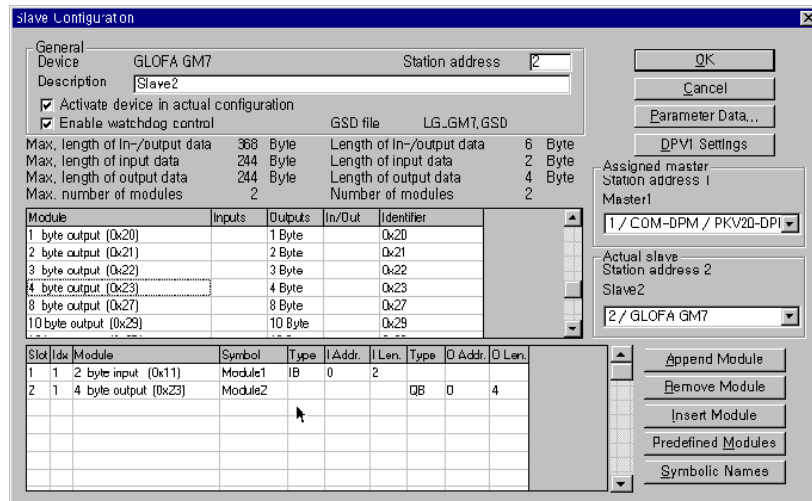
If there is no slave to use in the **Available slaves** list of **Insert Slave** dialog box, copy **GSD file** which is supplied by the module manufacturer, from the directory as shown below. Then, try SyCon again and insert slave.



- 8 **Slave Configuration:** Right-click the inserted slave icon and select **Slave configuration** from context menu or double-click the slave icon.

6. Profibus-DP Communication
6.4. Tool for Communication Setting

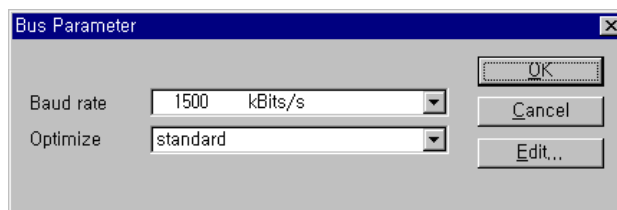
Step **Action**




From the list of available modules, select the module having the necessary point and click **Append Module**. Insert the input module first and then insert output module.

- 9 Bus Parameter Setting:** Bus parameter setting is the setting about Profibus-DP network. Click **Settings > Bus Parameter**.

The **Bus Parameter** dialog box appears. Optimize field contains standard and user definition setting. Speed setting (Baud rate) contains 9.6kbps ~12Mbps setting.



Normally, **Baud rate** is set as 1.5Mbps and **Optimize** is set as **standard**.

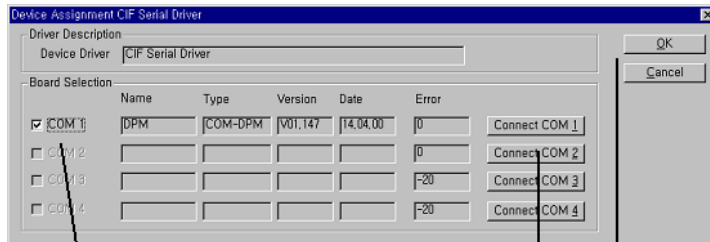
Step	Action
	 <p>ATTENTION</p> <ul style="list-style-type: none"> • Communication speed is related to transmission distance. • When you select Baud rate as 12Mbps, you should use the connector only for 12Mbps exclusive cable. • When using 12Mbps cable, distance between stations should be more than 1m. • When using 12Mbps cable, if the communication is cut off (especially, the station far from master), search for the proper end resistance value and set it random.

10 **Device Allocation:** It is required to download the prepared configuration to the master module. Click **Setting > Device Assignment**.

11 Select driver from the **Driver select** dialog box and click **OK**.

 **ATTENTION**
Driver to be provided by 2MLL-PMEA type master module is only RS-232C port. Thus, CIF TCP/IP Driver, CIF Device Driver is not available.

Driver Selection of CIF Serial Driver:



If the corresponding module information is indicated, check the COM1 check box.

Press the button "Connect COM1" to confirm if the corresponding module information is indicated.

If everything ends normally without any error, press OK.

