LS ELECTRIC XGL-PSRA Pnet Slave I-F Module User Manual

Pnet Slave I/F Module
XGT Series
User Manual
XGL-PSRA
XGL-PSEA

The right choice for the ultimate yield!
LS ELECTRIC strives to maximize your profits in gratitude for choosing us as your partner.
Programmable Logic Control

Contents

Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for Quick reference.

Before using the product …
For your safety and effective operation, please read the safety instructions thoroughly before using the product.
► Safety Instructions should always be observed in order to prevent accident or risk with the safe and proper use the product.
► Instructions are divided into “Warning” and “Caution”, and the meaning of the terms is as follows.

Warning This symbol indicates the possibility of serious injury or death if some applicable instruction is violated

Caution This symbol indicates the possibility of severe or slight injury, and property damages if some applicable instruction is violated
Moreover, even classified events under its caution category may develop into serious accidents relying on situations. Therefore we strongly advise users to observe all precautions properly just like warnings.
► The marks displayed on the product and in the user’s manual have the following meanings.

Be careful! Danger may be expected.

Be careful! Electric shock may occur.
► The user’s manual even after read shall be kept available and accessible to any user of the product.
Safety Instructions for design process

Warning

- Please install a protection circuit on the exterior of PLC so that the whole system may operate safely regardless of failures from external power or PLC. Any abnormal output or operation from PLC may cause serious problems to safety in whole system.
  – Install protection units on the exterior of PLC like an interlock circuit that deals with opposite operations such as emergency stop, protection circuit, and forward/reverse rotation or install an interlock circuit that deals with high/low limit under its position controls.
  – If any system error (watch-dog timer error, module installation error, etc.) is detected during CPU operation in

PLC, all output signals are designed to be turned off and stopped for safety.
However, there are cases when output signals remain active due to device failures in Relay and TR which can't be detected. Thus, you are recommended to install an addition circuit to monitor the output status for those critical outputs which may cause significant problems.

- Never overload more than rated current of output module nor allow to have a short circuit. Over current for a long period time may cause a fire .
- Never let the external power of the output circuit to be on earlier than PLC power, which may cause accidents from abnormal output cooperation.
- Please install interlock circuits in the sequence program for safe operations in the system when exchange data with PLC or modify operation modes using a computer or other external equipment's Read specific instructions thoroughly when conducting control operations with PLC.

 **Caution**

- I/O signal or communication line shall be wired at least 100mm away from a high-voltage cable or power line. Fail to follow this

Safety Instructions on installation process

 **Caution**

- Use PLC only in the environment specified in PLC manual or general standard of data sheet. If not, electric shock, fire, abnormal operation of the product may be caused.
- Before install or remove the module, be sure PLC power is off. If not, electric shock or damage on the product may be caused.
- Be sure that every module is securely attached after adding a module or an extension connector. If the product is installed loosely or incorrectly, abnormal operation, error or dropping may be caused. In addition, contact failures under poor cable installation will be causing malfunctions as well.
- Be sure that screws get tighten securely under vibrating environments. Fail to do so will put the product under direct vibrations which will cause electric shock, fire and abnormal operation.
- Do not come in contact with conducting parts in each module, which may cause electric shock, malfunctions or abnormal operation.

Safety Instructions for wiring process

 **Warning**

- Prior to wiring works, make sure that every power is turned off. If not, electric shock or damage on the product may be caused.
- After wiring process is done, make sure that terminal covers are installed properly before its use. Fail to install the cover may cause electric shocks.

 **Caution**

- Check rated voltages and terminal arrangements in each product prior to its wiring process. Applying incorrect voltages other than rated voltages and misarrangement among terminals may cause fire or malfunctions.
- Secure terminal screws tightly applying with specified torque. If the screws get loose, short circuit, fire or abnormal operation may be caused. Securing screws too tightly will cause damages to the module or malfunctions, short circuit, and dropping.
- Be sure to earth to the ground using Class 3 wires for FG terminals which is exclusively used for PLC. If the terminals not grounded correctly, abnormal operation or electric shock may be caused.
- Don't let any foreign materials such as wiring waste inside the module while wiring, which may cause fire, damage on the product or abnormal operation.
- Make sure that pressed terminals get tighten following the specified torque. External connector type shall be pressed or soldered using proper equipments.

Safety Instructions for test-operation and maintenance

Warning

- Don't touch the terminal when powered. Electric shock or abnormal operation may occur.
- Prior to cleaning or tightening the terminal screws, let all the external power off including PLC power. If not, electric shock or abnormal operation may occur.
- Don't let the battery recharged, disassembled, heated, short or soldered. Heat, explosion or ignition may cause injuries or fire.

Caution

- Do not make modifications or disassemble each module. Fire, electric shock or abnormal operation may occur.
- Prior to installing or disassembling the module, let all the external power off including PLC power. If not, electric shock or abnormal operation may occur.
- Keep any wireless equipment such as walkie-talkie or cell phones at least 30cm away from PLC. If not, abnormal operation may be caused.
- When making a modification on programs or using run to modify functions under PLC operations, read and comprehend all contents in the manual fully. Mismanagement will cause damages to products and accidents.
- Avoid any physical impact to the battery and prevent it from dropping as well. Damages to battery may cause leakage from its fluid. When battery was dropped or exposed under strong impact, never reuse the battery again. Moreover skilled workers are needed when exchanging batteries.

Safety Instructions for waste disposal

Caution

- Product or battery waste shall be processed as industrial waste. The waste may discharge toxic materials or explode itself.

Thank you for purchasing PLC of LS ELECTRIC Co., Ltd.
Before use, make sure to carefully read and understand the User's Manual about the functions, performances, installation and programming of the product you purchased in order for correct use and importantly, let the end

user and maintenance administrator to be provided with the User's Manual.
The User's Manual describes the product. If necessary, you may refer to the following description and order accordingly. In addition, you may connect our website (**https://www.ls-electric.com**/) and download the information as a PDF file.
Relevant User's Manuals

Tile	Description
XG5000 User's Manual (for XGK, XGB)	XG5000 software user manual describing online function such as pro gramming, print, monitoring, debugging by using XGK, XGB CPU
XG5000 User's Manual (for XG1, XGR)	XG5000 software user manual describing online function such as pro gramming, print, monitoring, debugging by using XG1, XGR CPU
XGK/XGB Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions tha t are used PLC system with XGK, XGB CPU.
XG1/XGR Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions tha t are used PLC system with XGI, XGR CPU.
XGK CPU User's Manual (XGK-CPUA/ CPUE/CPUH/CPUS/CPUU)	XGK-CPUA/CPUE/CPUH/CPUS/CPUU user manual describing about XGK CPU module, power module, base, 10 module, specification of e xtension cable and system configuration, EMC standard
XG1 CPU User's Manual (XGI-CPUU)	XGI-CPUU user manual describing about XGK CPU module, power m odule, base, 10 module, specification of extension cable and system configuration, EMC standard
XGR redundant series User 's Manual	XGR-CPUU user manual describing about XGR CPU module, power module, extension drive, base, 10 module, specification of extension cable and system configuration, EMC standard
N Configurator User's Manual	User's manual of how to use the N Configurator that network configur ation tools for Pnet I/F module.

Overview

1.1 How to use the user's manual

This User's Manual provides the information such as product specification, performance and operation method needed to use PLC System composed of Pnet remote I/F module.
The User's Manual is composed of as follows.

CHAP.1 Overview
Describes the configuration of the user's manual, product characteristics and terminology
CHAP.2 Product Specification
Describes common specification of each product used for Pnet remote, slave I/F module
CHAP.3 System Configuration
Describes the kinds of product available for Pnet remote, slave I/F module and system configuration method
CHAP.4 Communication Programming
Describes common communication program operating method to act Pnet remote, slave I/F module
CHAP.5 Profibus-DP Communication
Describes basic communication method of Profibus-DP (from now on referred to as Pnet) communication module
CHAP.6 Installation and Wiring
Describes installation and wiring method, and notices to make sure of the reliability of PLC system
CHAP.7 Maintenance and Repair
Describes check list and method to run PLC system normally for a long term.
CHAP.8 Trouble Shooting
Describes various errors to be occurred while using the system and the action to solve the problem

Appendix
Here describes the product terminology and external dimension for system installation.
If you want to write programs, refer to the following manuals.

- GLOFA PLC Instruction manual
- GLOFA PLC GMWIN user manual
- GLOFA PLC GM3/4 user manual
- GLOFA PLC GM6 user manual
- MASTER-K Instruction
- MASTER-K 200S/300S user manual
- KGLWIN user manual
- XG5000 user manual
- XGK Instruction manual
- XGI/XGR Instruction manual
- XGK CPU manual
- XGI/XGR CPU manual
- XGT Pnet I/F module user manual

When you make system of GLOFA-GM/MASTER-K and Pnet slave I/F module, consider the followings. The following is CPU or software version for operating the module.

- GLOFA PLC GMWIN program Tool: upper Ver.4.03
- GLOFA GMR CPU : more than Ver. 2.2
- GLOFA GM1/2 CPU : more than Ver. 3.2
- GLOFA GM3 CPU : more than Ver. 2.7
- GLOFA GM6 CPU : more than Ver. 2.1
- MASTER-K PLC KGLWIN programming Tool : more than Ver. 3.41
- MASTER-K K1000S CPU : more than Ver. 3.2
- MASTER-K K300S CPU : more than Ver. 3.4
- MASTER-K K200S CPU : more than Ver. 2.4
- Frame Editor : more than Ver. 2.01

Remark
1) This manual is written for GMWIN V4.04, KGLWIN V3.6, Frame editor V2.01 and XG5000 V4.01.

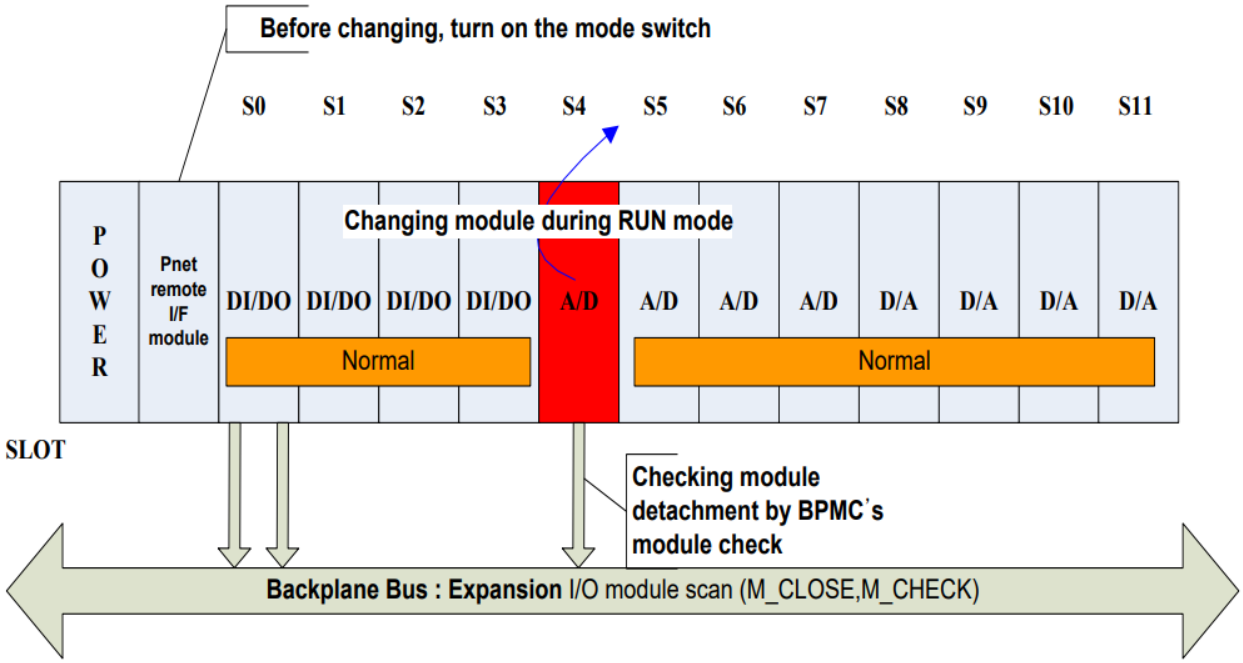
1.2 Characteristics of Product

1.2.1 Characteristics of Pnet remote I/F module

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

1. Product design based on International Electrotechnical Commission (IEC 61131) (GLOFA series in common)
   • Easy support to programming device
   • Standard language (IEC 61131-3) provided (IL / LD / SFC)
2. Open network by selecting international standard communication protocol.
3. Available to communicate with remote master module
4. Available to set maximum 99 stations.
5. Enables to save the cost for installation and maintenance.
6. Various system configuration and simple maintenance and repair.

7. Easy to change the system.
8. Compatible with other maker's product.
   – Available to connect Pnet remote I/F module to other maker's master.
9. Easy to set the system by hardware station address setting
10. Simple communication programming.
   – Using the GMWIN/KGLWIN High-speed link parameter
11. Supports various I/O.
   – 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 module such as AD(analog input)/DA(analog voltage output)/DC(analog current output) /RTD(Resistor temperature detector)/TC(Thermocouple)
12. Easy to configure system and use
   – Various I/O configurations by user
13. Provides the online network status detection function.
   – Available to know the remote module status through high speed link monitor.
   – Available to check diverse module instantly.
14. High seed communication
15. Flexible communication relation is available as the speed shall be set automatically according to the speed of master.
16. Hot-Swap function available
   1) Available to change the module during RUN mode.
   – I/O modules except the module under change operate normally.
   2) Before change, informs the BPMC of module change by switch manipulation.
   3) After change, restore the mode switch.
   4) You can check the invalid module installation and replacement through operation of M_CHECK,M_CLO/SE at BPMC I/F program.



1.2.2 Characteristics of Pnet slave I/F module

The characteristics of Pnet slave I/F module are as follows.

1. Supports open network by adopting a communication protocol of international standard.
2. Available to communicate with the master module at long distance
3. Available to set up to 98 stations
4. Helpful in reducing installation and maintenance cost
5. Diverse system configuration and easy maintenance
6. Easy system change
7. Compatible with other company's product
   – It is available for Pnet slave I/F module to connect with other company's master module
8. Easy system setting by setting up the station number with the hardware rotary switch
9. When using our master module, communication programming is simple
   – Uses high-speed link parameter of GMWIN/KGLWIN/XG5000
10. Easy I/O configuration by setting high-speed link parameter with XG5000
11. Online network monitoring function is provided.
    – Available to check the communication state of the communication module through high-speed link monitor
12. High speed communication
13. Flexible communication relation by deciding communication speed automatically based on the master speed
14. The master can enable/disable "Data Swap" and "Diagnostic function"
15. You can know error information and operating mode of the CPU module through diagnostic function of the master station
16. Global instructions are supported.
    -Synchronizes I/O data according to Sync, Unsync, Freeze, Unfreeze instruction
17. Available to be used with diverse CPU modules
    – Available to be used with XGK/I/R CPU modules

1.3 Product configuration

1.3.1 Product configuration of the Pnet remote I/F module

1) Digital I/O module

Name	Model	Contents	Remark
Digital input module	XGI-D21A	· DC 24V input, 8 points (current source / sink input)	
	XGI-D21DNote1)	· DC 24V Diagnosis input, 8 points (Current source / sink input)	
	XGI-D22A	· DC 24V input, 16 points (current source / sink input)	
	XGI-D24A	· DC 24V input, 32 points (current source / sink input)	
	XGI-D28A	· DC 24V input, 64 points (current source / sink input)	
	XGI-D22B	· DC 24V input, 16 points (current source input)	
	XGI-D24B	· DC 24V input, 32 points (current source input)	
	XGI-D28B	· DC 24V input, 64 points (current source input)	
	XGI-A12A	· AC 110V input, 16 points	
	XGI-A21A	· AC 220V input, 8 points	
Digital output module	XGQ-RY1A	· Relay output, 8 points (2A, single COM.)	
	XGQ-RY1DNote1)	· Diagnosis Relay output, 8 points (for 2A)	
	XGQ-RY2A	· Relay output, 16 points (2A)	
	XGQ-RY2B	· Relay output, 16 points (2A), Varistor added	
	XGQ-TR1CNote1)	· Isolated TR output, 8 points (2A, sink output)	
	XGQ-TR2A	· TR output, 16 points (0.5A, sink output)	
	XGQ-TR4A	· TR output, 32 points (0.1A, sink output)	
	XGQ-TR8A	· TR output, 64 points (0.1A, sink output)	
	XGQ-TR2B	· TR output 16 points (0.5A, source output)	
	XGQ-TR4B	· TR output 32 points (0.1A, source output)	
	XGQ-TR8B	· TR output 64 points (0.1A, source output)	
	XGQ-SS2A	· Triac output, 16 points (0.6A)	
Digital I/O module	XGH-DT4A	· DC 24V input, 16 points (current source / sink input)· TR output, 16 points (0.1A, sink output)	
Dustproof module	XGT-DMMA	· Dustproof module for unused slot	

Note1) Available for XGL-PSRA O/S Version V1.7 or above

2) Analog I/O module

Name	Model	Contents	Remark
	XGF-AV4A	· Voltage input: 4 channels	–

Analog input module	XGF-AV8A	· Voltage input: 8 channels	–
	XGF-AC4A	· Current input: 4 channels	–
	XGF-AC8A	· Current input: 8 channels	
	XGF-AD8A	· Voltage/Current input: 8 channels	
	XGF-AD4S	· Voltage/Current input: 4 channels, Insulation between channels	
	XGF-AW4S	·Voltage/Current input: 4 channels (2-wire input), Insulation between channels	
	XGF-AD16A	· Voltage/Current input: 16 channels	
	XGF-AC4HNote1)	· Current input: 4 channels	HART I/F unavailable
Analog output module	XGF-DV4A	· Voltage output: 4 channels · DC 1 ~ 5V / 0 ~ 5V / 0 ~ 10V / -10 ~ +10V	–
	XGF-DC4A	· Current output: 4 channels · DC 4 ~ 20mA / 0 ~ 20mA	–
	XGF-DV4S	· Voltage output: 4 channels, Insulation between channels	
	XGF-DC4S	· Current output: 4 channels, Insulation between channels	–
	XGF-DV8A	· Voltage output: 8 channels · DC 1 ~ 5V / 0 ~ 5V / 0 ~ 10V / -10 ~ +10V	–
	XGF-DC8A	· Current output: 8 channels · DC 4 ~ 20mA / 0 ~ 20mA	–
	XGF-DC4HNote1)	· Current output: 4 channels · DC 4 ~ 20mA / 0 ~ 20mA	HART I/F unavailable
Analog I/O module	XGF-AH6A	· Voltage/Current input 4 channels · Voltage/Current output 2 channels	4 words are allocated for each I/O
Thermocouple input	XGF-TC4S	· T/C input, 4 channels, insulation between channels	–
RTD input module	XGF-RD4A	· RTD input, 4 channels	–
	XGF-RD4S	· RTD input, 4 channels, insulation between channels	–

	XGF-RD8ANote1)	· RTD input, 8 channels	

Note1) Available for XGL-PSRA O/S Version V1.7 or above

1.3.2 Product Configuration of the Pnet slave I/F module

1) System configuration of the Pnet slave module

Available CPU	Installation position[note1)]	Max. installation numbers[note2)]	Remark
XGI-CPUU/CPUH	Main base ~ expansion 7	12	
XGI-CPUS	Main base ~ expansion 3	12	
XGI-CPUE	Main base ~ expansion 1	12	
XGK-CPUU/CPUH	Main base ~ expansion 7	12	
XGK- CPUA/CPUS	Main base ~ expansion 3	12	
XGK-CPUE	Main base ~ expansion 1	12	
XGR-CPUH/F, XGR- CPUH/T	Expansion base	6	

Note

[Note1] Installation position of the Pnet I/F slave module according to the CPU type

– When using XGK/XGI CPU, Pnet slave I/F module can be installed on both main base and expansion base.

-When using XGR CPU, Pnet slave I/F module can be installed on expansion base.

[Note2] Max. installation numbers are same as the number of High-speed link in use. When there are other communication modules using High-speed link, the number of all communication modules using High-speed link have to be less than 12..

1.4 Software to use the product

Here describe on main programming tool and other software to use the Pnet slave I/F module. For more specific program and application of communication, refer to the followings.

1.4.1 Software check point

Classification	Product	Communication setting tool
XGL-PSEA	Communication module for XGT	XG5000

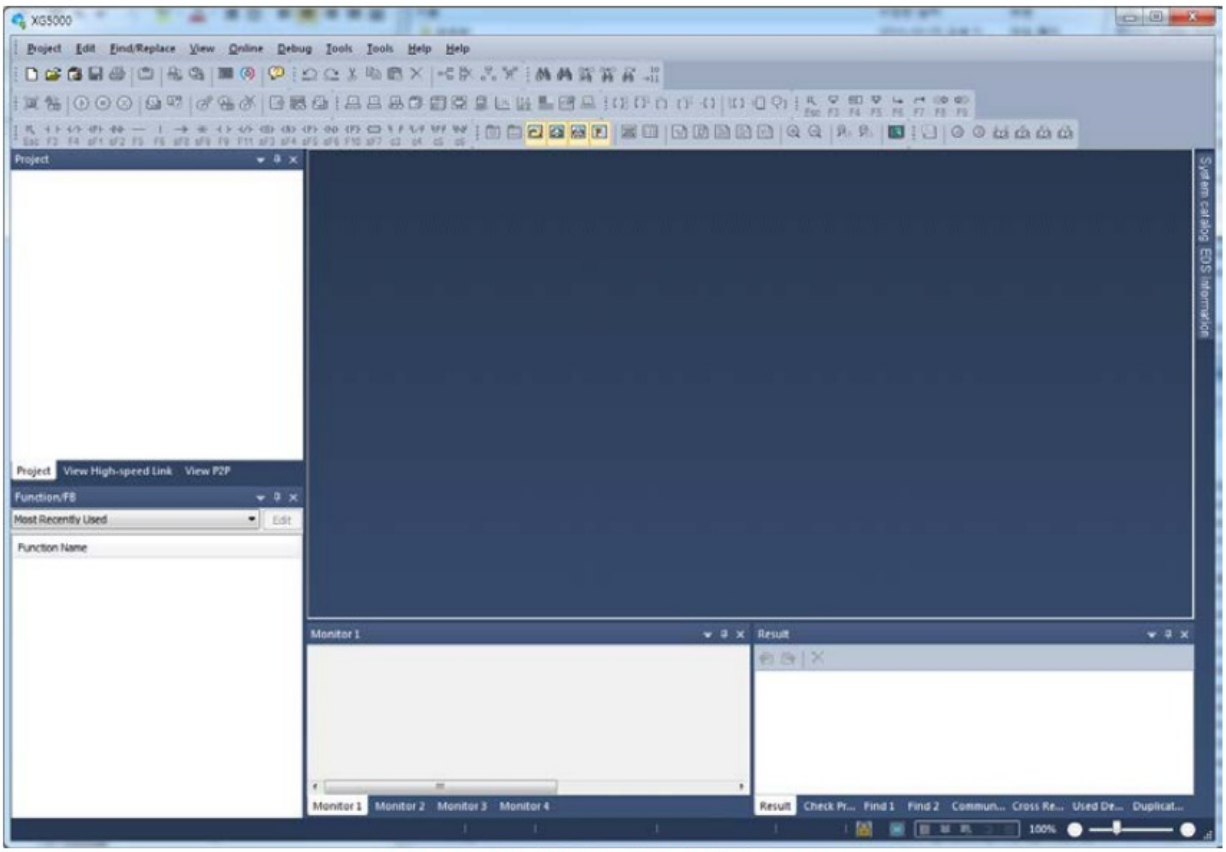
Note

1. The above program can be downloaded from our website now. In case of not using the internet, visit the near our company and get the CD.
   Internet web address : **https://www.ls-electric.com/**
2. XG5000 is programmable through the RS-23C port of CPU module and USB. For the used cable name, refer to the XGT catalog item list. (USB-301A, K1C-050A)

1.4.2 XG5000

XG5000 is dedicated software for setting of basic parameter, writing of frame and diagnosis of all communication module including the Pnet slave I/F module.

The following figure is initial screen of XG5000.



[Figure 1.4.1] XG5000 initial screen

1.4.3 Check of version

Before using the Pnet slave I/F module, check the version of module.

1. **Check through XG5000**

   Here describes on how to read communication module information by online connection to communication module. If interface with CPU is normal, it is available to get the following information.

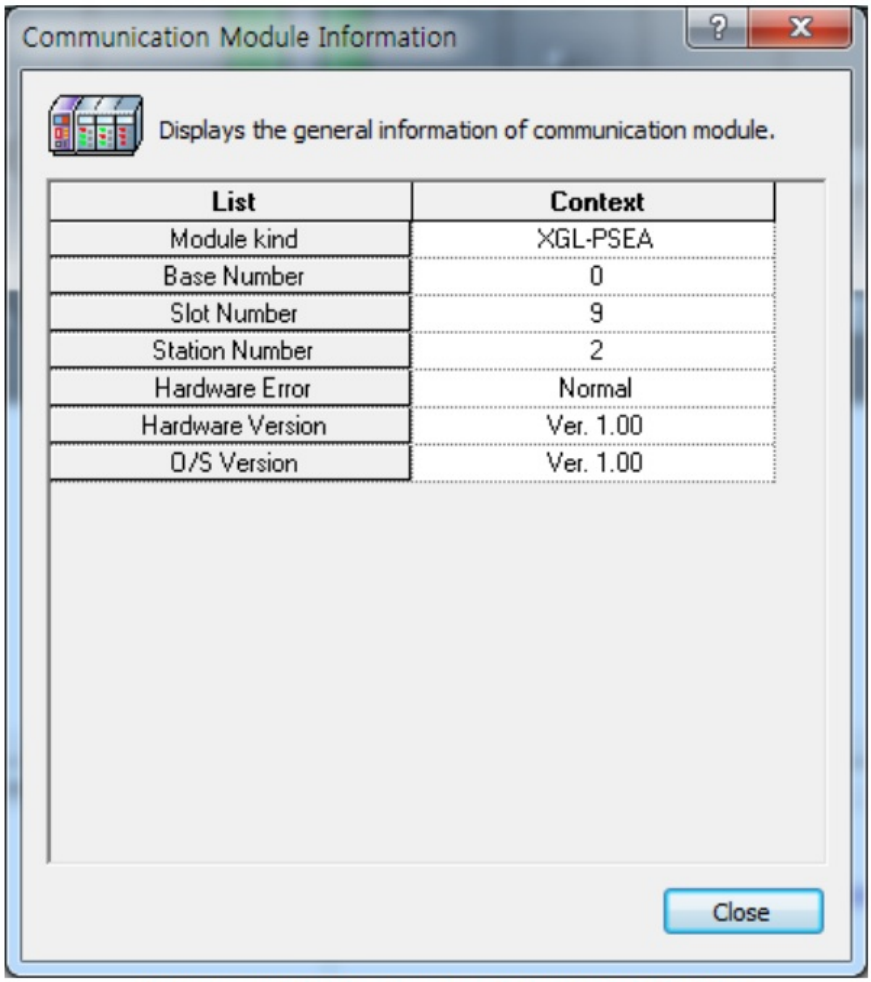
   (a) Execute the XG5000.

   (b) Connect with CPU through online connection.

   (c) If connection with CPU is established, execute the system diagnosis.

   (d) Double0click the module in the system diagnosis screen.

   (e) Software information shows at the right bottom of screen.



[Figure 1.4.2] Version check through XG5000

2. Check of version through the case label of the product

   Each communication module has the product information label on the case. If online check is not possible, see the label on the case after removing it from base.

   Label is in the back of the case and type name of product and version information is indicated.

1.5 Version Compatibility List

1.5.1 Pnet Remote I/F Module Compatibility List

The following table indicates compatible list of LS ELECTRIC Profibus-DP master module to use Pnet remote I/F module.
Before applying the system, refer to the following list.

Classification		Available Module		Ref.
		Type	O/S Version	
Communication Master	Pnet	G3/4/6L-PUEA/B	Version 1.0 or later	Sycon
		XGL-PMEA	Version 1.0 or later	Sycon
		XGL-PMEC	Version 1.0 or later	N Configurator
		XGL-PMEB	Version 5.0 or later	N Configurator
		XBL-PMEC	Version 1.0 or later	N Configurator

1.5.2 Pnet Slave I/F Module Compatibility List

The following table indicates compatible list of O/S Version between each CPU and master module to use Pnet slave I/F module.
Before applying the system, refer to the following list.

Classification		Available Module		Ref.
		Type	O/S Version	
CPU	GM3	GM3-CPUA	Version 2.5 or later	
	GM4	GM4-CPUA/B/C	Version 2.6 or later	
	GM6	GM6-CPUA/B/C	Version 1.9 or later	
	GM7	G7M Series	Version 1.6 or later	
	K1000S	K7P-30AS	Version 3.1 or later	
	K300S	K4P-15AS	Version 3.1 or later	
	K200S	K3P-03AS/BS/CS	Version 2.2 or later	
	K80S	K7M Series	Version 1.6 or later	
	XGK	XGK-CPUU/H/S/A/E	Version 1.6 or later	
	XGI	XGI-CPUU/H/S/A/E	Version 1.6 or later	
	XGR	XGR-CPUH/T,XGR- CPUH/F	Version 1.6 or later	Note 1)
PADT	GMWIN		Version 3.6 or later	
	KGLWIN		Version 3.3 or later	
	XG5000		Version 3.7 or later	
Communication Master	Pnet	G3/4/6L-PUEA/B	Version 1.0 or later	Sycon
		XGL-PMEA	Version 1.0 or later	Sycon
		XGL-PMEC	Version 1.0 or later	N Configurator
		XGL-PMEB	Version 5.0 or later	N Configurator
		XBL-PMEC	Version 1.0 or later	N Configurator

Note 1) In case of XGR system, master communication module can be installed on the extension base.

1.6 Notice in Using

When installing this device, notice the followings for the reliability and safety.

Category	Classification	Contents
Temperature	Condition	· When installing this device, maintain the temperature between 0~55 °C · Do not exposure it to direct light.
	Measure	· When temperature is too high, install pan, air-conditioner and when temper ature is too low, install suitable device.
Condensing	Condition	· No condensing allowed. · Install something in the control panel for protection from the water and dust .
	Measure	· Due to the frequent On/Off, condensing may occur. In this case, turn on th e device at the night
Shock	Condition	· Install it in the place where impact and vibration don't occur..
	Measure	· When impact and vibration is severe, install anti-vibration rubber so that vi bration and impact doesn't affect the device.
Gas	Condition	· Install in the place where there is not corrosive gas.
	Measure	· When corrosive gas enters, plan air-purification measure in the control pane l.
EMC Environm ent	Condition	· Install in the place where electro-magnetic wave is not severe.
	Measure	· In case of wiring, set the precise route. · Check the shield of control panel For light, use glow lamp and avoid fluorescent lamp · When installing power module, ground the device at standard electric poten tial

Product Specification

2.1 General Specification

The General Specification of Pnet remote, slave I/F module is as follows.

No.	Items	Specifications				Related stand ards
1	Ambient temperat ure	0 ~ 55 °C				
2	Storage t emperatu re	-25 ~ +70 °C				
3	Ambient humidity	5 ~ 95%RH(Non-condensing)				
4	Storage humidity	5 ~ 95%RH(Non-condensing)				
		Occasional vibration			–	
		Frequency	Acceleration	Amplitude	times	

<table>
<tr><td rowspan="6">5</td><td rowspan="6">Vibration resistance</td><td>5 £ f < 8.4Hz</td><td>–</td><td>3.5mm</td><td rowspan="6">10 times each directions (X, Yand Z)</td><td rowspan="6">IEC61131-2</td></tr>
<tr><td>8.4 £ f £ 150 Hz</td><td>9.8m/s2(1G)</td><td>–</td></tr>
<tr><td colspan="3">Continuous vibration</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td></tr>
<tr><td>5 £ f < 8.4Hz</td><td>–</td><td>1.75mm</td></tr>
<tr><td>8.4 £ f £ 150 Hz</td><td>4.9m/s2(0.5G)</td><td>–</td></tr>
<tr><td>6</td><td>Shock resistance</td><td colspan="5">· Peak acceleration: 147 m/s2(15G)·Duration: 11ms ·Half-sine, 3 times each direction per each axis</td><td>IEC61131-2</td></tr>
<tr><td rowspan="4">7</td><td rowspan="4">Noise resistance</td><td>Square wave Impulse noise</td><td colspan="4">AC: ±1,500V DC: ±900V</td><td>LS ELECTRIC standard</td></tr>
<tr><td>Electrostatic discharge</td><td colspan="4">4.0kV (Contact discharge)</td><td>IEC61131-2 IEC61000-4-2</td></tr>
<tr><td>Radiated electromagnetic field noise</td><td colspan="4">80 ~ 1,000 MHz, 10V/m</td><td>IEC61131-2, IEC61000-4-3</td></tr>
<tr><td rowspan="2">Fast transient/bust noise</td><td>Segment</td><td>Power supply module</td><td>Digital/analog input/output communication interface</td><td rowspan="2">IEC61131-2 IEC61000-4-4</td></tr>
<tr><td>Voltage</td><td>2kV</td><td>1kV</td></tr>
<tr><td>8</td><td>Environment</td><td colspan="5">Free from corrosive gasses and excessive dust</td><td></td></tr>
<tr><td>9</td><td>Altitude</td><td colspan="5">Up to 2,000 ms</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="5">2 or less</td><td></td></tr>
<tr><td>11</td><td>Cooling</td><td colspan="5">Air-cooling</td><td></td></tr>
</table>

Note

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

2.2 Communication Module Specification

2.2.1 Pnet remote I/F module specification

Item		Specification				
Standard		EN50170 / DIN 19245				
Interface		RS-485(electric)				
Media access		Polling				
Topology		Bus method				
Modulation method		NRZ				
Communication interface		Auto baud rate				
Master/Slave		Slave				
Max. station count per network		100 stations (including master and repeater)				
Max. station count per segment		32 stations (including master and repeater)				
Cable		Twisted shielded cable				
Max. 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	–
Max. node count		100 stations (setting range: 0 ~ 99)				
Max. expansion module installation count		12 modules				
Max. digital I/O points		768 points (Input max. 768 points/output max. 768 points, 64-point module x 12 slots)				
Max. analog I/O channels		Input max 122 channels (Max. TRX 244 byte/2) Output max 96 channels (8 channels X 12 slots) – 1 word per channel				
Internal consumption current ( )		600				
Weight (g)		114				

Note

How to write the parameter of special module and I/O module through expansion adapter is same as that through XG5000. For more detail, refer to XG5000 and special module manual.

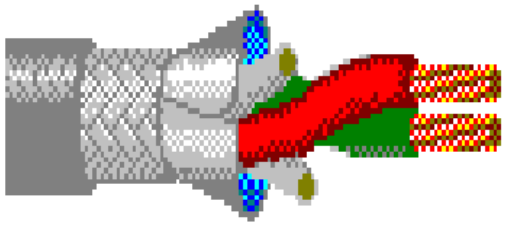
2.2.2 Pnet slave I/F module specification

Item			Specification				
Standard			EN50170 / DIN 19245				
Interface			RS-485(electric)				
Media access			Polling				
Topology			Bus method				
Modulation method			NRZ				
Communication interface			Auto baud rate				
Master/Slave			Slave				
Max. station count per network			99 stations (including master and repeater)				
Max. station count per segment			32 stations (including master and repeater)				
Cable			Twisted shielded cable				
Max. 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	–
Max. node count			9 stations (setting range: 0 ~ 98)				
Max RTX block count			24 blocks				
Max. expansion module installation count			12 modules				
Installation position	XGK-CPUU/H, XGI-CPUU		Main base ~ Expansion 7				
	XGK-CPUE, XGI-CPUE		Main base ~ Expansion 1				
	XGK-CPUA/S, XGI-CPUH/S		Main base ~ Expansion 3				
	XGR-CPUH/F, XGR-CPUH/T		Main base				
Internal consumption current ( )			410				
Weight (g)			103				

2.3 Communication Cable Specification

2.3.1 Profibus-DP cable specification

1. **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)	
Insulation	PE (Polyethylene)	
Insulation intensity	0.035 (inch)	
Shield	Aluminum Foil-Polyester Tape /Braid Shield	
Capacity	8500 /ft	
Characteristic impedance	150 Ω	
Core count.	2 Core	

2. Connector’s structure and connector wire method

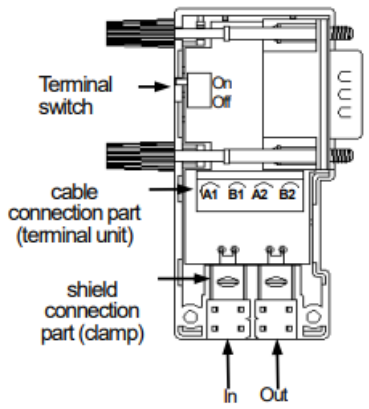
   (1) Input wire: green line is connected to A1, red line is connected to B1.

   (2) Iutput wire: green line is connected to A2, red line is connected to B2

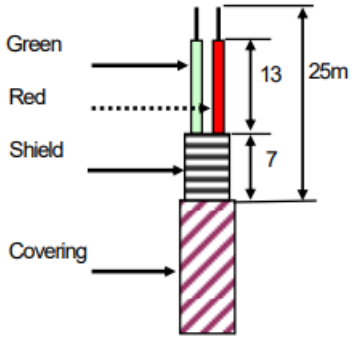
   (3) Shield is connected to connector’s clamp.

   (4) When installing the connector in terminal, install cable at the A1.B1.

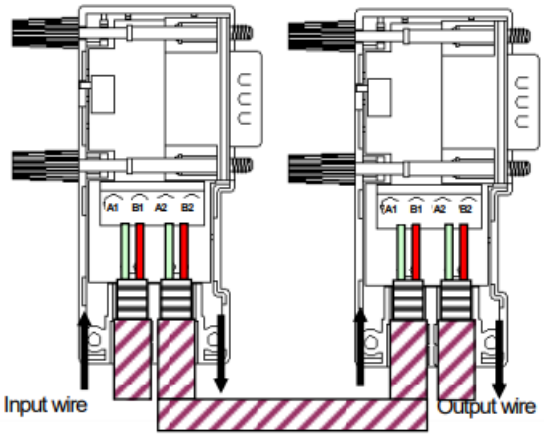
<connector structure>



<cable structure>



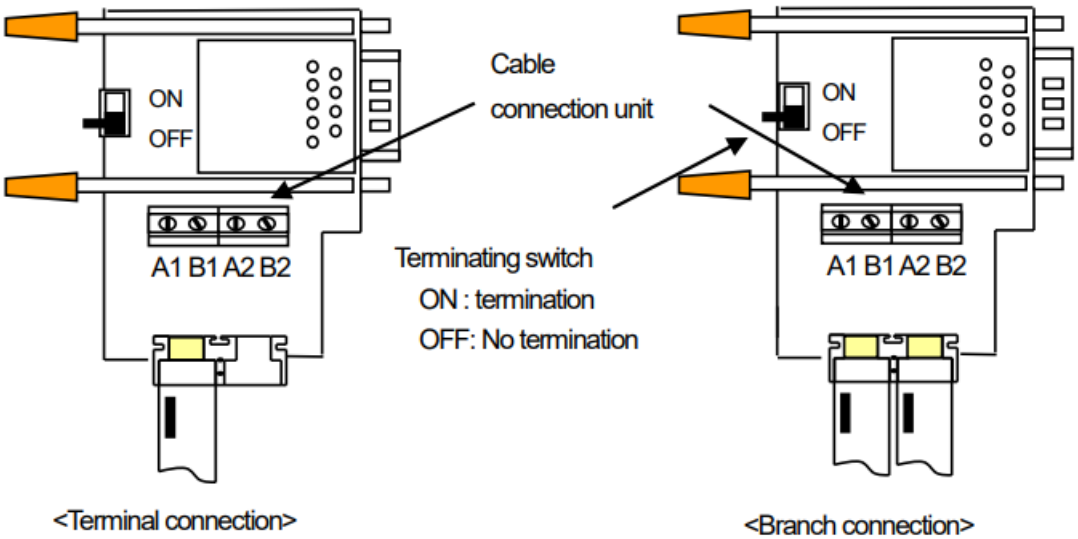
<connector wire method>



2.4 Terminating

2.4.1 Pnet Terminating

- Connection Connector



<Terminal connection>

<Branch connection>

System Configuration

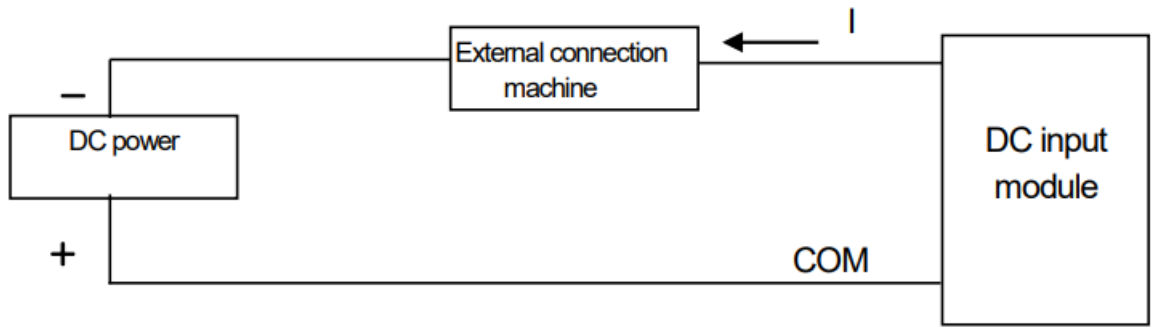
This chapter describes the method of system configuration and characteristics.

3.1 Notices in Selecting Module

Here describes the notices in selecting digital I/O module which is used for Remote I/O.

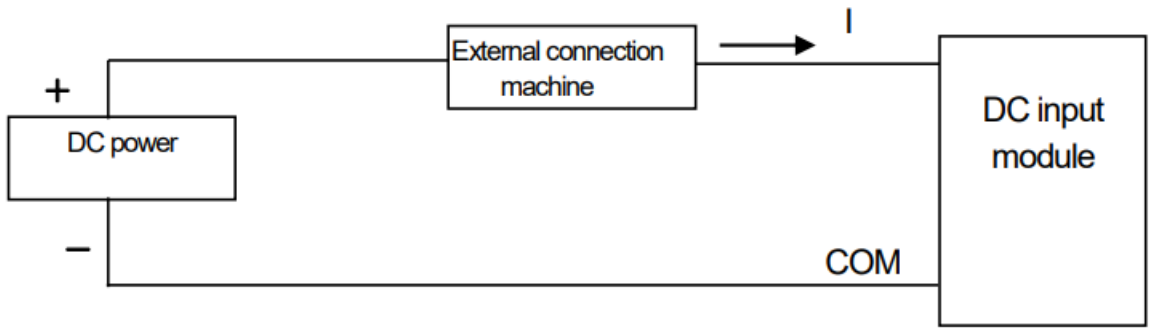
1) Digital input types contain the current sink input and current source input. In case of DC input module, as the wiring method of external input power is different according to such input types, make sure of selecting the input module considering the spec. of input connection machine. The wiring method per type is as follows.

(1) How to connect the sink type external connection machine to the source type DC input module.



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

(2) How to connect the source type external connection machine to the sink type DC input module.



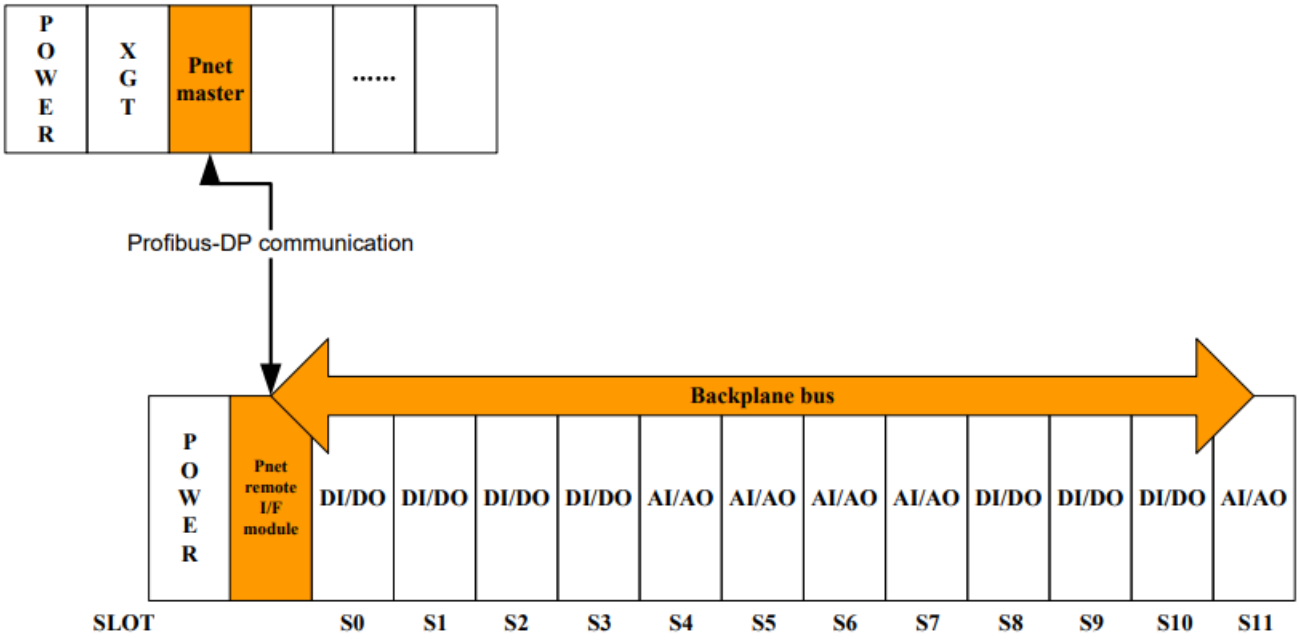
- External connection machine is located between DC power and (+) terminal of DC input module terminal.
- Thus, when inputting ON, the current flows from external connection machine to DC input module terminal.

2) In case that the open/close frequency is high or it is used to open/close the conductive load, please use transistor output module as Relay output module may reduce the life.

3.2 Names of Each Part (Pnet Remote I/F module)

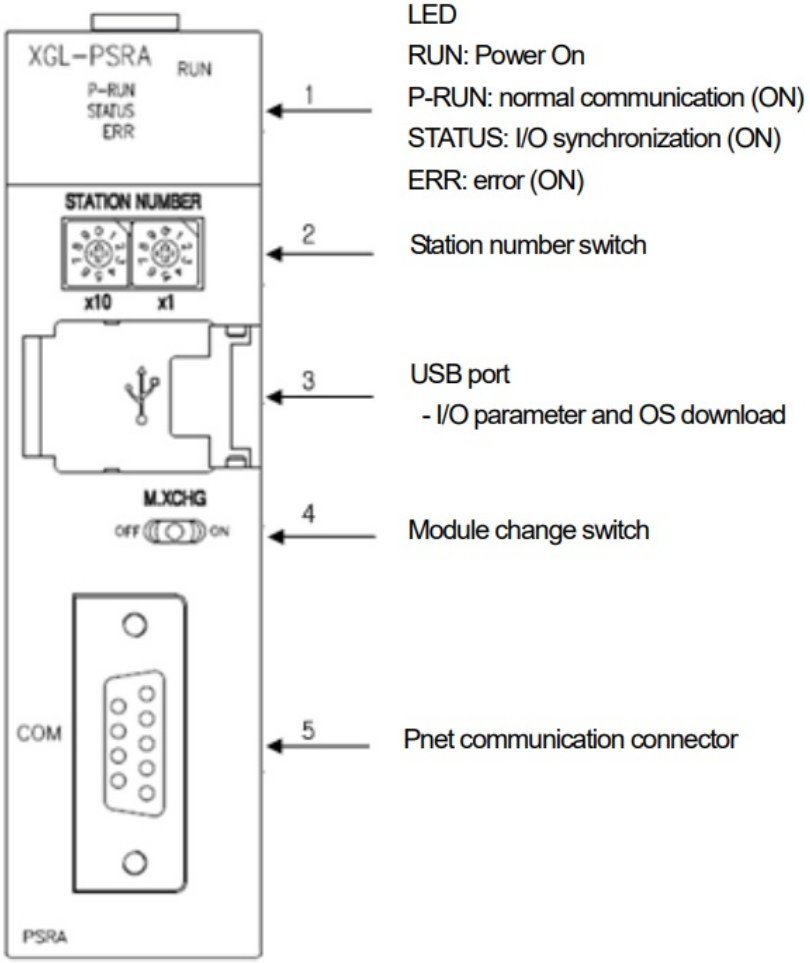
3.2.1 Basic System Configuration

Communicates with master and controls expansion I/O module through Backplane Bus



3.2.2 Names and Functions of Each Part

1. Pnet remote I/F module



2. **LED**

Item	Name	Normal	Abnormal	LED indication contents
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 configu ration of slave so communication is normal
		–	Off	System configuration of master is not same as I/O con figuration of slave so communication is not normal
4	ERR	–	On	Error à refer to the following error type
		Off	–	No error

3. **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, etc is attached at Base

   (3) Out of I/O points I/O module configuration exceeding max. I/O 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 Off

   – When different parameter is downloaded during not communicating: ERR LED On

3.2.3 Available Product List

1. Power module list

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

2. Base list

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

3. **Digital I/O module list**

Input module	XGI-A12A	AC110V, 16 point
	XGI-A21A	AC220V, 8 point
	XGI-D21A	DC24V, 8 point, sink/source
	XGI-D21D	DC24V, 8 point, sink/source
	XGI-D22A	DC24V, 16 point, sink/source
	XGI-D22B	DC24V, 16 point, source
	XGI-D24A	DC24V, 32 point, sink/source
	XGI-D24B	DC24V, 32 point, source
	XGI-D28A	DC24V, 64 point, sink/source
	XGI-D28B	DC24V, 64 point, source
Output module	XGQ-RY1A	Relay, 8 point
	XGQ-RY1D	Relay, 8 point
	XGQ-RY2A	Relay, 16 point
	XGQ-RY2B	Relay, 16 point, Built-in surge killer
	XGQ-SS2A	Triac, 16 point
	XGQ-TR1C	TR, 8 point, sink
	XGQ-TR2A	TR, 16 point, sink
	XGQ-TR2B	TR, 16 point, source
	XGQ-TR4A	TR, 32 point, sink
	XGQ-TR4B	TR, 32 point, source
	XGQ-TR8A	TR, 64 point, sink
	XGQ-TR8B	TR, 64 point, source
I/O module	XGH-DT4A	DC24V, 16 point input / TR 16 point, sink

NoteFor specification of I/O module, refer to XGI or XGK CPU manual.