6. Profibus-DP Communication

6.5. High-speed Link setting in SoftMaster-NM

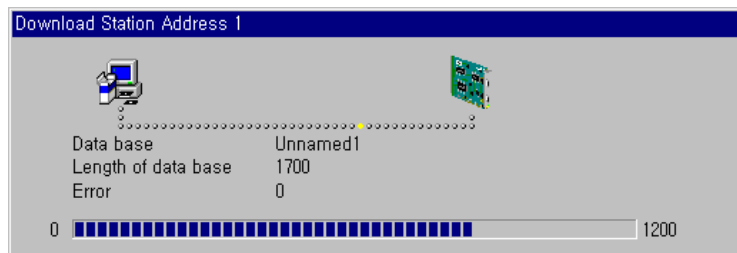
Step	Action
	Connect PC serial port and Configuration Port of Profibus-DP master module and apply the power of master module. Click Connect COM1 or other button according to PC serial port and confirm if the corresponding module is selected. As in the figure, Version and Date may have different value. If there is no error, select the check box and click the OK button.



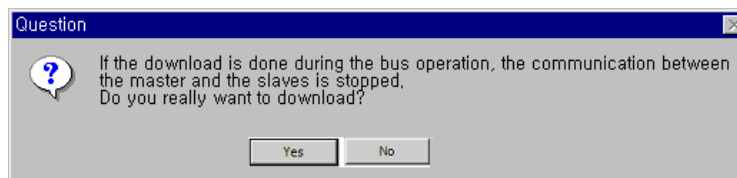
ATTENTION

When you click the **Connect COM1** button, if the module information does not appear normally and the error occurs, verify the connection of cable for configuration and the cable condition.

- 12 **Configuration Download:** Click **Online > Download**. It starts downloading, all LED status is OFF and only READY LED blinks. After downloading, all LED shows its function.



During the download, the following warning message appears.



After confirming if there is a problem in communication, click **Yes** to download.

6.5 High-speed Link setting in SoftMaster-NM

The following table lists the operation sequence of High-speed Link.

Table 15 – Operation sequence of High-speed Link

No.	Software used	Operation	Action
1	SyCon	Execute dedicated configuration tool	For 2MLL-PMEA, start SyCon.
2		Set network configuration	Refer to section 6.4 for SyCon Setting setting.
3		Connect to communication port	Refer to section 6.4 for SyCon setting.
4		Download network Configuration	Refer to section 6.4 for SyCon setting.
5	SoftMaster-NM	Execute SoftMaster-NM	On the SoftMaster window, click Tools > Network Manager .
6		Create new file	On the SoftMaster-NM window, click File > New File . Type project name and select the PLC series.
7		Set SoftMaster-NM connection	Select applicable connection driver through SoftMaster-NM using Online > Connect menu.
8		Connect to SoftMaster-NM	On the SoftMaster-NM window, click Online > Connect .
9		IO Information Read	On the SoftMaster-NM window, click Online > Read IO Information .
10		Define High-speed Link project	Select High-speed Link from the SoftMaster-NM window.
11		Set communication module and communication period	Select one among High-speed Link 1~ 12 and double-click it to specify module type, base number, slot number and period type.
12		Upload SyCon	Double-click the created Block and click Online > SyCon Upload on

6. Profibus-DP Communication

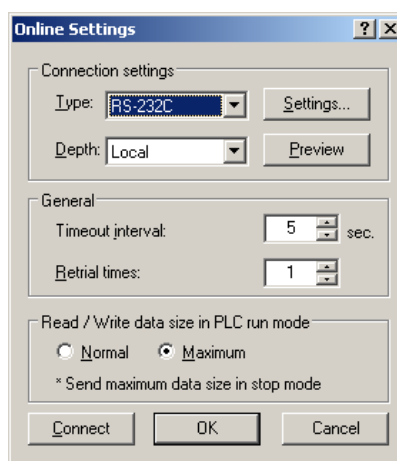
6.5. High-speed Link setting in SoftMaster-NM

No.	Software used	Operation	Action
			the High-speed Link window.
13		High-speed Link Block Setting	Double-click the cell on the High-speed Link window. <ul style="list-style-type: none">• For Send : specify Read area (CPU area)• For Receive : specify Save area (CPU area)
14		High-speed Link Parameters Write	Click Online > Write Parameter and verify the applicable High-speed Link.
15		High-speed Link Enable	Click Online > Enable Link to enable the applicable High-speed Link.

Perform the High-speed Link parameter setting as follows.

Step	Action
1	On the SoftMaster window, click Tools > Network Manager . The SoftMaster-NM window appears.
2	Click File > New File . The New NM Project dialog box appears.
3	Type the NM Project Name and select the PLC series.

- | Step | Action |
|------|---|
| 4 | <p>Connect SoftMaster-NM and PLC on which the communication module is installed.</p> <p>Click Online > Connection Settings.</p> <p>The Online Settings dialog box appears. It indicates the way SoftMaster-NM is connected to the CPU.</p> |



The following table lists the items and description of **Online Settings** dialog box.

	Items	Description
Connection settings	Connection method	RS-232C, USB, Ethernet, Modem, Extended base USB.
	Connection steps	Local/Remote connection setting Local: Connection from PC to CPU. Remote: Connection from PC to CPU through communication module.
Common	Timeout interval when communication failure	1~9 seconds

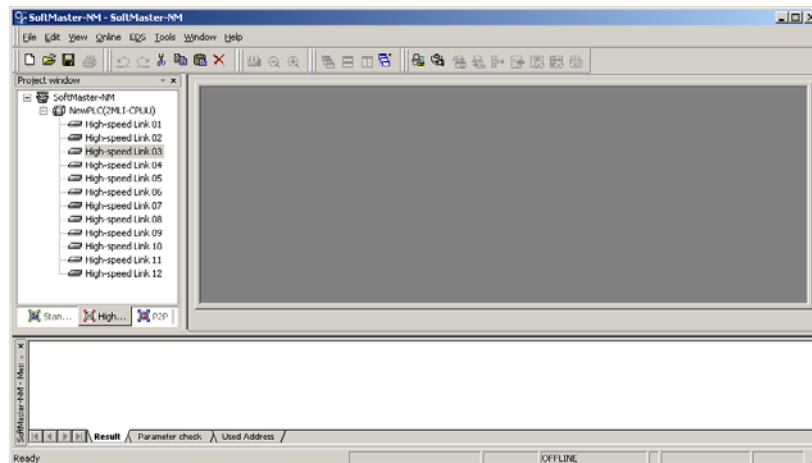
6. Profibus-DP Communication

6.5. High-speed Link setting in SoftMaster-NM

Step	Action	
	Retrial number when communication failure	1~9 times

5 Click **Online > Read IO Information** to read the modules installed on the base.

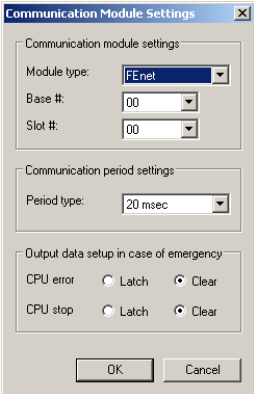
6 Select **High-speed Link** tab on the SoftMaster-NM.



7 Select the communication module and double-click the High-speed Link. The **Communication Module Settings** dialog box appears.

6. Profibus-DP Communication

6.5. High-speed Link setting in SoftMaster-NM

Step	Action
	

The following table describes the communication settings.

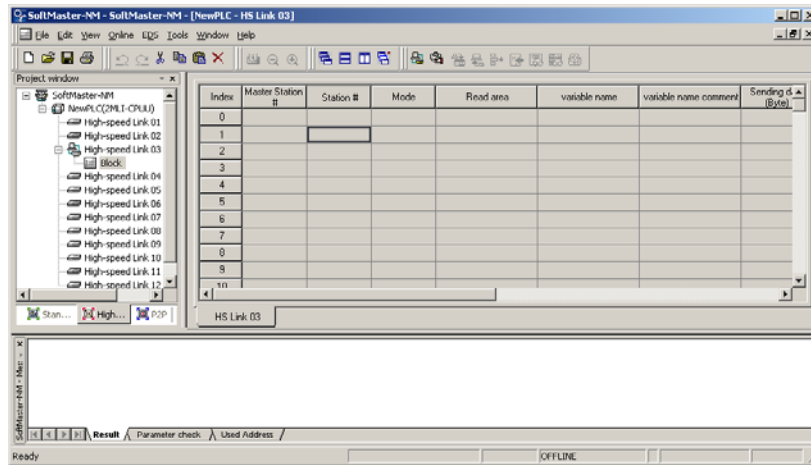
Classification		Description
Communication module settings	Module type	Select Pnet.
	Base number	Select base number on which the module is installed. Range of setting: 0 ~ 7
	Slot number	Select slot number on which the module is installed. Range of setting: 0 ~ 11
Communication period settings	Period type	Set the data transmission period Range of setting: 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s (default is 20ms) Communication period is applied to all of the Send/Receive blocks.
Output data setup in case of emergency	CPU error	Data is latched or cleared when CPU is on Error.
	CPU stop	Data is latched or cleared when CPU is Stop.

6. Profibus-DP Communication
6.5. High-speed Link setting in SoftMaster-NM

Step	Action
------	--------

- | | |
|---|---|
| 8 | Click OK in the Communication Module Settings dialog box. |
|---|---|

The following window appears.