Chapter 3 System Configuration

4. **Analog module list**

Analog input	XGF-AV4A	Voltage input: 4 channels
	XGF-AV8A	Voltage input: 8 channels
	XGF-AC4A	Current input: 4 channels
	XGF-AC8A	Current input: 8 channels
	XGF-AD8A	Voltage/current input: 8 channels
	XGF-AD4S	Voltage/current input: 4 channels, insulation between channels
	XGF-AW4S	Voltage/current input: 4 channels(2-wire input), insulation between channels
	XGF-AD16A	Voltage/current input: 16 channels
	XGF-AC4H	Current input: 4 channels
Analog output	XGF-DV4A	Voltage output type, 4 channels
	XGF-DC4A	Current output type, 4 channels
	XGF-DV8A	Voltage output type, 8 channels
	XGF-DC8A	Current output type, 8 channels
	XGF-DV4S	Voltage output type, 4 channels, insulation type
	XGF-DC4S	Current output type, 4 channels, insulation type
	XGF-DC4H	Current output type, 4 channels
Temp. conversion	XGF-TC4S	Thermocouple input, 4 channels, insulation type
	XGF-RD4A	RTD input, 4 channels
	XGF-RD4S	RTD input, 4 channels, insulation type
	XGF-RD8A	RTD input, 8 channels
Analog I/O	XGF-AH6A	Voltage/current selection input type, 4 channels/voltage/current selection output type, 2 channels – 4 words are allocated for each I/O in XGL-PSRA.

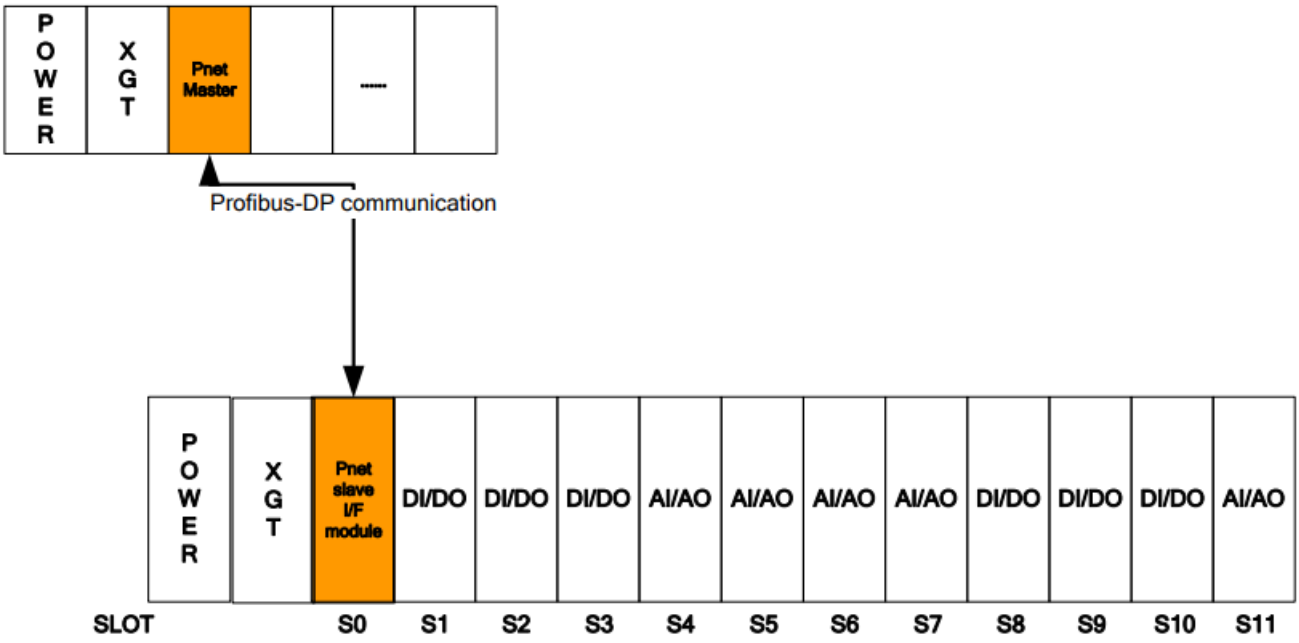
Note

For specification of analog I/O module, refer to each product's user manual

3.3 Names of Each Part (Pnet Slave I/F module)

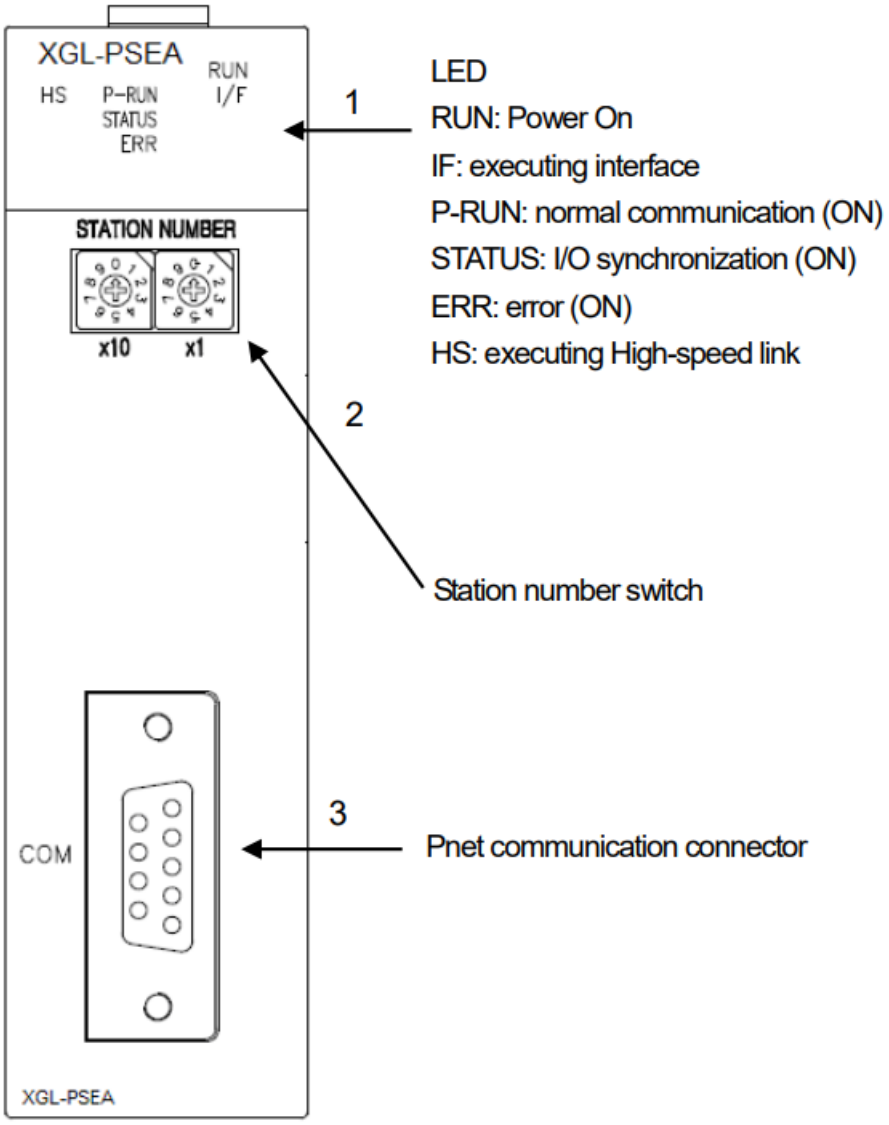
3.3.1 Basic System Configuration

Communicates with master and controls expansion I/O module through CPU



3.3.2 Names and Functions of Each Part

1. **Pnet slave I/F module**

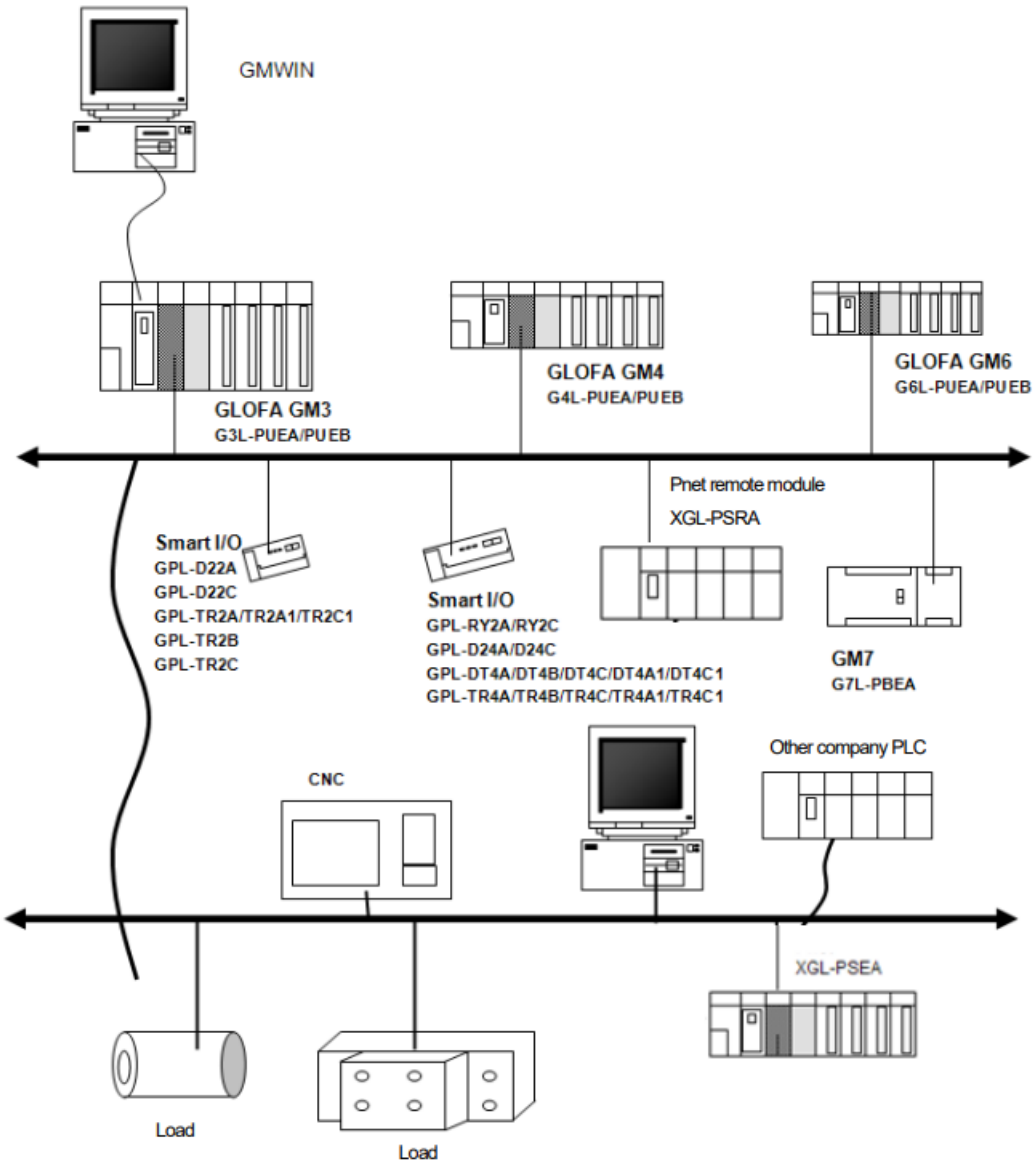


2. **LED**

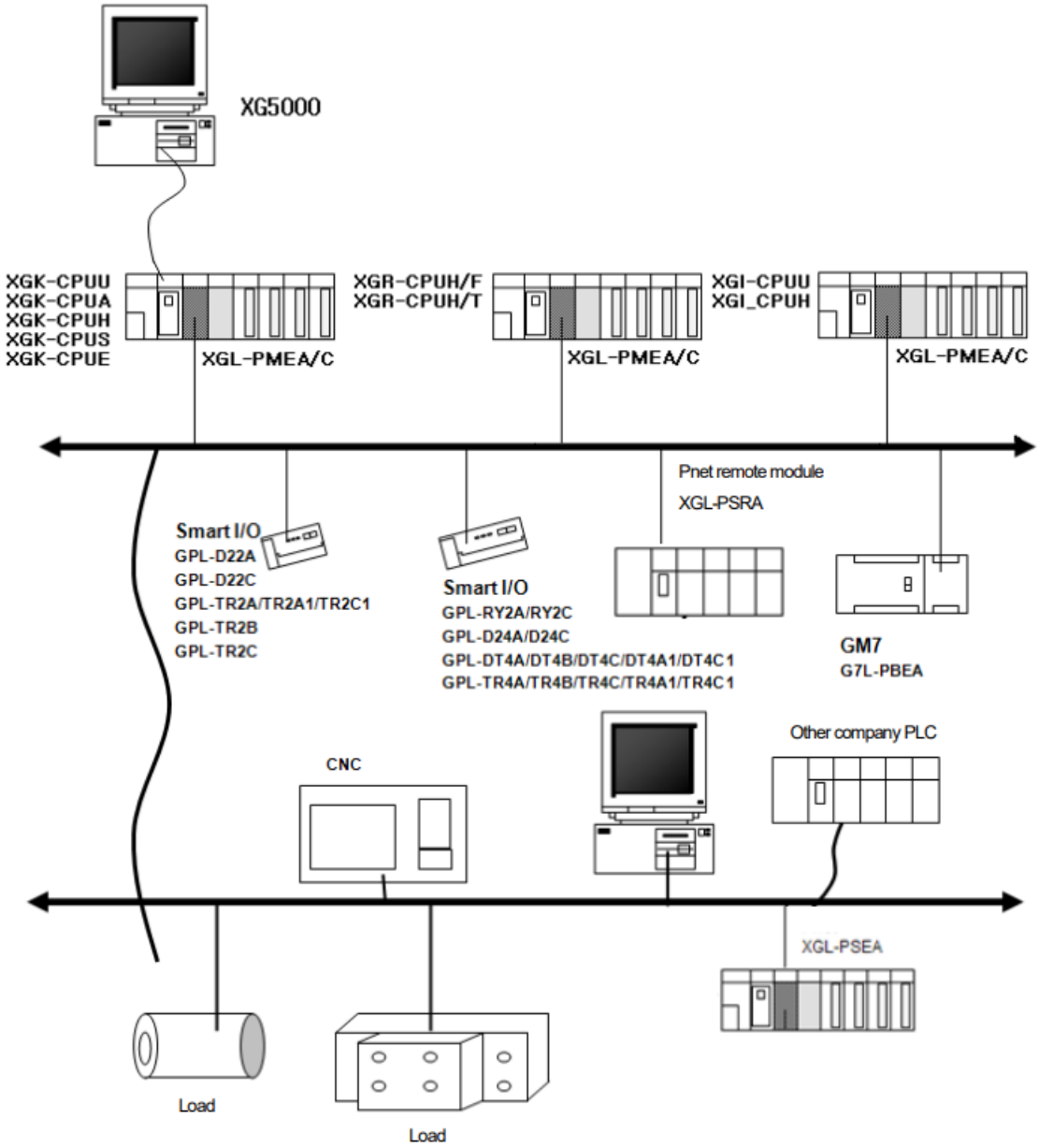
Item	Name	Normal	Abnormal	LED indication contents
1	RUN	On	–	Initialization complete and normal operation (Normal operation of system O/S)
		–	Off	Heavy trouble (O/S operation error by H/W error)
2	P-RUN	On		Master configuration and slave parameter are identical and data communication is normal
		–	Off	Data communication between the master and the slave is not being executed.
3	STATUS	On	–	Communication cable is connected with the master
		–	Off	Communication cable is not connected with the master because of error or detachment of the cable
4	IF	Flicker		Interface with CPU module is normal
			Off	Interface with CPU module is not operating
5	HS	On		Setting of High-speed link parameter downloaded from the XG5000 is normal and High-speed link is enabled.
			Off	Setting of High-speed link parameter downloaded from the XG5000 is abnormal or High-speed link is disabled
6	ERR	Off		No error
		–	Flicker	O/S error or RAM error Communication module is not normal

3.4 System Configuration Example

3.4.1 Pnet System (GMWIN)



3.4.2 Pnet system (XG5000)



Communication Programming

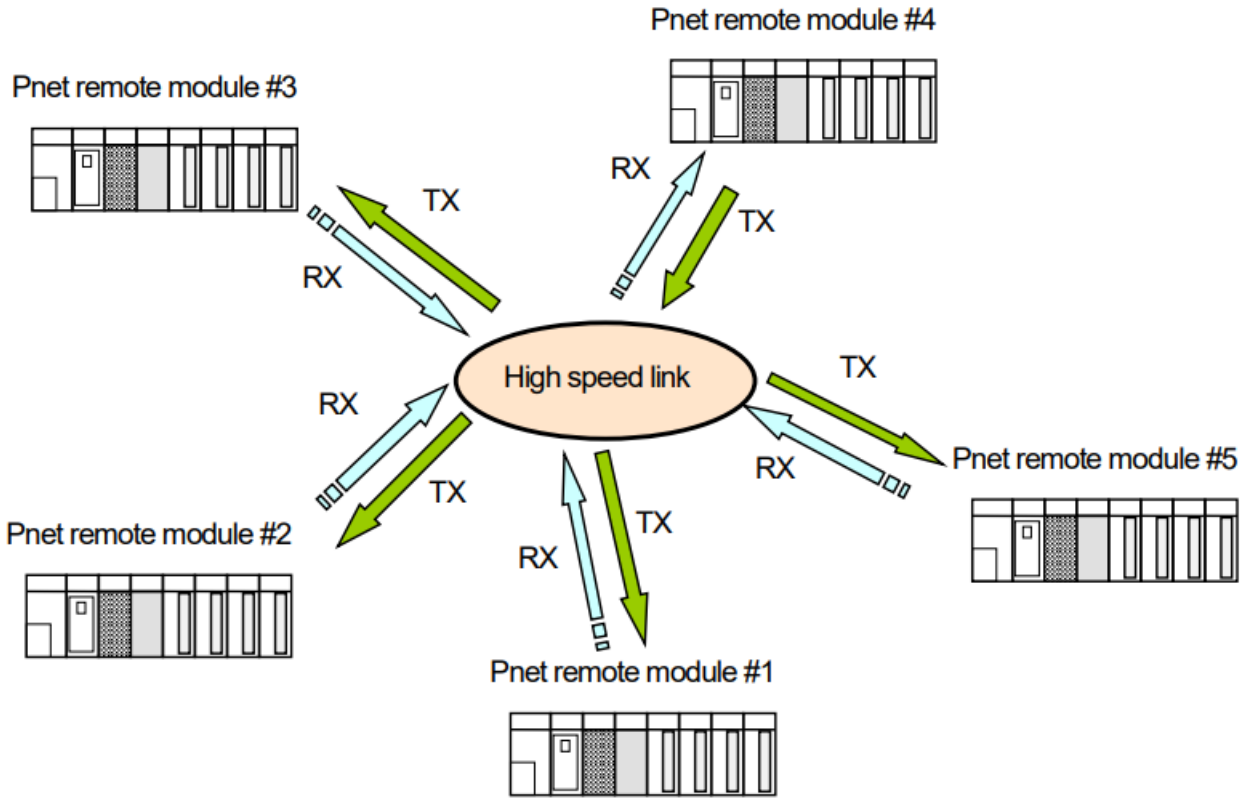
4.1 How to Set Master Module

Describes how to set master module to use Pnet remote module For more detail, refer to master module's user manual.

4.1.1 High-speed Link

High-speed Link is used when other station's data or information is periodically exchanged at every specific time. By referring to the changing data of its own station or other station periodically, it enables to utilize the data to the system effectively and communicates by setting the simple parameter.

The setting method is to designate its own area and the area of other station, data size, and station no. (for GLOFA seires, in GMWIN, for MASTER-K, in KGLWIN, for XGT, in XG5000) and then carry out communication. Data size is from minimum 1 byte (8 point) to 244 byte. And communication period is from maximum 10ms to 10s according to communication contents As it is available to communicate with other station by simple parameter setting, it is easy to use this program and the High-speed process of internal data enables to process lots of data at the same time periodically



4.1.2 XG5000's Link Parameter Setting

When using XGT Pnet master module, it is easy to set device region and date size to communicate between CPU module and Communication module (Master module and Slave module) by using XG5000.

(1) Pnet High-speed Link setting Contents

<table>
<tr><th colspan="2">Contents</th><th colspan="3">High-speed Link</th></tr>
<tr><td rowspan="12">Communication module setting</td><td rowspan="3">Communication module setting</td><td>Module Type</td><td colspan="2">Select Pnet</td></tr>
<tr><td>Base No.</td><td colspan="2">Max: 0 ~ 7, Setting range differ according to CPU module.</td></tr>
<tr><td>Slot No.</td><td colspan="2">Max: 0 ~ 11, Setting rage differ according to base Type.</td></tr>
<tr><td>Communication period setting (Period Type)</td><td colspan="3">Select among 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s-default is 10ms.</td></tr>
<tr><td rowspan="4">Output data setting when emergency</td><td rowspan="2">CPU Error</td><td>Latch</td><td>Maintain previous output status.</td></tr>
<tr><td>Clear</td><td>Clear all output.</td></tr>
<tr><td rowspan="2">CPU Stop</td><td>Latch</td><td>Maintain previous output status.</td></tr>
<tr><td>Clear</td><td>Clear all output.</td></tr>
<tr><td>Mode</td><td colspan="3">Sending: transfers data from Master module to Slave module.
Receiving: transfers data from Slave module to Master module.</td></tr>
<tr><td>Station No.</td><td colspan="3">Slave Station No. (Range: 1 ~ 99)</td></tr>
<tr><td>Communication type</td><td colspan="3">Indicate communication type between Master and Slave. (Poll, Bit-Strobe, COS, Cyclic)</td></tr>
<tr><td rowspan="2">Read area (Master → modul Slave module)</td><td>Address</td><td colspan="2">first device of TX devices Available device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR</td></tr>
<tr><td>Size (Byte)</td><td colspan="2">Indicate I/O point into Byte.
– Consider less than 8 bit I/O module as 1 Byte</td></tr>
<tr><td rowspan="2">Save area (Slave a module → Master module)</td><td>Address</td><td colspan="2">first device of RX devices
Available device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR</td></tr>
<tr><td>Size (Byte)</td><td colspan="2">Indicate Slave module’s I/O point into Byte.
– Consider less than 8 bit I/O module as 1 Byte</td></tr>
<tr><td colspan="2">PLC connection</td><td colspan="3">CPU module’s RS-232C or USB port</td></tr>
<tr><td colspan="2">Control condition</td><td colspan="3">Control is available regardless of location (RUN, STOP) of mode switch of CPU module.</td></tr>
<tr><td colspan="2">Max. communication point</td><td colspan="3">TX 28,672 point, RX 28,672 point each 3584 byte</td></tr>
<tr><td colspan="2">Max. Block No.</td><td colspan="3">126 (0~125)</td></tr>
<tr><td colspan="2">Max. point per block</td><td colspan="3">244</td></tr>
<tr><td colspan="2">High-speed link setting count</td><td colspan="3">Max. 12</td></tr>
</table>

Notice

1. The above category is not set in XG5000.
2. This data is uploaded value from XG5000 which is set in SyCon or N Configurator(XGL-PMEB).
3. Set according to the following sequence.

   First: Set parameter by SyCon or N Configurator → download to master module

   Second: XG5000 → Online → Communication module setting → Config. Upload → High-speed Link

parametersetting → parameter download → Enable High-speed Link If you don't follow above sequence, it may cause change of setting value.

▶ When you change High-speed Link contents, you should download parameter again.

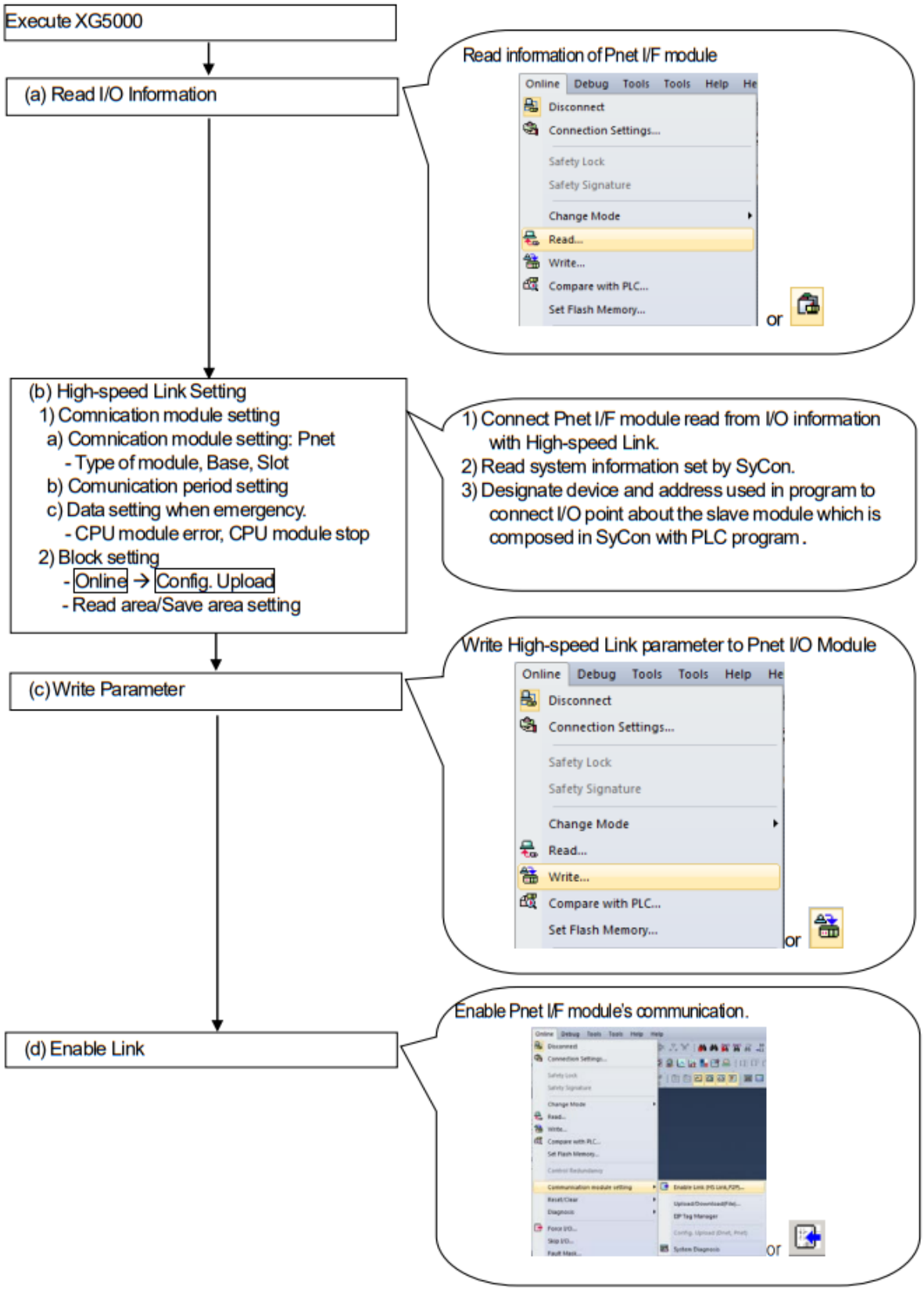
▶ It is available to set and use only one High-speed Link per one communication module.

▶ Wrtten parameter with Sycon or N Configurator is stored in master module and XG5000(basic, High-speed Link, P2P)
is stored in CPU module. When changing CPU module, download backup parameter set in XG5000 and write it to
new CPU module. For description on SyCon, refer to chapter 5

Notice

(2) How to use XG5000

How to use XG5000 for Pnet I/F Module is as follows.



4.1.3 High-speed Link communication status flag information (XGT)

Communication Flag List corresponding to High-speed Link Number High-speed Link No.1~12.

No.	Keyword	Type	Contents	Contents Explanation

L00000 0	_HS1_RLINK	Bit	All stations of High - speed Link No.1 are normal.	It indicates normal status of all stations which operate a ccording to parameter set in the High-speed Link. If the f ollowing condition is met, It would be turned On. 1. All stations set in parameter are RUN mode and ther e is no Error. 2. All data blocks set in parameter operate properly. 3. When parameter of each station in parameter comm unicates normally, after Run_Link is On, Run_Link maint ains On contiuosly unless quitted by disable.
L00000 1	_HS1_LTRBL	Bit	Indicates abnormal After _HS1RLINK ON	When _HSmRLINK Flag is On, if station set in paramete r and communication status is same as the followings, t his flag is turned On. 1. Station set in parameter is not RUN mode. 2. Station set in parameter has Error. 3. Communication status of data block set in paramete r is not proper. If above condition is met, Link_Troble set On. If condition is normal, Link_Troble set Off.
L00002 0~ L000 09F	_HS1_STATE [k] (k=000~127)	Bit A rray	Indicates High- spe ed Parameter No.1 Kth Block's total st atus	It indicates total status about each data block set in para meter. HS1STATE[k]=HS1MOD[k]&_HS1TRX[k]&(~_HS mERR[k])
L00010 0~ L000 17F	_HS1_MOD[k] (k=000~127)	Bit A rray	Run Mode of High- speed Parameter No.1 Kth Block	It indicates operation mode of station set in Kth block of parameter.
L00018 0~ L000 25F	_HS1_TRX[k] (k=000~127)	Bit A rray	Indicates normal C ommunication stat us with High- spee d Parameter No.1 Kth Block	It indicates whether communication status of parameter' s Kth data block operates normally or not according to s etting.
L00026 0 ~ L00 033F	_HS1_ERR[k] (k=000~127)	Bit A rray	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.

L00034 0~ L000 41F	_HS1_SETBL O CK[k]	BitA rray	Indicates setting of High-speed Param eter No.1 Kth Block	It indicates whether Kth data block of parameter is set o r not.

Note

High-speed Li nk Number	L Region Address Number	Reference
2	L000500~L00099F	When [Table 1]'s High-speed Link is 1, other Flag ad dress 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 us ing the High-speed Link Flag for the program and mo nitoring, use Flag Map registered in the XG5000.
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	

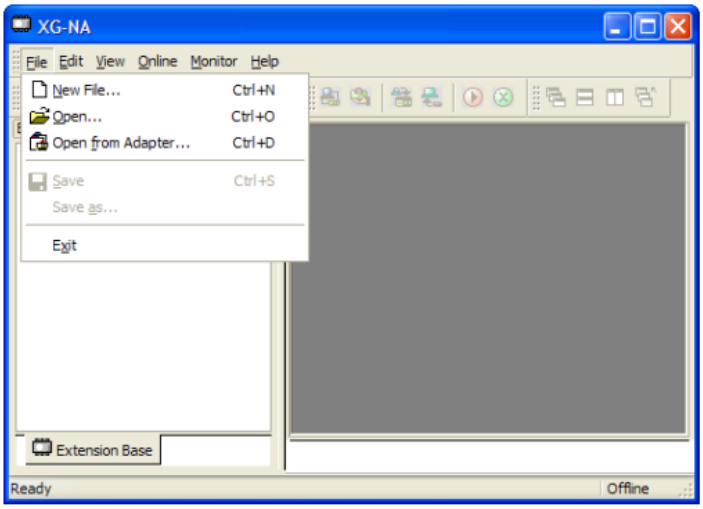
K indicates information about 128 Blocks from Block No.000 to 127 through 8 word (Each word consist of 16 block.).
For example, mode information (_HS1MOD) has information about block 0 ~15 in the L00010. (16~31, 3 2~47,48~63, 64~79, 80~95, 96~111, 112~127 in the L00011, L00012, L00013, L00014, L00015, L00016, L00017) So block no. 55's mode information in the L000137

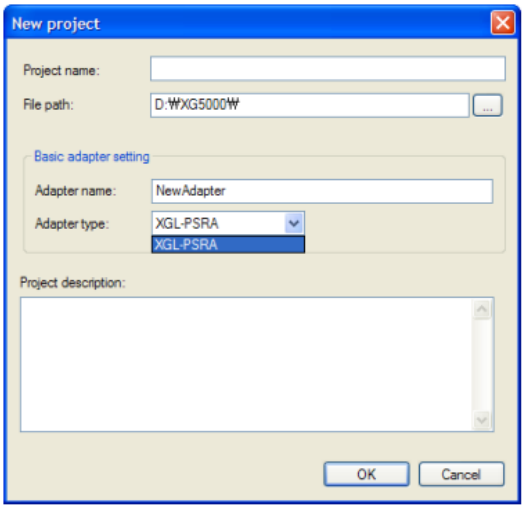
4.2 How to register XGT Profibus-DP remote module

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

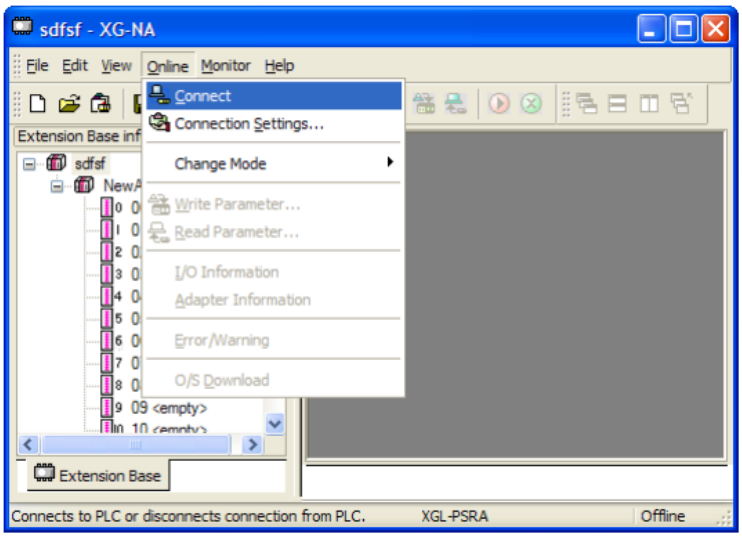
4.2.1 Create new project

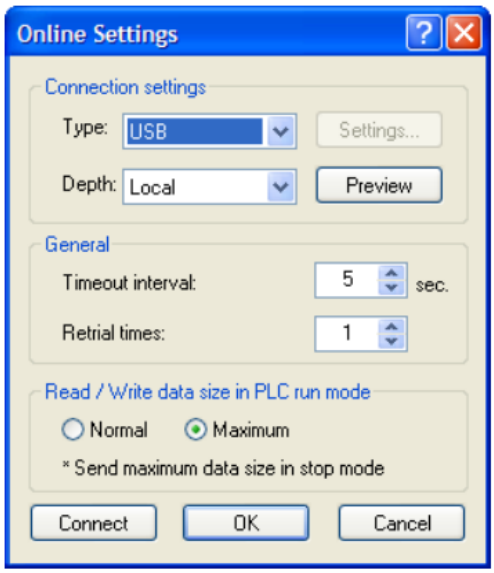
Select "File – New File" and then select "XGL-PSRA" at Adapter type.





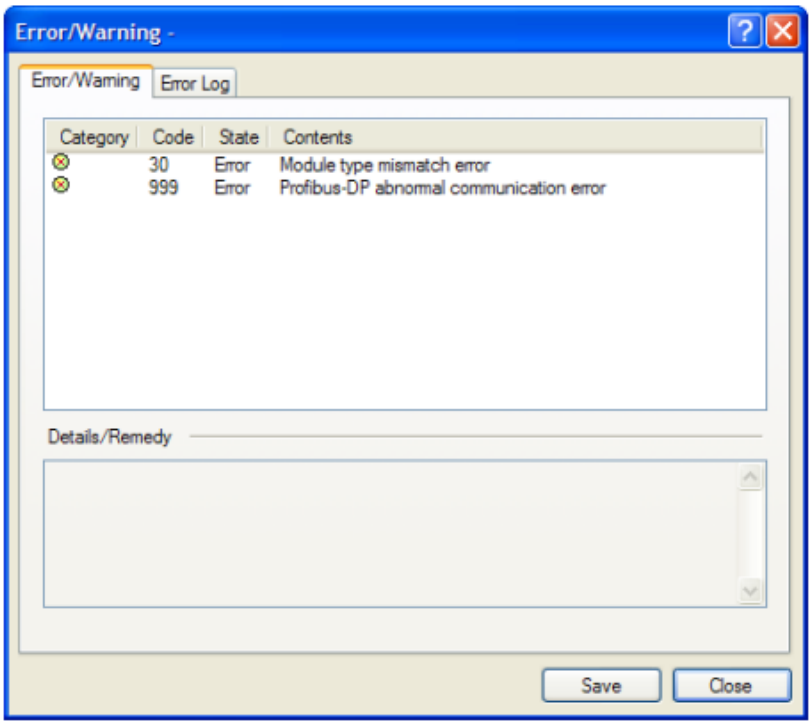
After connecting USB cable to XGT Profibus-DP remote module, turn on the power. Select “Online – Connection Settings” and then set the “Type” as USB and “Depth” as local. Then establish connection.



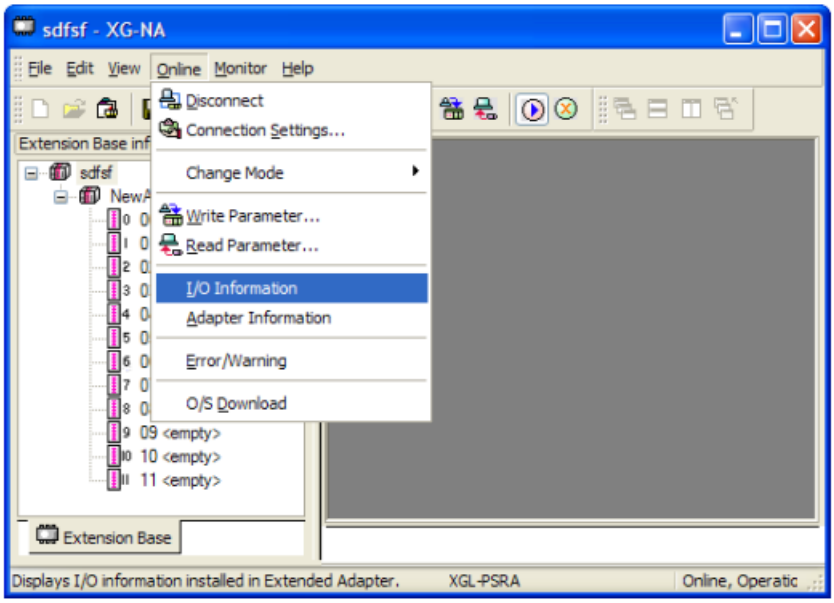


4.2.2 Set IO parameter

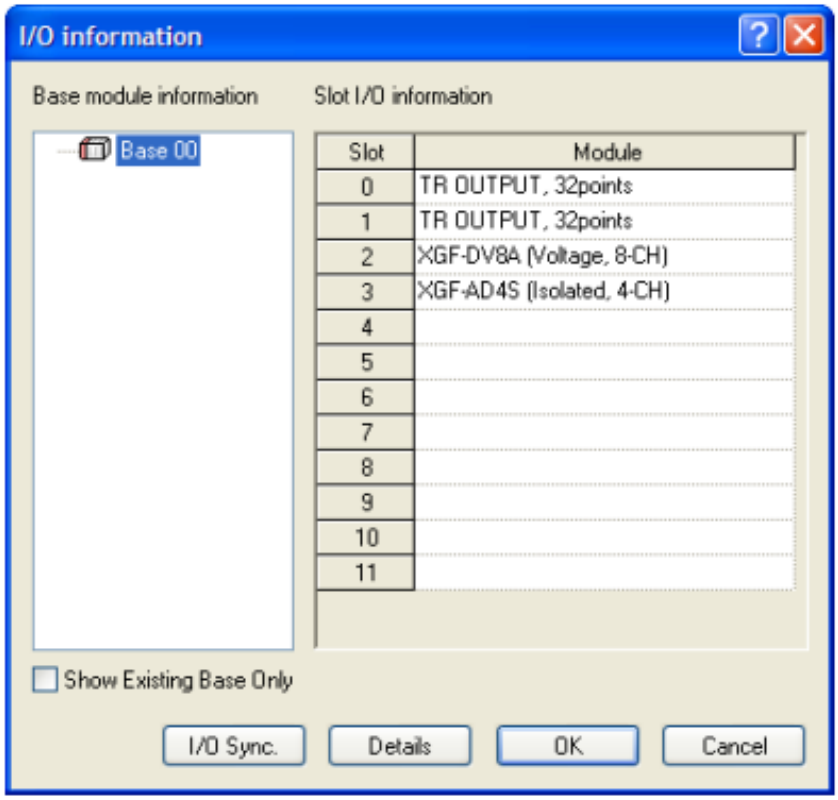
If I/O parameter is different with actual system configuration in main base, XGT Profibus-DP remote module indicates “Module type mismatch” error. At this time, STATUS LED is off.



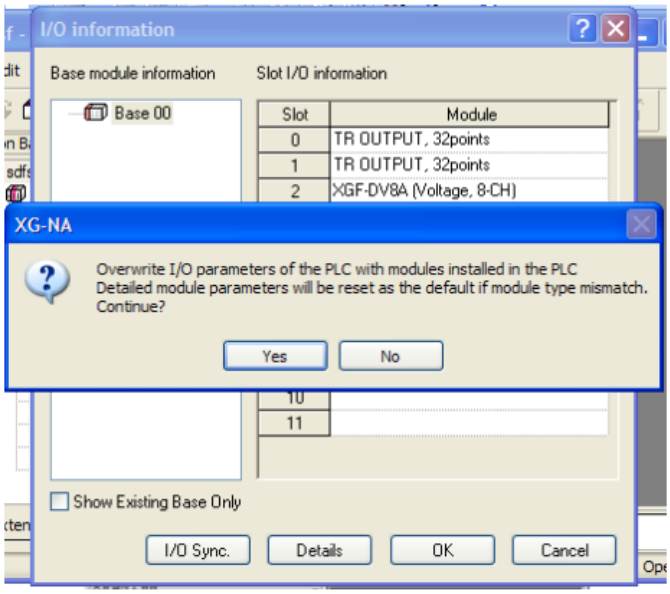
1) I/O synchronization Open “I/O information” at “Online” and check whether I/O information matches actual system configuration.

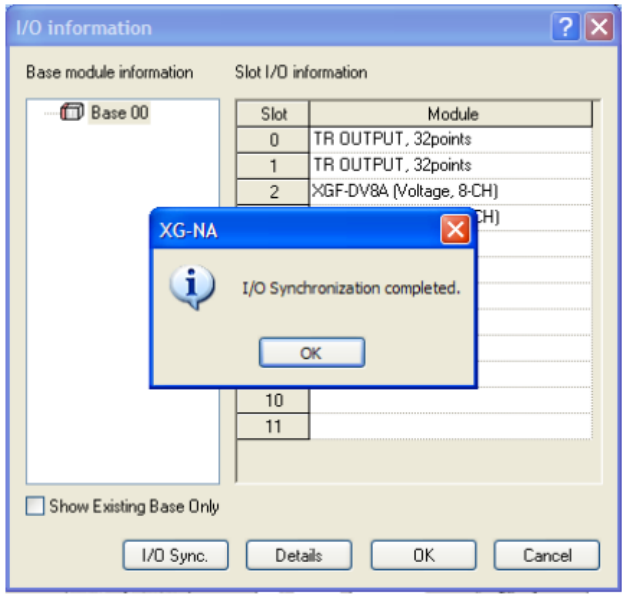


The following figure is I/O information where TR output modules are in slot 0 and 1, XGF-DV8A in slot 2, XGFAD4S in slot 3.

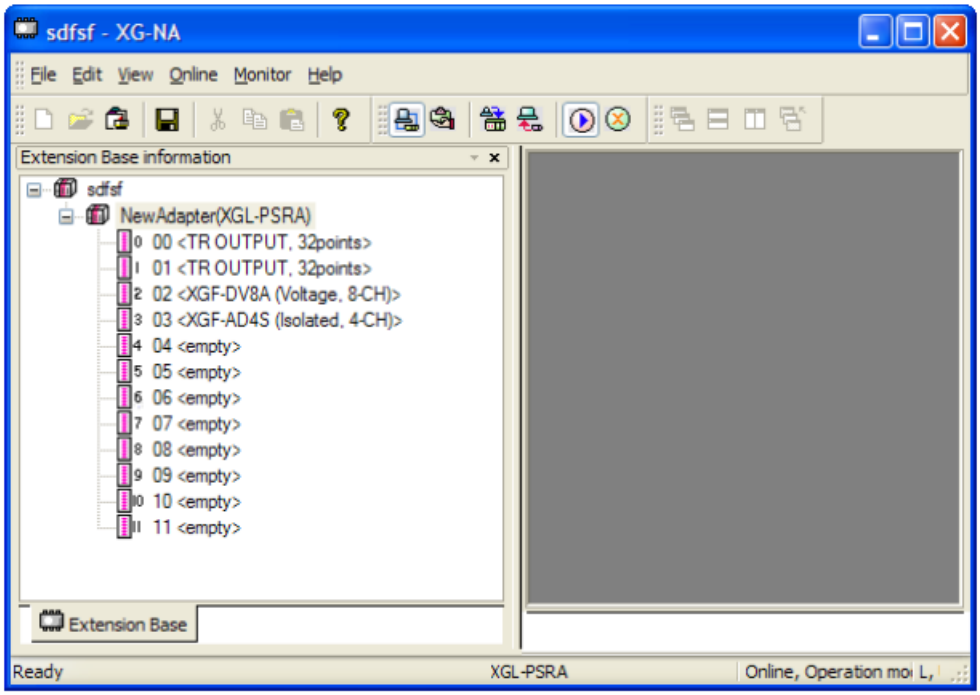


If I/O information matches actual module configuration, click “I/O synchronization button” and match I/O information.





If “module mismatch error” appears, check whether ERR LED is off or not.
Check whether all modules are registered at project window.

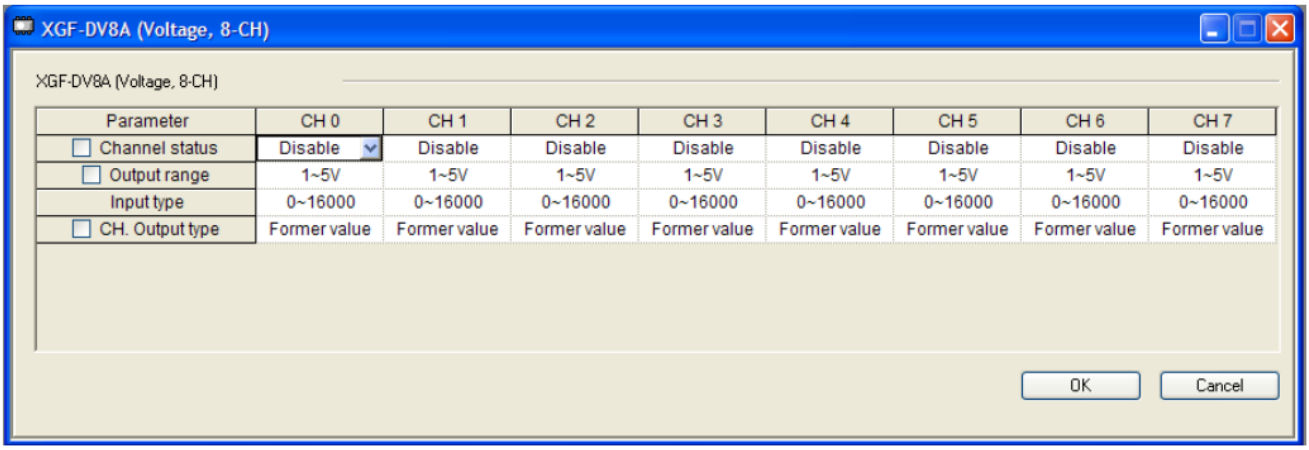


1. Analog module parameter setting

   To set a detail parameter on the module, double-click the module at project window.

   The figure below is parameter window when you double-click the XGF-DV8A.

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

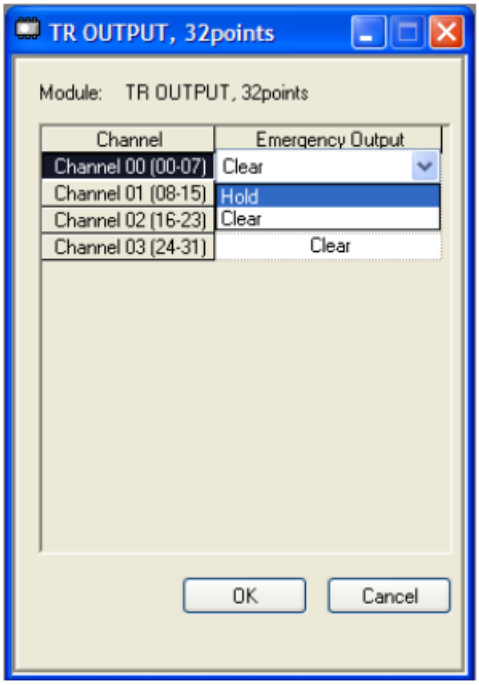


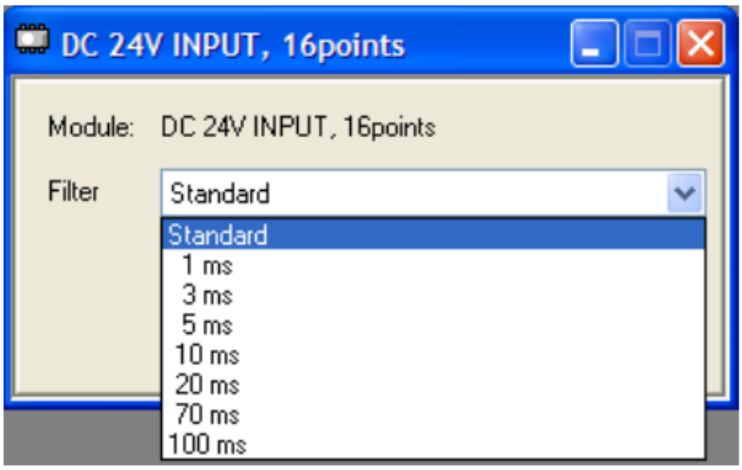
After completing the parameter setting, download the parameter through “Online ➔ Write Parameter”.

2. Digital I/O module parameter setting

   If you double-click the digital I/O module, for output module, emergency output setting window appears and for input module, input filter setting window appears as follows. Emergency output sets output status in case of remote module error.

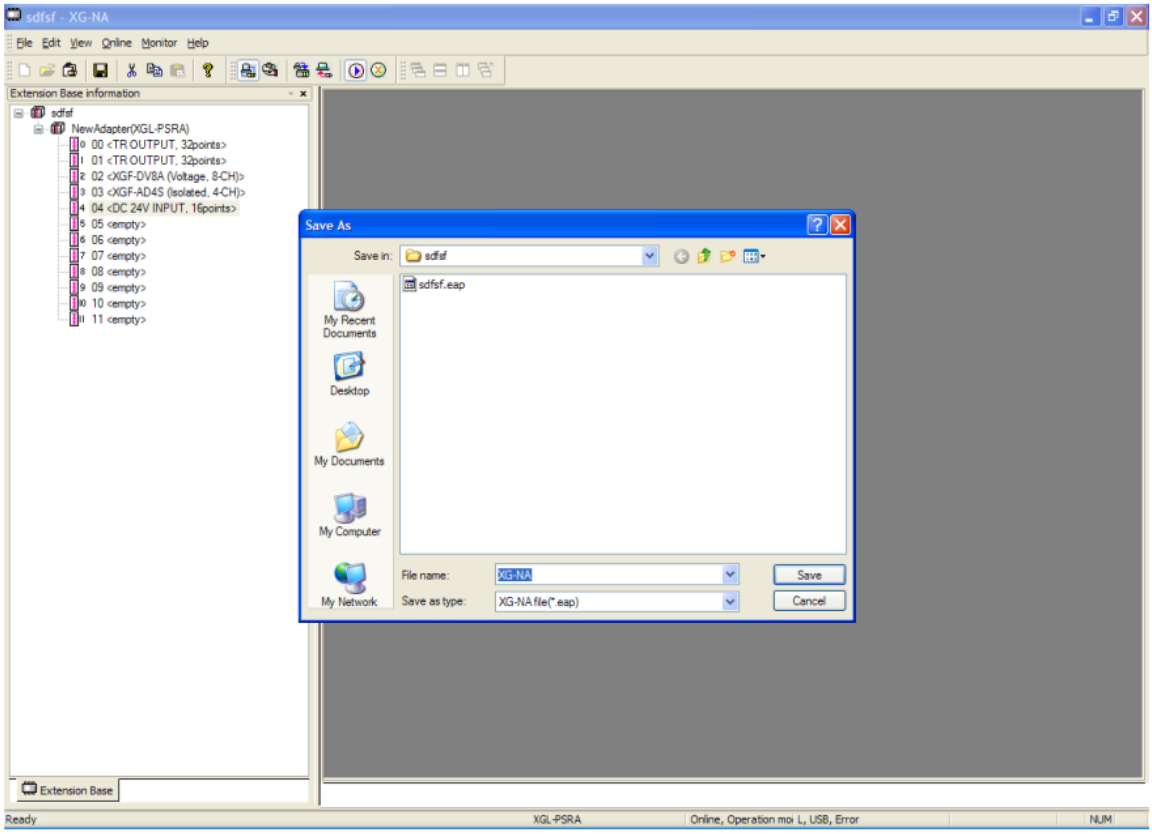
   If emergency output is “Clear”, output becomes ‘0’ in case of error. If emergency output is “Hold”, output holds last output data.





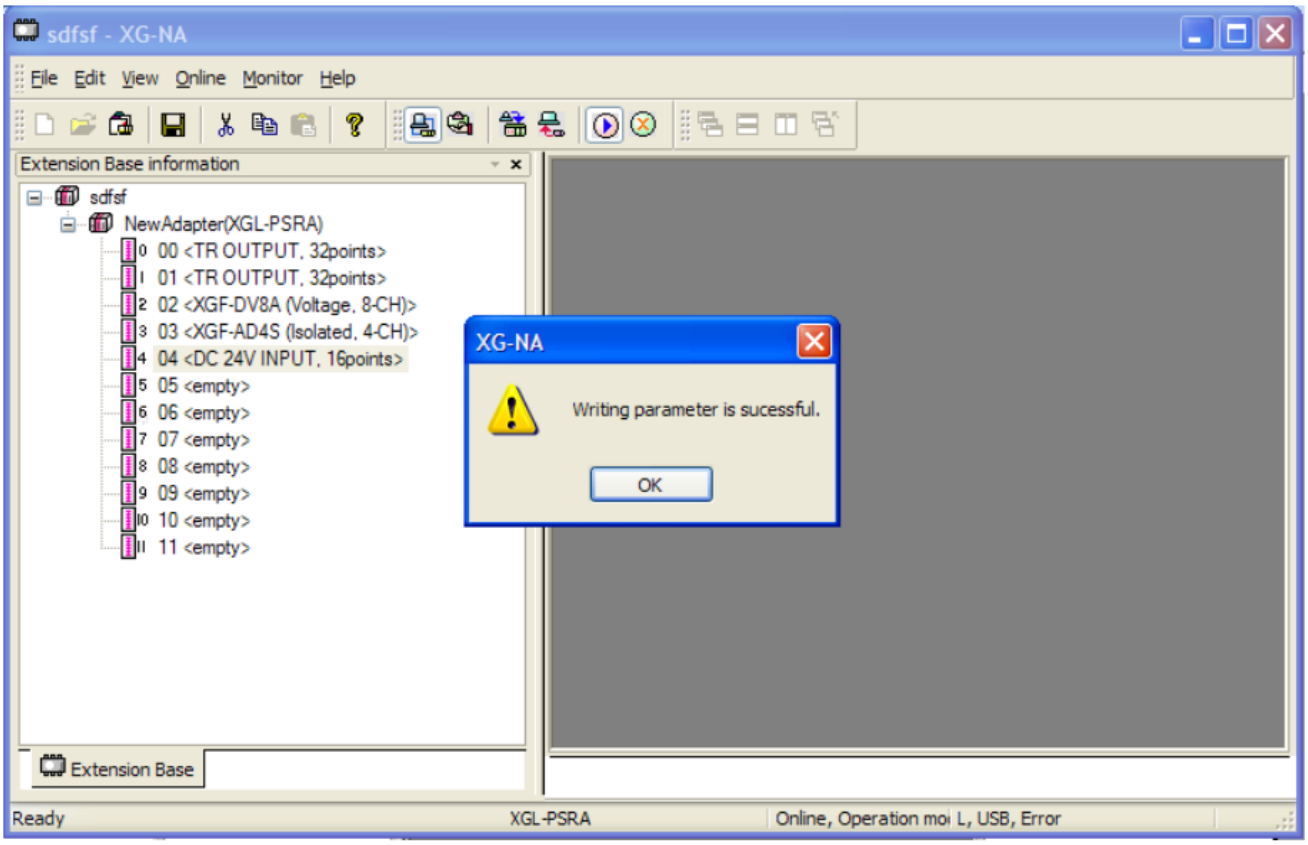
3. Save setting

   Before downloading, save the project.



4. Write parameter

   After completing the parameter setting, download parameter through “Online – Write Parameter”. If downloading is complete, complete message appears.



Note

1. Parameter is saved in flash memory permanently.
2. Emergency parameter is applied when communication with master is not normal.

3. Emergency output data is not maintained when power is off. If you turn off and on power while Emergency output is set as “Hold” and error occurs, emergency output data is not hold.
4. If you download parameter, read I/O, synchronize I/O during communication, communication may stop during some ms.
5. If progressing in debug mode, [Write Parameter] will deactivate in [Online]-[I/O Information].

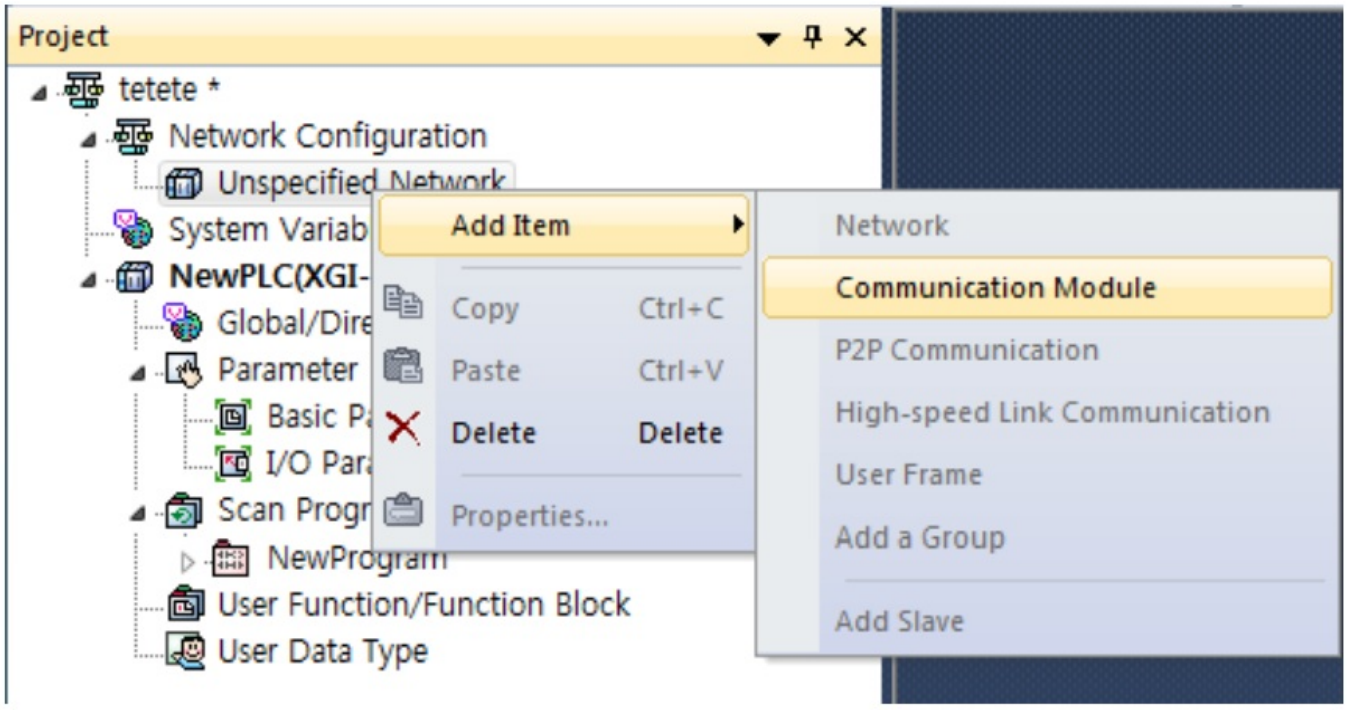
4.3 How to set Pnet slave I/F module parameter

In order to use the XGT Profibus-DP slave module, you have to register high-speed link parameter by using XG5000.

4.3.1 High–Speed link parameter setting

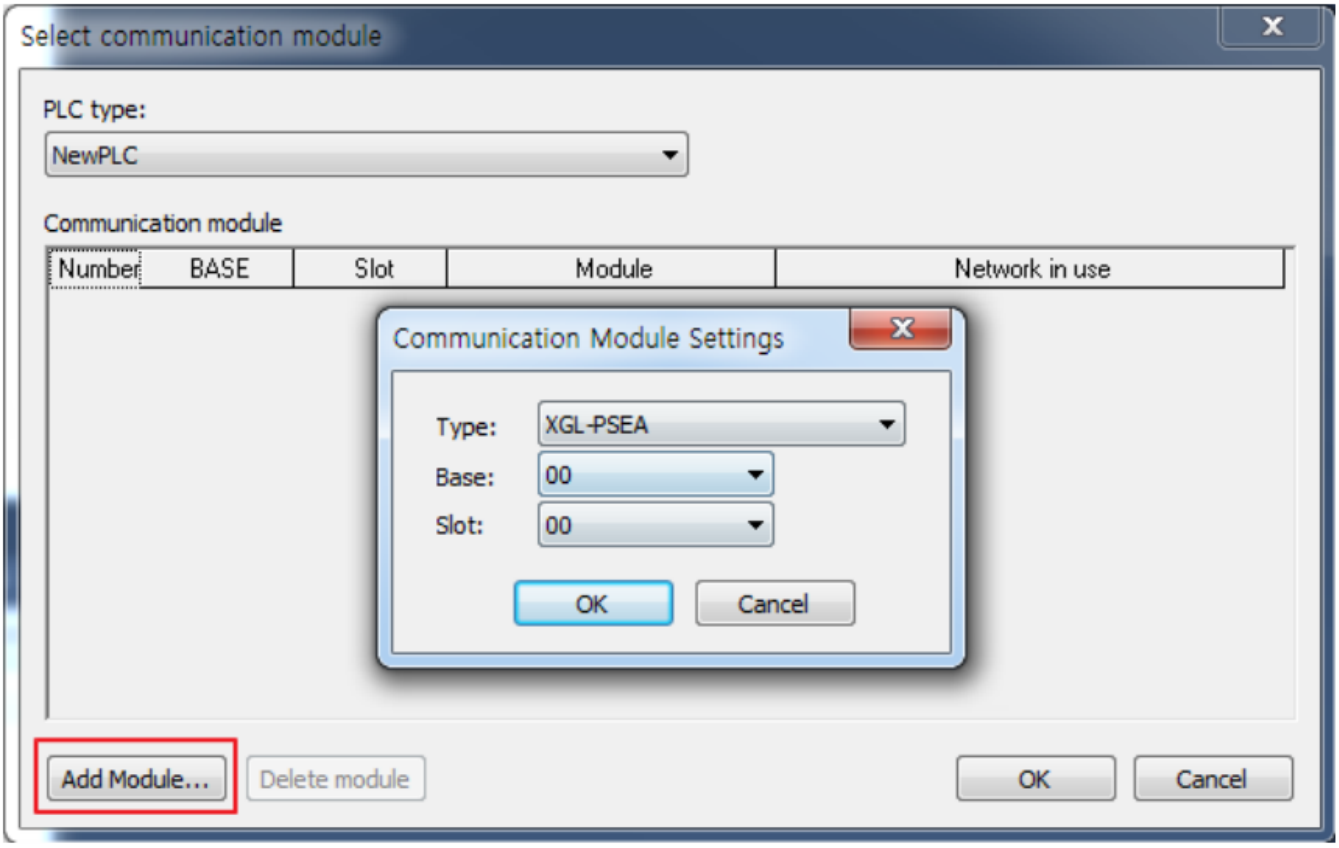
Execute the XG5000 and create new project

After selecting CPU type, click the right mouse button while cursor is on the base where Pnet slave is installed and set communication module as follows.



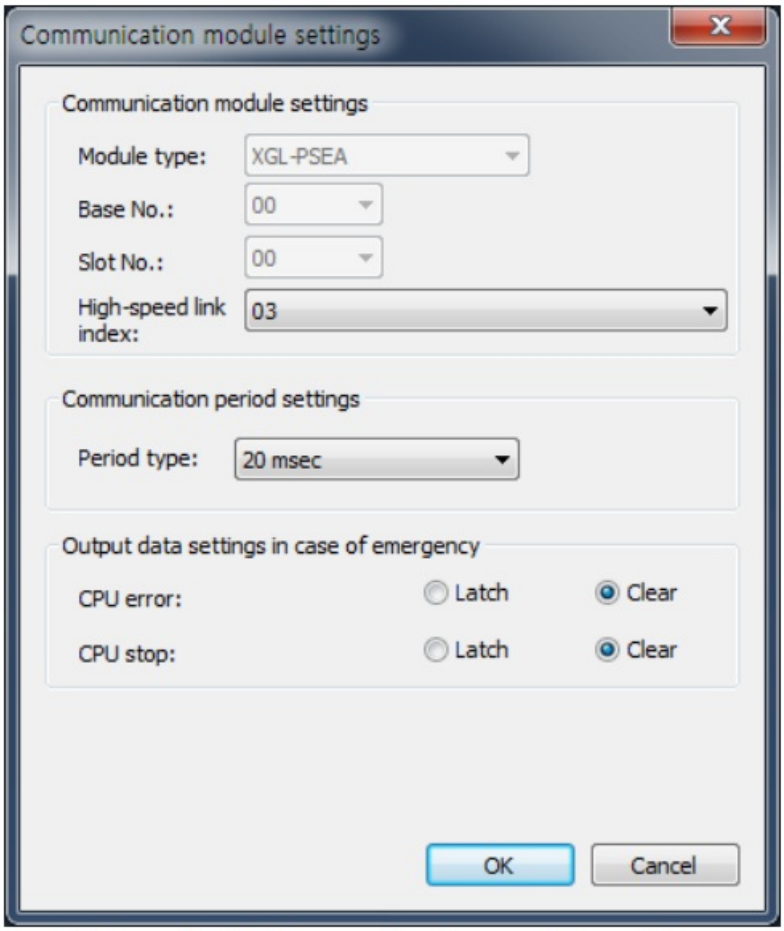
[Figure 4.3.1] Add High-Speed Link

Select Pnet Slave at the communication module setting window as follows.



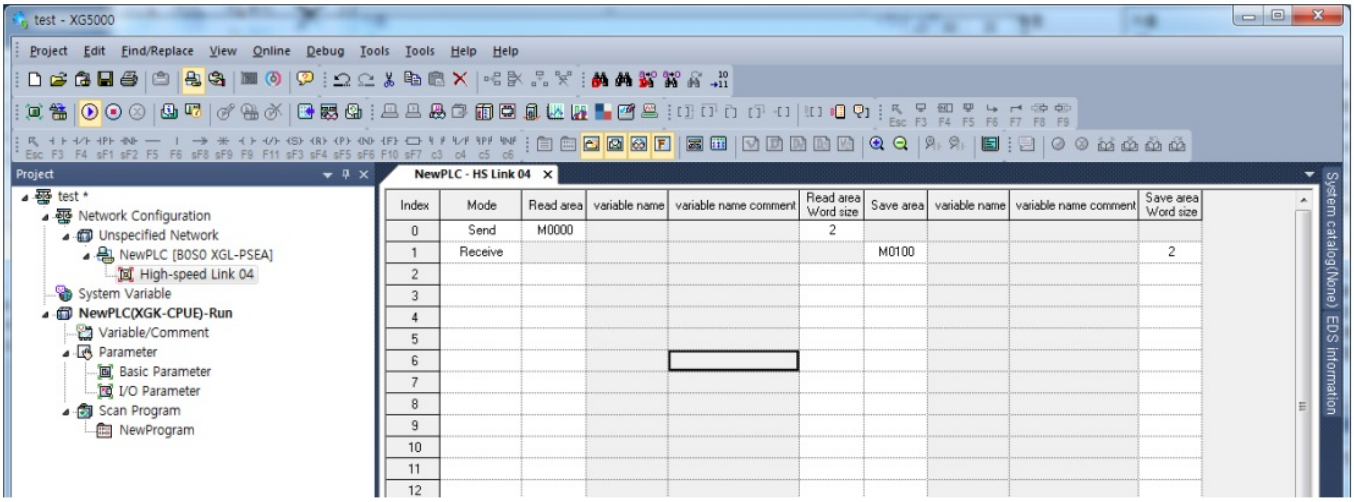
[Figure 4.3.2] Select Pnet Slave

In the project window, select High-speed link tap and High speed link.
Set the module type as “Pnet Slave” and set “Communication period” and “Output data setup in case of emergency”



[Figure 4.3.3] Communication module settings

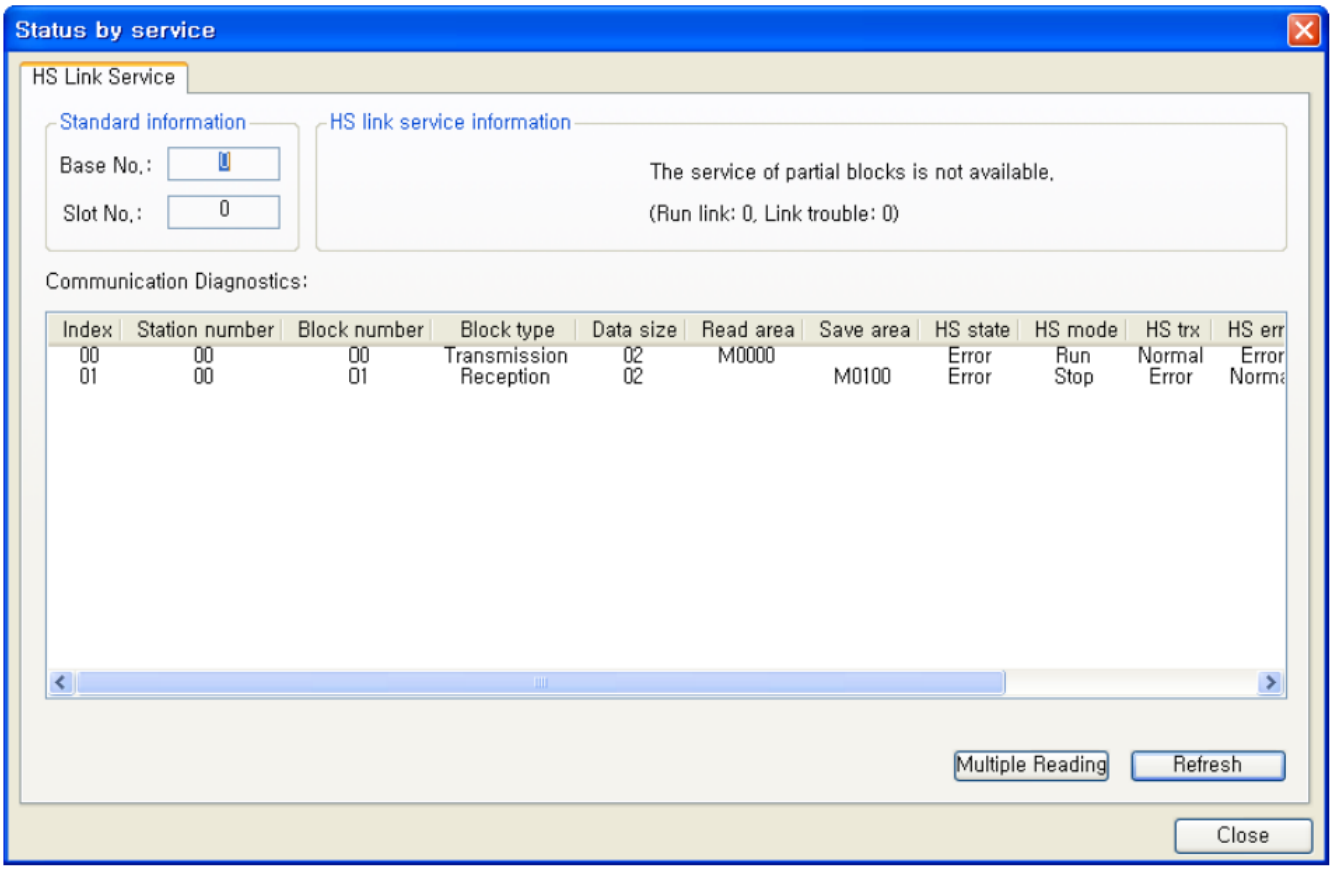
Select a High-speed link block and set up TX, RX items The following figure is block setup transmitting 2-word data of M0000 and receiving 2-word data of M0100.



[Figure 4.3.4] Screen of High-Speed Link block setting

4.3.2 High-speed Link Communication Diagnosis

You can check the data communication status through the LED in the communication module
When you want to monitor detailed High-speed link data for each block, monitor the High-speed link service at the system monitor window. Then you can monitor “Service count” and “Error information” for each block.



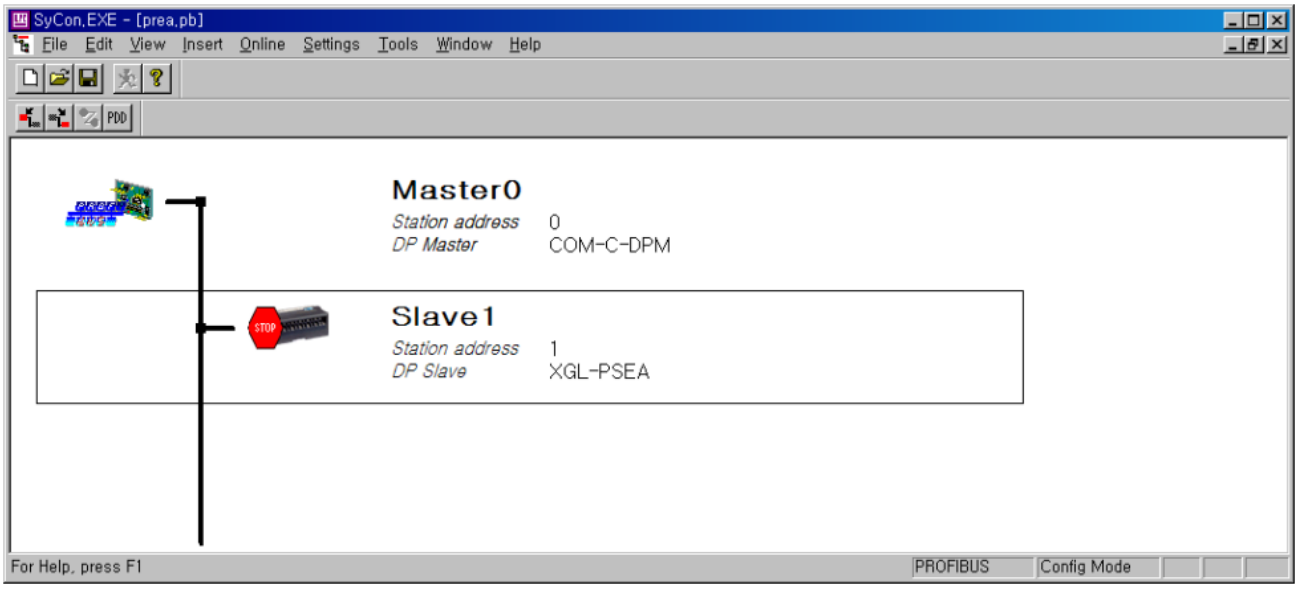
[Figure 4.3.5] Status by service window

4.3.3 Sycon Parameter Setting

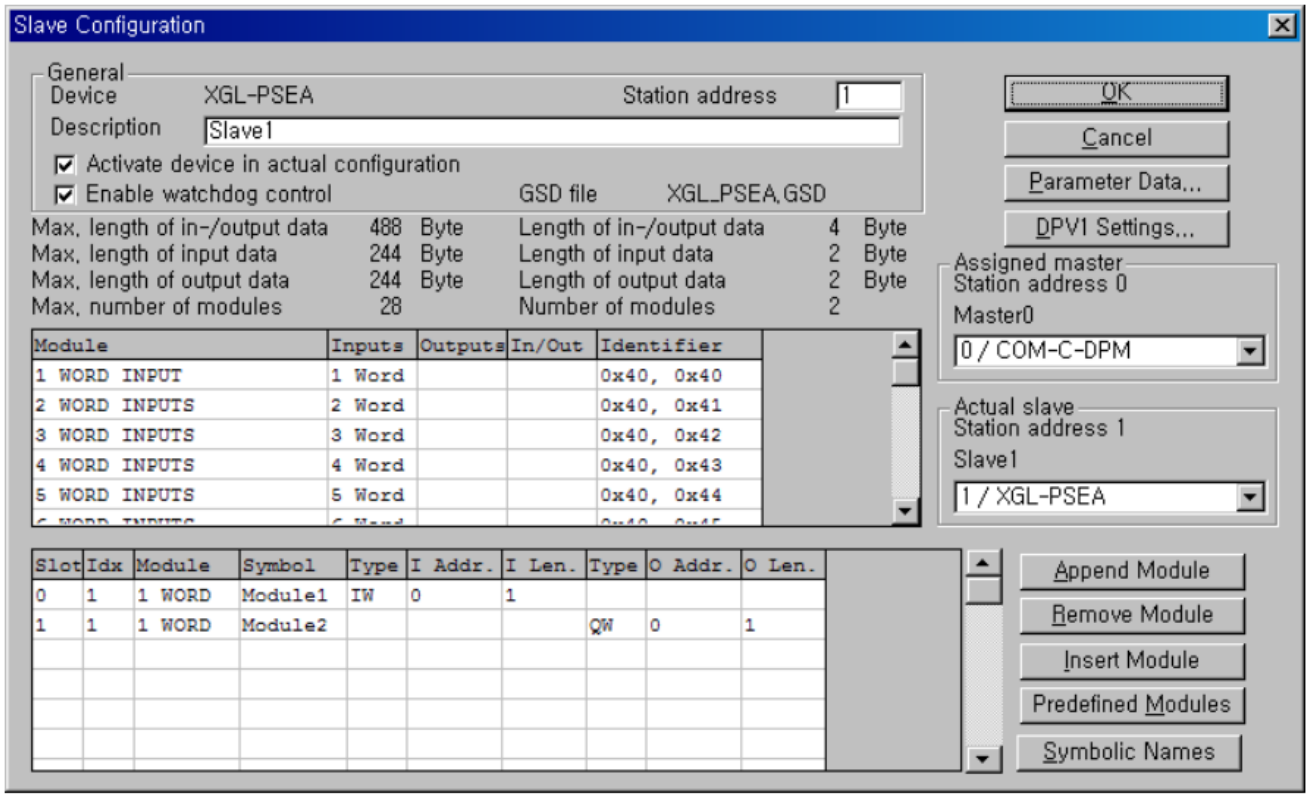
Describes how to set up the parameter of the slave module with SyCon

1. Module parameter setting

Double-click the slave station at the main screen of SyCon as follows.



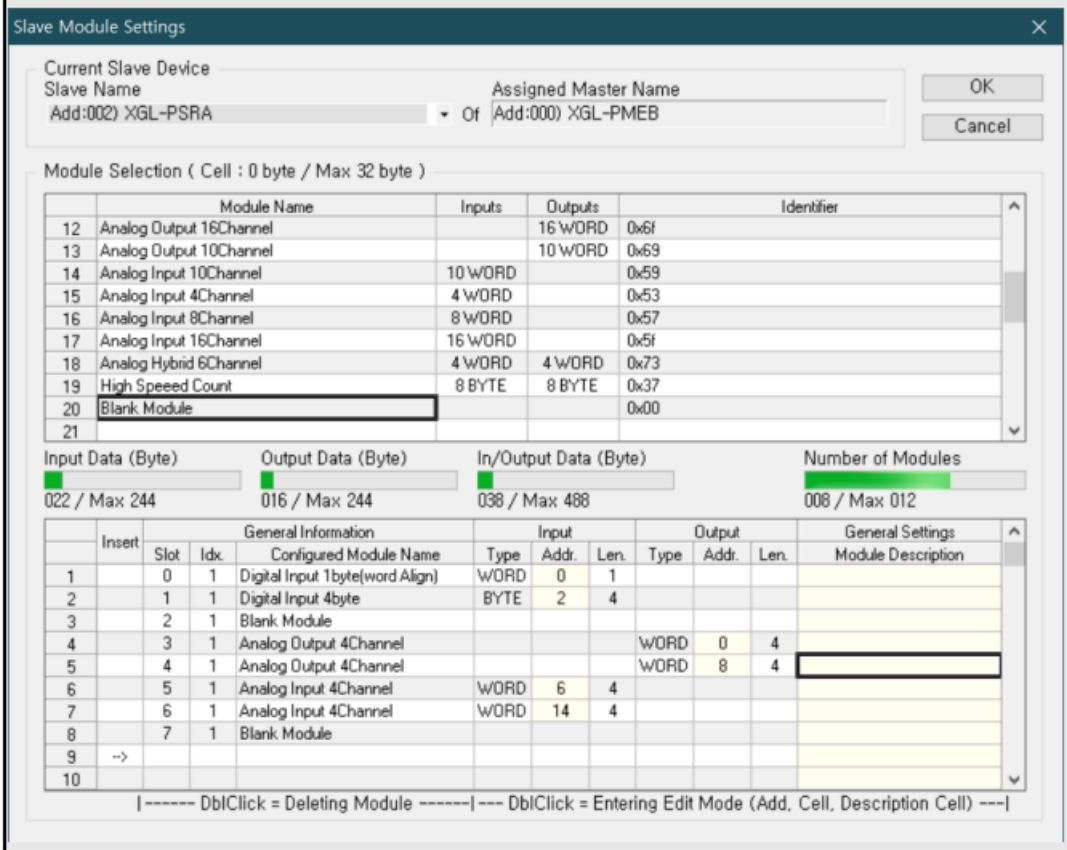
Configuration window of the slave station appears as follows.



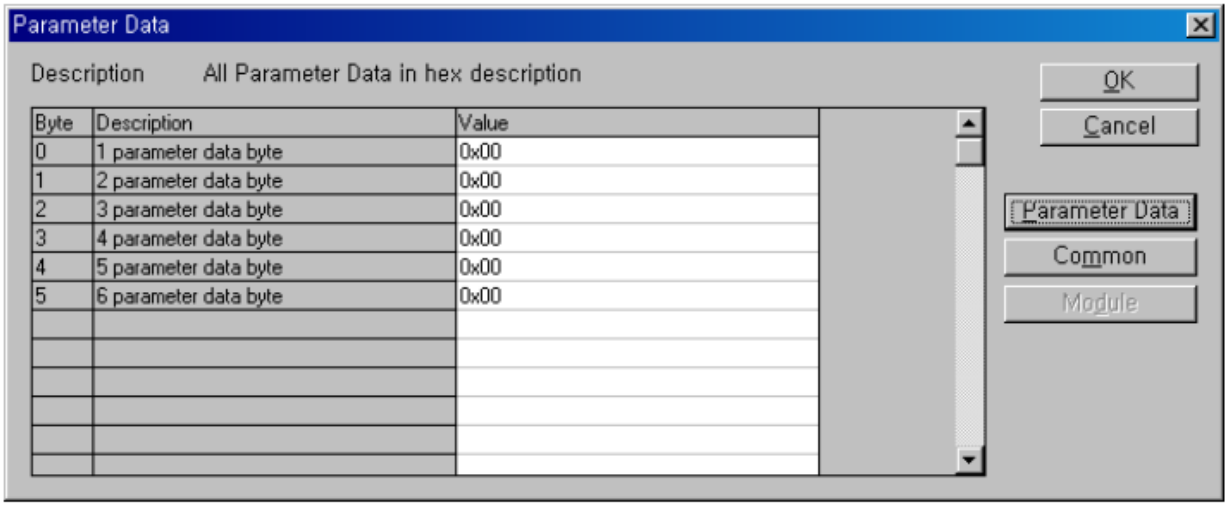
Select the module in the middle box and click “Append Module” button. Then the selected module is inserted to the bottom box. You can insert up to 24 modules This setting should be same as that of High-speed link block in the XG500

Note

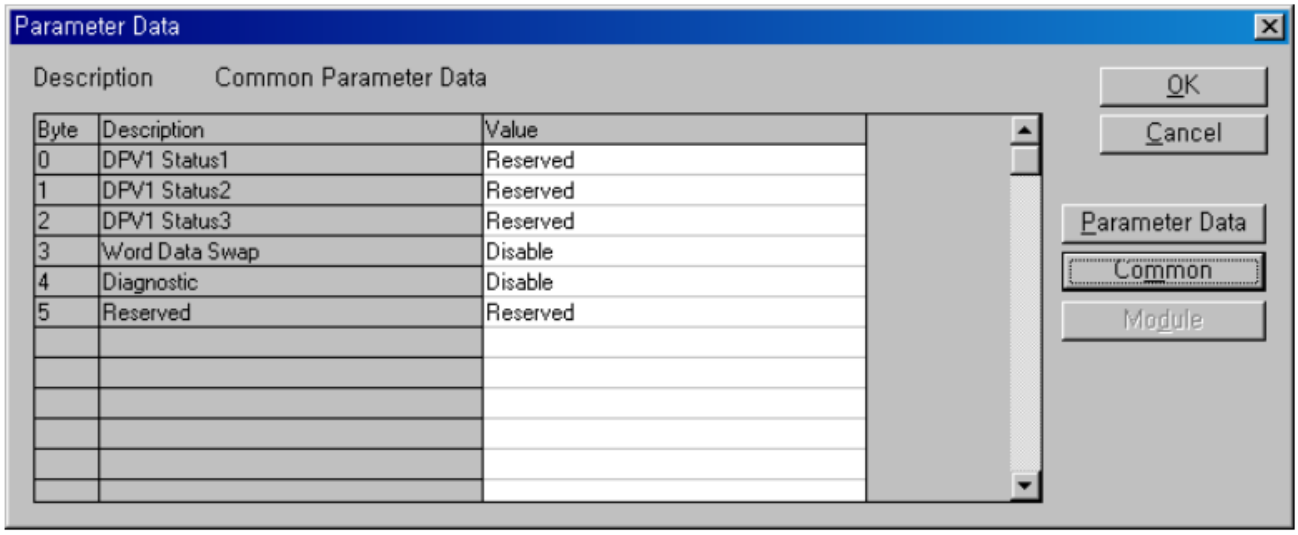
If there is empty slot in XGL-PSRA, [Blank Module] should be added at that location.



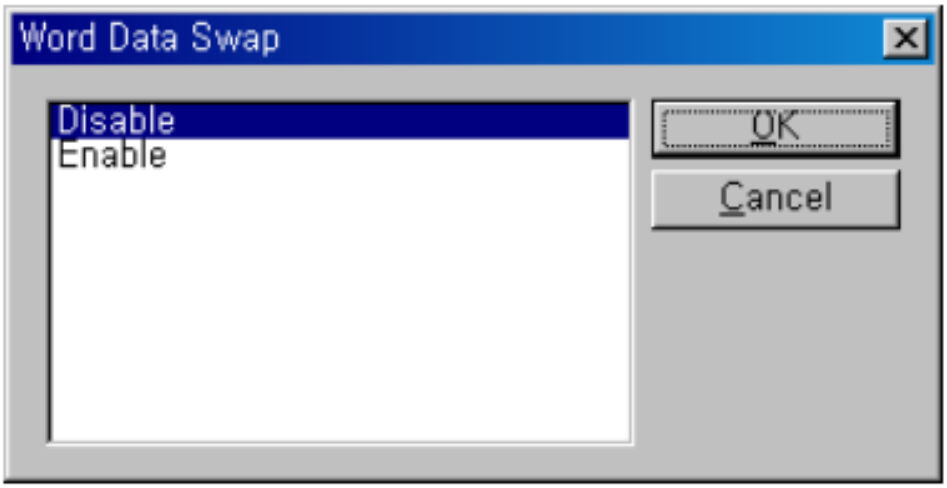
2. Slave parameter setting In order to set up the parameter of the slave station, click “Parameter Data” at the configuration window. Then “Parameter Data” window appears



Parameter data consists of 6-byte data. Click “Common” button to check the meaning of the each parameter item 0~2-byte are parameter on DPV1. That is not supported in the current version and not used.



Third byte is the parameter on “Word Data Swap”. Double-click “Disable” item to change “Disable” status into “Enable” status. “Disable” status is “Little Ending” method and “Enable” status is “Big Ending” method.



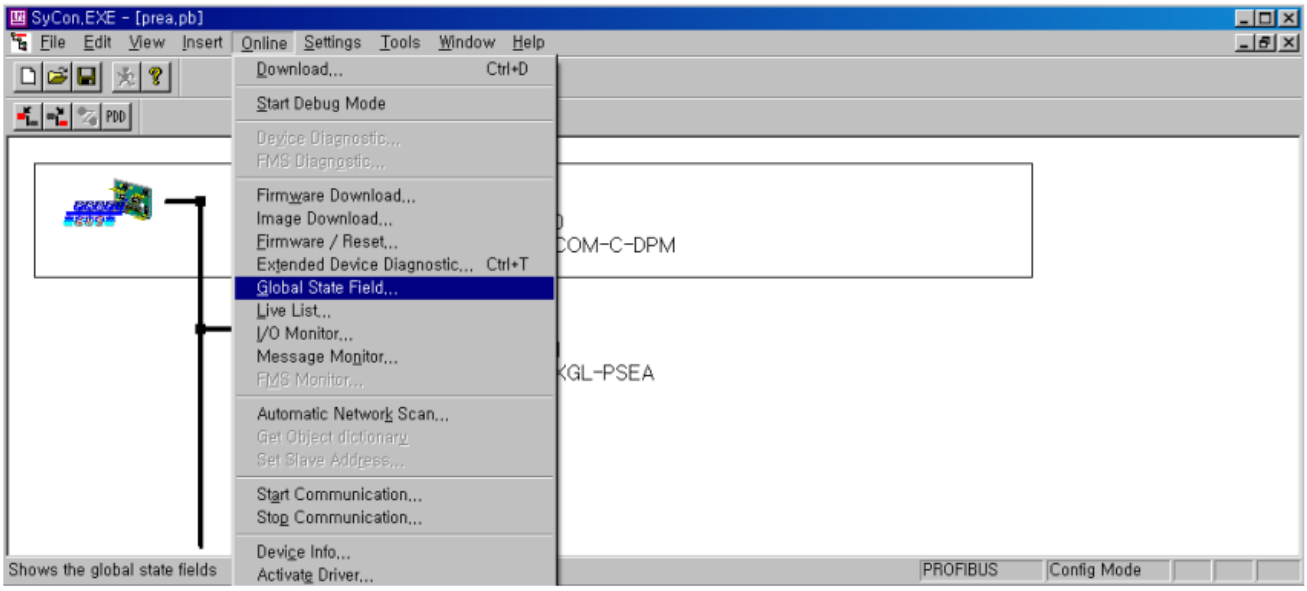
If you select “Enable” and press “OK” button, “Word Data Swap” function will be enabled. At this status, when receiving and sending data, upper byte and lower byte in a word swaps each other. .

Diagnostic parameter is the parameter on enabling diagnostic function. If you set this as “Enable”, when operation mode of the CPU module where slave station is installed is not “Run” or CPU module is error state, you can monitor CPU module status at the master station.

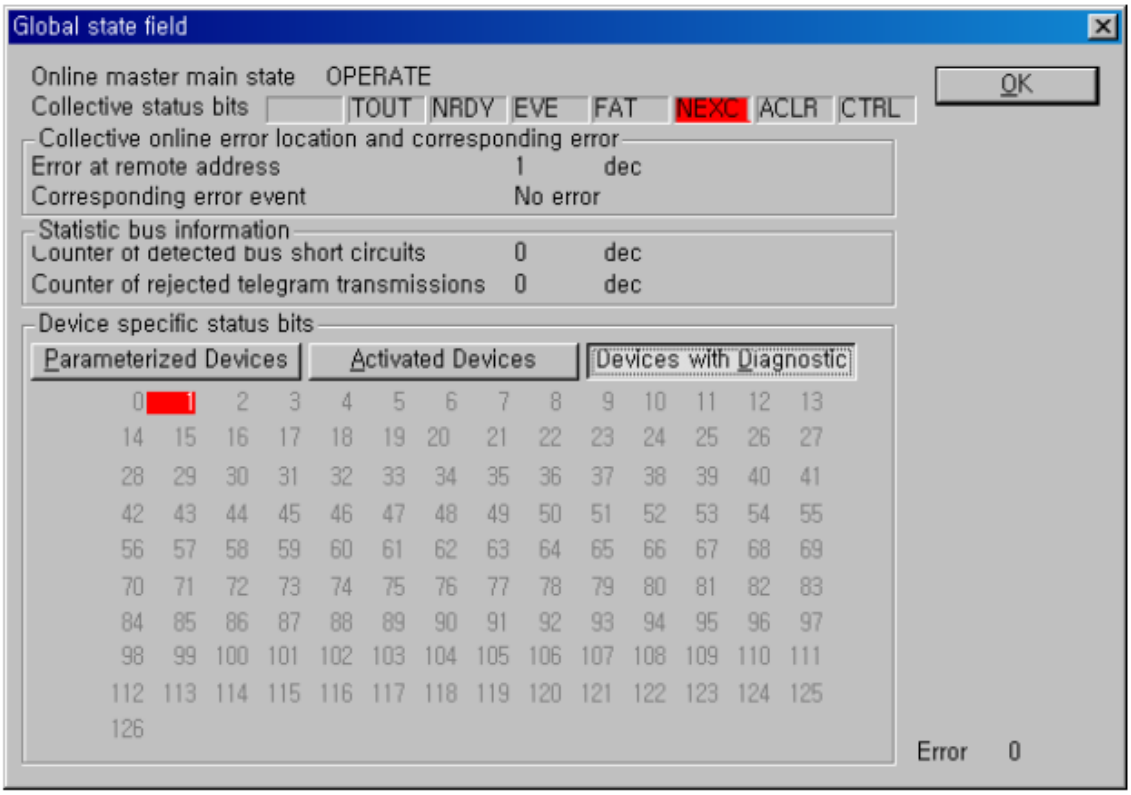
If parameter setting is complete, download the parameter to the Pnet master module to apply the parameter.

3. Slave diagnostic function monitoring

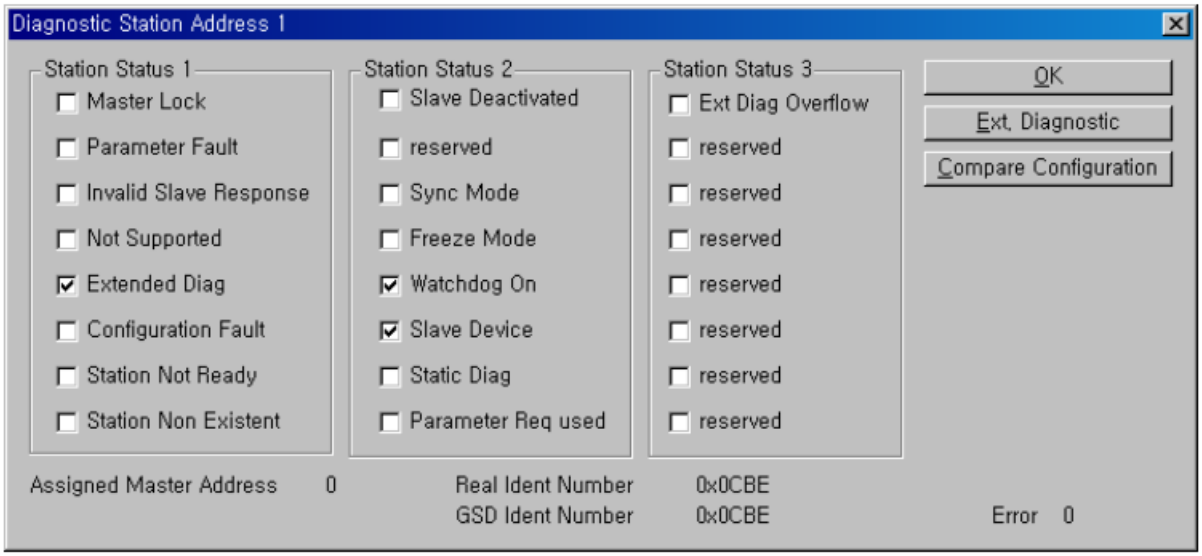
   If diagnostic parameter is set as “Enable”, when operation mode of the CPU module where slave module is installed is not “Run” or CPU module is error, you can monitor slave station by executing Online-Global State Field on SyCon menu. Data communication continues under diagnostic state.



If you click “Devices With Diagnostic” button at “Global State Field” window, the slave station having diagnostic information appears as follows. Click the corresponding station.

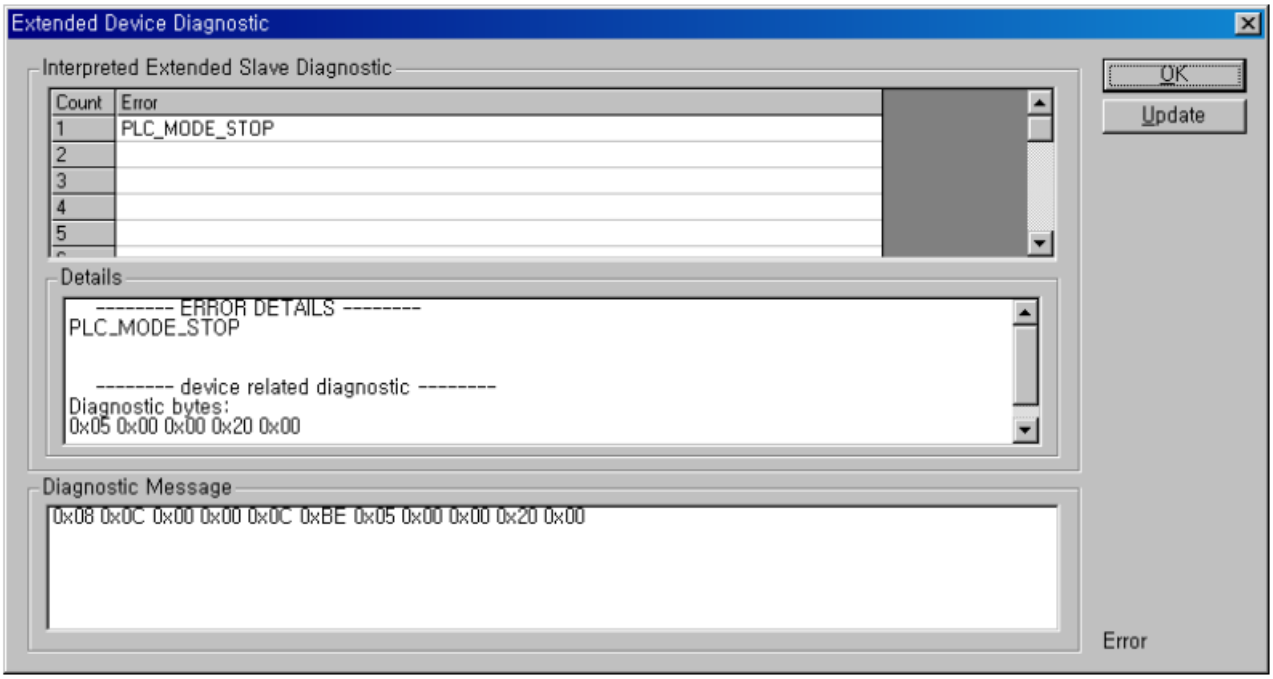


Diagnostic information window of the slave station appears and informs that “Extended Diagnostic” occurs



If you click “Ext. Diagnostic” button, detailed information of the slave station appears as follows

The following detailed information window informs that the CPU module where slave station is installed is “Stop” state.



States of the CPU module you can know through diagnostic function are as followsFor detailed information on the following error, refer to CPU manual.

“CPU configuration error ”

“Module mismatch error ”

“Module detachment error ”

“Blown fuse error ”

“I/O modules error ”

“Special module interface error ”

“Heavy trouble detection error ”

“Execution code size over error ”

“Basic parameter error ”

“I/O parameter error ”

“Special module parameter error ”

“Special module parameter error ”

“Program error ”

“Program code error ”

“System watchdog error ”

“Base power error ”

“Scan watchdog error ”

“Base information error ”

“Timer index error ”

“Compile error ”

“Instruction error ”

“PLC_MODE_STOP ”

“PLC_MODE_DEBUG “

4. Operation of Sync, Freeze

   XGL-PSEA supports Sync and Freeze instruction as Global instruction according to Profibus-DP standard.

   You can use Sync and Freeze function by using the master supporting Sync and Freeze instruction.

   – Sync instruction: This is used to synchronize the output data of the slave station. If slave station receives Sync instruction from the master, it keeps lastly received output data as current output data. Slave repeats this action whenever it gets Sync instruction of the master and output data is synchronized according to Sync instruction. Master cancels Sync action of slave by sending Unsync instruction.