- | | |
|----|--|
| 9 | Click Online > SyCon Upload to upload the SyCon's configuration file. |
| 10 | Double-click the applicable index number of uploaded Configuration file and it indicates the Read area and Write area of Sending/Receiving data . |

The following table describes the block settings.

Classification	Description
Master Station #	Display the Master station number.
Station # *1	Setting range for the slave : 0 ~ 126 If identical station No. is set, communication may not be normal.
Mode *1	Sending: Data transmission from master module to slave module. Receiving: Data transmission from slave module to master module.

Step	Action		
Read area (Master module → Slave module)	2MLR	Read area to set the start address of device used for sending. Refer to <i>ML200R User's Guide</i> for memory address.	
	2MLI	Read area to set the start address of device used for Sending. Setting device : A, M, I, Q, R, W, F, K, L, N, U	
Write area (Slave module → Master module)	2MLR	Write area to set the start address of device used for receiving. Refer to <i>ML200R User's Guide</i> for memory address.	
	2MLI	Write area to set the start address of device used for receiving. Setting device : A, M, I, Q, R, W, F, K, L, N, U	
Sending/ Receiving data (Byte)	Display input/output points of slave module (in bytes). In case of I/O module of 8 bits or less, set 1 byte.		

Note: *1 – Read/Write area is not able to set.

- 11 Click **Online > Write Parameter**. The **Write parameter** dialog box appears.
- 12 Select the applicable High-speed Link and click **OK**.
- 13 Click **Online > Enable Link**. The **Link Enable(HS Link,P2P)** dialog box appears.
- 14 Select the applicable High-speed Link and click **Write**. If the High-speed Link is enabled, then High-speed LED is ON.

6.6 How to set and download GSD

The following procedure explains how to set and download GSD.

1. Download the expansion I/O module and the Pnet remote I/F module information through GSD file.
2. Read the GSD file where information of digital or analog I/O module is described through the configuration tool supporting Pnet configuration.
3. Modify the parameter through configuration tool.
4. After completing the setting, download information to Pnet master module.
5. Master establishes the communication with Pnet remote I/F module and verifies the information of expansion I/O modules based on the downloaded information.

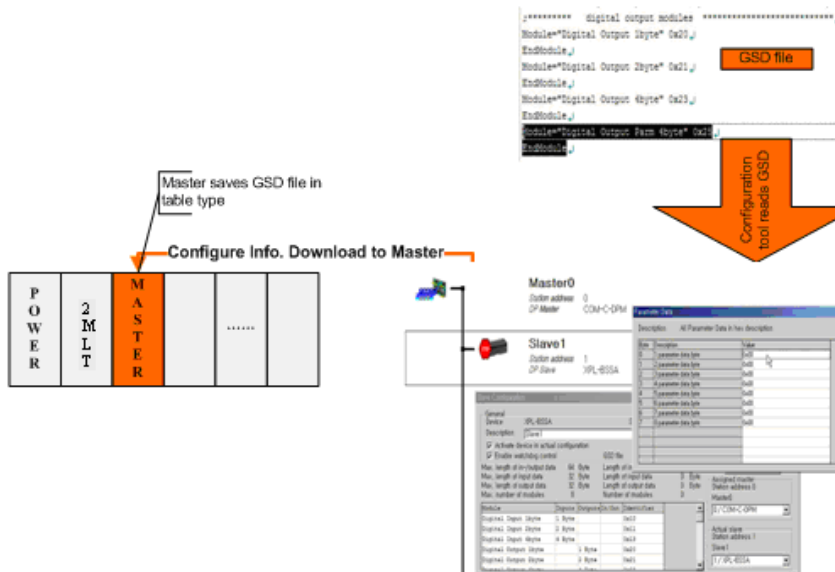


Figure 22 – Downloading configuration information through GSD file

7. Maintenance and Repair

7.1 I/O module maintenance

The routine inspections are recommended to maintain the module in good condition.

The I/O module mainly consists of semiconductor elements. Hence, the life of PLC depends upon the condition of its semiconductor parts. Regular checks must be carried out as errors in the elements may occur due to the effect of the surrounding environment.

Refer to the following table for the items to be checked, once or twice in every 6 months.

Checklist		Judgment Basis	Actions
Environment	Temperature	0 ~ + 55°C	Adjust the temperature and humidity conditions properly.
	Humidity	5 ~ 95%RH	
	Vibration	None	Use vibration-preventive rubber or other measures.
Loose terminal screw		Screws should not be loose.	Tighten the loosened screw.
Input voltage change rate		Within -15%+10%	Maintain the change rate within the allowable range.
Spare parts		Check whether the amount and conditions of spare parts are proper.	Replenish insufficient parts and improve the storage condition.
Power supply		Voltage measure between terminals. DC 20.4 ~ 28.8V	Adjust the power within the allowable voltage variance range.

7. Maintenance and Repair

7.2. Routine inspection

7.2 Routine inspection

The following items must be routinely inspected for Profibus-DP module.

Checklist		Check Point	Judgment Basis	Actions
I/O module connection status		<ul style="list-style-type: none">• Check whether the screws are firmly tightened.• Check whether the module cover is intact or separated.	Must be firmly tightened.	Tighten the module screw.
Cable connection status		Check the cable connection if it is loosened.	Cable must be tightened.	Tighten the cable.
Display LED	RUN LED	Check whether the LED is ON in RUN state.	LED On (off or blinking is error).	Refer to section System Configuration
	P-N LED	Check whether the LED is ON.	Power and communication normal.	
	STATUS LED	Check whether the LED is ON.	Expansion I/O module information match.	
	ERR LED	Check whether the LED is ON.	Module detached, invalid module installed, Out of I/O data range, I/O parameter error.	

8. Troubleshooting

8.1 Introduction

This chapter describes various potential errors that occur while operating the system, causes of errors, ways to detect them, and corrective measures.

8.2 Basic troubleshooting procedure

If there is any problem in the system, identifying the cause for the problem and taking immediate corrective actions would improve the reliability of the system. To troubleshoot the system, ensure that the cautions and procedures given below are followed.

- Check the following manually.
 - Operation status (Stop and Run).
 - Power ON/OFF status.
 - I/O device status.
 - Wiring status (I/O wiring, extension, and communication cable).
 - The status of each displays (RUN, ERR, P-RUN, STATUS LED, I/O LED, and so on), connection to peripherals, and verify the operation condition.

- Check for any abnormality.

Observe how an error can be detected:

- Move the key switch to STOP and turn it ON/OFF.

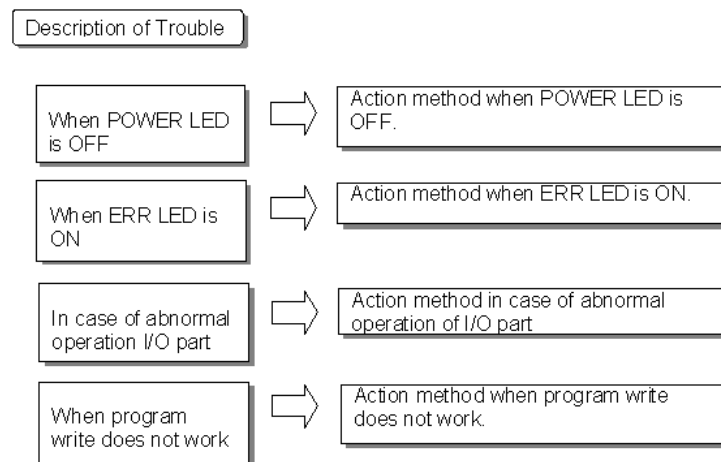
- Restricting range.

Identify the reason for the fault.

- Is it from the PLC or external factor?
- I/O module or others?
- PLC program?