   – Freeze instruction: This is used for the master to read momentary value of input data. If slave station receives Freeze instruction, it keeps then input value as input data. Though actual input data changes, it keeps the value of moment when it receives Freeze instruction as input data. And slave repeats this action whenever it gets Freeze instruction of the master. Master cancels Freeze state by sending UnFreeze instruction.

Profibus-DP Communication

5.1 Overview

Profibus is an open type field bus that the manufacturer selects independently to apply and manufacture (Vendor-independence). Also, It is used widely for processing automation. DP among them is the most frequently used Communication profile and the network suitable for FA environment of Field Level and also is suitable for master-slave communication between master automation machine and 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 4~20mA or Hart system together with 24V parallel signal transmission to the production automation system. Smart I/O communication supports Profibus-DP by GM3/4/6 and XGT master module.
(G3L-PUEA, G3L-PUEB, G4L-PUEA, G4L-PUEB, G6L-PUEA, G6L-PUEB, XGL-PMEA, XGL-PMEC).
For further information for Profibus-DP, please refer to Profibus’s homepage. (**http://www.profibus.com**)

5.2 Communication Specification

Classification			**Profibus-DP**	
Module type			Pnet remote I/F module	
Network type			Profibus-DP	
Slave protocol			DP-V0	
Standard			EN 50170 / DIN 19245	
Interface			RS-485 (Electric)	
Topology			Bus	
Modulation method			NRZ(Non Return to Zero)	
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
			200	1.5M
			100	3M/6M/12M
Max. Node/network			100 Stations	
Max. Node/segment			32 Stations	
Cable			Electric twisted shielded pair cable	
Max. I/O data/slave			244 byte	
XGL-PSRA	Max. I/O module installation count		12 (except high-speed counter, positioning module)	
	Installation position		CPU slot	
	Consumption current		410	
XGL-PSEA	Installation position	XGK-CPUU/H, XGI-CPUU	Main base ~ expansion 7	
		XGK-CPUE	Main base ~ expansion 1	
		XGK-CPUA/S, XGI-CPUH/S	Main base ~ expansion 3	
		XGR-CPUH/F, XGR-CPUH/T	Expansion base	

5.3 Basic Performance

5.3.1 Overview

Profibus-DP Master module is available to set as the following function.

1. Supports only High-speed Link communication.
2. Uses parameter setting in GMWIN/KGLWIN/XG5000 and Configuration Tool (LS ELECTRIC provided tool : SyCon, N Configurator).
3. Sets only sending/receiving area from GMWIN/KGLWIN/XG5000 high-speed link parameter setting.

4. Sending/receiving data shall be 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 as 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 or N Configurator) Communication begins through GMWIN/KGLWIN/XG5000 High-speed Link enable set.

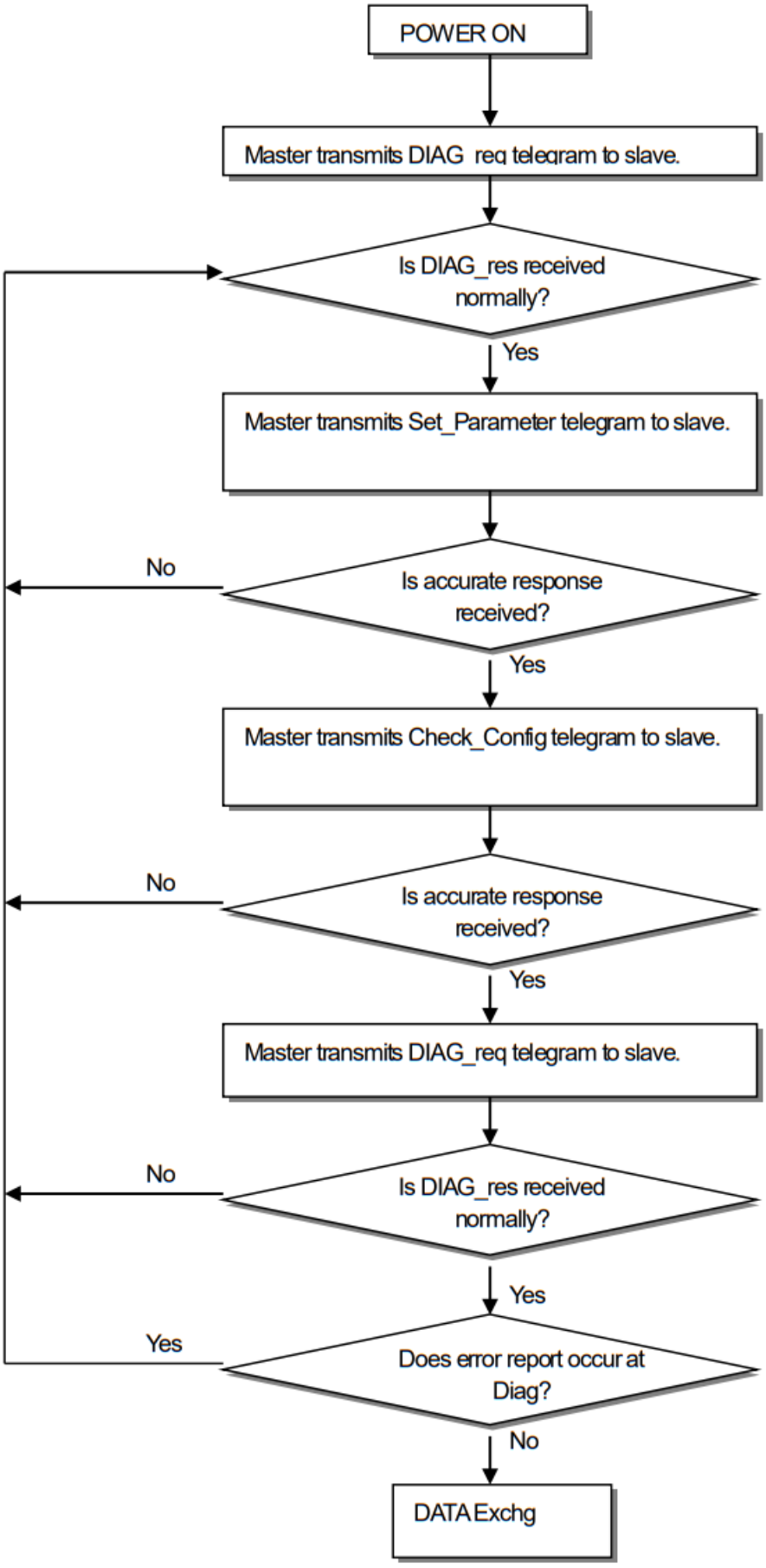
5.3.2 Operation by High-speed Link

1. If Master module is the product of LS ELECTRIC (G3/4/6L-PUEA/PUEB, XGL-PMEA), it configures Profibus Network using SyCon. (In case of XGL-PMEB, using N Configurator)
2. Download Profibus Network Configuration to master module.
3. Set High-speed Link parameter of master in GMWIN and download it.
4. Enable High-speed Link.
5. If using other maker's product as Master, configure Profibus Network using Configuration Tool of the corresponding product.

5.3.3 Procedure to establish Pnet communication

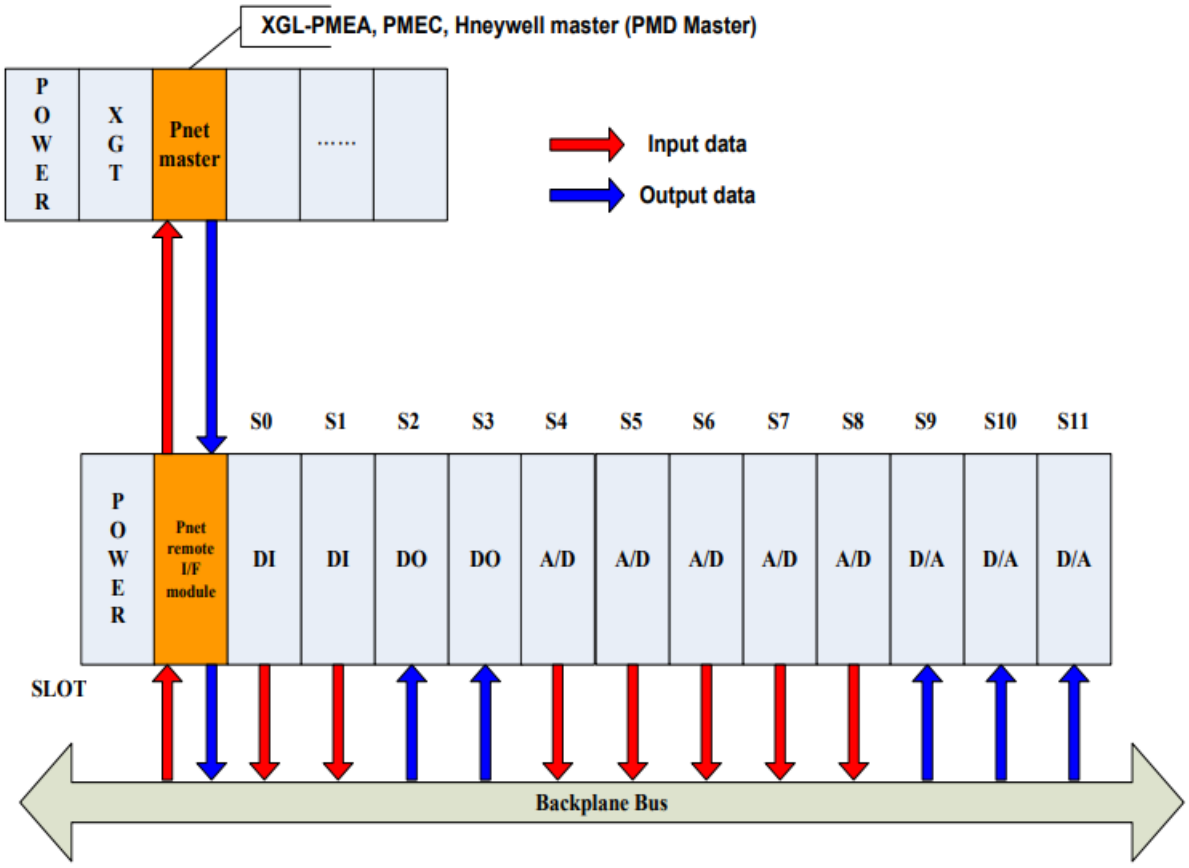
Master communicates Pnet expansion I/O module based on the downloaded setting information

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.



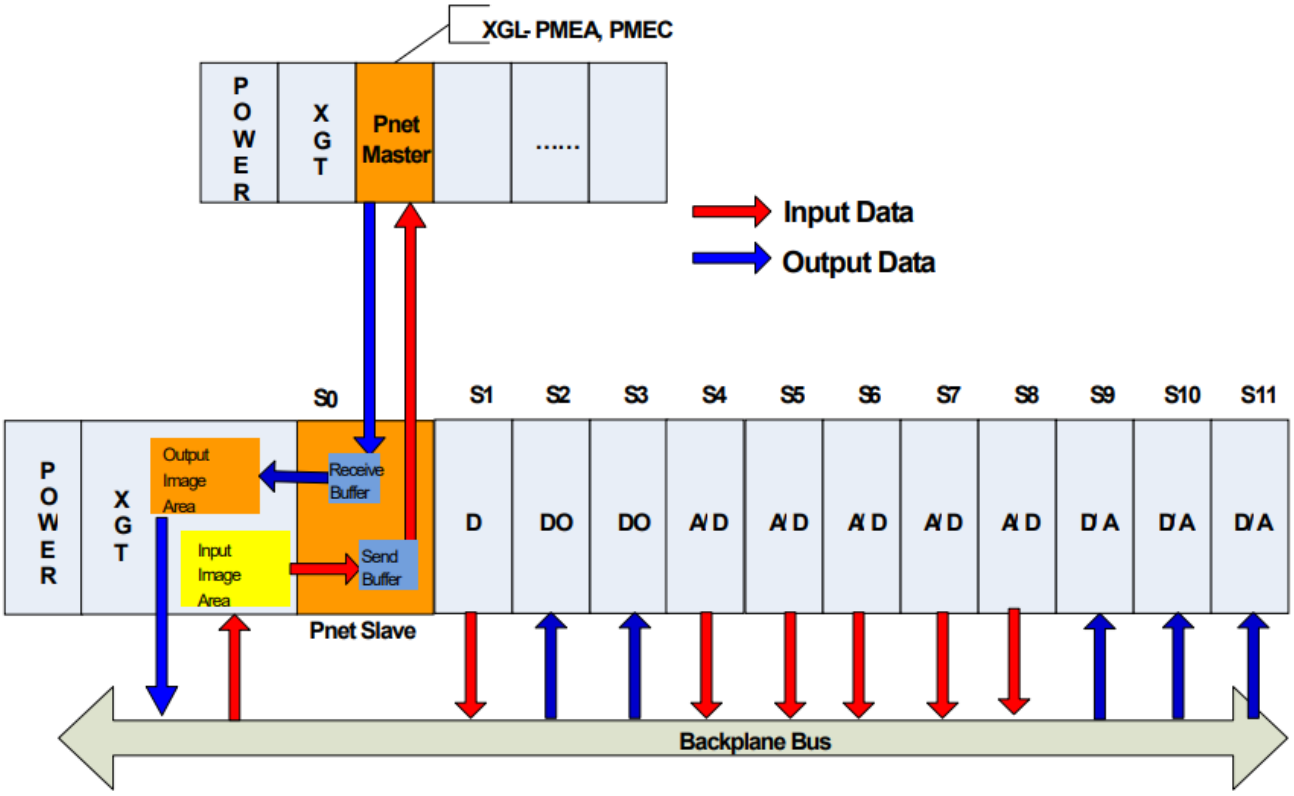
5.3.4 I/O Data Communication

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



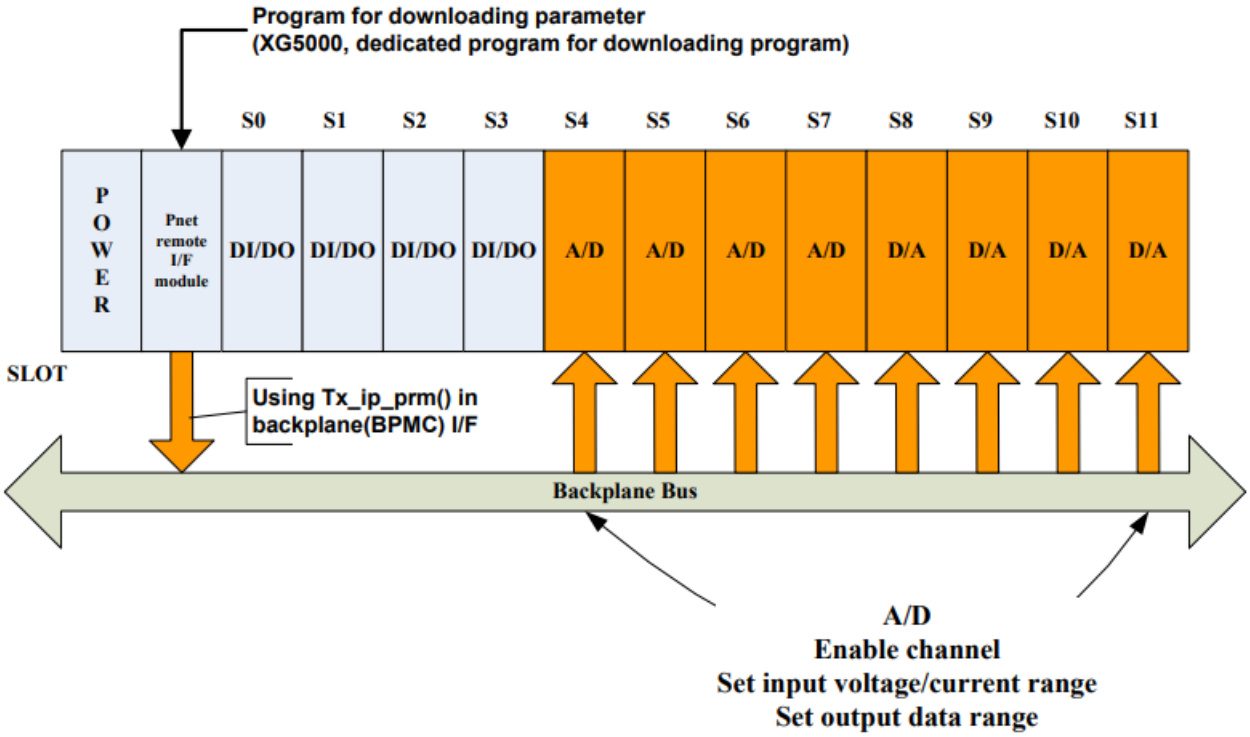
<XGL-PSRA TRX process>

3. Slave I/F module refreshes data in TRX buffer through CPU module's I/O image area and CPU module refreshes data in I/O image area through I/O module and backplane bus.



<XGL-PSEA TRX process>

4. In XGL-PSRA, writing parameter of expansion I/O module is available through local USB connection.

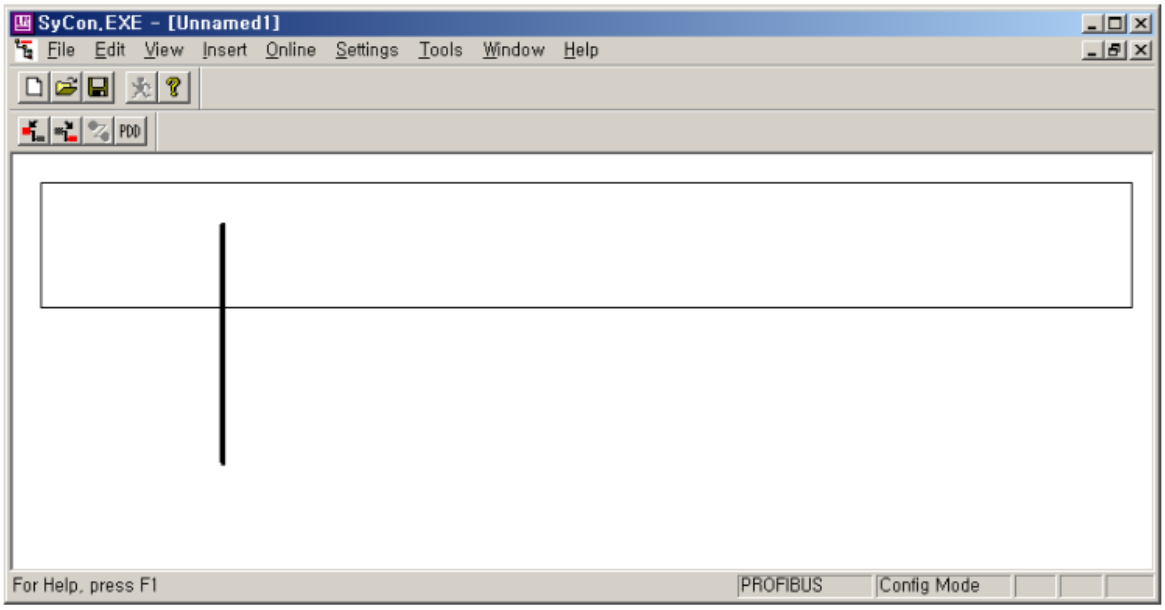


5.4 Tool for Communication Setting

5.4.1 Communication Setting by SyCon

If using master module provided by LS ELECTRIC (G3/4/6L-PUEA/PUEB, XGL-PMEA), it is required to configure Profibus Network using SyCon and download the information to the corresponding master module. As Profibus Network Configuration Tool is different from each master module, if using LS ELECTRIC master module (G3/4/6LPUEA/PUEB,XGL-PMEA), it is required to use only SyCon.

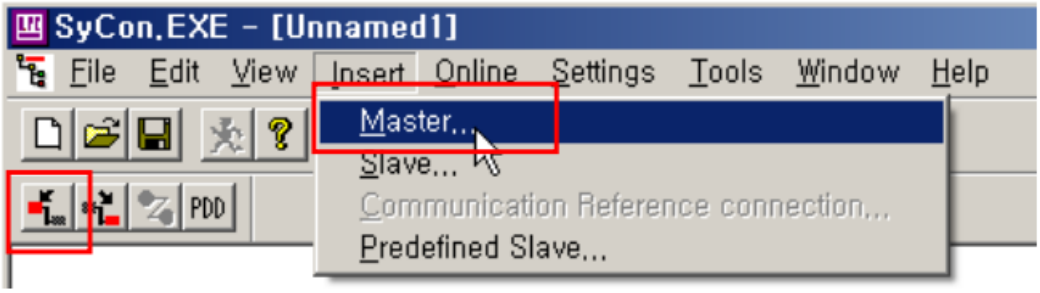
1. **SyCon execution**

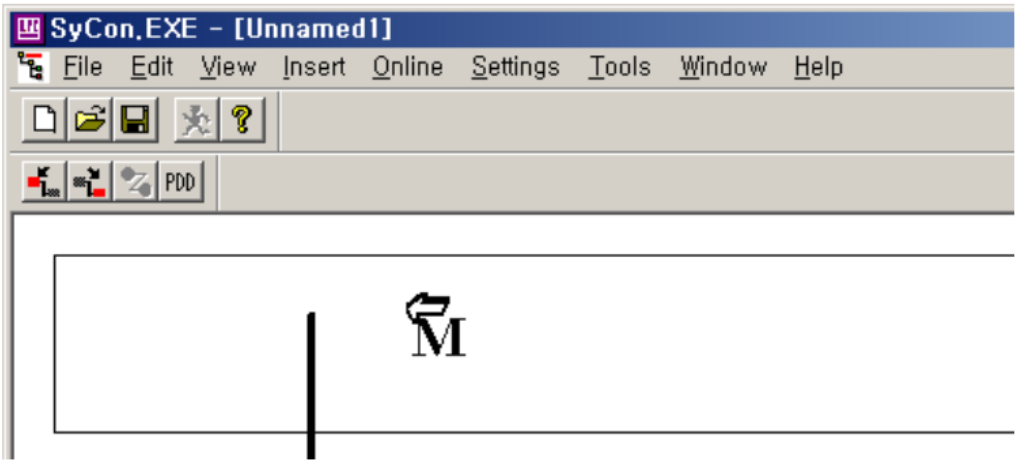


If there is no project using before executing SyCon, the initial screen same as the above figure will appear and if you are preparing the project, the latest project will be open.

2. **Insertion of Master Module**

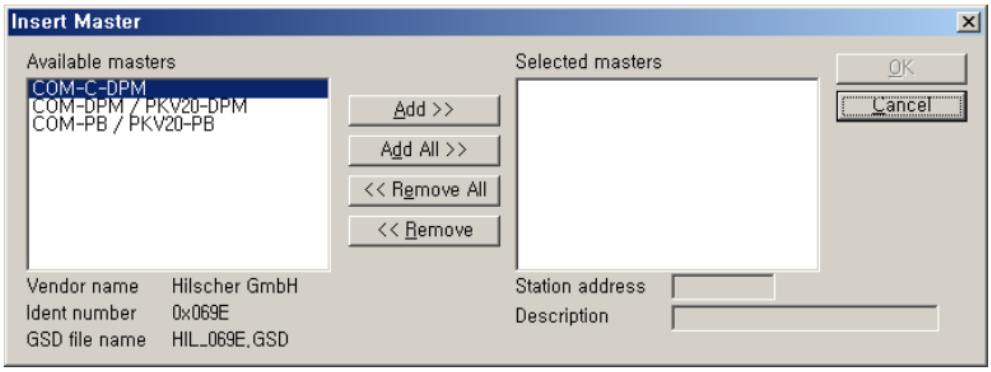
Click “Insert  Master” or select from the left top tool bar and click the proper point of left top from the window below.

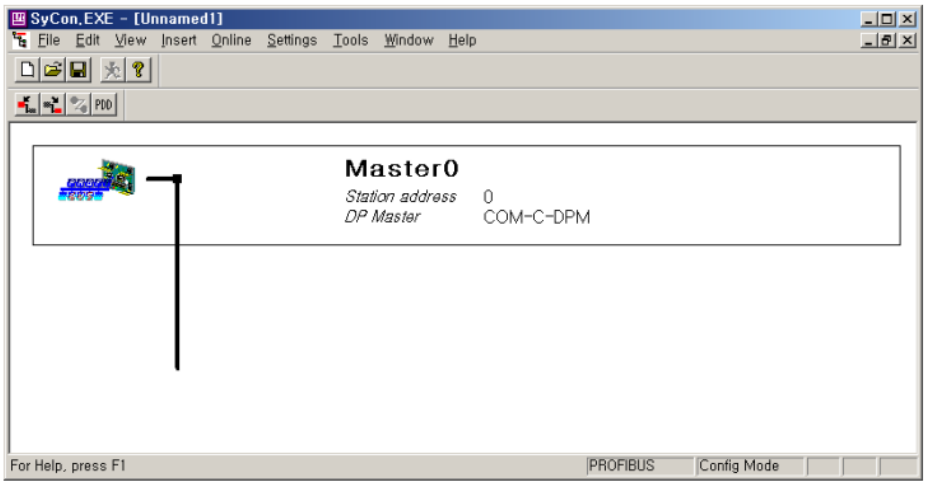




Insert the master at the top of window below

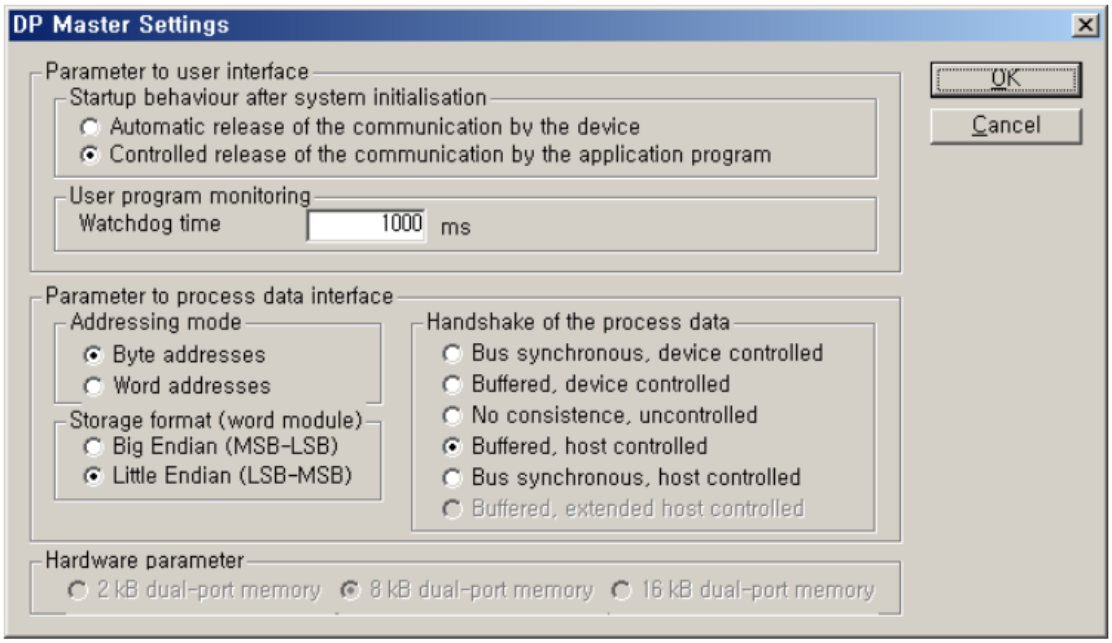
If Insert Master window is open as the above figure, select COM-DPM/PKV20-DPM if the using master module is G3/4/6L-PUEA and click Add button in the middle. If using master module is G3/4/6L-PUEB, select COMPB/PKV20-PB and click Add button in the middle. If using master module is XGL-PMEA, select COM-C-DPM and click Add button in the middle part. Confirm Station address and if necessary, it is available to change Description. If pressing OK button, master module shall be inserted.





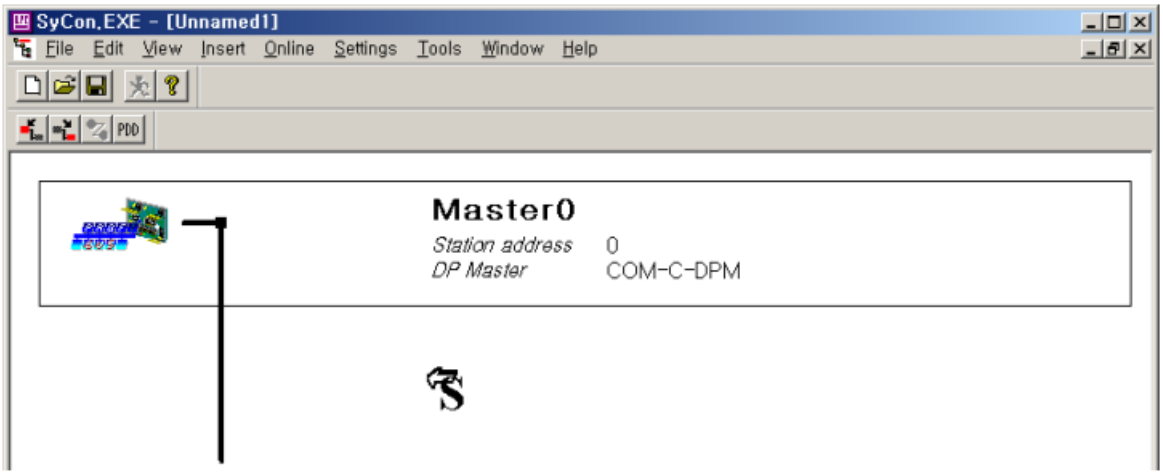
3. **Master module setting**

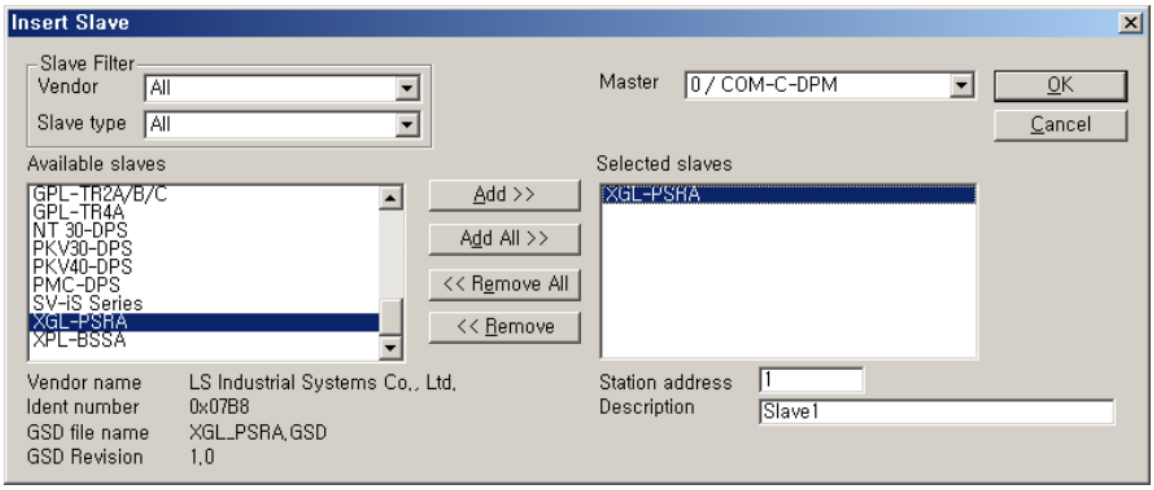
If you click the right side of mouse on the inserted master module and select “Master Settings…” from the appeared popup window, the following window will be open. Select “Controlled release of the communication by the application program” from “Parameter to user interface”, “Little Endian (LSB-MSB)” from “Storage format (word module)” and select ”Buffered, host controlled” from “Handshake of the process data” in order.



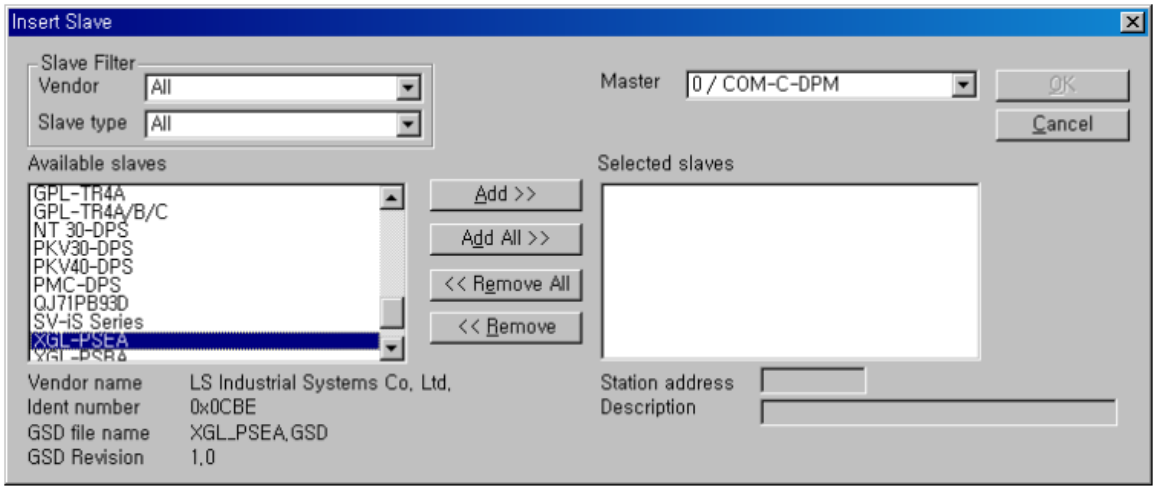
4. **Insertion of slave**

Similar to master, click “Insert  Slave” or select from left top tool bar and click master bottom, and Insert Slave window will appear as below.





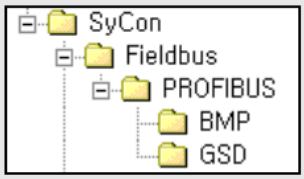
If using XGL-PSRA, select “XGL-PSRA” from the left side “Available slaves” and click “Add” button in the middle part. If there are several masters, select one from the right side “Master” and confirm “Station address” and “Description”, and then click “OK” button.



If using XGL-PSEA, select “XGL-PSEA” from the left side “Available slaves” and click “Add” button in the middle part. If there are several masters, select one from the right side “Master” and confirm “Station address” and “Description”, and then click “OK” button.

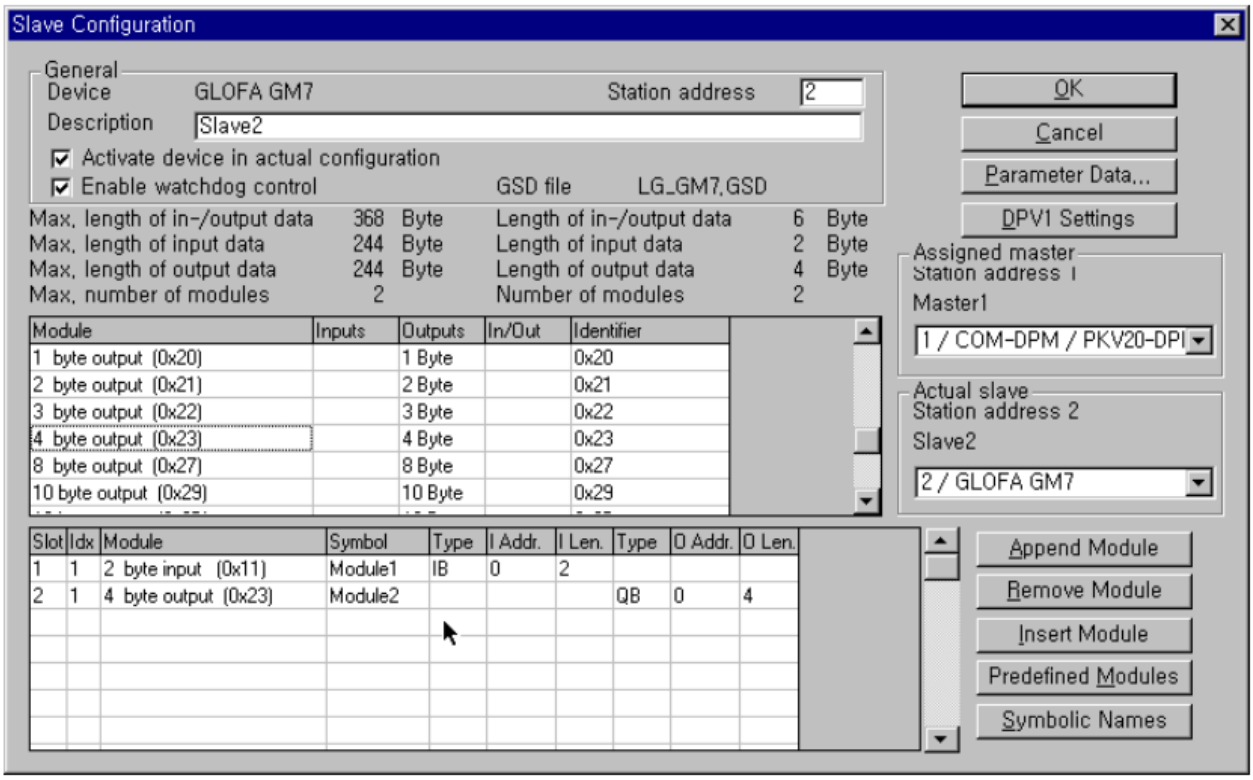
Note

1) If there is no slave to use in the slave list (Available slaves) of insert slave window, copy “GSD file” which is the original self-information supplied by the module manufacturer, from the directory below. Then, try SyCon again and insert slave.



5. **Slave Configuration**

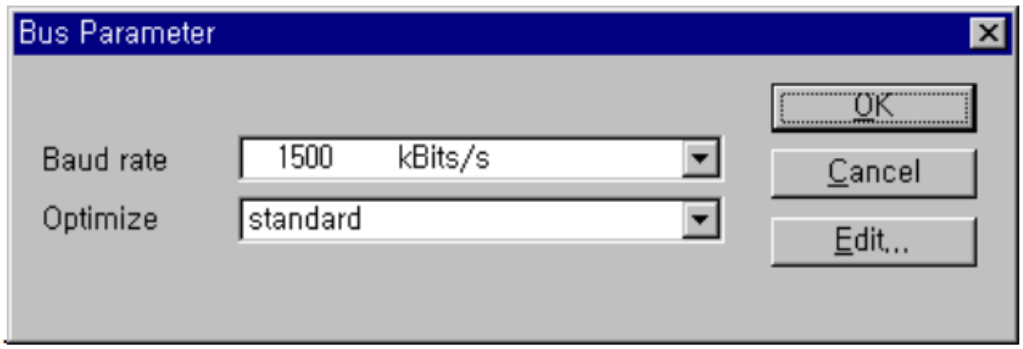
Click the inserted slave icon with the right button of mouse and select “Slave configuration” from the appeared popup window. (or double-click the left button of mouse on the slave icon.)



List box in the middle part shows all available modules. If you select the module having the necessary point and click “Append Module” button on the right bottom, it shall be inserted to the list box below. In this case, it is required to insert input module first and then insert output module in the bottom. And the numbers of available module are 12 for XGL-PSRA and 24 for XGL-PSEA.

6. **Bus Parameter Setting**

Bus parameter setting is the setting about Profibus-DP network. Select “Settings/Bus Parameter…” from the menu. Optimize field contains “Standard” and “user definition” setting. Speed setting (Baud rate) contains 9.6kbps ~12Mbps setting. Basically, Baud rate is set as 1.5Mbps and Optimize is set as ‘standard’



Note

Communication speed is related to transmission distance.

When using 12Mbps, you should use the connector only for 12Mbps and exclusive cable.

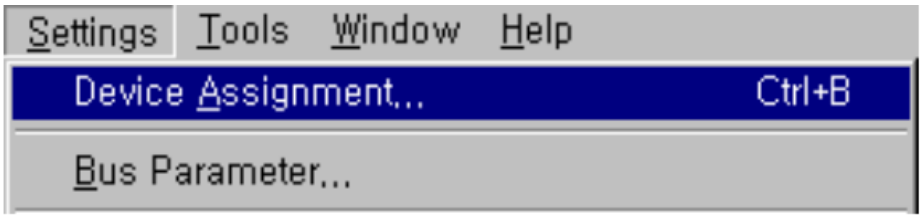
When using 12Mbps, min. Distance between stations shall be set as more than 1m.

When using 12Mbps, if the communication is cut off (especially, the station far from master), search the proper end resistance value and set it random.

7. **Device Allocation**

It is required to download the prepared configuration to the master module. In this case, click the left button of mouse and select master module icon to set which device to use. Select “Setting/Device Assignment…” from the menu.

(1) Device Allocation



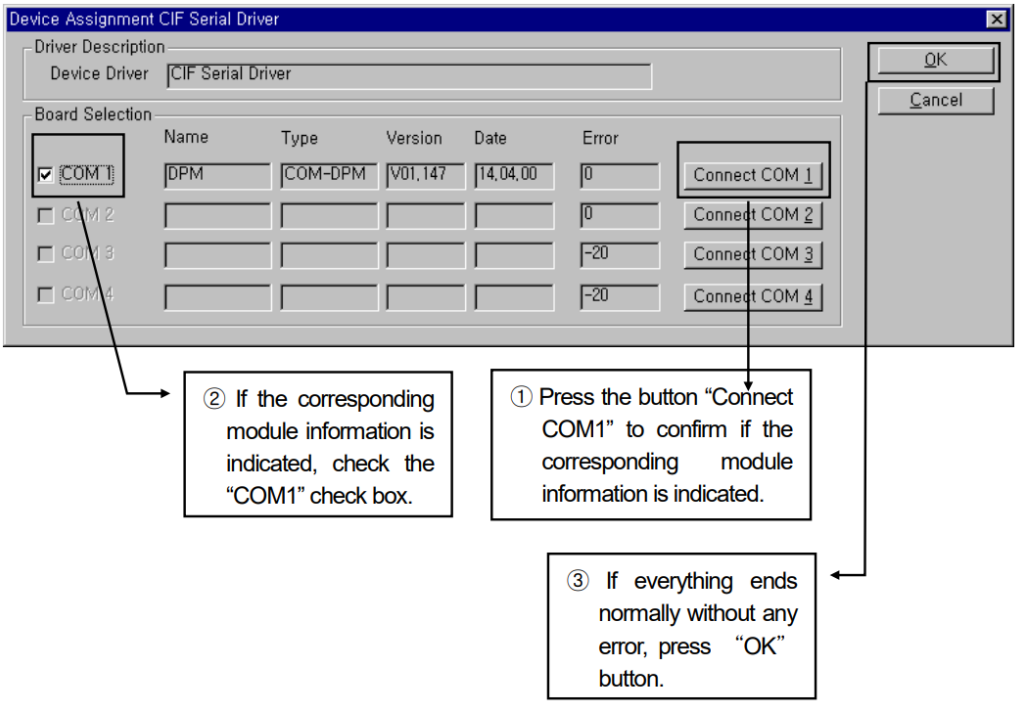
(2) Driver Selection

If driver selection window is open, select “CIF Serial Driver”.

Note

1) Driver to be provided by G3/4/6-PUEA/B, XGL-PMEA type master module is only RS-232C port. Thus, “CIF TCP/IP Driver”, “CIF Device Driver” is not available.

(3) Driver Selection of CIF Serial Driver



Connect PC serial port and Configuration Port of Profibus-DP master module. And apply the power of master module. Press “connect COM1” or other button according to PC serial port and confirm if the corresponding

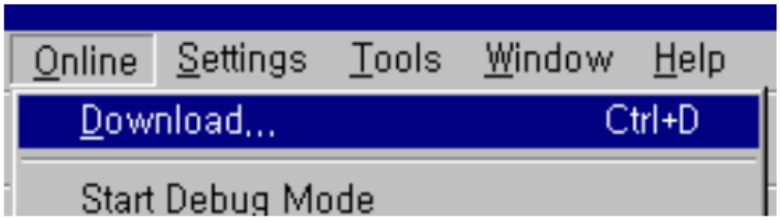
module is selected. On the figure, “Version” and “Date” may have different value. If there is no error, check the check box of the left side and click “OK” button.

Note

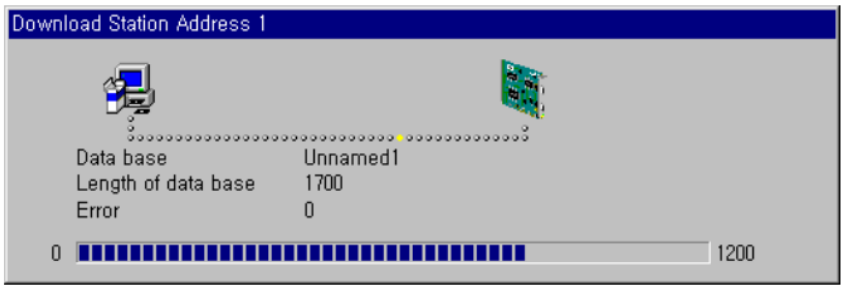
1) When pressing “Connect COM1” button, if the module information does not appear normally and the error occurs, check the connection of cable for configuration and the cable condition first.

If Cable is OK, it means that module must be poor. In this case, contact the customer service center.

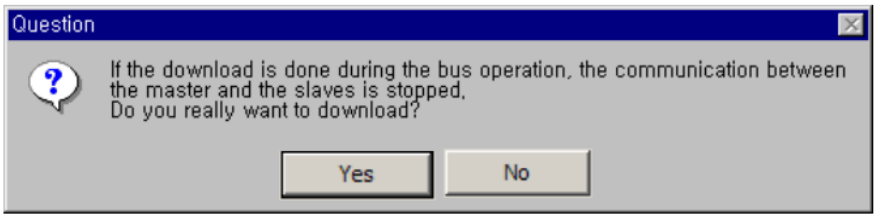
8. **Configuration Download**



If you select “Online/Download” from the menu, ‘Download’ begins to run. In this case, all LED shall be OFF and only “READY” LED shall be blinking. After downloading, all LED show its function.



If you carry out ‘Download’ in the status that the communication between the current master and slave is open, the warning window with the message “if the download is done during the bus operation, the communication between the master and the slaves is stopped.” will appear. After confirming if there is a problem by communication cutoff, click “Yes (Y)” button and ‘Download’ will run **normally.**



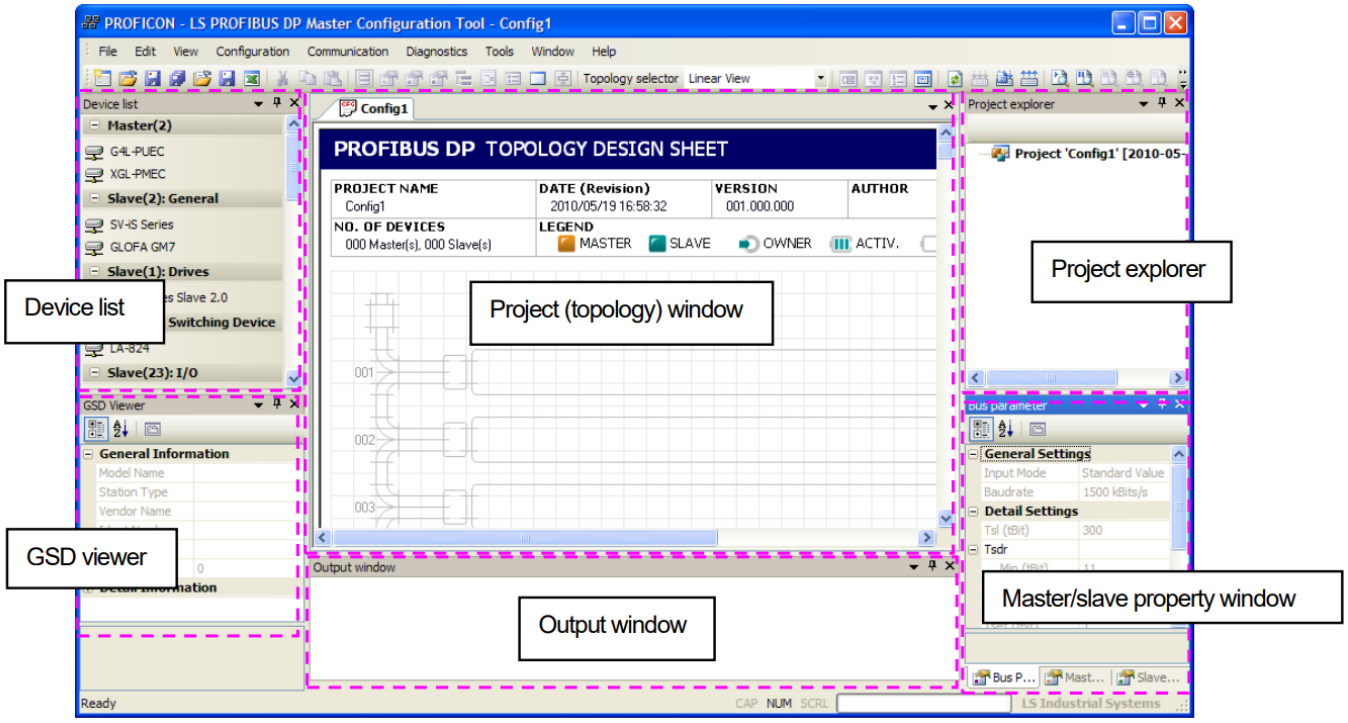
Note

1) Reset after complete the download.

5.4.2 Communication Setting through N Configurator

If you use LS ELECTRIC’s master module (XGL-PMEB), you can configure Profibus Network and download it by using N Configurator.

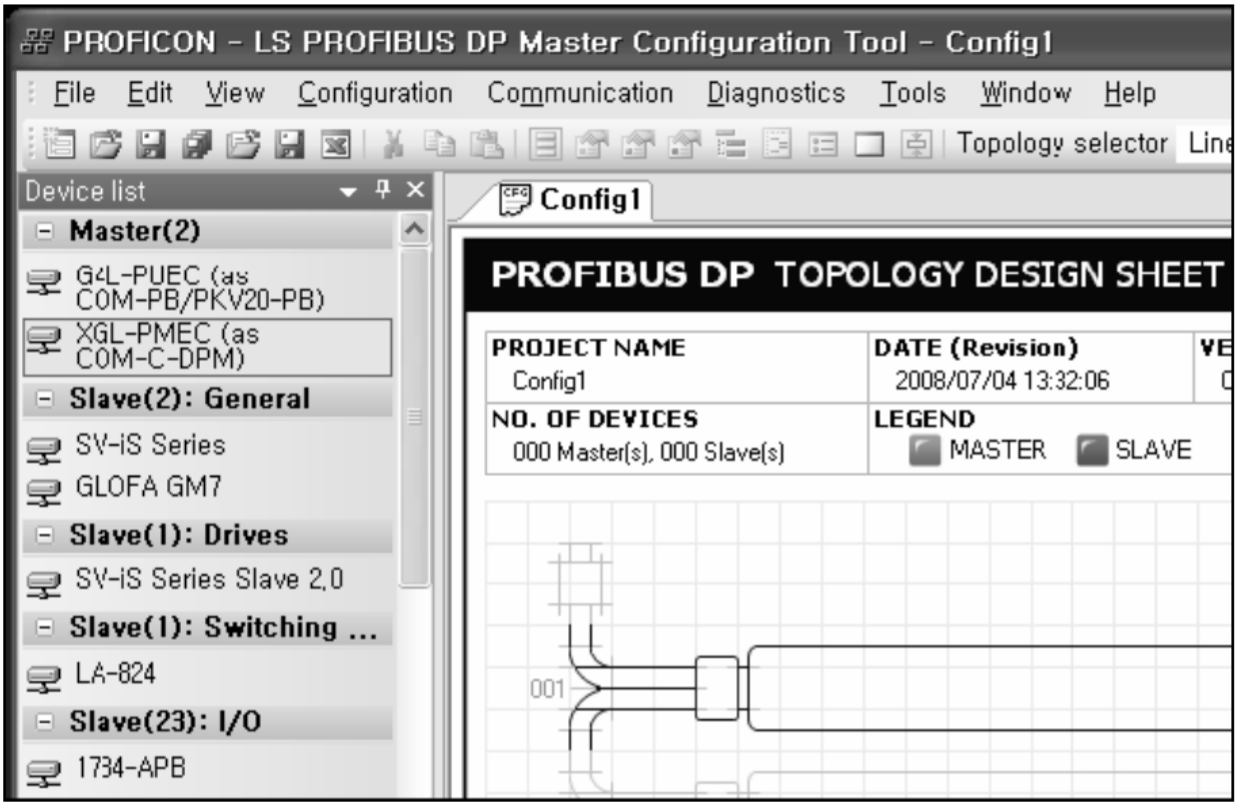
Screen of N Configurator is as follows.



– Device list: List of devices analyzed from GSD. You can drag & drop these devices to Project (topology) Window
– Project: PROFIBUS network topology
– Project explorer: classifies the topology configured in project window in Project-Master-affiliated slave
– GSD viewer: GSD detail information on the device selected from device list
– Output window: operation result of Configuration Tool
– Master property window: sets the properties of master device in the project window
– Slave property window: sets the properties of slave device in the project window
– Bus parameter window: Sets the communication properties of PROFIBUS network in the project window

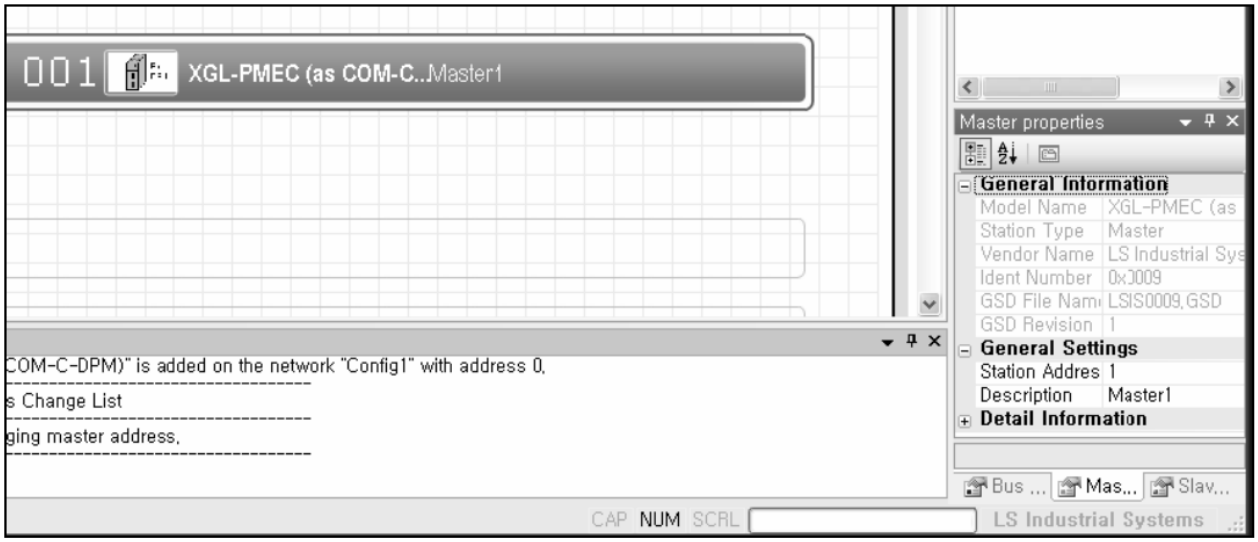
1. **Master configuration**

There are master devices at the top of the device list. Select the master you want use as figure below.



If you want to change the properties of master such as station number or description, press ""Master

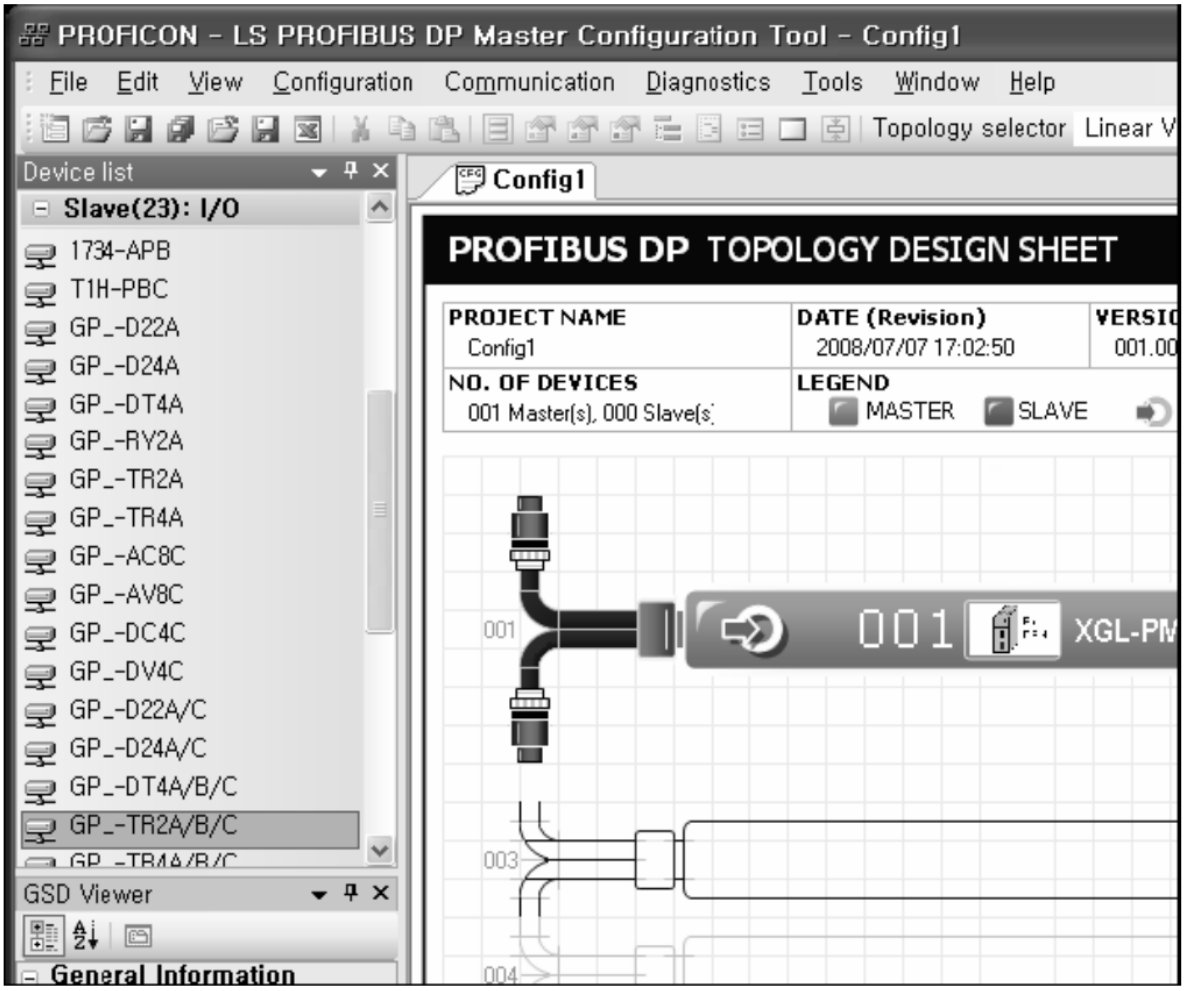
Properties” of “Configuration” menu. Master property window is activated as figure below.



2. **Slave configuration**

Slave configuration is available after master configuration.

How to configure slave is same as that of master. Select the slave device you want to add in the device list as figure below.



Basically the tool allocates station number in order when adding each device to topology. So if you want to change station number and properties of slave, user “Slave Properties” item of “Configuration” menu.

Affiliated items of “Slave Properties” are as follows

– Station Address

– Description

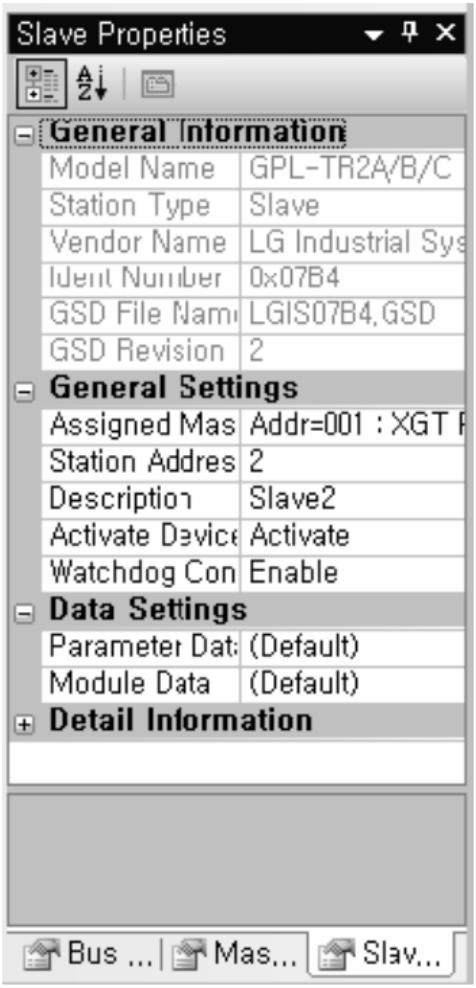
– Activate Device

– Communication Watchdog

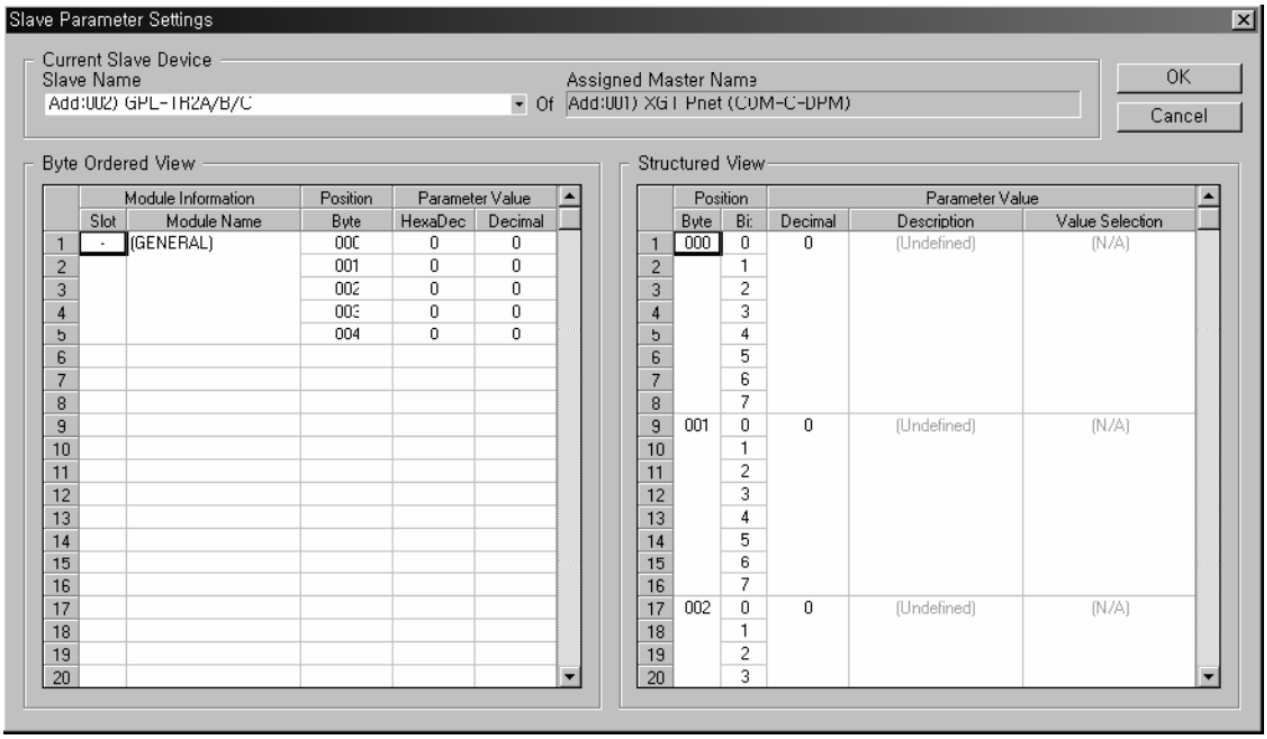
– User parameter setting

– Module setting

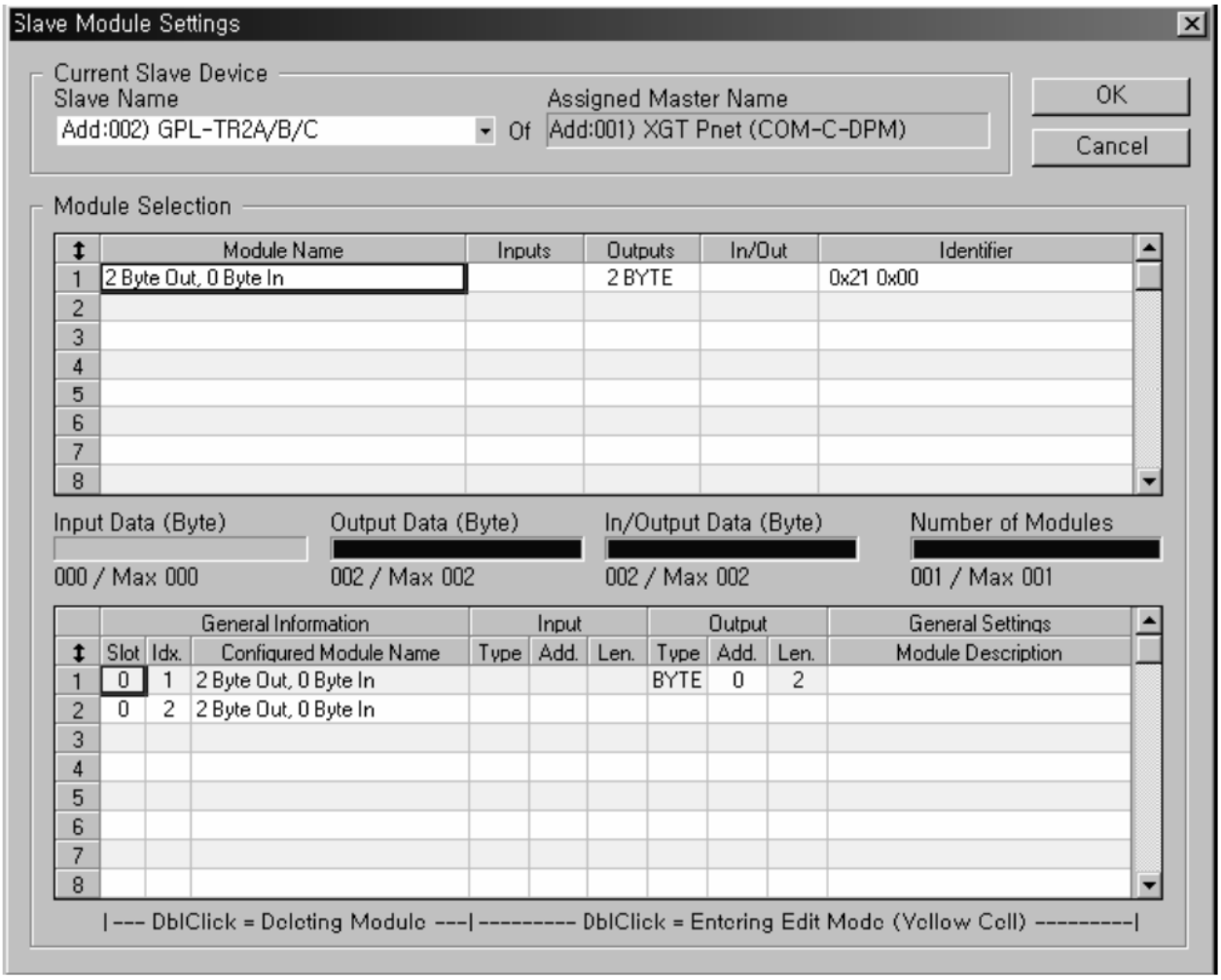
For user parameter setting and module setting, additional window appears.



For user parameter setting, “Slave Parameter Settings” window appears as figure below.



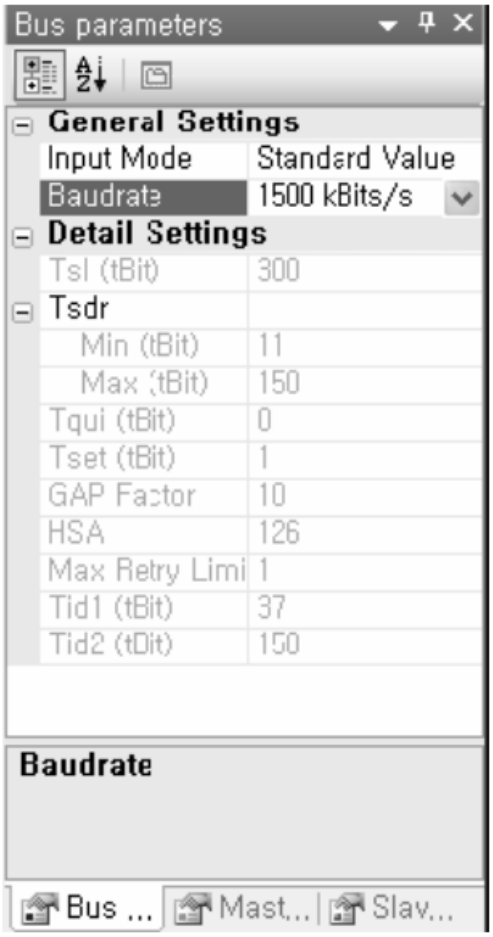
“Slave Module Settings” window is as follows. Double-click the actually configured module in the Module Selection area. If you select wrong module, double-click the module then the module is removed.



3. **Bus parameter**

You can change the communication speed or communication parameter through network bus parameter setting. Generally, default value of communication parameter is used so we describe how to change communication speed. Since the master has the right to change network bus parameter, you should select the master in the topology. Then “Bus Parameters” item of “Configuration” menu is activated. Select the activated “Bus Parameters” then activate the bus parameter setting tab as follows. Slave configuration is also same with master as follows.

Select the slave in device list.



If you select PROFIBUS DP communication speed (Baud rate) you want, bus parameter will be applied.

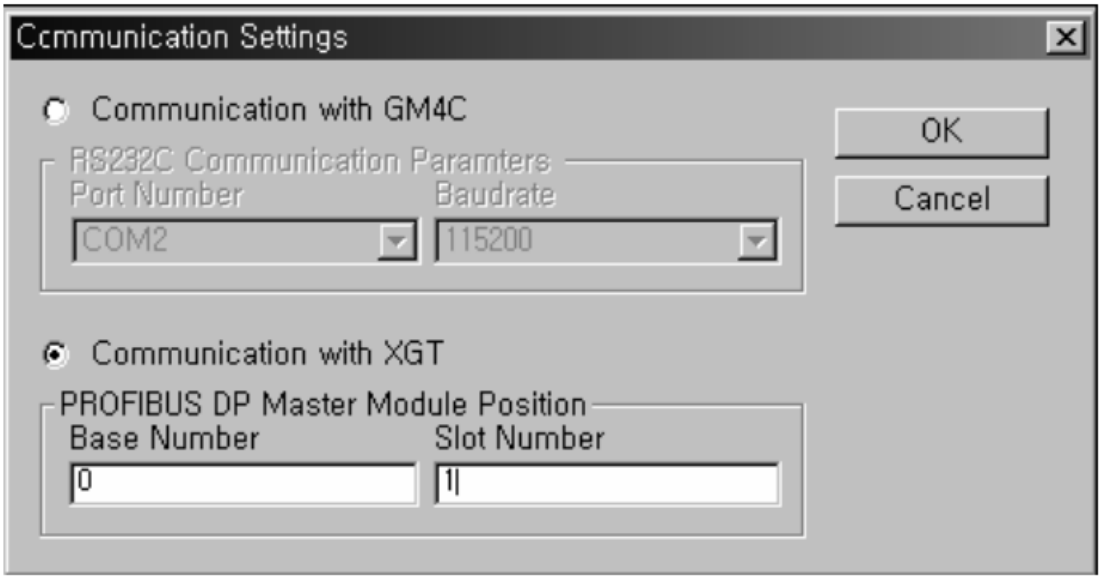
4. **Configuration download and upload**

PROFIBUS DP master operates based on Network configuration data. For this, you should download the network configuration data to master. And you can read the downloaded configuration data from master (Upload function). Here Pnet I/F module of XGT PLC, XGL-PMEC is used for example.

(1) Communication connection settings

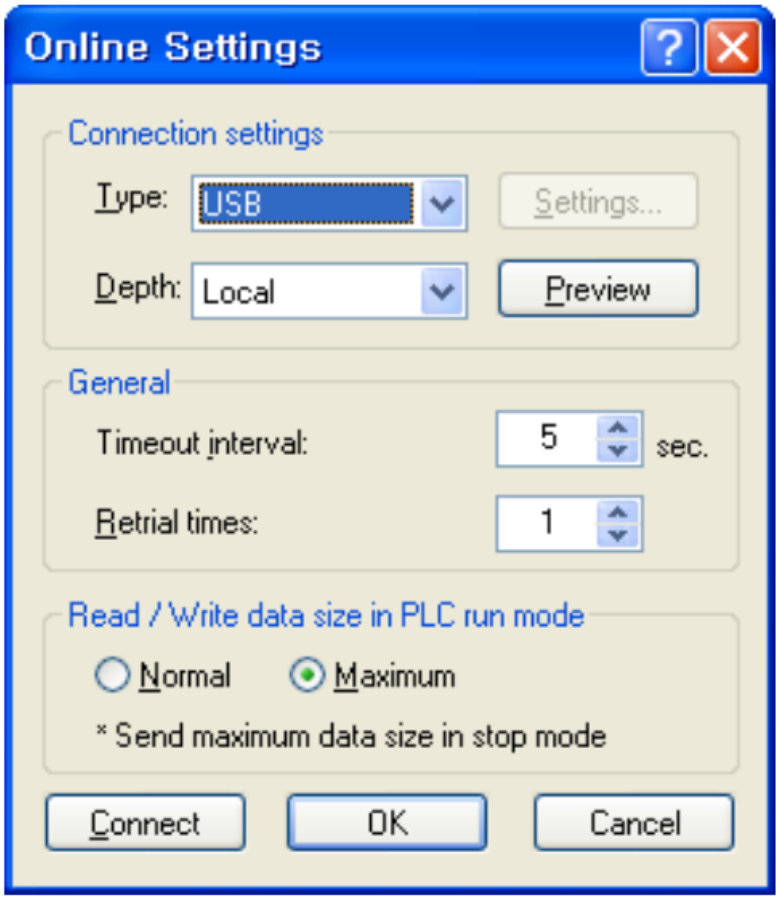
To download the Network Configuration set in Topology window to XGT Pnet master, first you should connect XGT PLC

If you select “Settings…” item of “Communication” menu, the window below appears. Select “Communication With XGT” and input the information on the PROFIBUS DP master module position and click “OK”



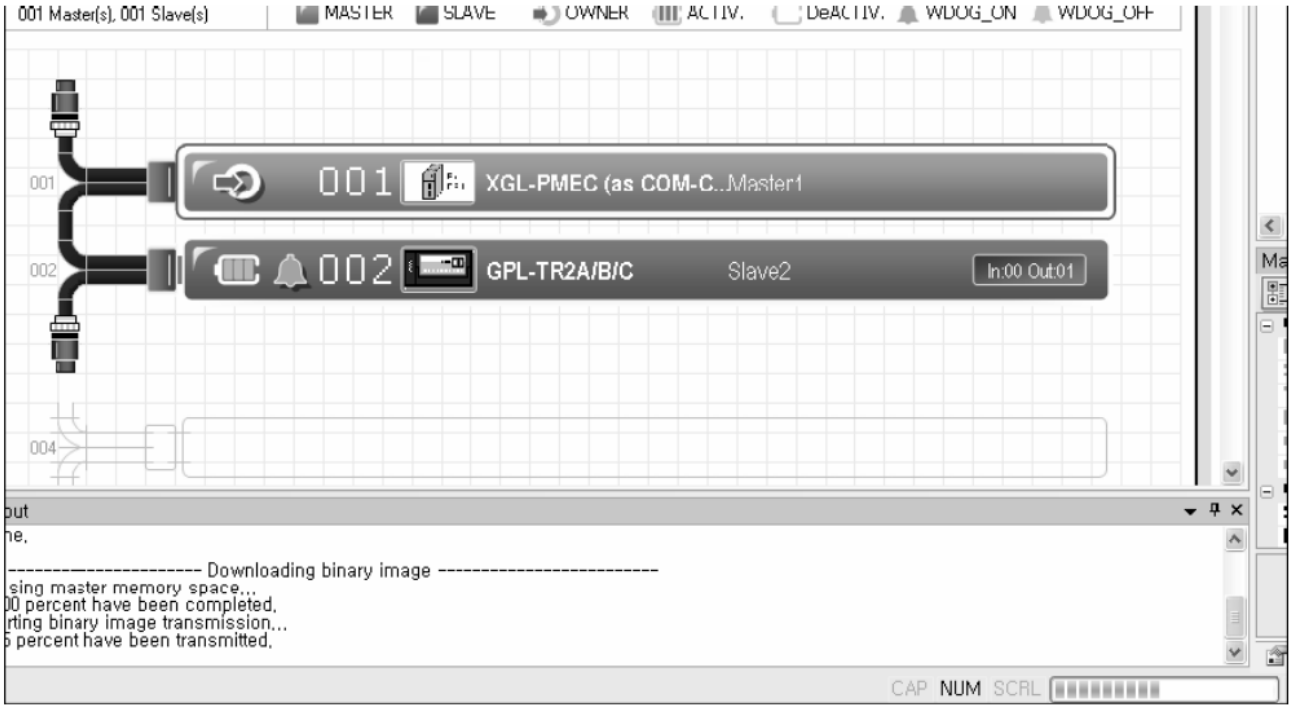
Then XGT CPU “Connection Settings” window appears. After setting, press “OK” button and complete the

connection setting.

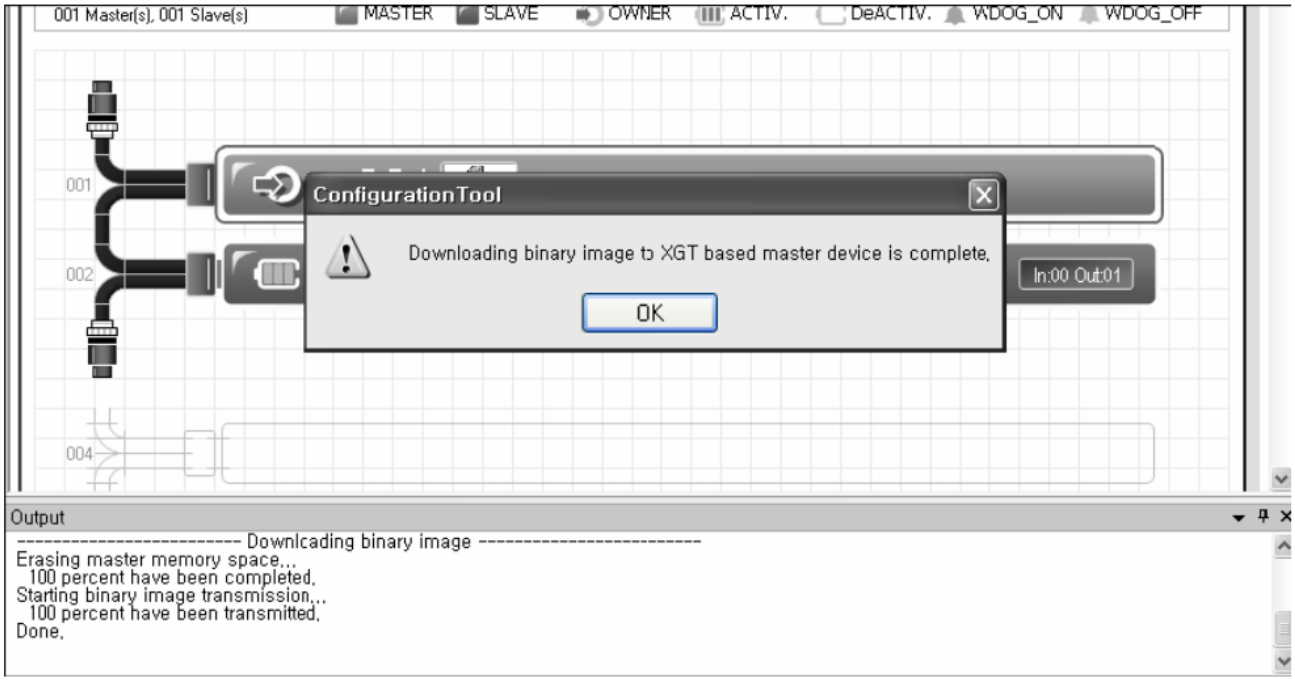


(2) Network Configuration download

After configuring network in the topology, if you select “Download Image” item of “Communication” menu, downloading will start. The figure below displays downloading status. Progress Bar operates in the status bar and Process Rate is displayed in the output window.



If downloading is complete, Progress Bar becomes full and “Done” is displayed in the output **window.**



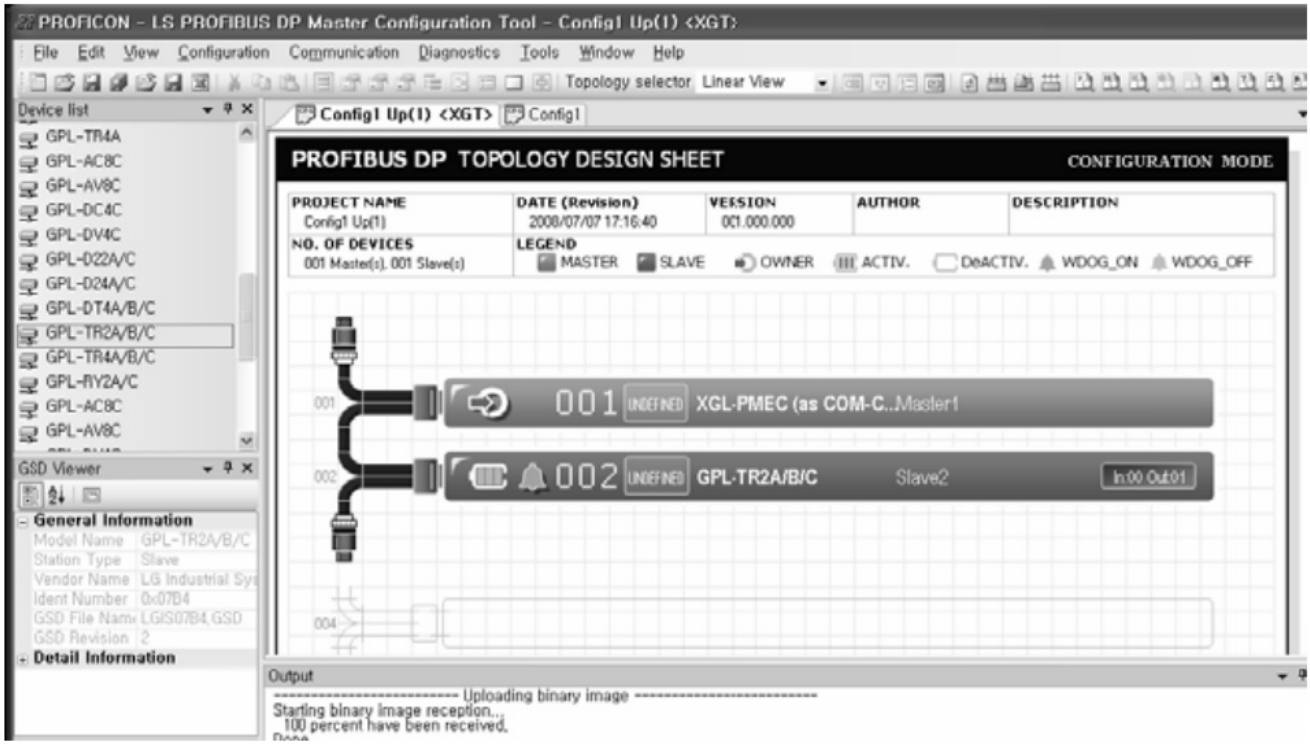
Note

1) Reset after complete the download.

(3) Network Configuration upload

If you select “Upload Image” item of “Communication” menu, uploading will starts. At this time, project is created automatically.

If uploading is complete, “Done” is displayed in the output window and Network Configuration read form master is displayed in the project topology window.



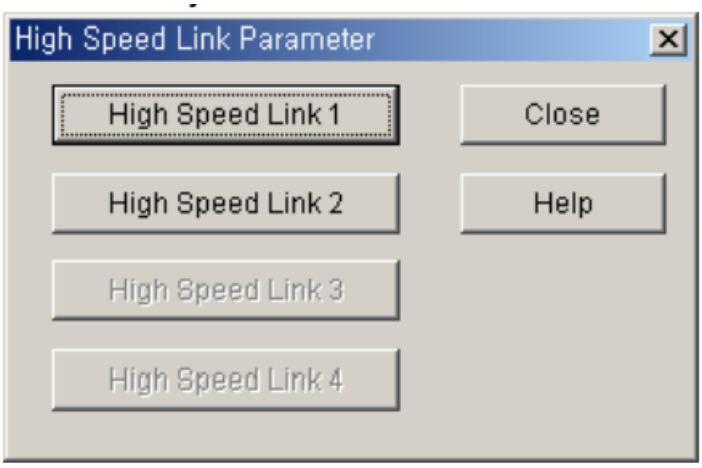
5.5 High Speed Link Setting

5.5.1 High Speed Link Setting in GMWIN

In the previous article, we explained the method to set Configuration and the method to download this to the master module. High-speed Link parameter setting should be done after downloading Configuration. And High-speed Link parameter is set by selecting link parameter from GMWIN project screen and setting the corresponding items. The setting order and its functions per item are as follows.

1. High-speed Link parameter setting in GMWIN

   Open High-speed Link parameter from Project basic screen and enter into the High-speed Link parameter setting menu



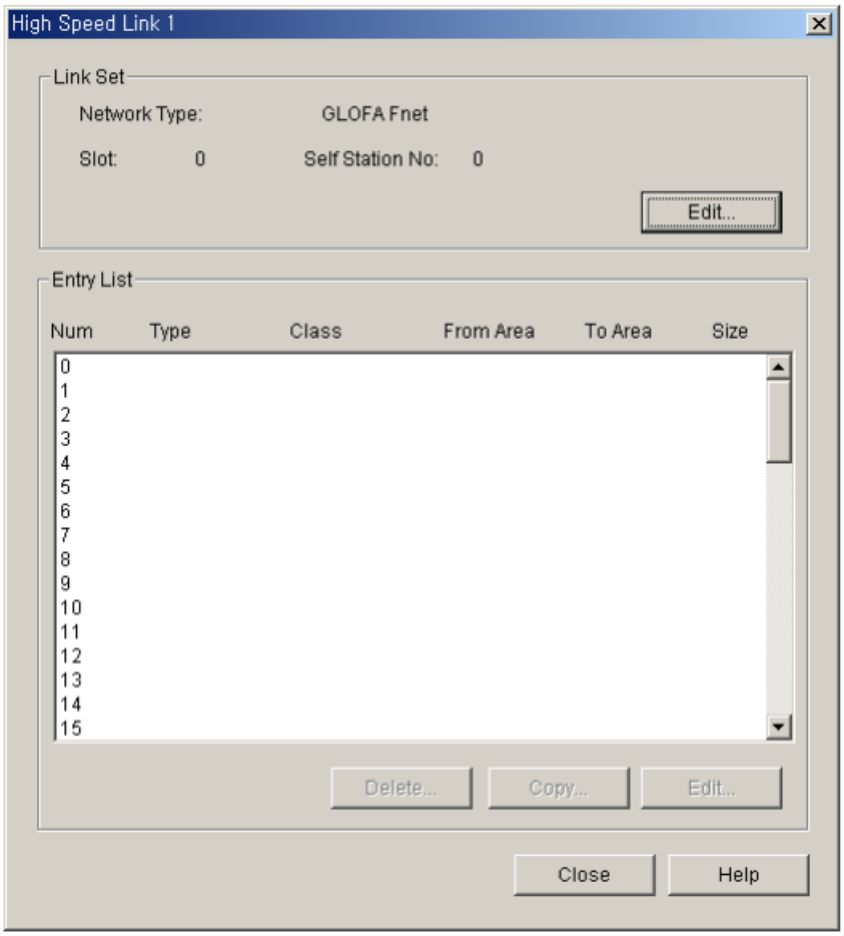
The number of activated “High-speed Link” item of the above figure means the maximum Installation number of communication module according to PLC CPU type. Available “High-speed link” is activated and in this case, Highspeed Link no. is not related to the installed slot no. and the slot no. should be set in the individual parameter setting screen and only one High-speed Link parameter is available per one communication module.

1. Max. Installation number per GLOFA-GM CPU model

Classification	Available communication module	Max. installation number	Remarks
GM3-CPUA	G3L-PUEA, G3L-PUEB	4	If combined with other communication module using HS link, installation number shall be limited.
GM4-CPUA/B	G4L-PUEA, G4L-PUEB	2 (A type) / 4 (B type)	
GM6-CPUA/B/C	G6L-PUEA, G6L-PUEB	2	
XGK/I CPU	XGL-PMEA	12	

2. Link parameter setting

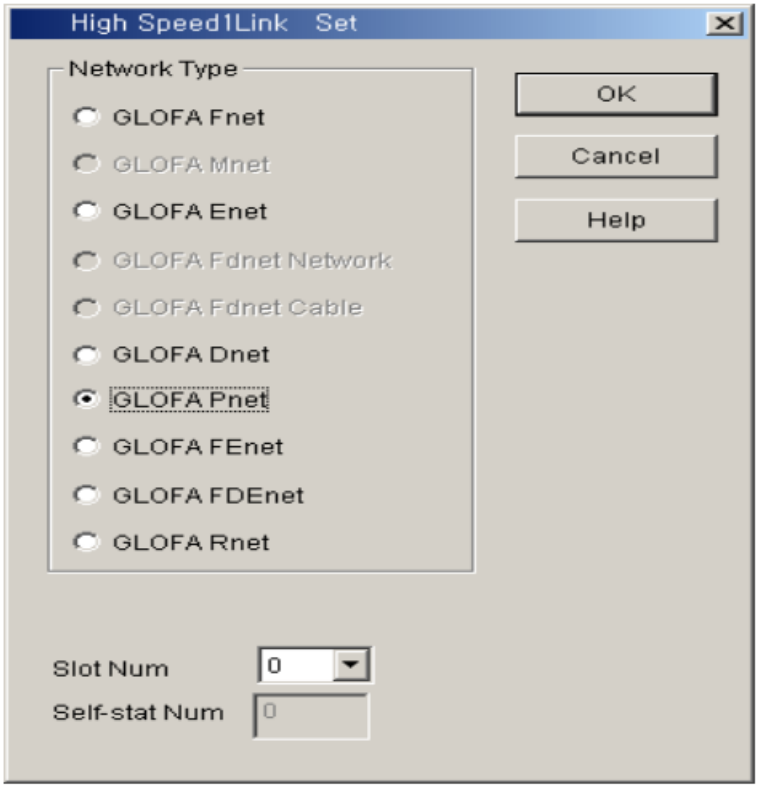
   If you select the corresponding parameter from parameter setting basic screen, the High-speed Link parameter setting initial screen will appear as shown in the following figure.



   Parameter setting initial screen is composed of two items such as ‘link set’ and ‘Entry list’. The setting method per each item and its function are as follows

3. High-speed Link setting

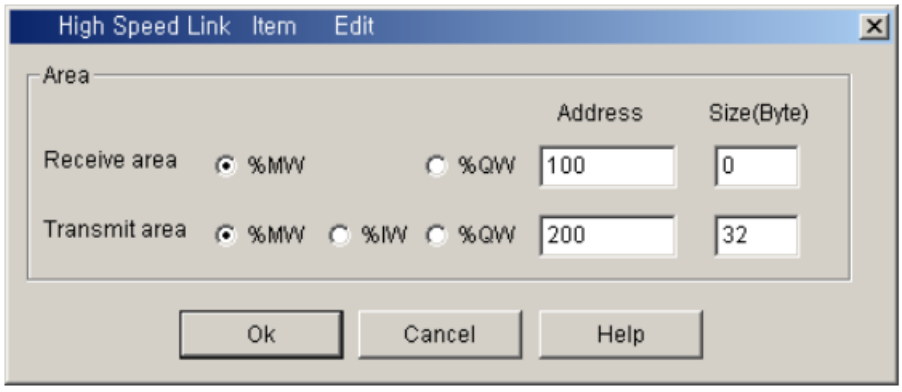
   “Link Set” is the item to set the basic items of the communication module. Select ‘Edit’ button of “link set” and set network type, slot no. the self station no. in the High-speed Link setting screen.



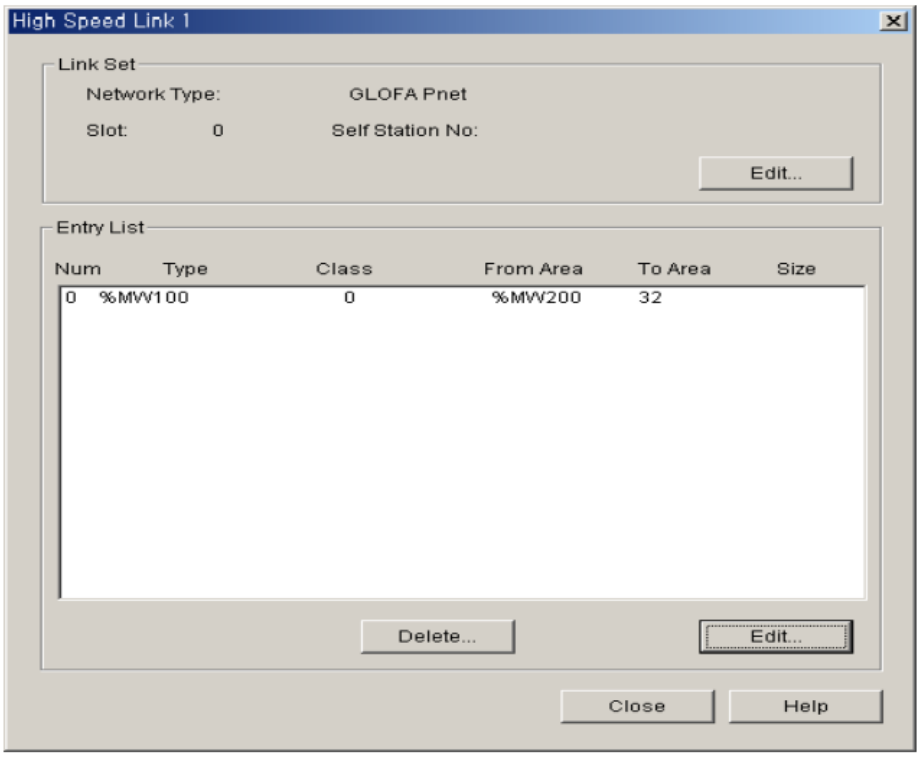
- Network Type: It sets the installed communication module type and GLOFA Pnet should be set.
- Slot Num: It sets the position of the communication module. (0 ~ 7 slot).
- Self-station Num: The master module' station no. shall be set in SyCon and the slave module's station no. shall be set by rotary switch. It is not available to change station number here.

4. Entry List setting

Entry list is the area to register the TRX information of actual data after link setting. It is required to set in the registration no. '0' of Entry list area, and the major setting items are shown on the top of registration list menu. Select (or double-click) the corresponding list from High-speed Link setting screen and the user can set the corresponding item from "High-speed Link item Edit" window as shown on the figure below.



The following shows the screen after setting the TRX parameter. Double-click the corresponding registration no. to modify the parameter.



The function of each registration item is as follows.

● Area: When sending, set the area to send and when receiving, set the storage area of the received data.

● Size: This means the data size to send/receive and the unit is 1 byte, and it is available to set total size as 1Kbyte for G3/4/6L-PUEA and 7Kbytes for G3/4/6L-PUEB.

Remark

1) The size of receive/transmit area is total I/O contact number made in SyCon.

2) The order of module is as follows.

First, G4L-PUEA 1 and GPL-TR2A (16 points), GPL-TR4A (32 points), GPL-D22A (16 points) and when setting the transmit area as %MW0, the receiving area as %MW100,

– Transmit area : %MW0

– Receive area : %MW100

– Size of transmit area : 6 bytes (total output contact number)

– Size of receive area : 2 bytes (total input contact number) And,

– %MW0 data -> GPL-TR2A output

– %MW1 ~ %MW2 data -> GPL-TR4A output

– GPL-D22A input -> %MW100 saved

3) The order of module programmed in SyCon has higher priority than station no. and cable connection when sending/receiving the data.

5. **High-speed Link Information**

High-speed Link service provides the user with the method to confirm High-speed Link service status to confirm the reliability of the data read from other station through High-speed Link as High-speed Link information because this is data exchange between more than 2 communication stations.

That is, the communication module provides the user with the high link information every regular time by collecting all data received until then about whether the High-speed Link action is done by the parameter set by the user or not. The High-speed Link information contains the overall information such as RUN-LINK (_PHSxRLINK), LINKTROUBLE (_PHSxLTRBL) that provides the user with overall information of communication network and the individual information such as _PHSxSTATE that informs the communication

status per slave station. The user can use the above information as keyword type when preparing the program and monitor the High-speed Link status by using the High-speed Link information monitor function. When operating several PLC using High-speed Link, it is required to confirm the reliability of the sending/receiving data using the High-speed Link information such as RUNLINK, LINK-TROUBLE etc.

(1) Run-Link (_PHSxRLINK)

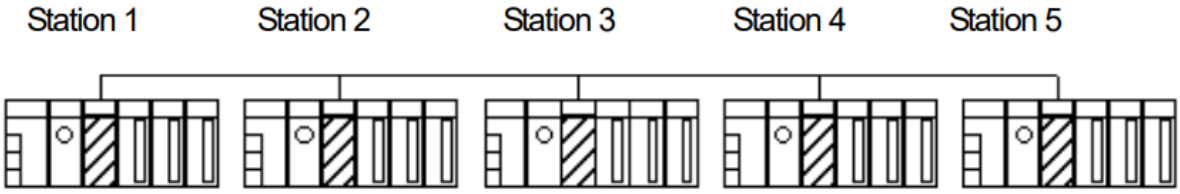
This is the overall information that shows whether or not High-speed Link is running normally by the parameter set by the user. Once 'ON', it maintains 'ON' until link enable is 'OFF' and if the following condition is given, it shall be 'ON'.

a) When 'Link Enable' is 'ON'.

b) When parameter registration list setting is set normally all.

c) When sending/receiving all data that corresponds with parameter registration list within the setting period.

d) When all other station status set in the parameter is 'RUN' and at the same time there is no error.



Example of High-speed Link parameter setting of each station

Station 1	**Station 2**	**Station 3**	**Station 4**	**Station 5**
send: 2 words receive: 2words (station 2) receiving: 2words (station 3)	sending: 2words receiving: 2words (station 1) receiving: 2words (station 4)	sending: 2words receiving: 2words (station 1) receiving: 2words (station 5)	sending: 2words	sending: 2words

The figure shows High-speed Link system configuration to explain RUN-LINK ON condition. In case that 5 communication modules are connected by network as shown on the above figure and carry out High-speed Link as the content of parameter, RUN-LINK ON condition of Station 1 is as follows.

– When in the self station (station 1), Link-Enable is 'ON',

– When the self station (station 1) is RUN status,

– When the self station (station 1) is not the error status,

– When the sending parameter data set in the self station (station 1) is sent properly,

– When the data receiving from station 2, 3 is received properly,

– When the action mode of other station (station 2, 3) to send the data to the self station (station 1) is RUN mode, not the error status and it is communicated properly,

– When in the other station (station 2, 3) of the self station (station 1), the action mode of other station (station 4, 5) set in the parameter is RUN mode and not the error status and it is communicated properly.

If the above 7 items are satisfied, RUN-LINK of station 1 shall be ON. If using RUN-LINK contact associated with program in the system where PLC of various stations perform interlocking through High-speed Link, it is available to carry out the mutual monitoring of sending/receiving data and the reliable communication. But, once RUNLINK contact is 'ON', it maintains 'ON' status until Link-Enable becomes 'OFF'. Thus when monitoring the abnormal status such as on communication error, it is required to use 'LINK-TROUBLE' information contact together as follows.

(2) LINK-TROUBLE (_PHSxLTRBL x=High-speed Link no.(1~2))

This is the overall information indicating whether the High-speed Link is running normally by the parameter set by the user. When RUN-LINK violates the condition of RUN-LINK ON in the status that RUN-LINK is ON, LINKTROUBLE shall be ‘ON’ and if recovered, it shall be ‘OFF’.