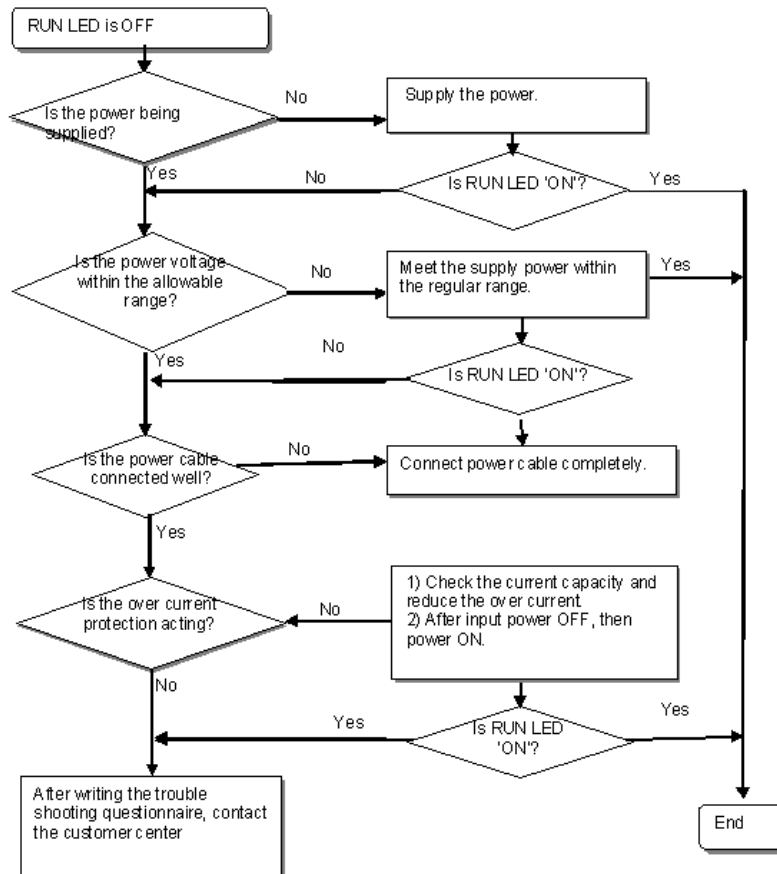
8.3 Troubleshooting methods

The following procedure describes the detection methods, description for error codes, and corrective measures.



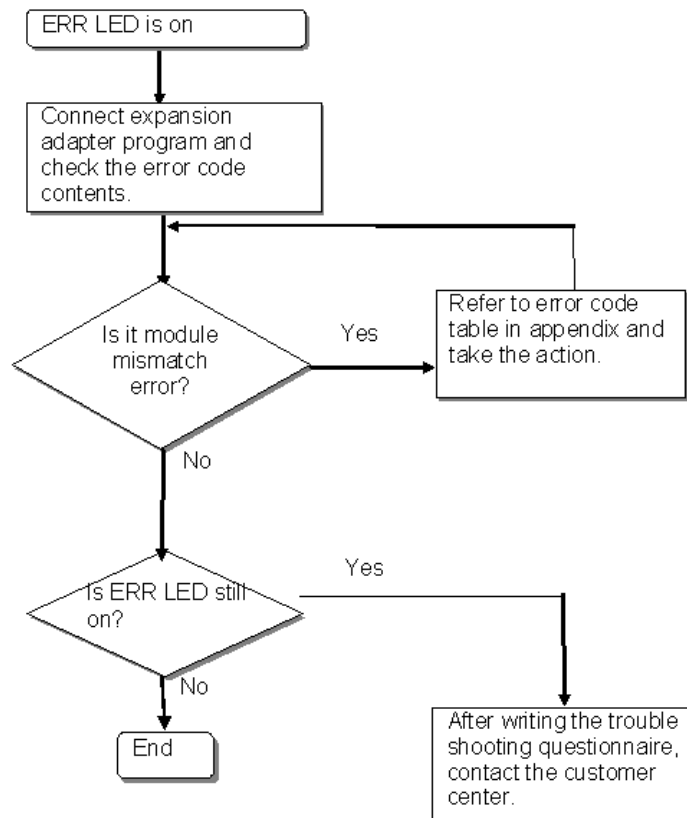
Action method when RUN LED is OFF

This section describes the sequence of steps to be taken, if the RUN LED is OFF.



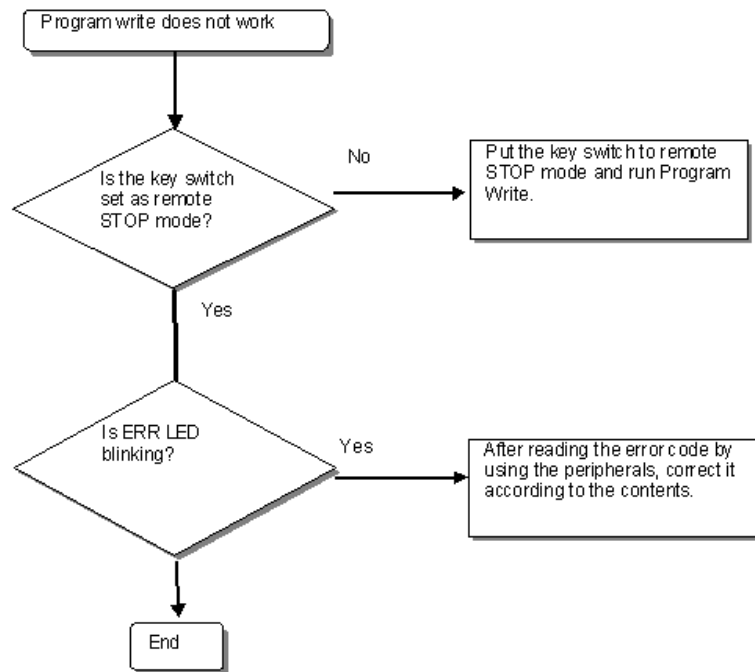
Action method when ERR LED is ON

This section describes the sequence of steps to be taken, if the ERR LED is ON.



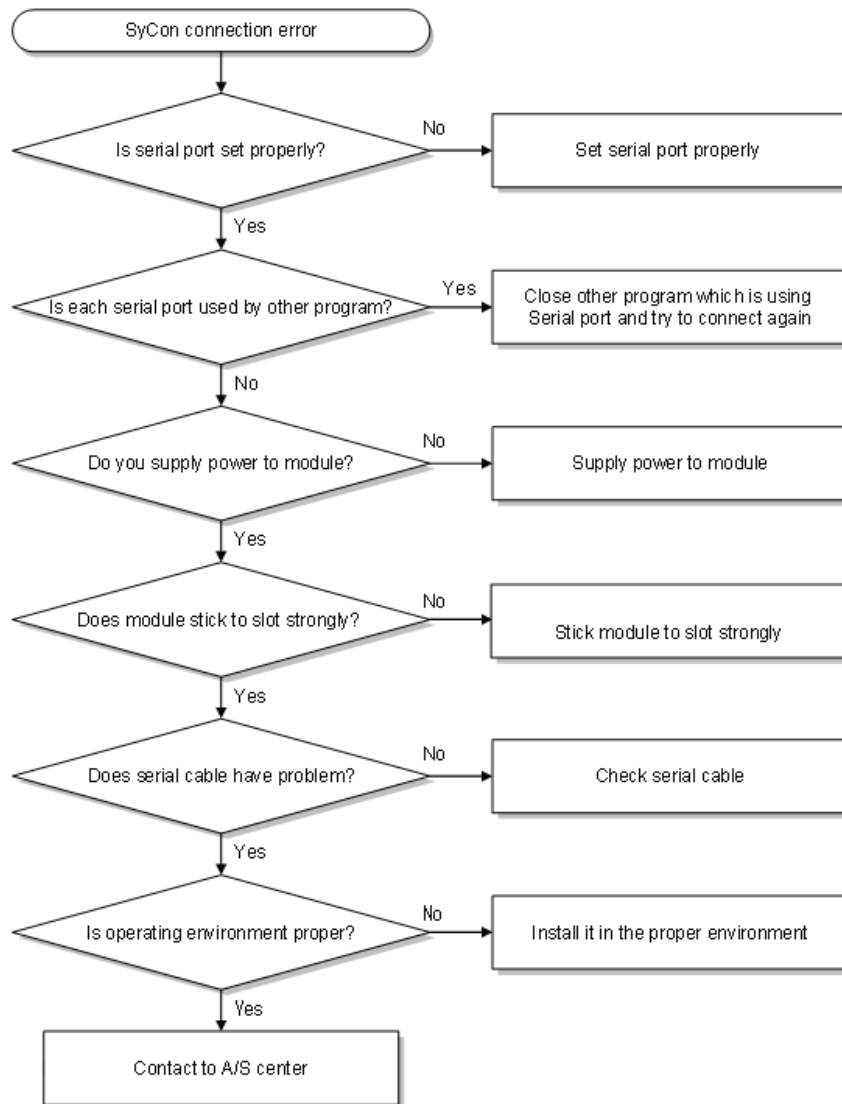
Action method when Program Write does not work

This section describes the sequence of steps to be taken, if the Program Write does not work.