(3) High-speed Link status (_PHSxSTATE[0..127] x=the salve station no. (0~127))

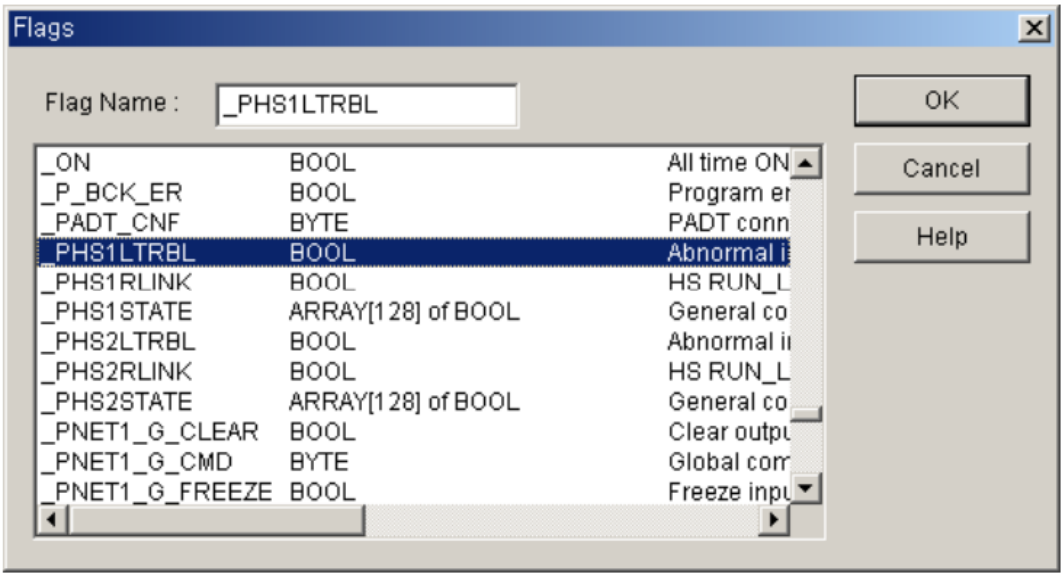
This is the individual information indicating the action status of the slave station and this is available to indicate max. 127 stations High-speed Link status same as max. slave station number. That is, if the sending/receiving status of the corresponding list is normal and the action mode is RUN and there is no error, it shall be ‘ON and if violating the above condition, it shall be ‘OFF’.

6. **High-speed Link information monitoring**

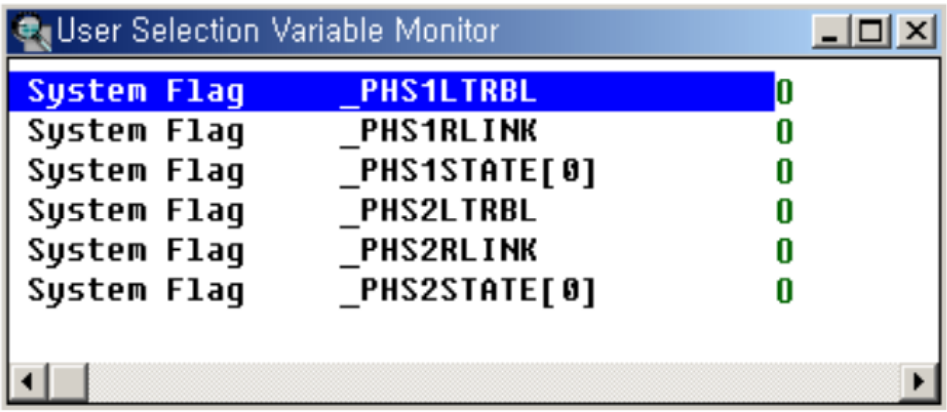
High-speed Link information enables to monitor using the monitoring function after GMWIN online connecting. There are two kinds of method to monitor: the method to select ‘variable monitor’ from monitor menu and the method by link parameter monitor.

(1) Variable monitor

The variable monitor is the function to monitor by using GMWIN flag monitor function and selecting the necessary item. If you select ‘variable monitor’ from online monitor item, the variable registration screen will appear as below. Select the flag and register by selecting directly the High-speed Link information flag from variable, flag list screen one by one. In this case, as PHSxSTATE[n] is Array type flag, the user should select the array no. directly and the array no. means the slave station no. Also, ‘x’ means the High-speed Link no. and it has the range 1~4 for GM3 PLC CPU, the range 1~2 for GM4 PLC CPU, and the range 1 for GM6 PLC CPU. If you register the variable in the figure below and select ‘close’, the monitor screen will appear and if you press ‘start’ from tool box shown on the right side separately, it begins to monitor.



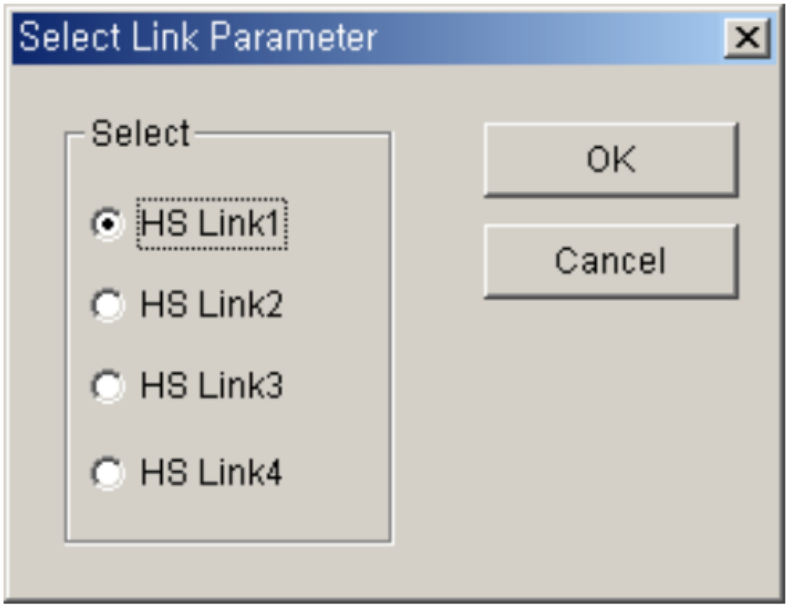
High-speed Link information monitor screen (Variable registration)



(2) Link parameter monitor

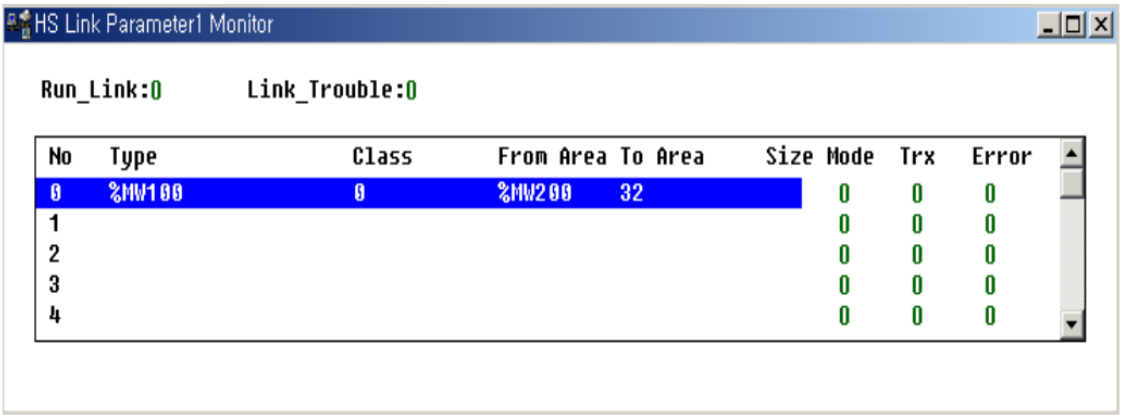
If you select ‘link parameter’ item from monitor menu of GMWIN online connection, ‘Select Link Parameter’ screen will appear as shown on the figure below. If the user selects the desired item from parameter number set by it and verify it, the High-speed Link parameter monitor screen will be open and the setting registration list will be monitored and indicated on the screen.

Link parameter selection screen



Link parameter monitor indicates the general information such as RUN-LINK, LINK-TROUBLE on the right top

and the individual information for mode (action mode), communication (sending/receiving status), error with registration list no.



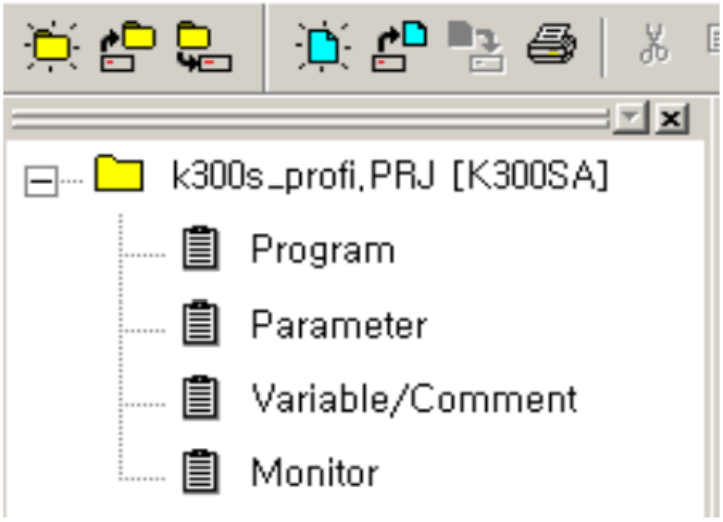
If selecting the High-speed Link information monitor as shown on the above figure, the High-speed Link parameter and information set by the user will be monitored together. And it is available to monitor the High-speed Link status with I/O data as the individual information setting value is monitored together.

5.5.2 High-speed Link Parameter Setting in KGLWIN

Profibus-DP master for MASTER-K also uses SyCon for the Configuration setting and the setting method is the same as that of GLOFA-GM. In case of MASTER-K, it should be required to set the High-speed Link parameter after downloading the Configuration to the master module and the High-speed Link parameter selects the parameter from KGLWIN project screen and set the corresponding item. The setting order and the function per item are as follows.

1. High-speed Link parameter setting in KGLWIN

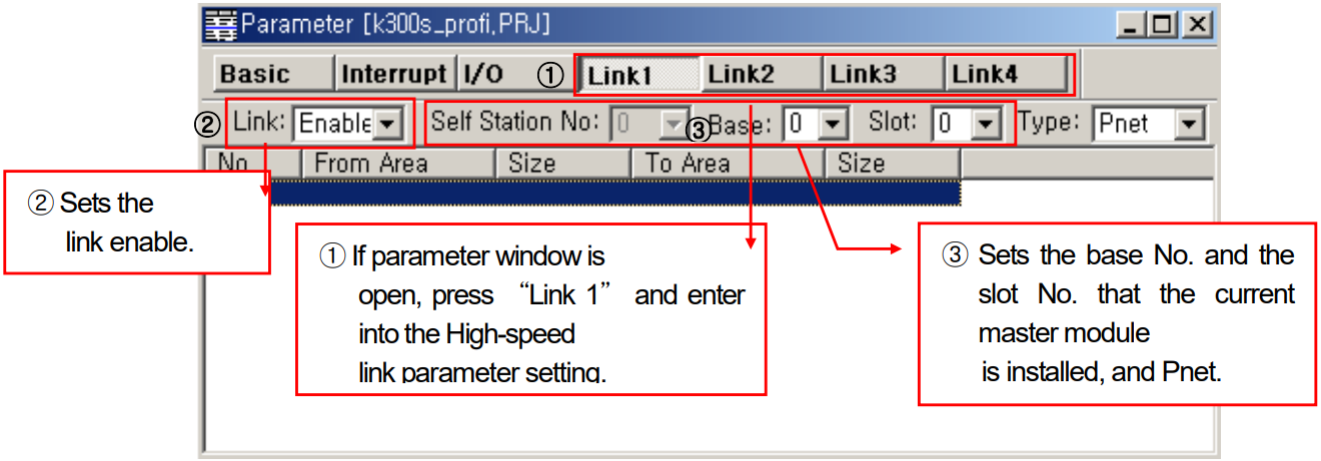
   If selecting ‘parameter’ from the following project basic screen, the High-speed Link parameter basic screen will appear and you can select the corresponding item.



2. High-speed Link parameter selection

   (1) Setting method

   Select the corresponding parameter from the basic screen as shown on the figure below and enter into the parameter setting.



The High-speed Link item tab of the above figure means max. installation number of communication module according to PLC CPU type. The High-speed Link button as much as the available setting number shall be active and in this case, the High-speed Link no. is not related to the installed slot no. and the slot no. shall be set in the individual parameter setting screen and only one High-speed Link parameter is available to set for one communication module.

The following table shows the communication model available to install per MASTER-K CPU model and max. installation number.

Max. installation number per MASTER-K CPU model

Classification	**Available communication module**	**Max. installation number**	**Remarks**
K1000S CPU	G3L-PUEA, G3L-PUEB	4	–
K300S CPU	G4L-PUEA, G4L-PUEB	2 /4 (Above version 3.0)	
K200S CPU	G6L-PUEA, G6L-PUEB	2	

* If combined with other communication module using the High-speed Link, the installation number shall be limited.

a) Link: This is the item to allow the High-speed Link and the initial value is prohibited and it is required to set 'enable' to execute the High-speed Link.

b) Self station no. : Master module is set in SyCon and the slave module is set as rotary switch. It is not available to change here.

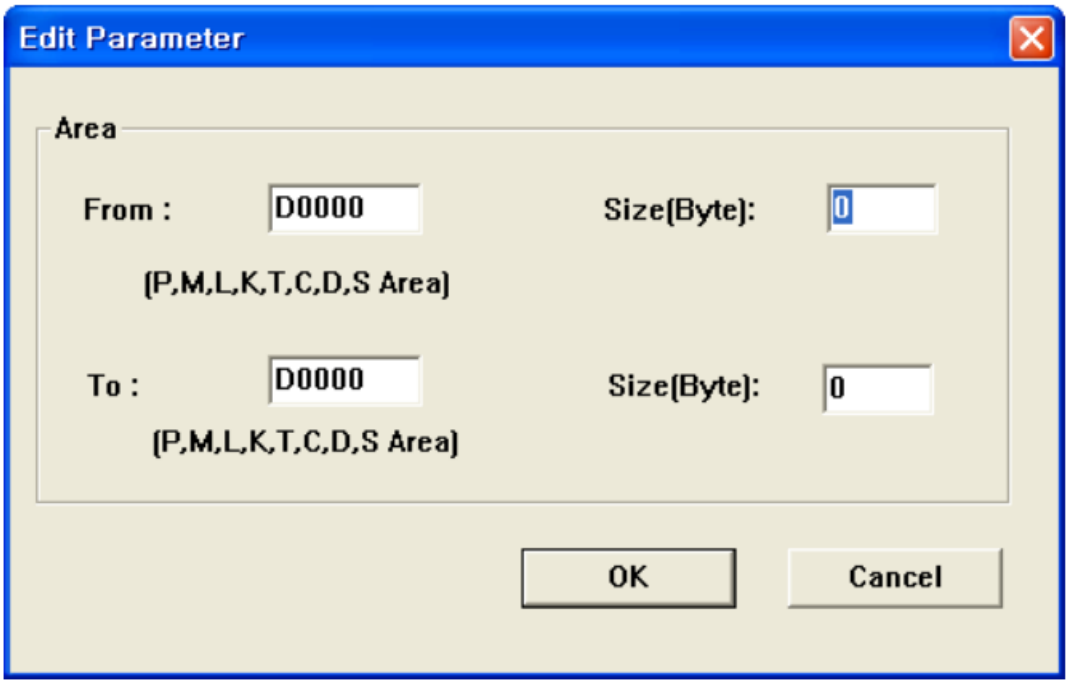
c) Base: It sets the base position that the communication module to set is installed.

d) Slot: It sets the position that the communication module to set is installed. (0 ~ 7 slot).

e) Type: It sets the type of the installed communication module and sets the Pnet.

3. Parameter setting and modification

If you double-click the corresponding parameter from the parameter setting basic screen as shown on the figure below, the High-speed Link parameter setting screen will appear.



a) area: When sending, set the area to read the data to send and set the storage area of the received data when receiving.

b) Size: This means the data size to send/receive and the unit is 1 byte and it is available to set total sending/receiving as 1Kbytes for G3/4/6L-PUEA and 7Kbytes for G3/4/6L-PUEB

Remark

1) The size of sending/receiving area is the total I/O contact number made in SyCon.

2) The order of setting is carried out as G4L-PUEA 1 and GPL-TR2A(16 points), GPL-TR4A(32 points), GPL-D22A(16 points) and when setting sending area as P000, the receiving area as P010,

Sending area : P000

Receiving area : P010

Size of sending area : 6 bytes(total output contact number)

Size of receiving area : 2 bytes(total input contact number),

And,

P000 data -> GPL-TR2A output

P001~P002 data -> GPL-TR4A output

GPL-D22A input -> P010 saving.

3) The setting order programmed in SyCon has the priority when sending/receiving the data than station no. and cable connection.

5.5.3 High Speed Link Setting in XG5000

1. Operation sequence of High-speed link

No.	S/W applied	Operation	Details
1		Execute XG5000	XG5000

2	XG5000 (Slave)	Create new file	File à New File à Set project name and type
3		Set XG5000 connection	XG5000àOnlineà connection settings
4		Connect XG5000	XG5000à Online à Connection
5		Read I/O information	XG5000àOnline àRead
6		Specify HS link project	Specify “HS link” at XG5000 screen
7		Set HS link block	Click shell of “Hs link” screen 1) In case of TX: specify Read area (CPU area) 2) In case of RX: specify Save area (CPU area)
8		Write HS link parameter	Online à Write parameter : Check corresponding HS link and write
9		Enable HS link	Online à Enable Link: Enable corresponding HS link
10	SyCon or PROFICON	Execute dedicated configuration tool	For XGL-PMEA, execute SyCon and for XGL-PMEC, execute PROFICON
11		Set network Configuration	Refer to Chapter 6 SyCon Setting (XGL-PMEA) or Chapter 7 PROFICON setting (XGL-PMEC)
12		Connect to communication port	Refer to Chapter 6 SyCon Setting (XGL-PMEA) or Chapter 7 PROFICON setting (XGL-PMEC)
13		Download network Configuration	Refer to Chapter 6 SyCon Setting (XGL-PMEA) or Chapter 7 PROFICON setting (XGL-PMEC)
14		Execute XG5000	XG5000

15	XG5000 (Master)	Create new file	File à New file Set project name and project type
16		Set XG5000 connection	Select applicable connection driver through XG5000 à Online à Connect.
17		Connect to XG5000	XG5000 à Online à Connect
18		IO Information Read	XG5000 à Online à Read
19		Define High-speed link pr oject	Select “High-speed Link” on the XG5000 screen
20		Set communication modul e and communication peri od	Select one among “High-speed link 1” ~ ”High-speed link 12” and double- click it to specify module type, base No., slot No. and period type
21		Upload SyCon	Double-click the created “Block” and click Online à SyCon Upload on the “High-speed Link” screen
22		High-speed Link Block Se tting	Double-click the cell on the “High-speed Link” screen 1) For Send : specify Read area (CPU area) 2) For Receive : specify Save area (CPU area)
23		High-speed Link Paramet ers Write	Online à Write Parameter: check applicable High-speed link so to write
24		Enable High-speed Link	Online à Enable Link: enable applicable High-speed link

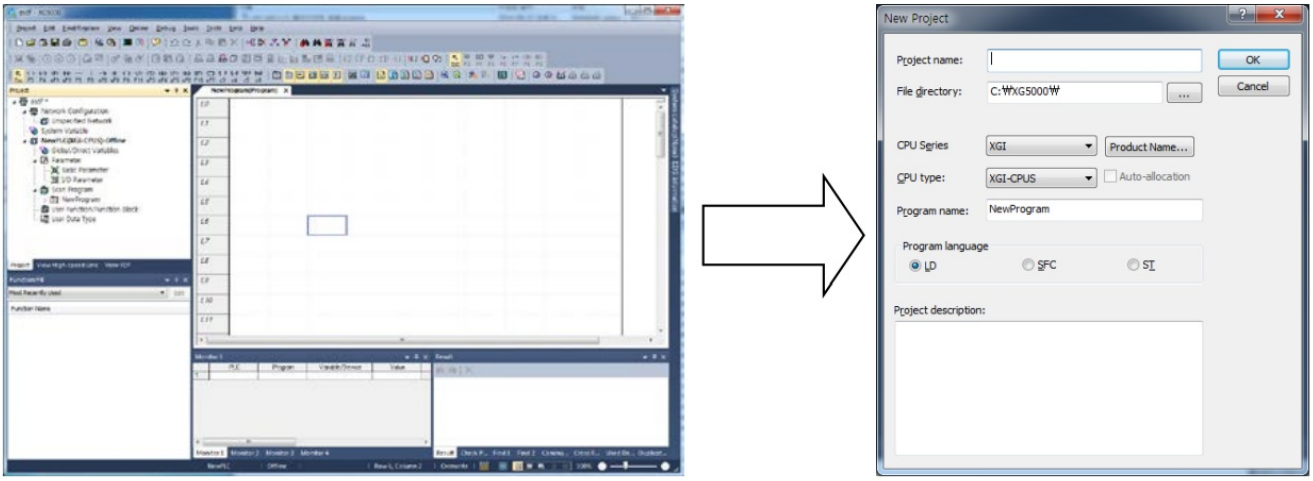
2. High Speed Link Parameter Setting

   High-speed link parameter setting is set in High-speed link screen in XG5000.

   Sequence of settings, please refer to the Chapter 8.3.

   (1) Execution of XG5000 and creation of new file

   XG5000 is executed firstly

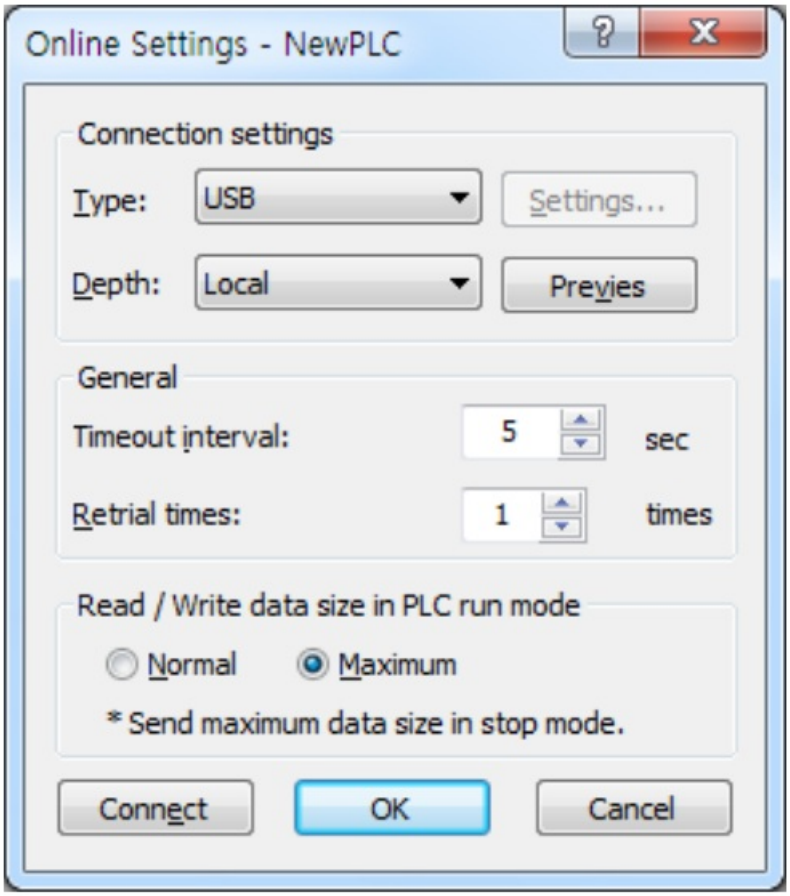


Basic screen of XG5000

Item	Contents	Remark
Project name	Input project name on XG5000	–
File location	Directory where project will be saved	–
CPU series	Select XGK or XGI or	–
CPU type	Select CPU kind	–
Project comment	Input project comment	–

(2) Setting of XG5000 connection

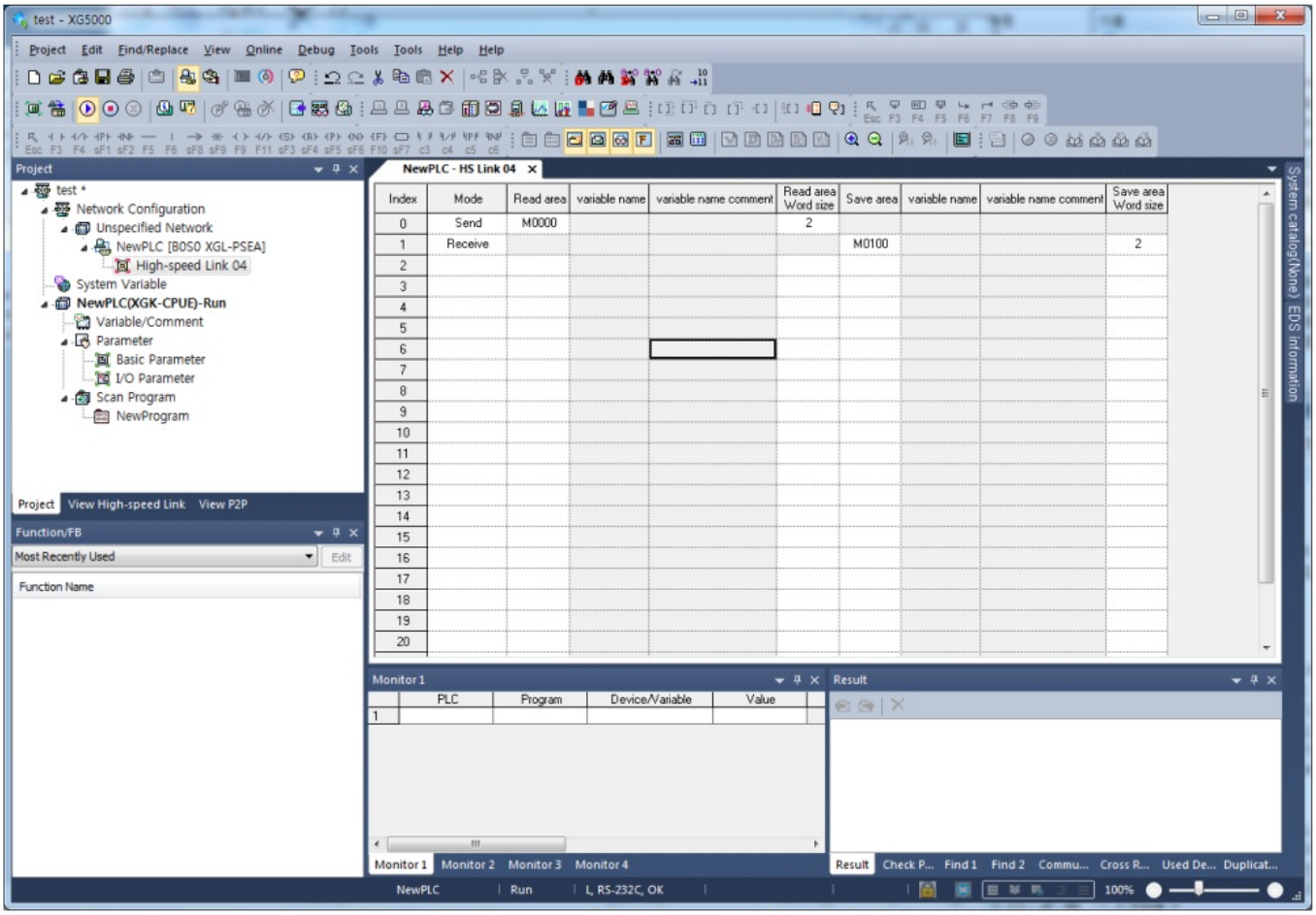
It designates the way of XG5000 connection with CPU. “Online” → “Connection Settings”



Connection settings

Items		Description
Connection option settings	Connection method	RS-232C, USB
	Connection steps	Local/Remote connection setting Local: Connection of from PC to CPU Remote: Connection from PC to CPU via communication module
Common	Timeout time when communication failure	1~9 seconds
	Retried number when communication failure	1~9 times

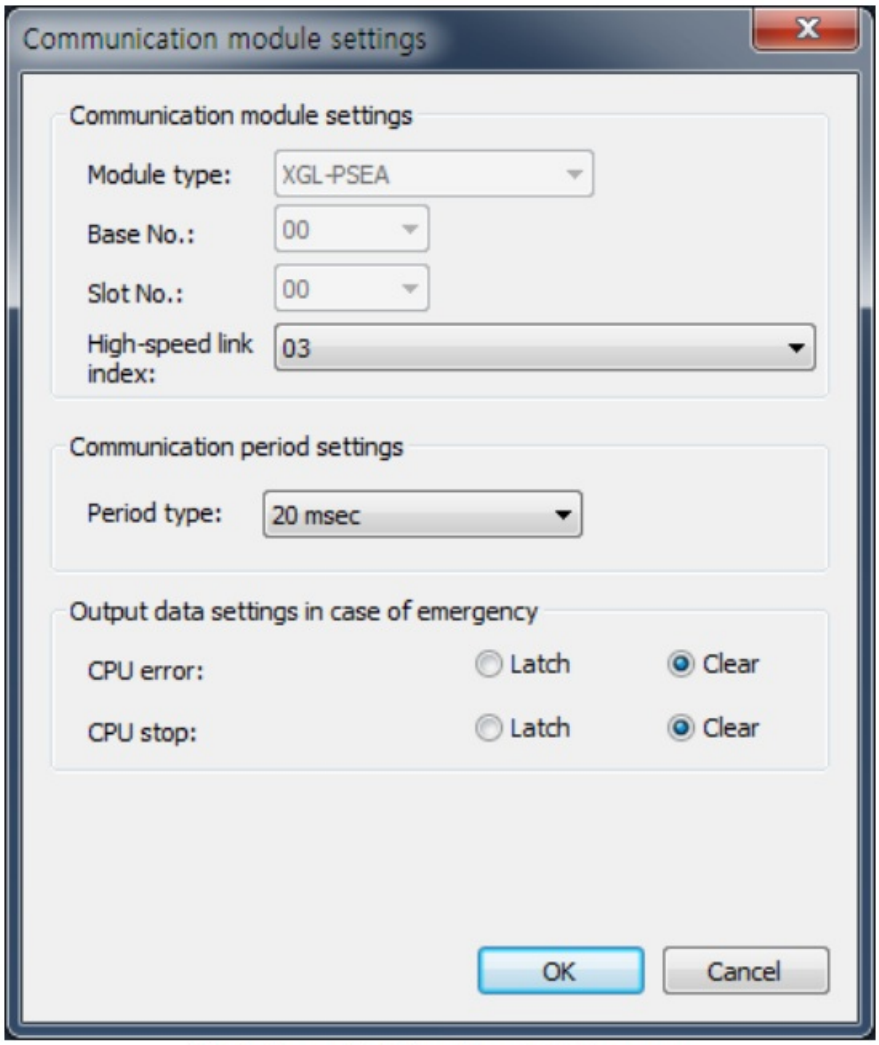
(3) XG5000 connection
XG50000 is connected to CPU by “Online” → “Connect”.
(4) Read information
Select “Online” → “Read” to read modules installed on the base.
Surely execute “Read” for High-speed link setting.
(5) High-speed link project



Initial screen of High-speed Link Setting

(6) Communication module and Communication period setting

If double-click the High-speed link, screen of Communication module settings and Communication cycle settings is opened. In this screen, communication module, communication and Output data setup in case of emergency settings period can be specified.



High Speed Link setting initial screen

Items			Description
Communication module settings		Module type	Setting of communication module installed Applicable module: FENet, FDEnet, Dnet, Rnet, Pnet
		Base No.	Setting of base position installed (Maximum 7 bases allowed) Range of Setting: 0 ~ 7
		Slot No.	Setting of slot position installed (Maximum 12 slots allowed) Range of Setting: 0 ~ 11
Communication period settings		Period type	– It is set to transmit the data time every period. – Range of setting: 20 , 50 , 100 , 200 , 500 , 1s, 5s, 10s (default is 20) – But Receive data will be updated data in every scan regardless of communication period. – Communication period will be applied to all of the Send/Receive blocks.
Output data setup in case of emergency settings	CPU error	Latch	– Keep the output (But, Clear the P device data)
		Clear	– Clear the all data
	CPU stop	Latch	– Keep the output (But, Clear the P device data)
		Clear	– Clear the all data

Setting of communication module

(7) Config. Upload

After “Setting of communication module and communication period” is complete, click the mouse cursor positioned on

High-speed link window (right screen of XG5000), and select “Online” → “Communication module setting” → “Config. Upload (Dnet, Pnet)” to upload SyCon’s configuration file.

(8) Setting of High-speed link block

Double-click the applicable index number of Configuration file uploaded and designates the ‘Read area’ and ‘Save area’ of Send/Receive.

Index	Master Station No.	Station number	Mode	Read area	Sending data (Byte)	Save area	Receiving data (Byte)
0	0	1	Receive				2
1	0	2	Send		2		
2							
3							
4							
5							
6							
7							
8							
9							
10							

High-speed ...

Setting of High-speed link block

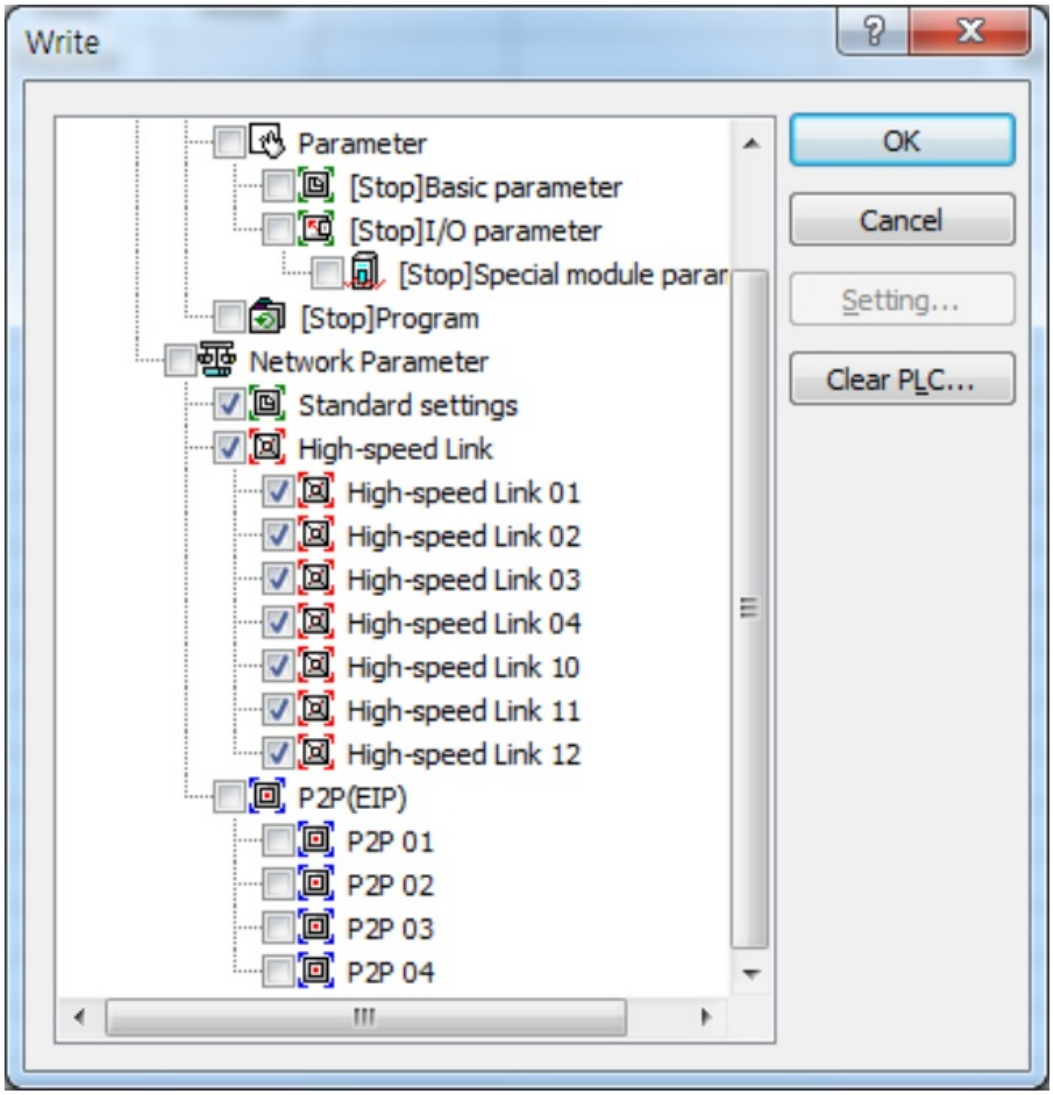
Classification	Details	
Master Station No.	Display the Master station no.	
Station No. *1	Setting range for the slave : 0 ~ 126 If identical station No. is set, communication will not be normal.	
Mode *1	Sending: Transmission the data from master module to slave module. Receiving: Transmissio n the data from slave module to master module.	
Read area (Mas ter module → Slave modul e)	XGK	Area to set the start address of device used for Sending. Setting device : P, M, K, F, T, C, U, Z, L, N, D, R, ZR
	XGI	Area to set the start address of device used for Sending. Setting device : A, M, I, Q, R, W, F, K, L, N, U
Save area (Slav e module →Master modul e)	XGK	Area to set the start address of device used for Receiving. Setting device : P, M , K, F, T, C, U, Z, L, N, D, R, ZR
	XGI	Area to set the start address of device used for Receiving. Setting device : A, M, I, Q, R, W, F, K, L, N, U
Send data Rece ive data (Byte)	Display input/output points of slave module by the bytes. – In case of I/O module of 8 bits or less, please set 1 byte.	

*1 : Area is not able to set

Setting of High-speed link block

(9) Write the High-speed link parameter

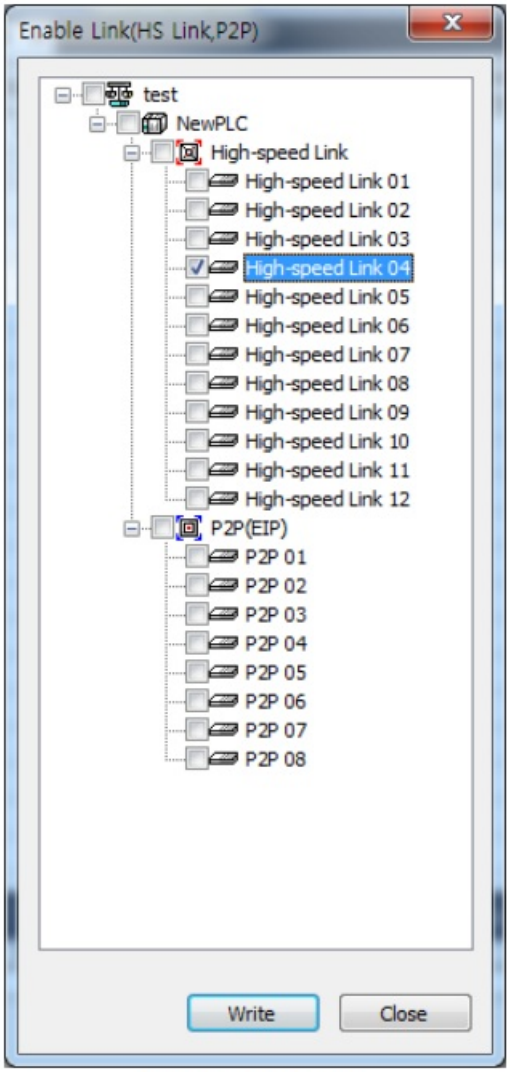
Click “Online” → “Write” in XG5000, check the applicable High-speed link and then click [OK].



Screen of Write the parameter

(10) Enable of High-speed link

Click “Online” → “Link Enable” in XG5000, check the applicable High-speed link and then click [Write]. If Highspeed link is enabled, on the module’s LED display High-speed LED will be On, when High-speed link starts.



Screen of Link Enable

* Enable Link through flag

It describes “Enable Link” method through flag. The following XG5000 version, CPU OS version is needed.

Item	Version
XG5000	V3.61 or above
XGR CPU	V1.91 or above
XGI CPU	V3.4 or above
XGK CPU	V3.7 or above

Flag list related with “Enable Link” -XGR

Flag	Data type	Device	Description
_HS_ENABLE_STATE	ARRAY[0..11] OF BOOL	%FX19040	HS link enable/disable current state
_HS_REQ	ARRAY[0..11] OF BOOL	%FX31520	HS link enable/disable request
_HS_REQ_NUM	ARRAY[0..11] OF BOOL	%FX31536	HS link enable/disable setting
_P2P_ENABLE_STATE	ARRAY[0..7] OF BOOL	%FX19072	P2P enable/disable current state
_P2P_REQ	ARRAY[0..7] OF BOOL	%FX31552	P2P enable/disable request
_P2P_REQ_NUM	ARRAY[0..7] OF BOOL	%FX31568	P2P enable/disable setting

-XGI

Flag	Data type	Device	Description
_HS_ENABLE_STATE	ARRAY[0..11] OF BOOL	%FX15840	HS link enable/disable current state
_HS_REQ	ARRAY[0..11] OF BOOL	%FX16480	HS link enable/disable request
_HS_REQ_NUM	ARRAY[0..11] OF BOOL	%FX16496	HS link enable/disable setting
_P2P_ENABLE_STATE	ARRAY[0..7] OF BOOL	%FX15872	P2P enable/disable current state
_P2P_REQ	ARRAY[0..7] OF BOOL	%FX16512	P2P enable/disable request
_P2P_REQ_NUM	ARRAY[0..7] OF BOOL	%FX16528	P2P enable/disable setting

-XGK

Flag	Data type	Device	Description
_HS1_ENABLE_STATE	BIT	F09600	HS link 1 enable/disable current state
_HS2_ENABLE_STATE	BIT	F09601	HS link 2 enable/disable current state

_HS3_ENABLE_STATE	BIT	F09602	HS link 3 enable/disable current state
_HS4_ENABLE_STATE	BIT	F09603	HS link 4 enable/disable current state
_HS5_ENABLE_STATE	BIT	F09604	HS link 5 enable/disable current state
_HS6_ENABLE_STATE	BIT	F09605	HS link 6 enable/disable current state
_HS7_ENABLE_STATE	BIT	F09606	HS link 7 enable/disable current state
_HS8_ENABLE_STATE	BIT	F09607	HS link 8 enable/disable current state
_HS9_ENABLE_STATE	BIT	F09608	HS link 9 enable/disable current state
_HS10_ENABLE_STATE	BIT	F09609	HS link 10 enable/disable current state
_HS11_ENABLE_STATE	BIT	F0960A	HS link 11 enable/disable current state
_HS12_ENABLE_STATE	BIT	F0960B	HS link 12 enable/disable current state
_HS1_REQ	BIT	F10300	HS link 1 enable/disable request
_HS2_REQ	BIT	F10301	HS link 2 enable/disable request
_HS3_REQ	BIT	F10302	HS link 3 enable/disable request
_HS4_REQ	BIT	F10303	HS link 4 enable/disable request

_HS5_REQ	BIT	F10304	HS link 5 enable/disable request
_HS6_REQ	BIT	F10305	HS link 6 enable/disable request
_HS7_REQ	BIT	F10306	HS link 7 enable/disable request

Flag	Data type	Device	Description
_HS8_REQ	BIT	F10307	HS link 8 enable/disable request
_HS9_REQ	BIT	F10308	HS link 9 enable/disable request
_HS10_REQ	BIT	F10309	HS link 10 enable/disable request
_HS11_REQ	BIT	F1030A	HS link 11 enable/disable request
_HS12_REQ	BIT	F1030B	HS link 12 enable/disable request
_HS1_REQ_NUM	BIT	F10310	HS link 1 enable/disable setting
_HS2_REQ_NUM	BIT	F10311	HS link 2 enable/disable setting
_HS3_REQ_NUM	BIT	F10312	HS link 3 enable/disable setting
_HS4_REQ_NUM	BIT	F10313	HS link 4 enable/disable setting
_HS5_REQ_NUM	BIT	F10314	HS link 5 enable/disable setting

_HS6_REQ_NUM	BIT	F10315	HS link 6 enable/disable setting
_HS7_REQ_NUM	BIT	F10316	HS link 7 enable/disable setting
_HS8_REQ_NUM	BIT	F10317	HS link 8 enable/disable setting
_HS9_REQ_NUM	BIT	F10318	HS link 9 enable/disable setting
_HS10_REQ_NUM	BIT	F10319	HS link 10 enable/disable setting
_HS11_REQ_NUM	BIT	F1031A	HS link 11 enable/disable setting
_HS12_REQ_NUM	BIT	F1031B	HS link 12 enable/disable setting
_P2P1_ENABLE_STATE	BIT	F09620	P2P1 enable/disable current state
_P2P2_ENABLE_STATE	BIT	F09621	P2P2 enable/disable current state
_P2P3_ENABLE_STATE	BIT	F09622	P2P3 enable/disable current state
_P2P4_ENABLE_STATE	BIT	F09623	P2P4 enable/disable current state
_P2P5_ENABLE_STATE	BIT	F09624	P2P5 enable/disable current state
_P2P6_ENABLE_STATE	BIT	F09625	P2P6 enable/disable current state
_P2P7_ENABLE_STATE	BIT	F09626	P2P7 enable/disable current state

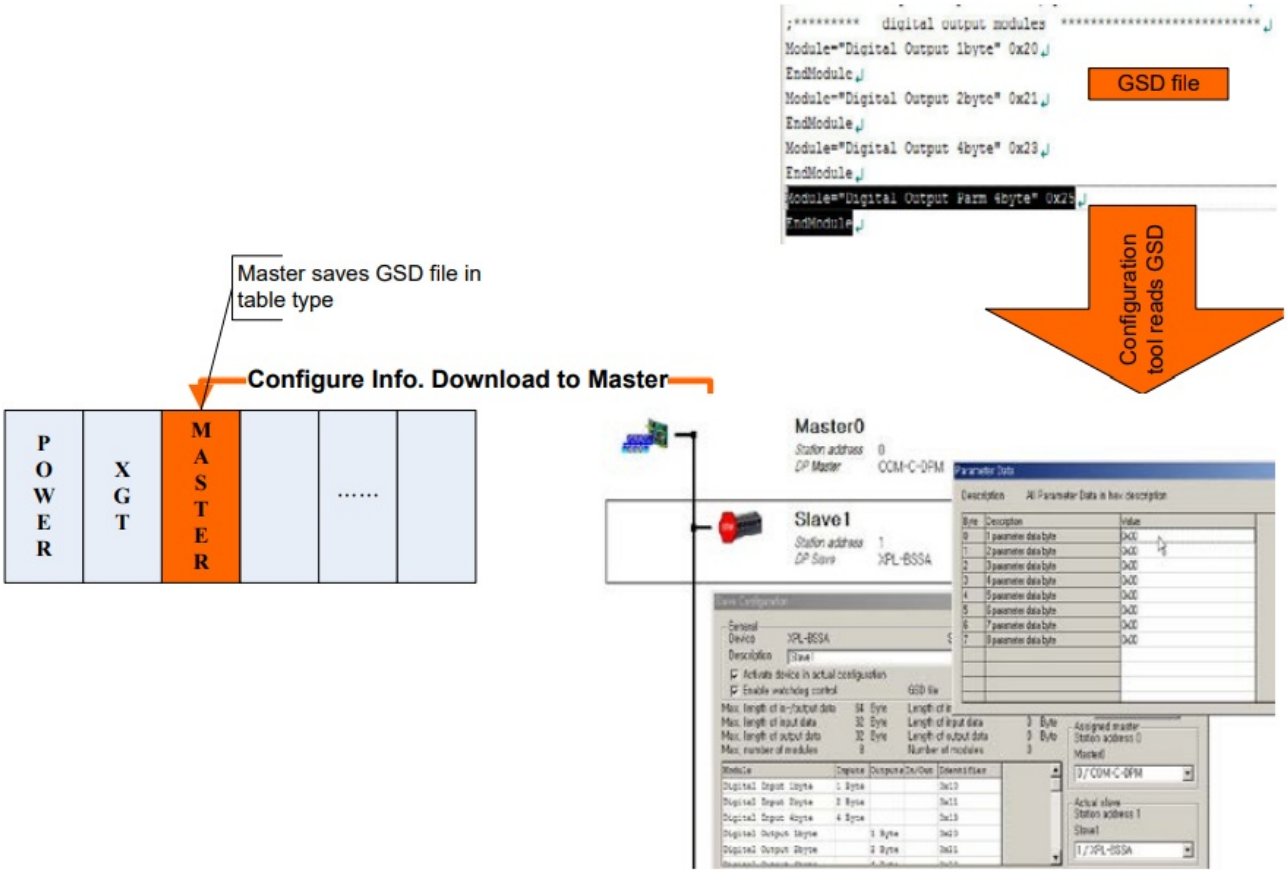
_P2P8_ENABLE_STATE	BIT	F09627	P2P8 enable/disable current state
_P2P1_REQ	BIT	F10320	P2P1 enable/disable request
_P2P2_REQ	BIT	F10321	P2P2 enable/disable request
_P2P3_REQ	BIT	F10322	P2P3 enable/disable request
_P2P4_REQ	BIT	F10323	P2P4 enable/disable request
_P2P5_REQ	BIT	F10324	P2P5 enable/disable request
_P2P6_REQ	BIT	F10325	P2P6 enable/disable request
_P2P7_REQ	BIT	F10326	P2P7 enable/disable request
_P2P8_REQ	BIT	F10327	P2P8 enable/disable request
_P2P1_REQ_NUM	BIT	F10330	P2P1 enable/disable setting
_P2P2_REQ_NUM	BIT	F10331	P2P2 enable/disable setting
_P2P3_REQ_NUM	BIT	F10332	P2P3 enable/disable setting
_P2P4_REQ_NUM	BIT	F10333	P2P4 enable/disable setting
_P2P5_REQ_NUM	BIT	F10334	P2P5 enable/disable setting

_P2P6_REQ_NUM	BIT	F10335	P2P6 enable/disable setting
_P2P7_REQ_NUM	BIT	F10336	P2P7 enable/disable setting
_P2P8_REQ_NUM	BIT	F10337	P2P8 enable/disable setting

- How to enable link
  -HS link/P2P enable/disable setting flag ON → HS link/P2P enable/disable request flag ON
- How to disable link
  -HS link/P2P enable/disable setting flag OFF → HS link/P2P enable/disable request flag ON
- You can monitor the Enable/Disable state of the each link through “enable/disable current states” flag.

5.5.4 How to set GSD and downloading procedure

1. Download expansion I/O module and Pnet remote I/O module information through GSD file
2. Read the GSD file where information of our digital or analog I/O module is descried through the configuration tool supporting Pnet configuration
3. The user can modify the parameter through configuration tool.
   – A developer should describe it in the GSD.
4. After completing the setting, download information to Pnet master module
5. Master establish communication with Pnet remote I/F module and check information of expansion I/O modules based on the downloaded information



<Download GSD data to Pnet master>

Installation and Wiring

6.1 Installation

6.1.1 Installation Environment

This machine has a high reliability regardless of the environment to install. But cares should be taken to secure the reliability and the safety as follows.

1. Environment Condition
   (1) Install it to a water-proof and dust-proof control panel.
   (2) Do not apply continuous impact or vibration.
   (3) Do not expose it directly to direct rays.
   (4) No dew by sudden change of temperature.
   (5) Do not exceed surrounding temperature 0~55º C.
   (6) Do not exceed relative humidity 5 ~ 95% .
   (7) No corrosive gas or combustible gas.
2. Installation Construction
   (1) When working the screw hole and the wiring, it is not allowed to put the wire remnants into the PLC.
   (2) The installation location should be the place to operate.
   (3) Do not install it on the same panel as the high voltage machine.
   (4) The distance between wiring duct and the surrounding module should be at least 50mm apart.
   (5) The grounding should be done on a good place free from noise.
3. Radiation Design of Control Panel
   (1) When installing the PLC in the sealed control panel, the radiation design should be done considering the radiation of other machine as well as the radiation of PLC itself. When circulating the air using the vent or the

general fan, it may effect the PLC system due to the inflow of gas or dust.

(2) It is recommended to install the filter or use the sealed type thermal exchanger.

6.1.2 Notices in installing Profibus-DP module

Profibus-DP Smart I/O can set max. 126 stations. (including master)
But forXGL-PSRA, station number 0~99 is available. For XGL-PSEA, station number 0~98 is available

1. Check 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 etc. to be used for this communication.
3. The station no. of all other stations including this module should be different. If connecting with double station no., 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. If changing the mode switch of master module in the status that other stations are in communication, it may cause significant communication obstacle with other stations. So, special cares are needed.
5. For communication cable, the designated standard cable should be used. If not, it may cause significant communication obstacle.
6. Check if the communication cable is cut off or short-circuited before installation.
7. Tighten the communication cable connector completely and fix the cable connection tightly. If cable connection is not complete, it may cause significant communication obstacle.
8. If the communication cable is twisted or 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 done far from the power line or inductive noise.
10. If LED action is abnormal, check the trouble causes referring to this manual Chapter 11. “Trouble Shooting”. If the problem repeats after taking the action, contact customer service center.
11. Install this communication module in the status that PLC power is ‘OFF’.
12. After finishing the communication cable connection, put the power ON and check the normal action in the LED action status. If it is normal, download the corresponding program into GMWIN for GLOFA series and into KGLWIN for MASTER-K series and run the program.

6.1.3 Notices in Handling

Here it describes notices in handling from the opening of each unit and module to the installation.

- Do not drop or apply the strong impact.
- Do not remove the PCB from the case. It may cause failure.
- Cares should be taken not to make foreign materials such as the wire remnants etc. enter the unit when wiring. If entered, remove them before applying power.

1) Notices in handling the product

Here it describes the notices in handling and installing the basic unit and the extended module.

1. Recheck the I/O standard specification

   Input part should pay attention to the input voltage and in case of output part, if applying the voltage exceeding max. capacity to Open/Close, it may cause failure, breakage and fire.
2. Use Wire

   The wire should be selected considering the ambient temperature, allowable current and the min. spec. of the

wire should be more than AWG24(0.18mm²).

3. Environment

   When I/O wiring, if it is close to heat generating machine or material or if the wiring is contacted directly to oil for long time, it may cause short-circuit, breakage and failure.

4. Polarity

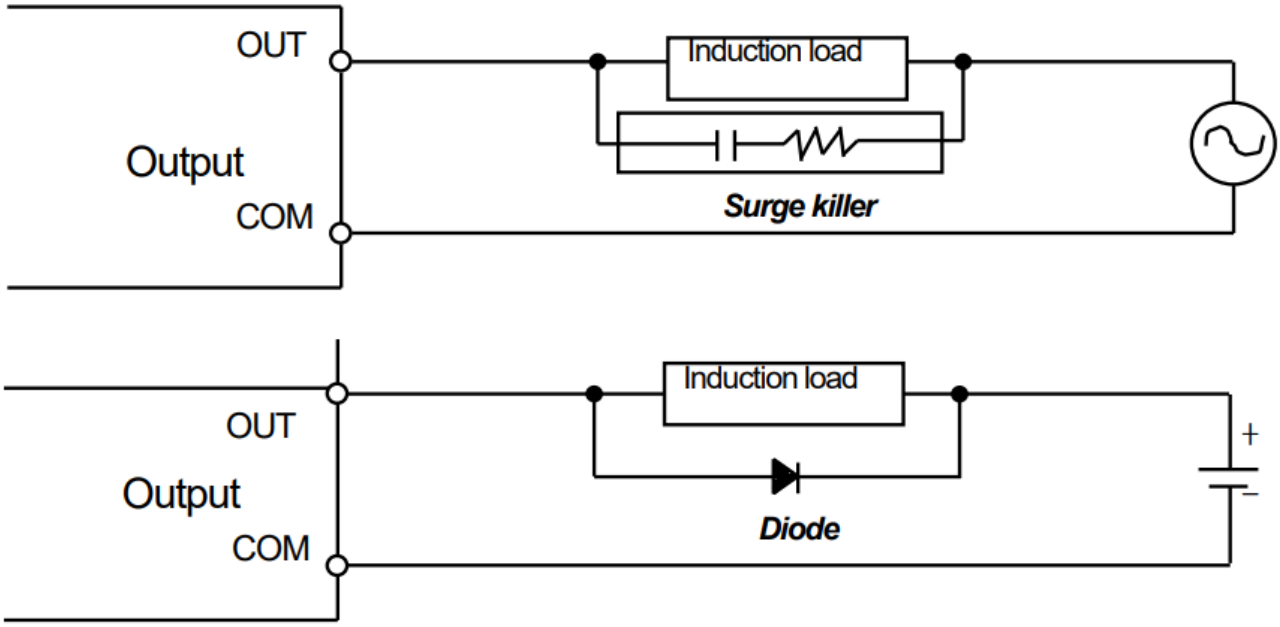
   Check the polarity before applying power to the terminal block that has the polarity. Special cares should be taken not to wire AC input power to DC24V external power supply terminal on the edge of basic unit input part. In case of DeviceNet, 24V power enters into the communication cable together and it is not necessary to wire separately.

5. Wiring

   • When wiring the I/O line with high voltage cable and the power cable together, induction obstacle occurs this may cause the failure and malfunction.

   • It is not allowed to pass the cable in front of I/O action indication part (LED). (because it prevents from distinguishing the I/O indication.)

   • In case the inductive load is connected to the output part, please connect the surge killer or diode to the load in parallel. Connect the cathode of diode to the '+' side of the power.



6. Terminal block

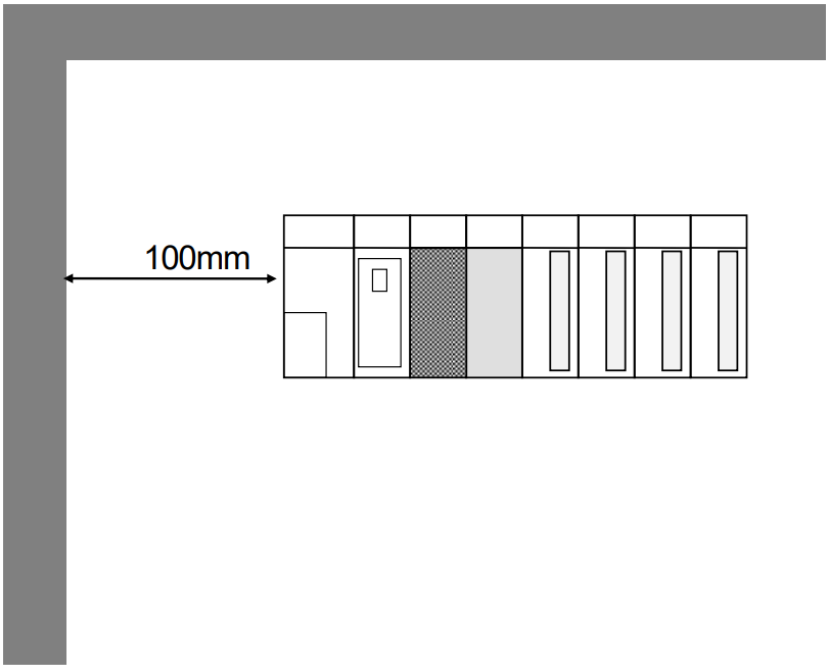
   When wiring terminal block or making screw hole, cares should be taken not to make the wire remnants enter the PLC. It may cause malfunction and failure.

7. Except for the mentioned above, do not apply strong impact to the basic or extended unit or remove the PCB from the case.

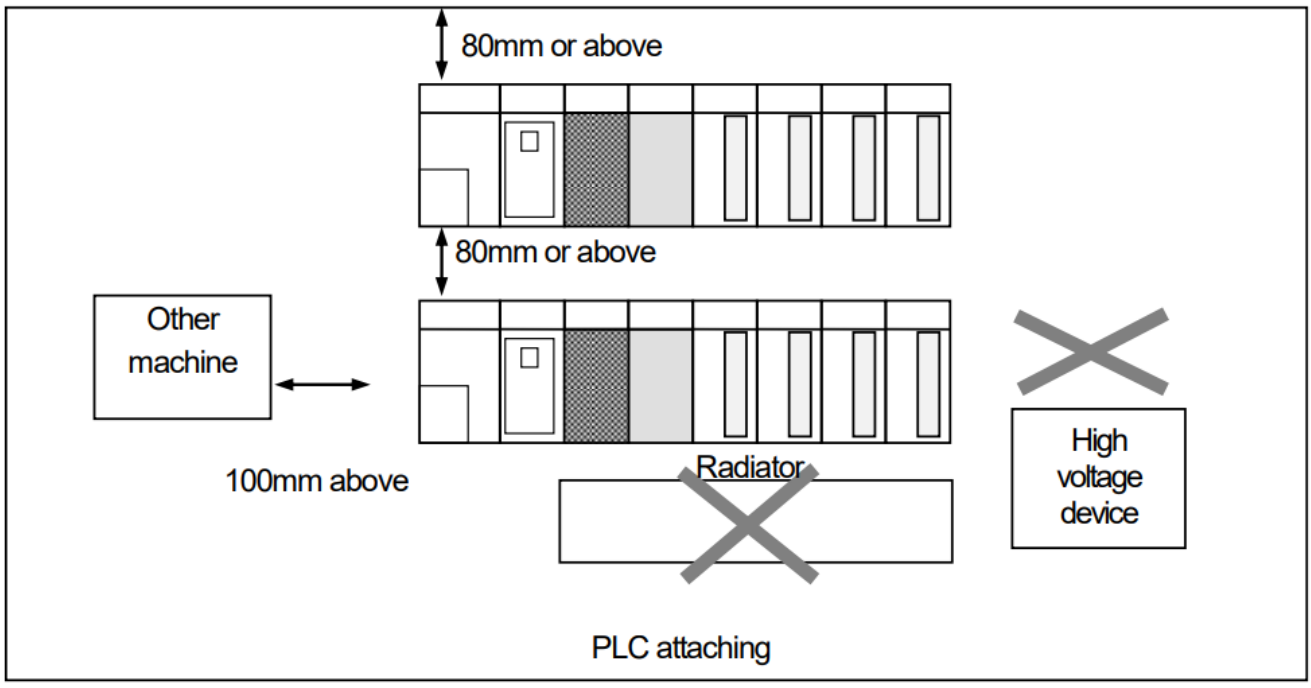
2) Notices in installation

Here it describes the notices in attaching the PLC to the control panel.

1. Sufficient distance is required to have well-ventilated room and facilitate the exchange of the basic unit and the extended module. Especially, for the periodical exchange of battery (3 years), please separate the left side of the basic unit and the control panel for at least 100mm.
2. For the max. radiation effect, it is required to install it as shown on the figure below.



3. Use different panel for large sized electronic contactor or vibration source such as no-fuse breaker etc. and install separately.
4. Install the duct for wiring if necessary.
   But, if the dimension of upper part or lower part of PLC is smaller than the figure below, please pay attention to the following.
   • In case of installing on the upper PLC, the height of wiring duct should be less than 50mm for good ventilation.
   • In case of installing on the lower PLC, please 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, it is required to separate it more than 100mm and be install.
   And the left/right direction of the unit and the equipment should be separated more than 100mm and installed.

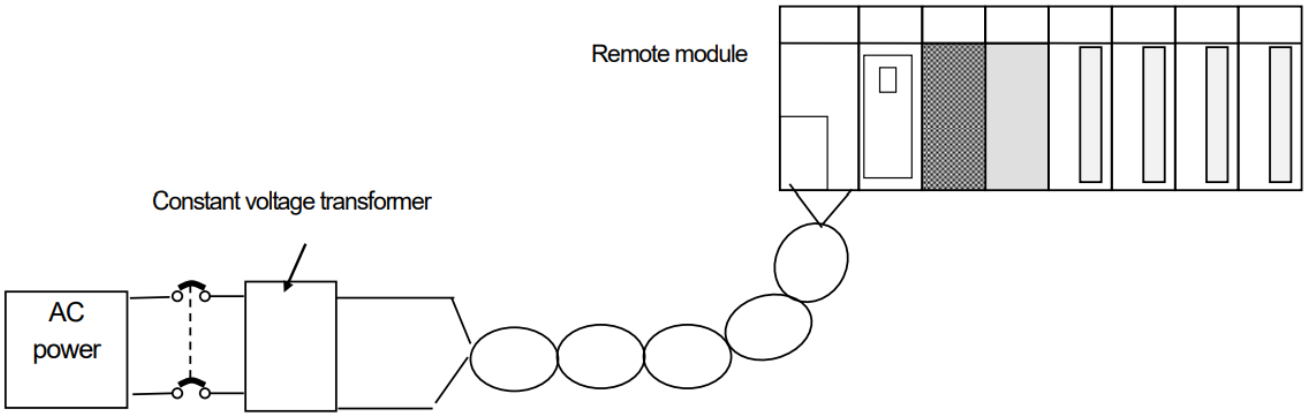


6.2 Wiring

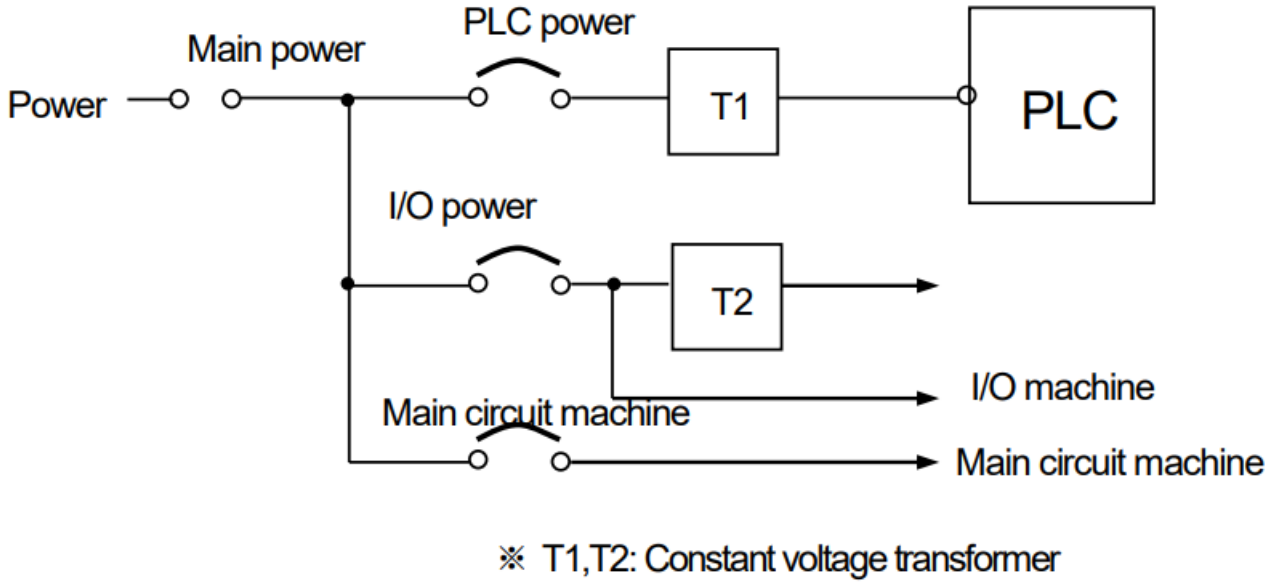
Describes the notices related to the wiring in case of using the system

6.2.1 Power Wiring

1. For power, please use AC100~240V power supply.
2. If the power variation is larger than the regular range, please connect a constant voltage transformer.
3. In order to prevent the noise from the power cable, it is required to twist the power cable densely if possible, and connect within the shortest distance.

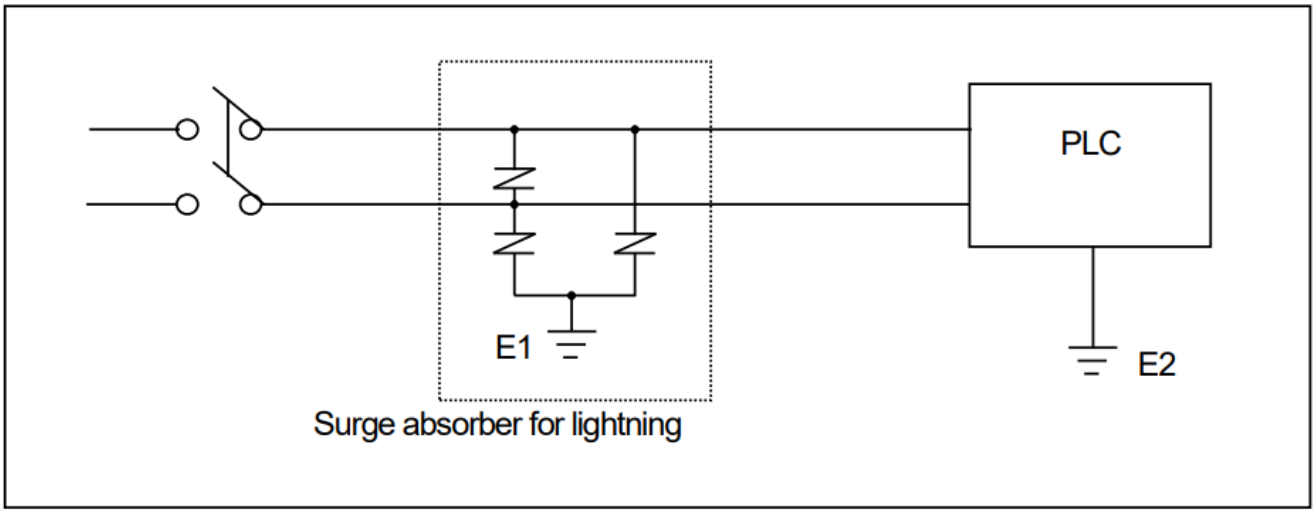


4. Connect power of which the noise between lines or between grounds is small.
   (If there is much noise, please connect the insulation transformer.)
5. For PLC power, I/O machine and power machine, it is required to divide the system as follows.



※ T1,T2: Constant voltage transformer

6. For the power cable, it is required to use a thick one (2mm²) to make the small falling down of the voltage.
7. The power cable is not allowed to approach closely to the main circuit (high voltage, convection current) cable, I/O signal cable and needs to separate more than 80mm apart.
8. Please use the surge absorber to prevent the lightning as shown on the below.



Remark

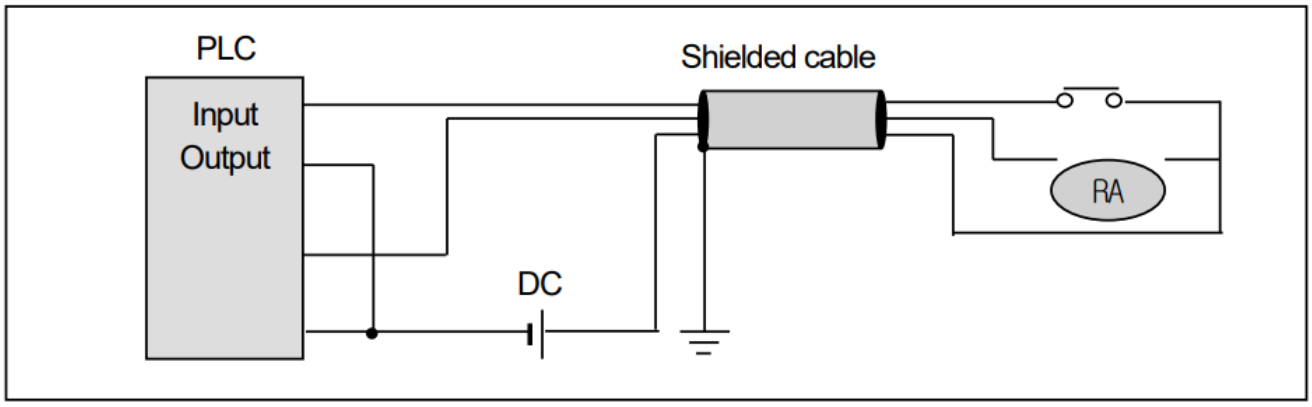
1) Separate the earth (E1) of the surge absorber for lightning and the earth (E2) of PLC.

2) Select the surge absorber for lightning so that it does not exceed max. allowable voltage of the absorber even when the power voltage is rising maximum.

9. When you are afraid of the invasion of the noise, please use the insulation sealed transformer or the noise filter.
10. In case of the wiring of each input resource, the wiring of the sealed transformer or the wiring of the noise filter is not allowed to pass the duct.

6.2.2 I/O Device Wiring

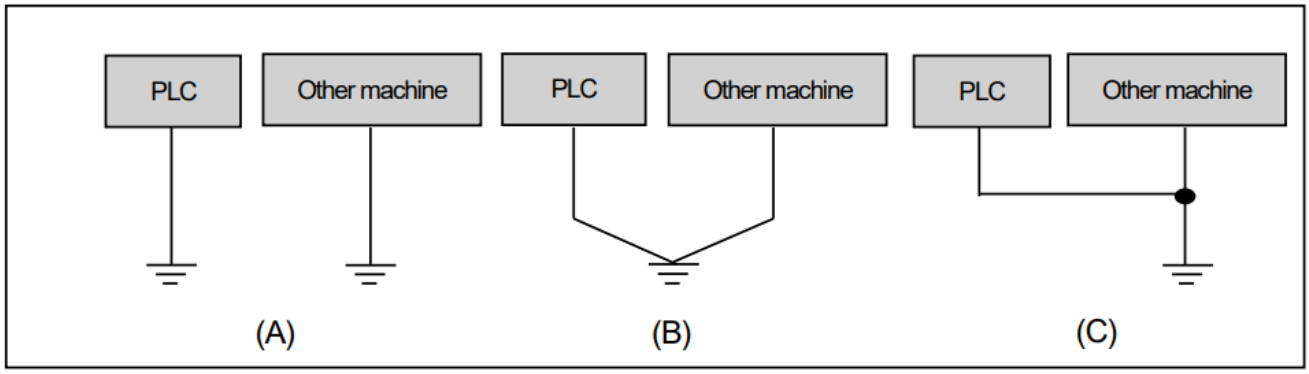
1. The spec. of I/O wiring cable is 0.18~2 mm² and it is recommended to use the cable spec. (0.5mm²) conveniently.
2. Input cable and output cable should be separated for wiring.
3. I/O signal cable should be separated at least 80mm from main circuit cable of high voltage, high current when wiring.
4. In case it is not available to separate the main circuit cable and the power cable, please use the shielded cable and earth the PLC.



5. In case of pipe wiring, make sure of the pipe and then ground it.
6. DC24V output cable should be separated from AC110V cable and AC220V cable.
7. In case of wiring the long distance more than 200m, the error occurs according to the leakage current caused by the interline capacity.

6.2.3 Grounding Wiring

1. As this PLC carries out sufficient noise policy, it is available to use without grounding except the case where there is much noise. But, when grounding, please refer to the following notices.
2. When grounding, please use the exclusive grounding if possible.
   For he grounding construction, please use the 3rd class grounding (grounding resistance less than 80Ω).
3. If not available to use the exclusive grounding, please use the common grounding as shown on the figure (B).



(A) exclusive grounding: Excellent (B) common grounding: Good (C) common grounding : Bad

4. Please use the electric wire for grounding more than 2 mm² . Place the grounding point near this PLC if possible and shorten the length of the grounding cable.

• When connecting the extended base, please connect the extended connector accurately.
• Do not remove the PCB from the module case and modify the module.
• When attaching/removing the module, the power should be OFF.
• Use the cellular phone or radio phone apart more than 30mm from the product.
• I/O signal cable and communication cable should be at least 10cm apart from the high voltage cable or the power cable to avoid the effect caused by the noise or the change of magnetic filed.

6.2.4 Cable Specification for Wiring

The Cable specification to be used for the wiring is as follows

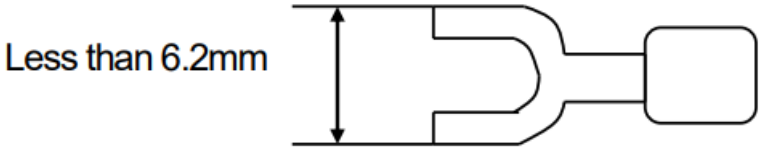
External connection type	Cable spec.(mm²)	
	Low limit	High limit
Digital input	0.18 (AWG24)	1.5 (AWG16)
Digital output	0.18 (AWG24)	2.0 (AWG14)
Analog I/O	0.18 (AWG24)	1.5 (AWG16)
Communication	0.18 (AWG24)	1.5 (AWG16)
Main power resource	1.5 (AWG16)	2.5 (AWG12)
Protection grounding	1.5 (AWG16)	2.5 (AWG12)

For the power and I/O wiring for 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 kg·cm torque.

- Use the fork type screw for the compressed terminal.

Example of the proper compressed terminal (fork type)



Maintenance and Repair

To maintain the PLC in optimal status, please carry out daily check and regular check.

7.1 Repair and Check

I/O module is usually composed of semiconductor microelectronic device and the life is semi- permanent. As the microelectronic device may occur the error caused by the ambient environment, it is required to check it periodically. The following are items to be checked 1~2 times every 6 months.

Check items		Judgment basis	Action
Ambient environ-ment	Temperature	0 ~ +55°C	Control the use temperature and the use humidity.
	Humidity	5 ~ 95%RH	
	Vibration	No vibration	Use the dust-proof rubber or take the vibration protection policy.
Shaking of each unit and module		No shake	Make all unit and module not to be shaker
Terminal screw loosened.		No loosening	Tighten the loosened screw.
Input voltage change rate		Within -15%/+10%	Maintain the change rate within the allowable range.
Spare parts		Check if the quantity of spare part and the preservation status is good.	Make up insufficient and improve the preservation status.

7.2 Daily Check

Daily check point for Pnet remote I/F module is as follows.

1. Daily check for Profibus-DP module

Checking items		Description	Judgment basis	Action
Cable connection status		Cable loosening	No loosening	Tighten the cable
Module connection status		Screw loosening	No loosening	Tighten the module scre w.
Indication LE D	RUN LED	Check ‘ON’	Module operates normally (nor mal operation of system OS)	Refer to Chapter 3.
	P-N LED	Check ‘ON’	Power and communication nor mal	Refer to Chapter 3.
	STATUS LED	Check ‘ON’	Expansion I/O module informati on match	Refer to Chapter 3.
	ERR LED	Check ‘ON’	Module detached, invalid modul e installed, Out of I/O data rang e, I/O parameter error	Refer to Chapter 3.

7.3 Regular Check

Check the following items 1~2 times every 6 months and take the necessary actions.

Checking items		Checking method	Judgment basis	Action
Ambient environment	Temperature	Measure by thermometer/hygrometer.	0 ~ 55℃	Adjust suitable for general standard (in case of using in the area, apply the environment basis in the area)
	Humidity		5 ~ 95%RH	
	Pollution	Measure the corrosive gas.	No corrosive gas	
Module status	Loosening, shaking	Shake the communication module.	Tightening status	Tighten the screw.
	Dust, foreign material adding	Macrography	No adding	
Connection status	Terminal screw loosened	Tightening by the driver	No loosening	Tightening
	Pressed terminal approach	Macrography	Proper interval	Correction
	Connector loosened.	Macrography	No loosening	Connector correction Screw tightening
Power voltage check		Voltage measure between terminals	DC 20.4 ~ 28.8 V	Power supply change

Trouble Shooting

Here it describes the contents of each error to be occurred while operating the system, the method to find the cause and the action.

8.1 Basic Procedure of Trouble Shooting

It is important to use high reliable machine to increase the system reliability but it is important to take prompt action when trouble occurs as well.

To start the system promptly, it is more important to find the trouble occurring cause promptly and take the

necessary action. The basic items to comply when taking this trouble shooting are as follows.

1) Check with the naked eye
Check the following items with the naked eye.

- Machine action status (stop, action)
- Power appliance status
- I/O machine status
- Wiring status (I/O cable, extended or communication cable)
- Check the indication status of each indicator (RUN, ERR, P-RUN, STATUS LED, I/O LED etc.) and connect the peripheral device and then check the PLC action status or the program contents.

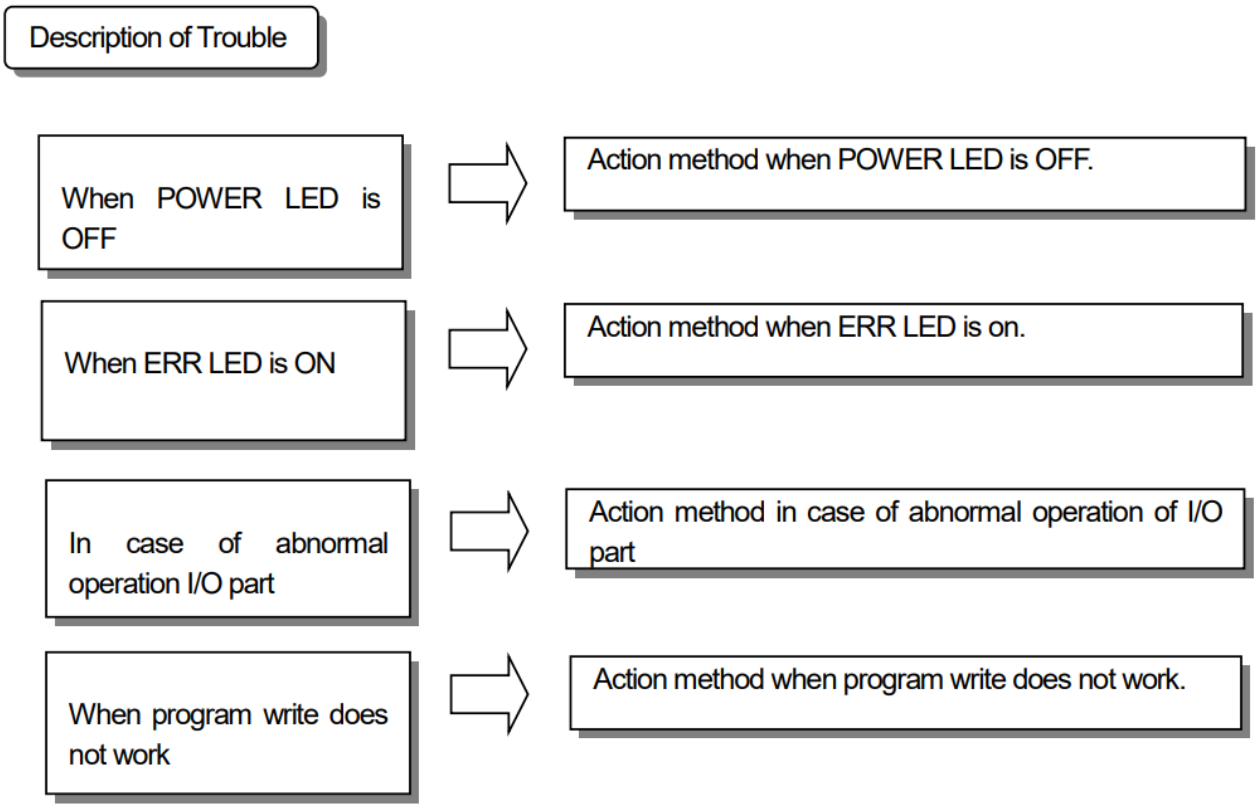
2) Check the trouble
Examine how the trouble is changed by the following action.

- Connect or disconnect. communication cable

3) Limit range
Estimate the cause of trouble using the above method.

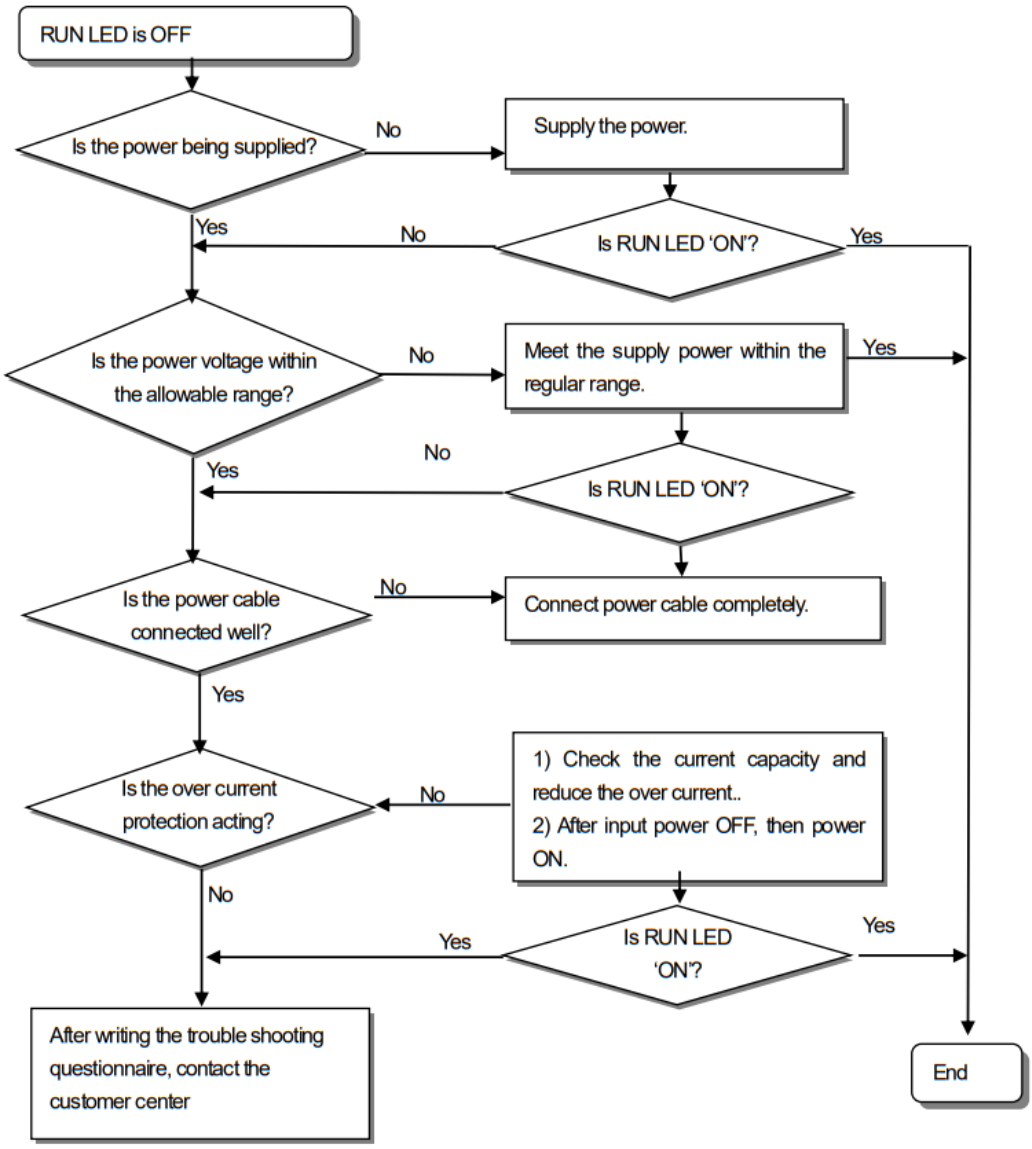
- Is it the cause from PLC itself? Or external cause?
- Is it the cause from I/O part? Or other cause?
- Is it the cause from PLC program?

8.2 Trouble Shooting
Here it describes the trouble finding method, the error code and the actions on the above by dividing them per phenomenon.



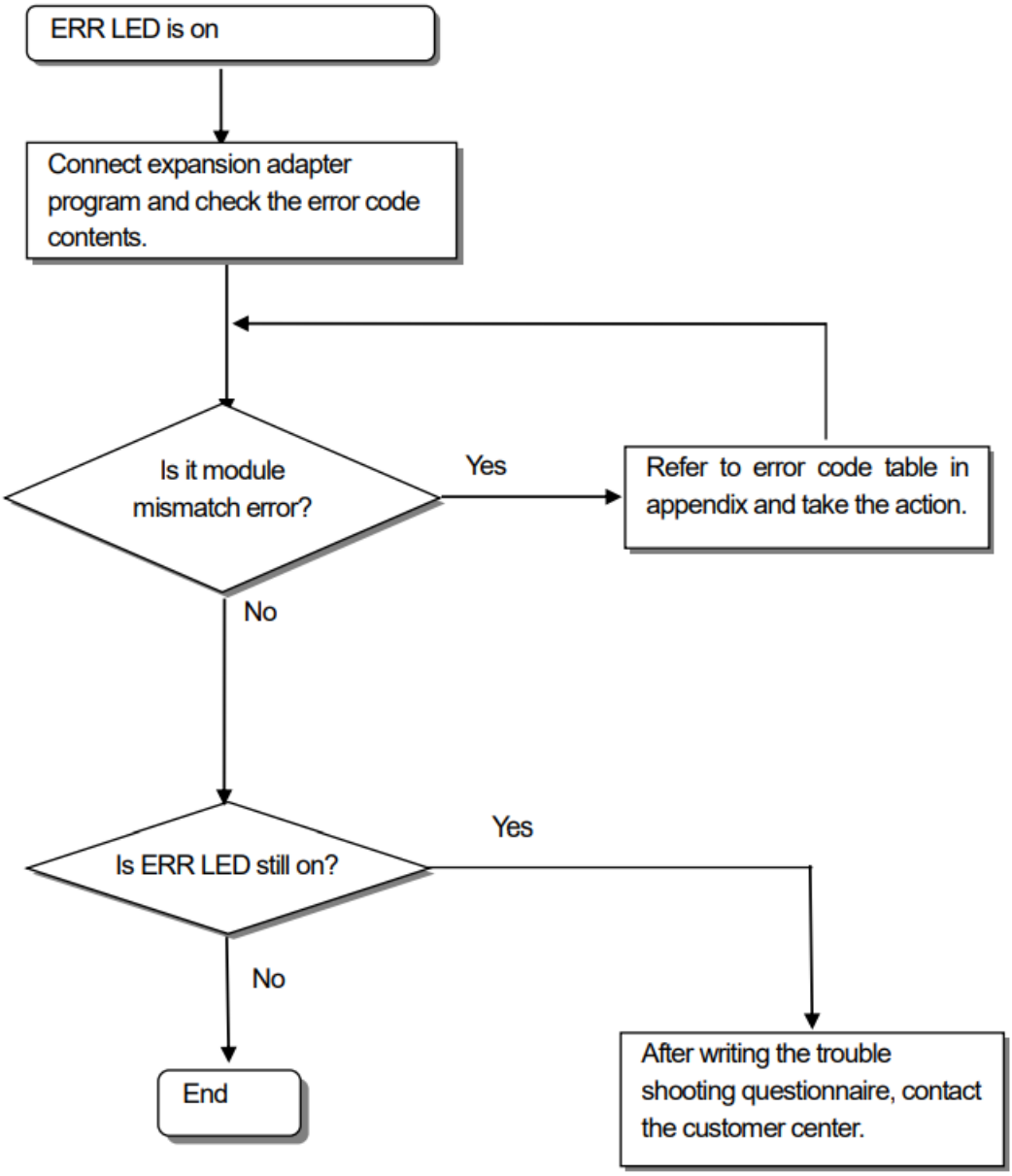
8.2.1 Action method when RUN LED is OFF

Here it describes the action order when RUN LED is OFF while applying the power or during the operation.



8.2.2 Action method when ERR LED is ON

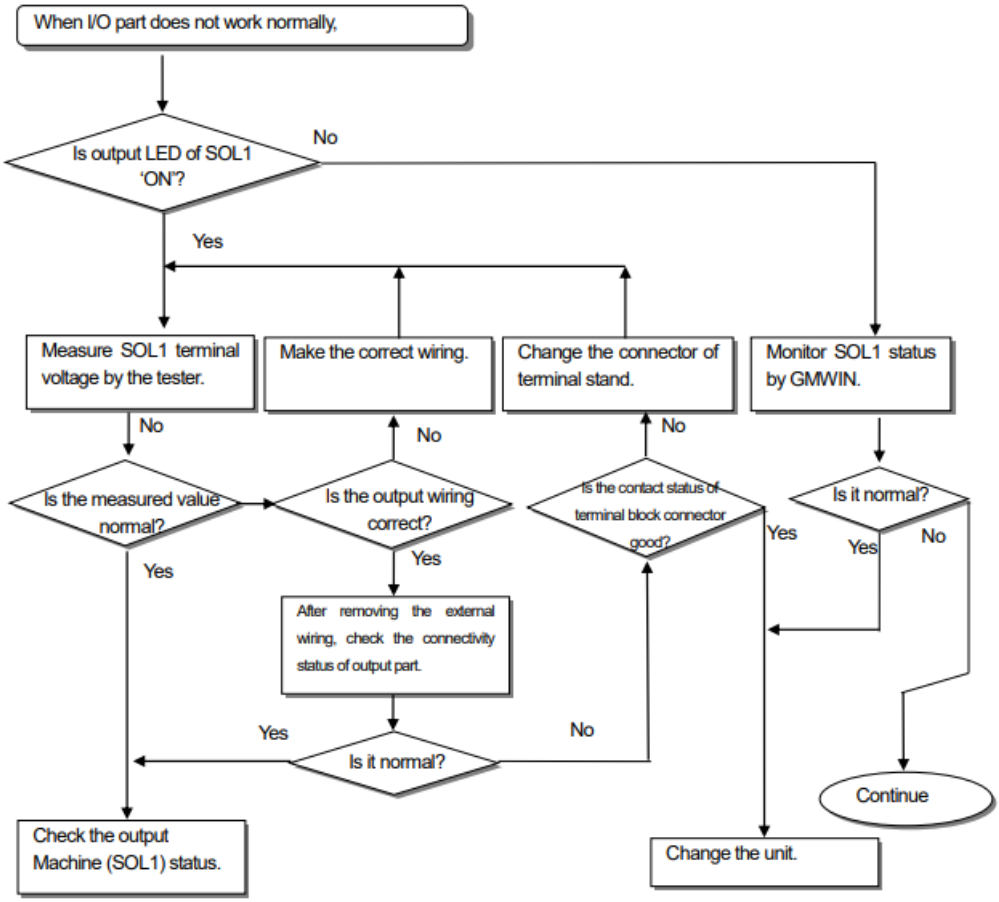
Here it describes the action order when ERR LED is on in case of power input, or when operation starts, or during operation.

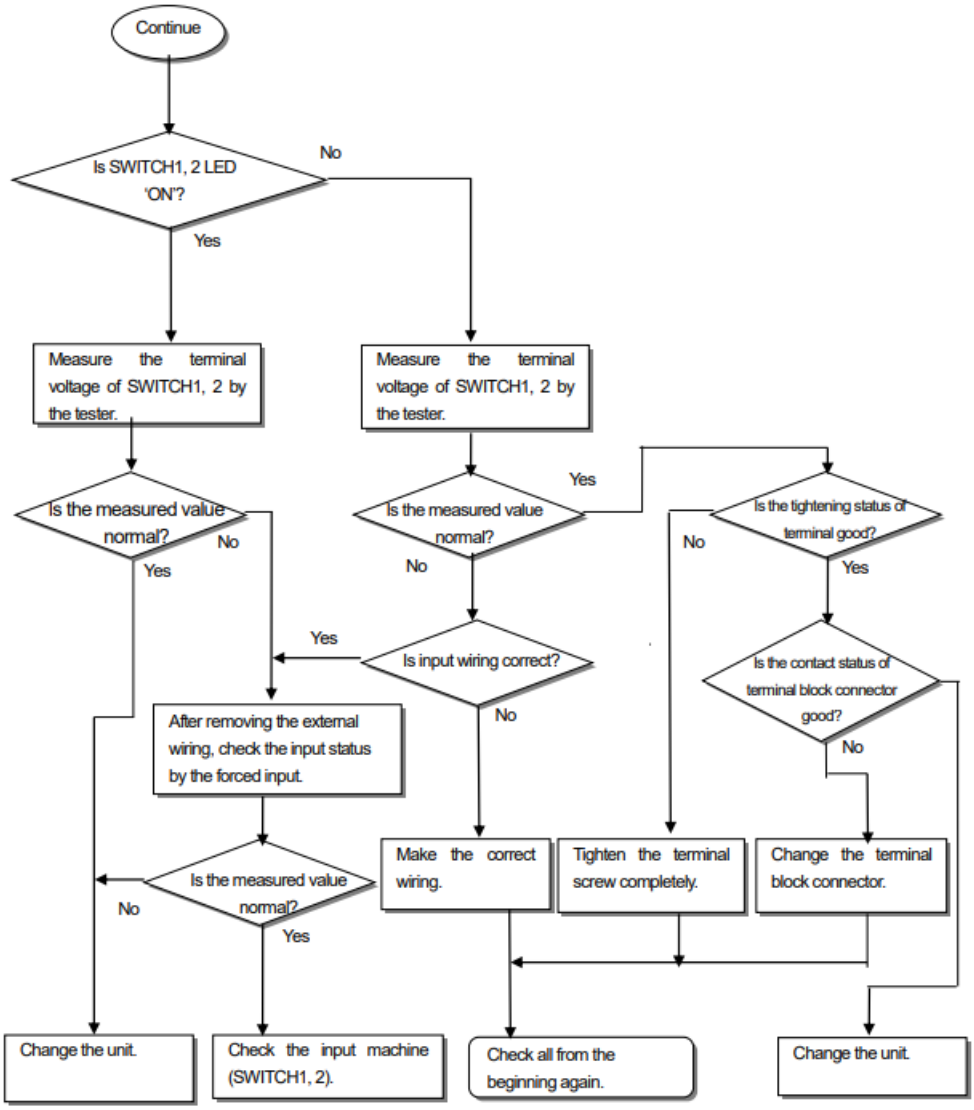


8.2.3 Action method when I/O part does not work normally.

Here it describes the action order when I/O part does not work normally during operation, as shown on the program example below.

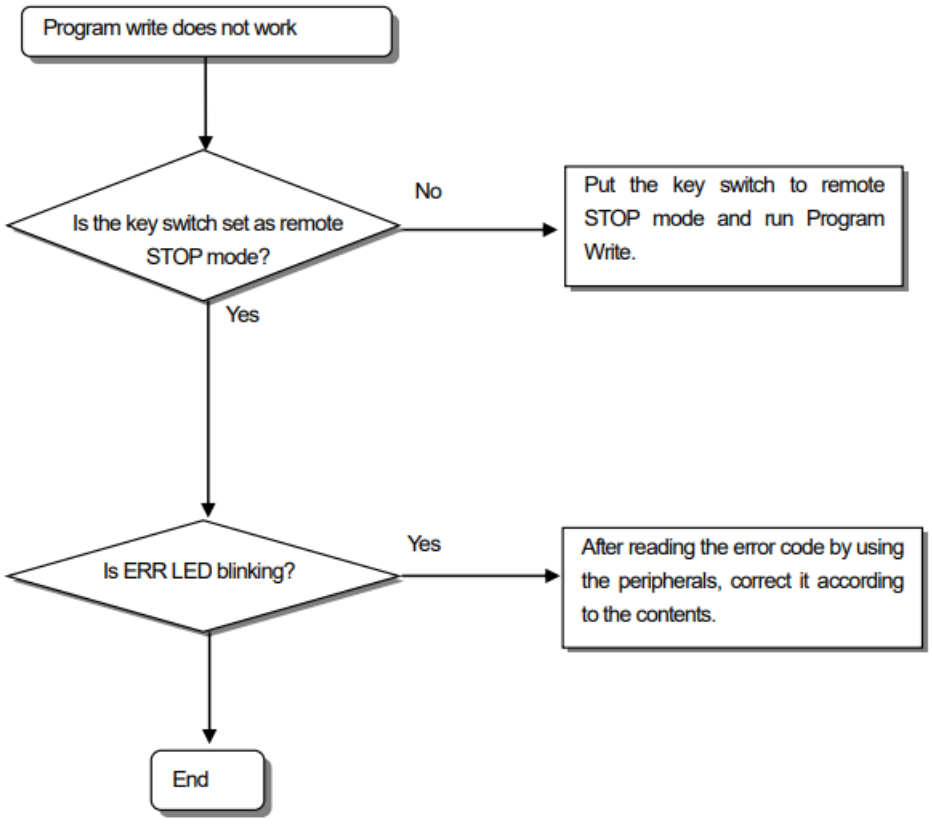

SWITCH1
SWITCH2
SOL1
SOL1


When I/O part does not work normally,
Is output LED of SOL1 'ON'?
No
Yes
Measure SOL1 terminal voltage by the tester.
Make the correct wiring.
Change the connector of terminal stand.
Monitor SOL1 status by GMWIN.
No
No
No
Is the measured value normal?
Is the output wiring correct?
Is the contact status of terminal block connector good?
Is it normal?
Yes
Yes
Yes
Yes
No
After removing the external wiring, check the connectivity status of output part.
Yes
No
Is it normal?
Continue
Check the output Machine (SOL1) status.
Change the unit.