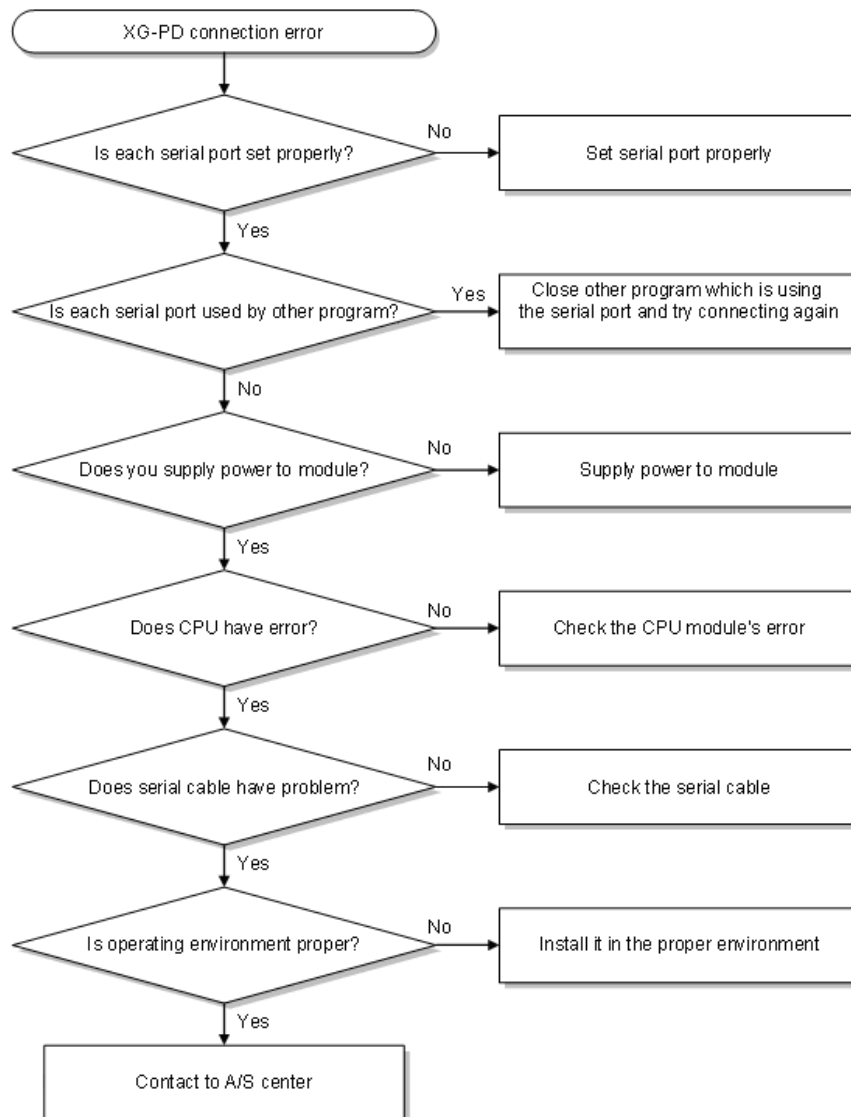
SyCon connection error

This section describes the sequence of steps to be taken, if the SyCon connection error occurs.



SoftMaster-NM connection error

This section describes the sequence of steps to be taken, if the SoftMaster-NM connection error occurs.

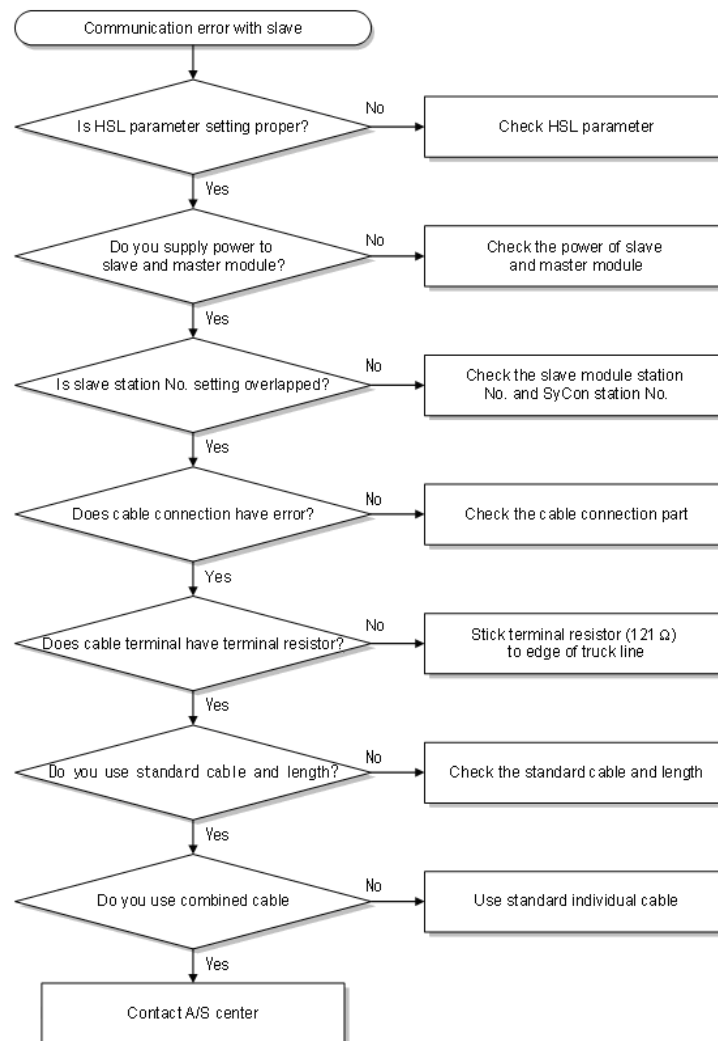


8. Troubleshooting

8.3. Troubleshooting methods

Communication error with slave

This section describes the sequence of steps to be taken, if the communication error occurs with slave.



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