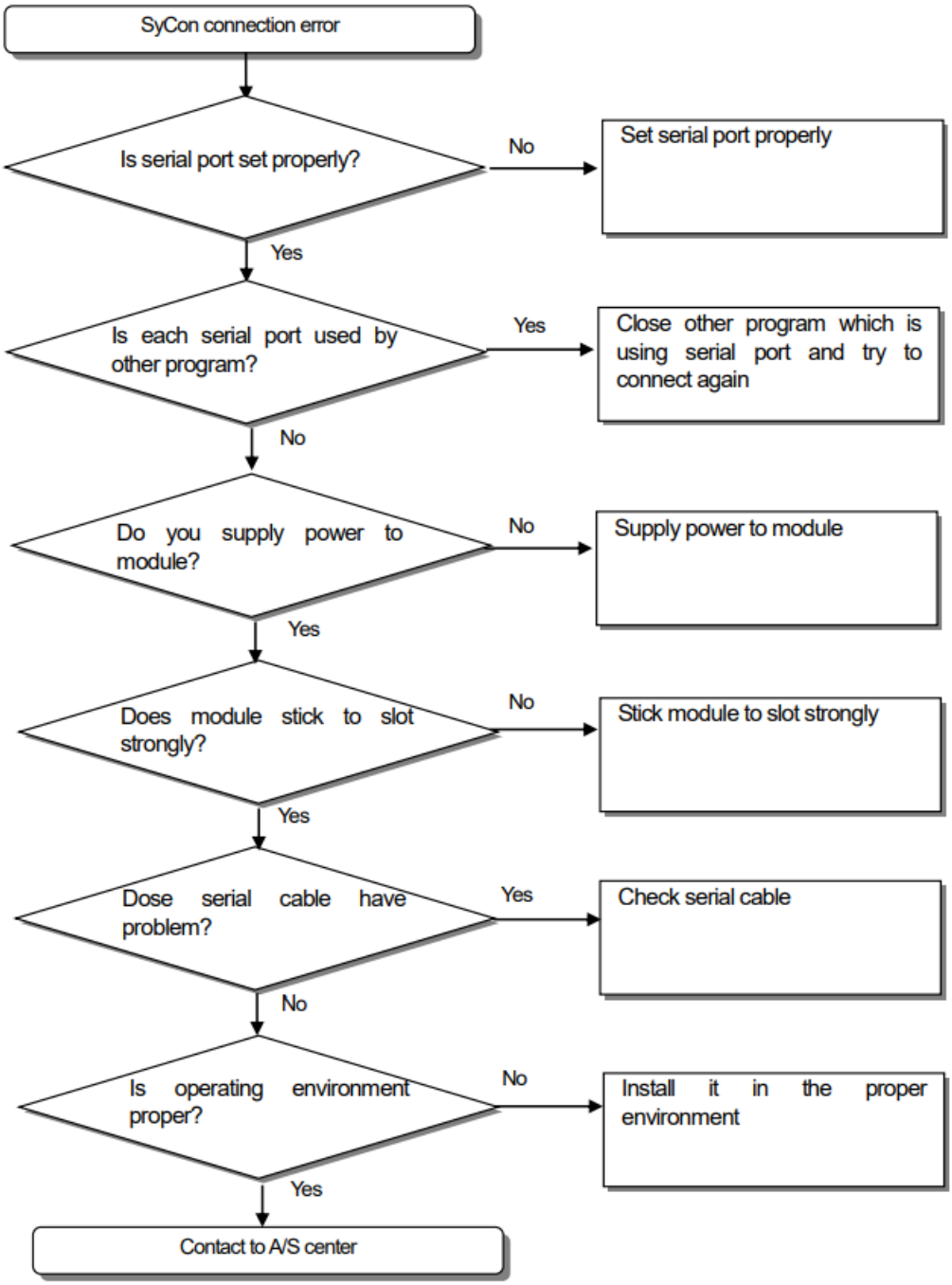


8.2.4 Action method when Program Write does not work

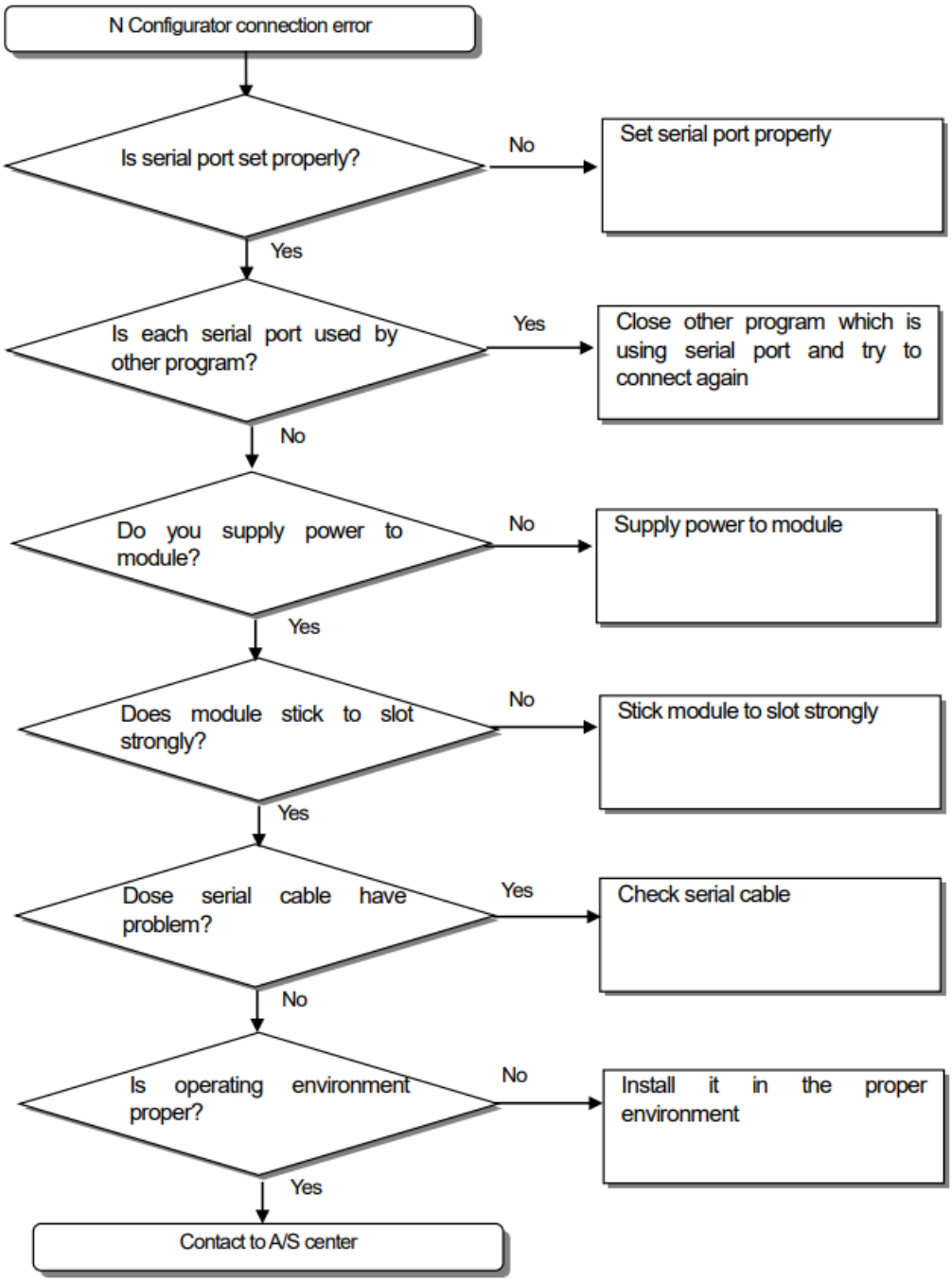
Here it describes the action order when Program write does not work in the Master CPU.



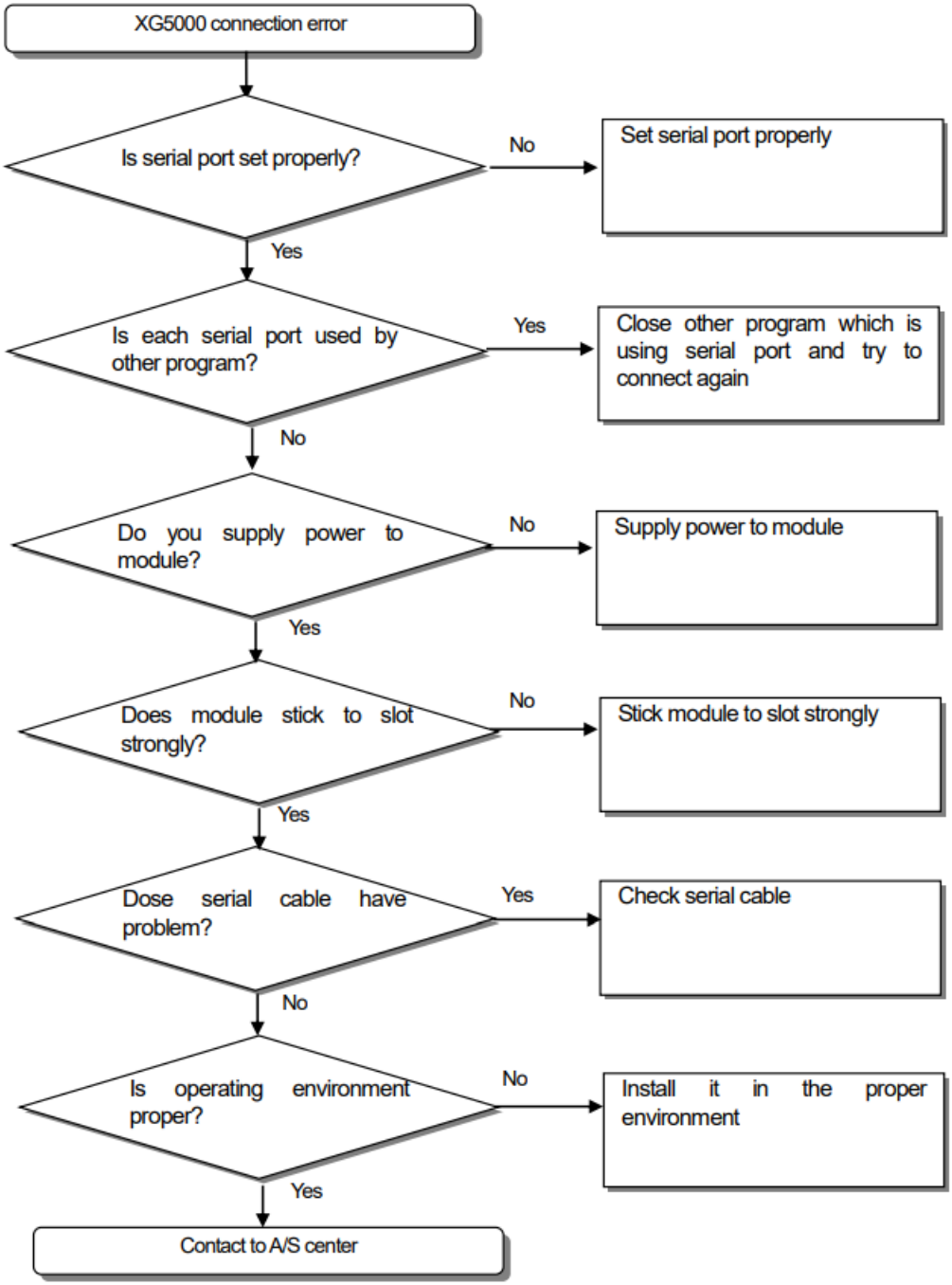
8.2.5 SyCon connection error



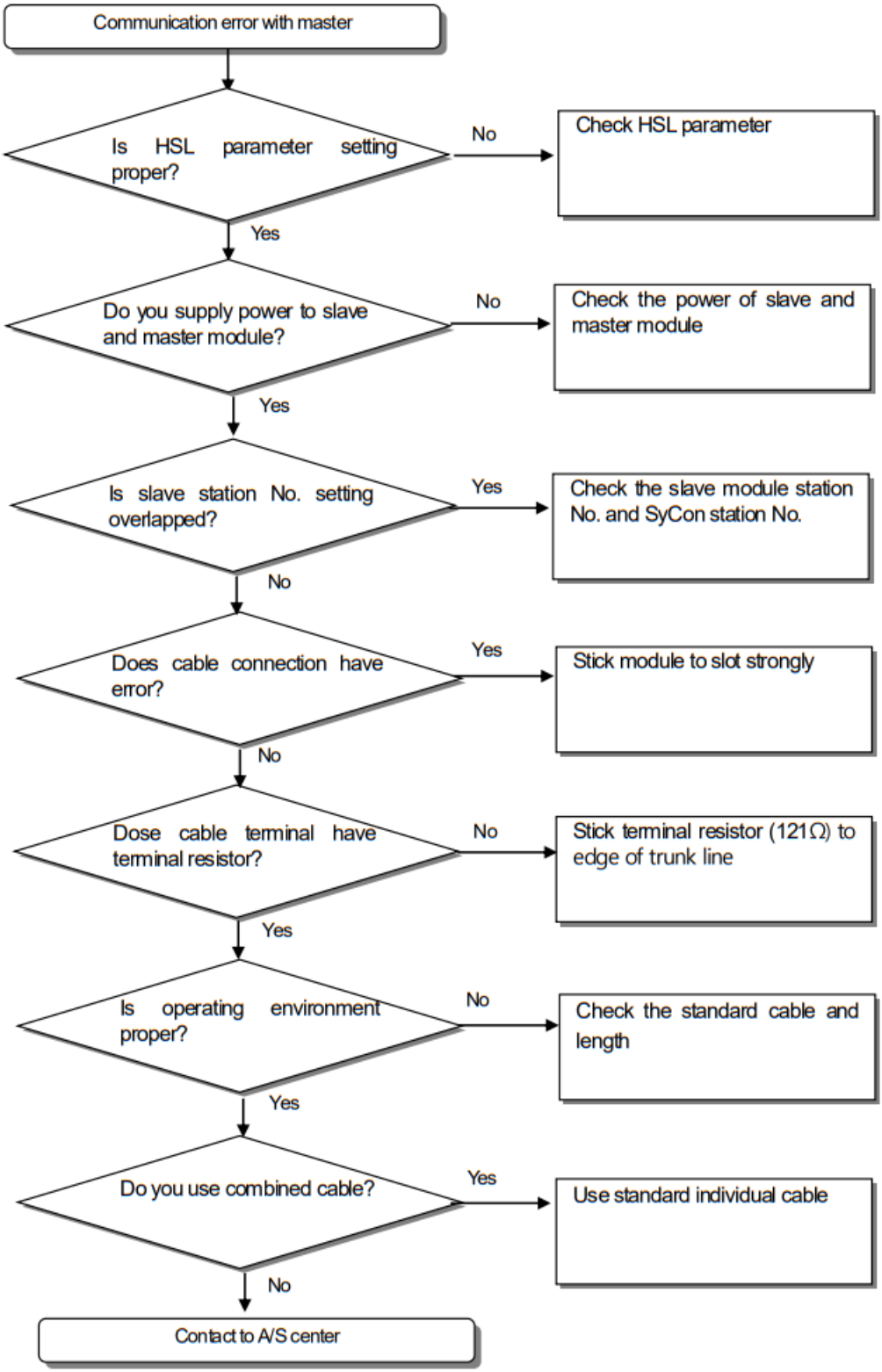
8.2.6 N Configurator connection error



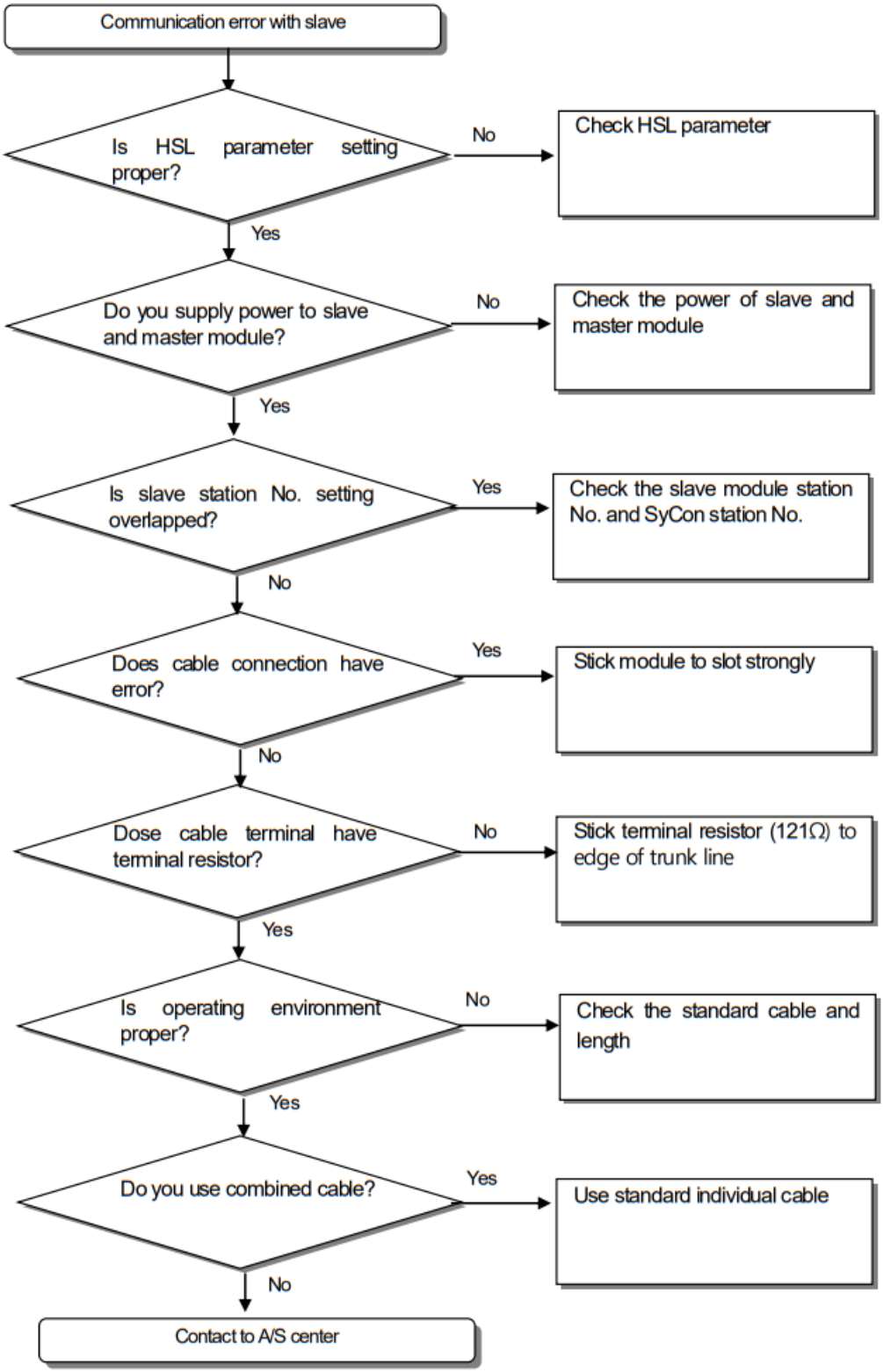
8.2.7 XG5000 connection error



8.2.8 Communication error with master

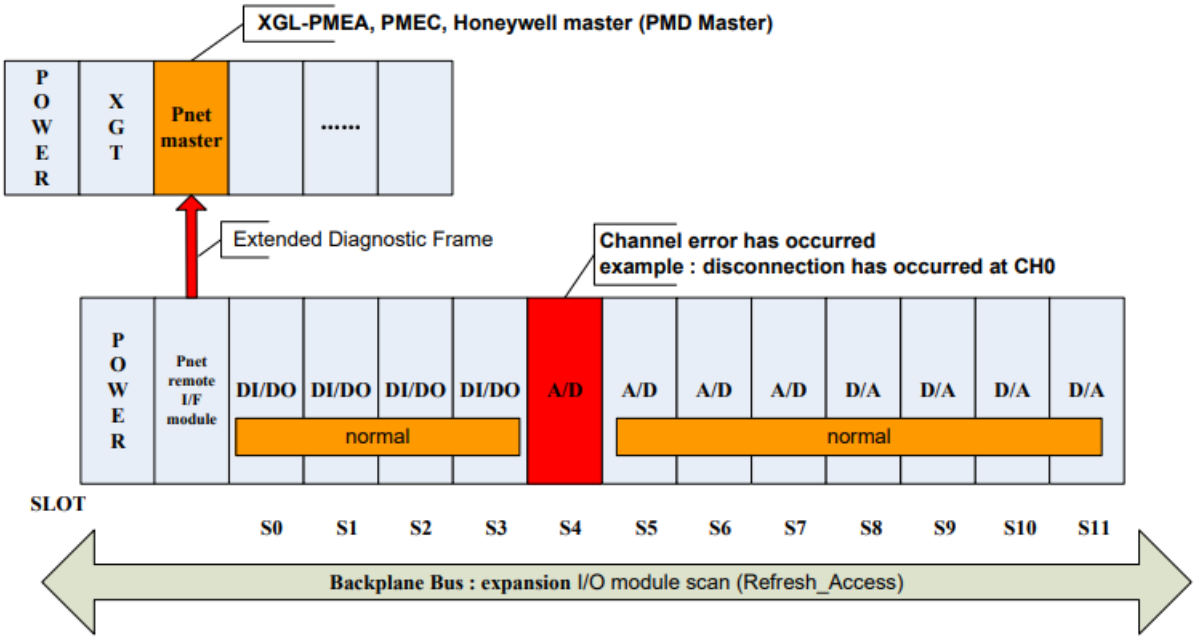


8.2.9 Communication error with slave



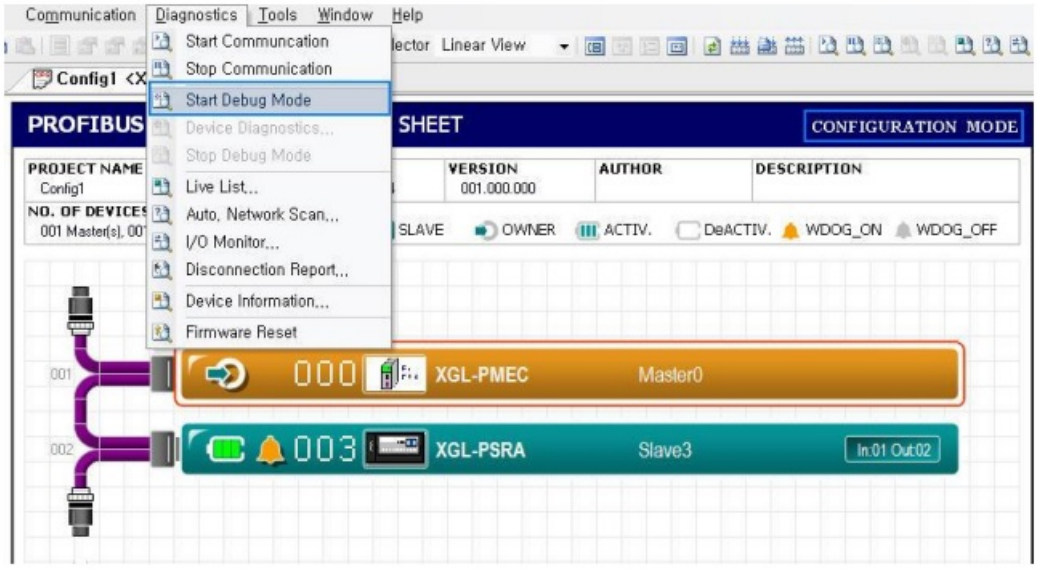
8.2.10 Analog Module's Channel Error Diagnosis Function (XGL-PSRA)

1. Pnet remote I/F module can check the internal address or U device area of special module and diagnose error status by using Refresh access function of BPMC after processing I/O data.
2. For our analog I/O module, it can detect the disconnection information and error type of analog I/O module
3. If it finds the error, it sends the special frame (refer to S/W detailed design) for diagnosis to master.
4. In diagnosis process, in case Diagnosis Request frame of master occurs, it creates the frame based on standard diagnosis frame structure and sends it to master.

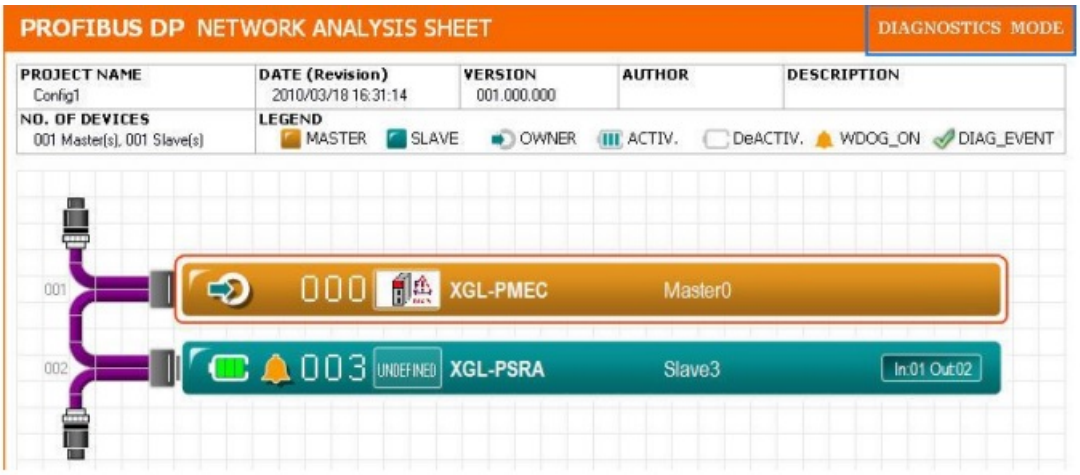


5. Example of diagnosis when disconnection occurs at CH7, 8 of AV8A analog input module installed at 6th slot during data communication. (Channel diagnosis is supported at XGL-PMEC and PROFICON)

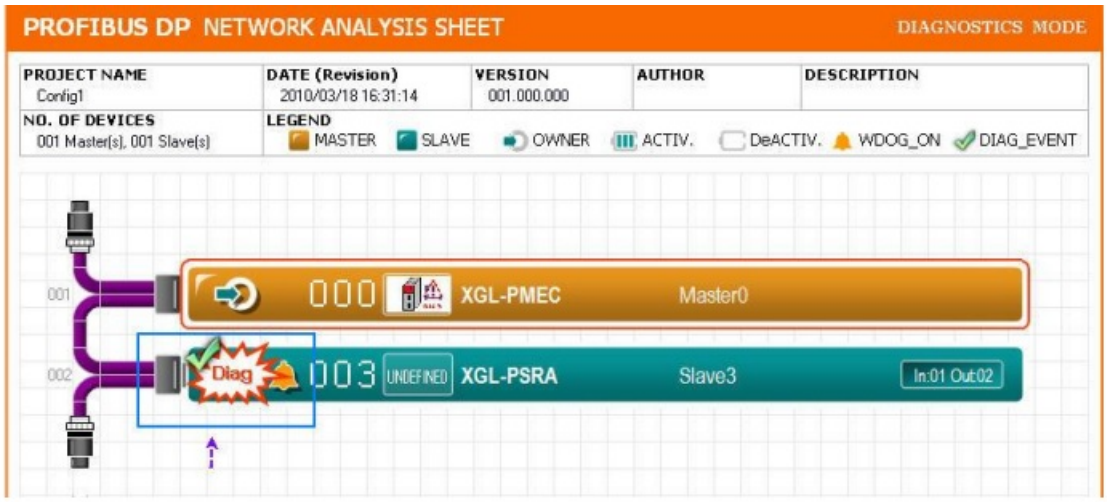
1. To check diagnosis status information, go into DEBUG mode.



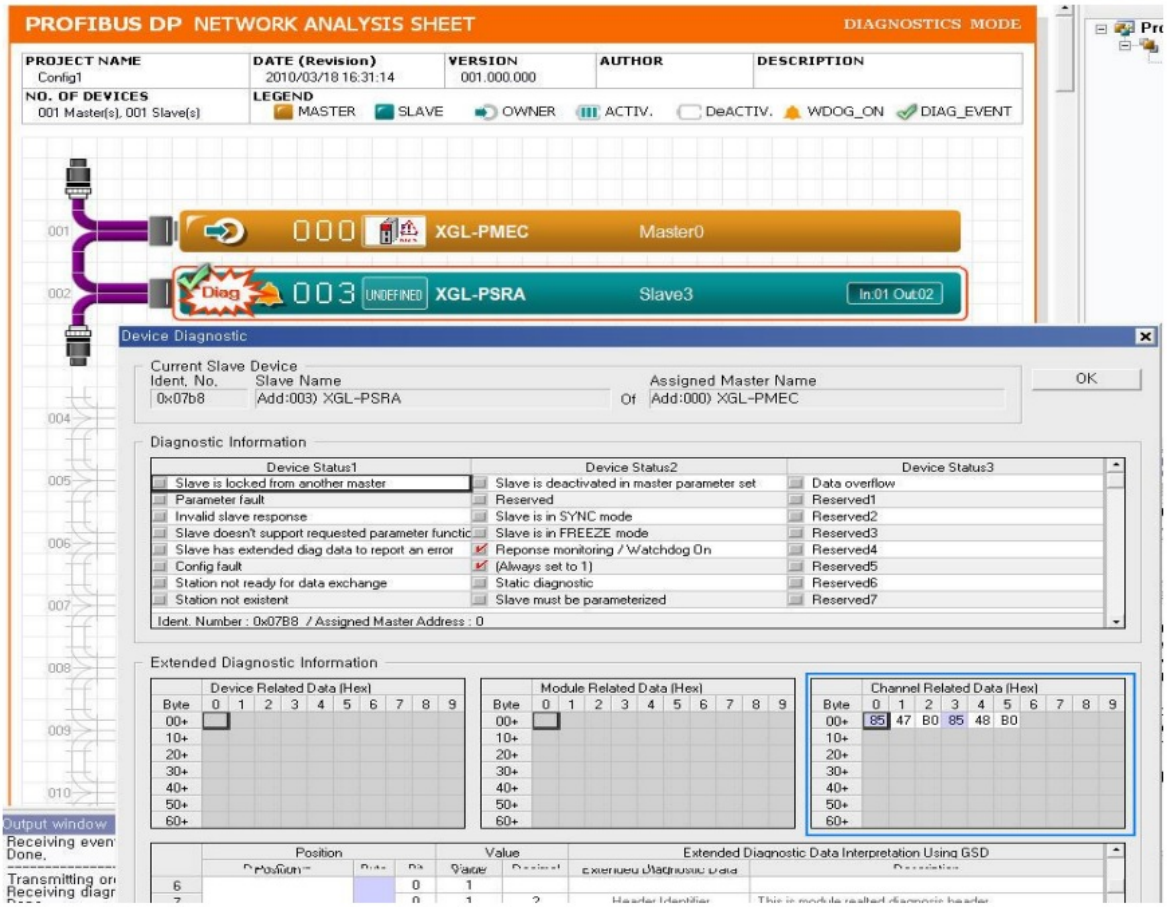
2. You can check the DEBUG mode status at right-top of screen. If here is no error information on analog input module channel of expansion base, no message appears at XGL-PSRA. This means normal communication status



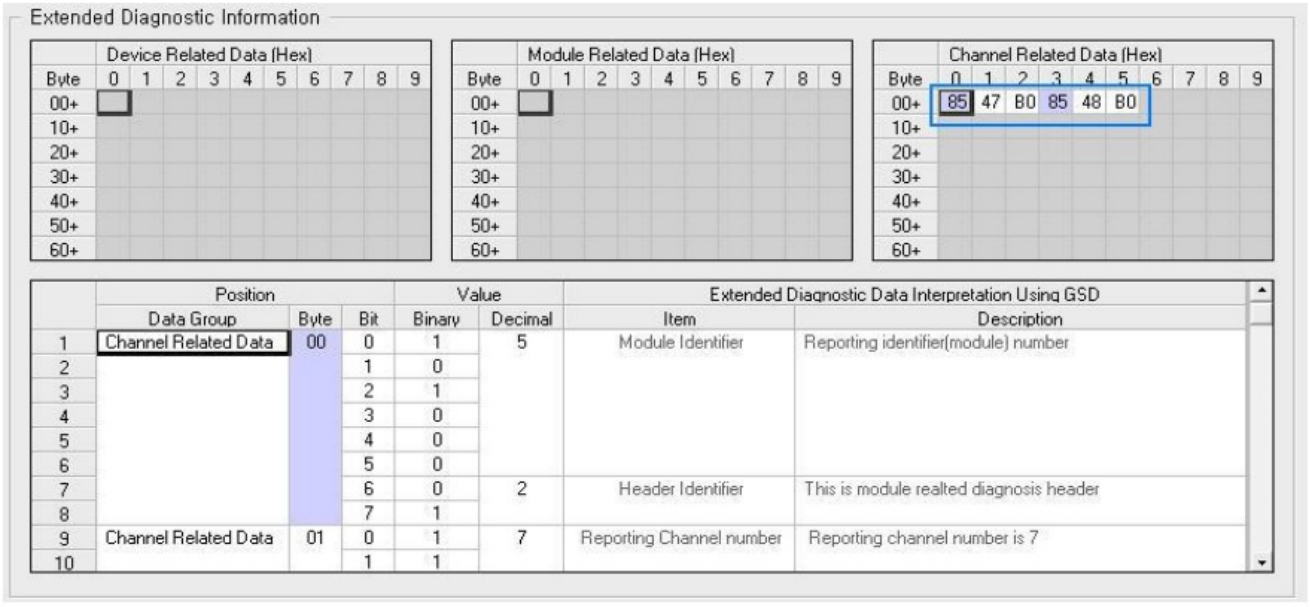
3. If disconnection occurs at CH7, 8 of AV8A analog input module installed at 6th slot, icon “DIAG” flickers at PSRA



4. For detailed channel diagnosis message, double-click PSRA. Then, diagnosis data related with channel appears. This data is displayed in accordance with protocol of standard Pnet diagnosis code.



5. Since one channel has 3 byte size, in the above case, it means error occurs at two channels. In the following information, meaning of the code is displayed in accordance with Pnet protocol standard.



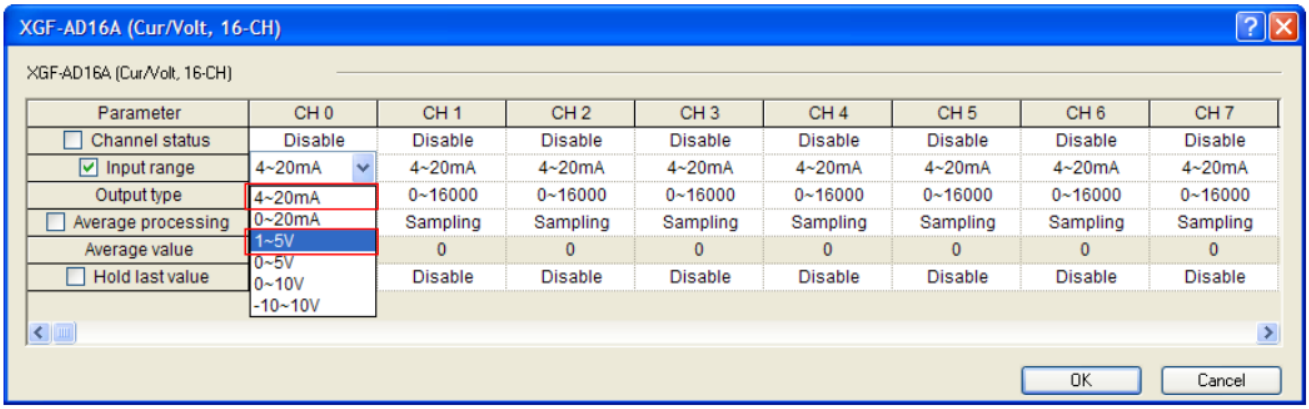
6. Limit on channel diagnosis

(1) For channel diagnosis, up to 20 are supported simultaneously. If diagnosis more than 20 occurs, the recently occurred diagnosis message is displayed first. But in case of module detachment error (while Hot-Swap switch is not on), up to 19 channel diagnosis message are supported.

(2) The modules supporting channel diagnosis are as follows. And diagnosis function is supported when input current and voltage range are as follows. You can set this when writing parameter on analog input module through USB.

– XGF-AD4S, XGF-AV8A, XGF-AC8A, XGF-AD16A

– Input current and voltage range: 1 ~ 5V, 4 ~ 20mA



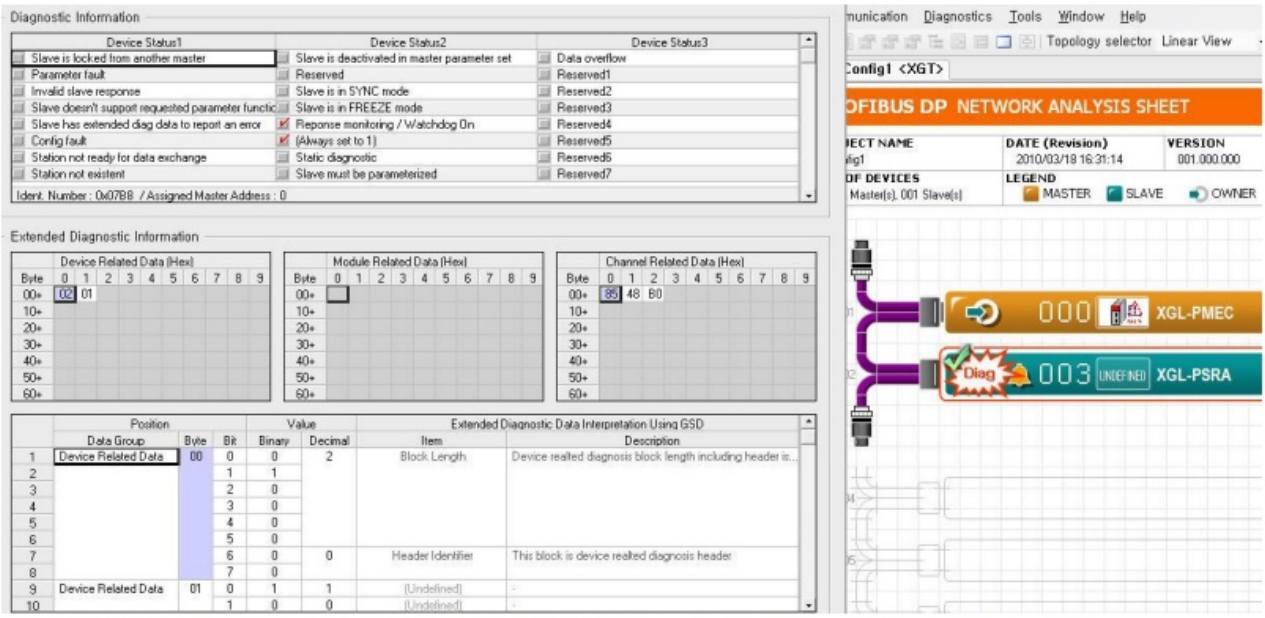
7. Cancel diagnosis status

(1) If you check the channel where “Diag” status occurs and solve the problem, “Diag” icon disappears at PROFICON diagnosis mode. And executes data communication.

8. Report module detachment status

(1) If module is detached while module change switch is not on, PSRA reports this to master with diagnosis message. At this time, if channel diagnosis occurs simultaneously, channel diagnosis information is displayed together. In case of module detachment error, you should reset PSRA for normal operation. If module is detached while module change switch is on, diagnosis message doesn’t appear and normal data communication is executed.

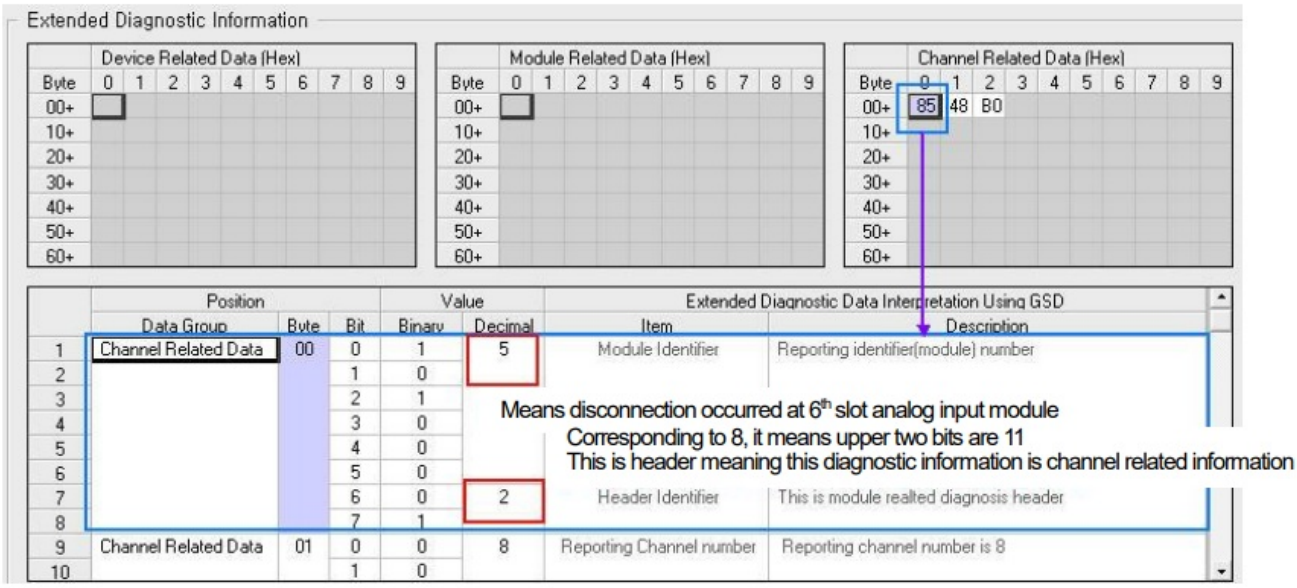
(2) When module detachment and channel diagnosis occur simultaneously When module in 12th slot is detached and disconnection occurs at CH8 of 6th AV8A, diagnosis mode of PROFICON displays all two information. But it can’t return to data communication mode. For return, you should reset PSRA.

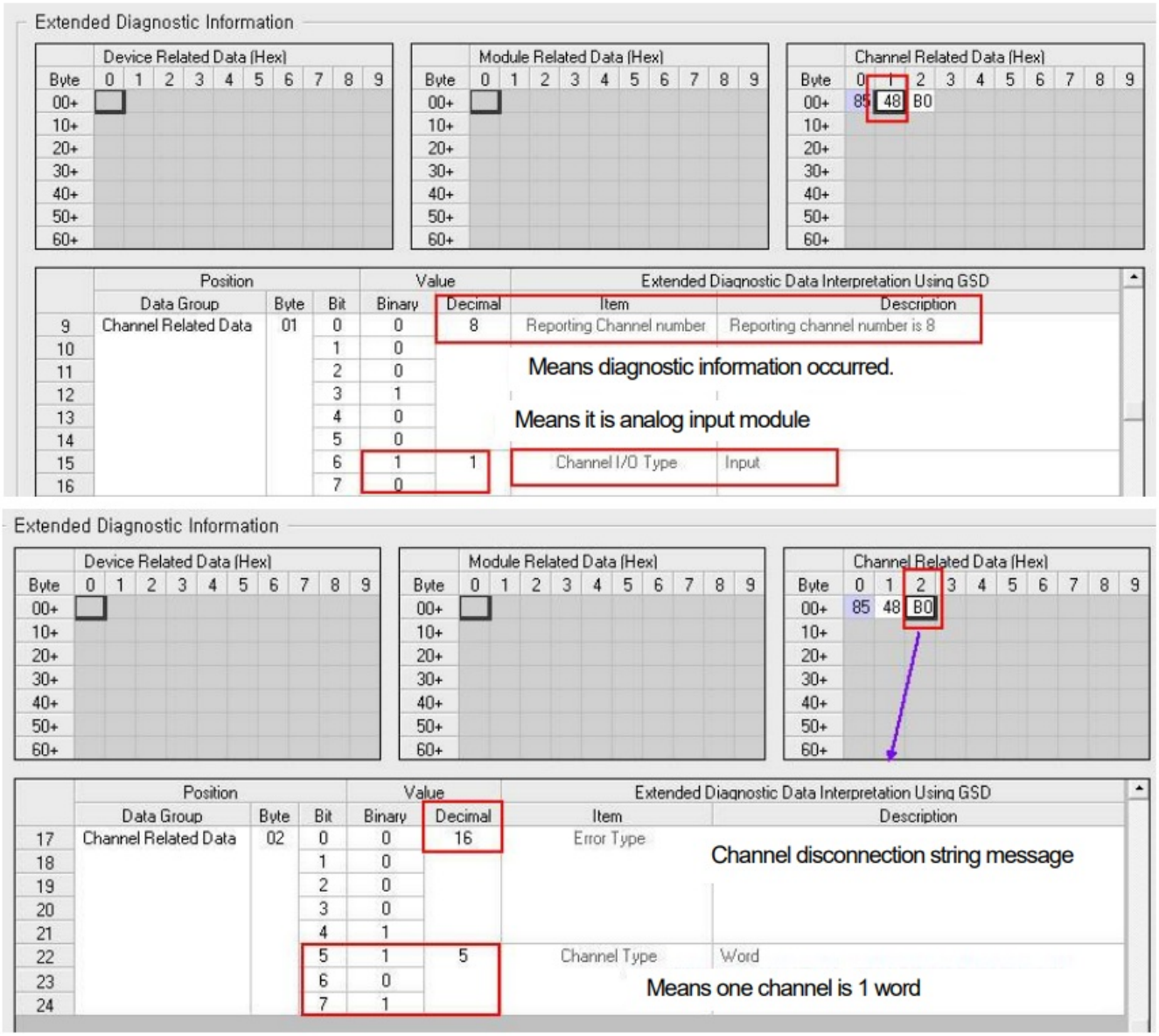


Module detachment message appears with channel disconnection information as figure above

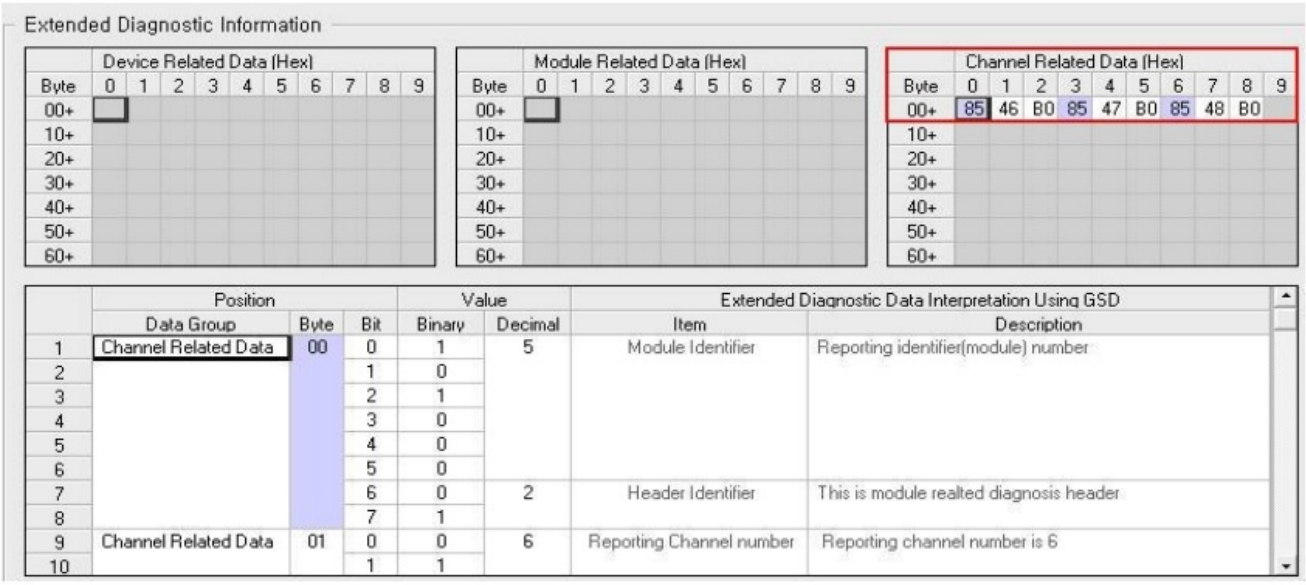
9. PROFIBUNS standard diagnosis protocol

   Here it describes Pnet standard channel diagnosis code with example where disconnection occurs at CH7 of AV8A. Allocating 3 byte channel diagnosis code per channel is regulation in standard. Each byte has the following meaning.





If several channel diagnosis occurs, 3 byte diagnostic information as many as channel diagnosis count appear. The following is case disconnection appears at CH6, 7, 8 of 6th slot analog input module.



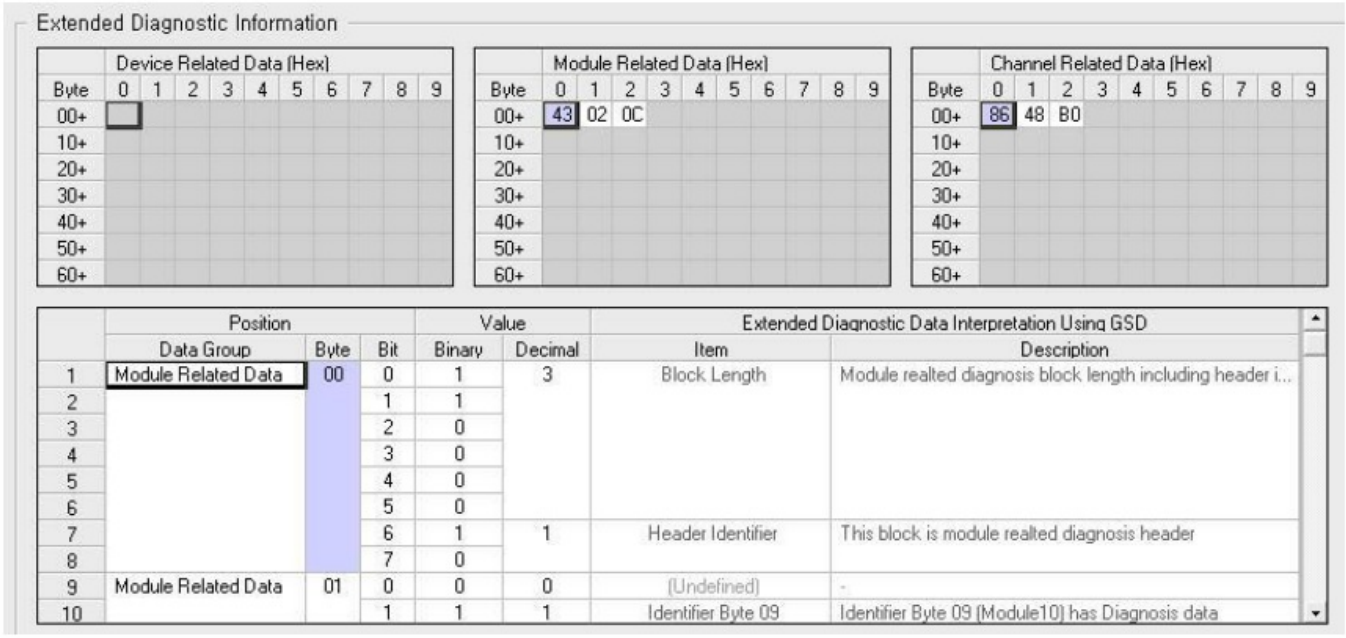
10. Module detachment diagnostic message

Error information of module operates as Pnet standard id diagnosis message. Now, ID diagnosis data field consists of 3 byte. First byte means it is ID diagnosis field. Second and third bytes mean the slot number of module where diagnosis occurs. Configuration of 3 byte is as follows. 0100 0011 Second byte: means from 0th

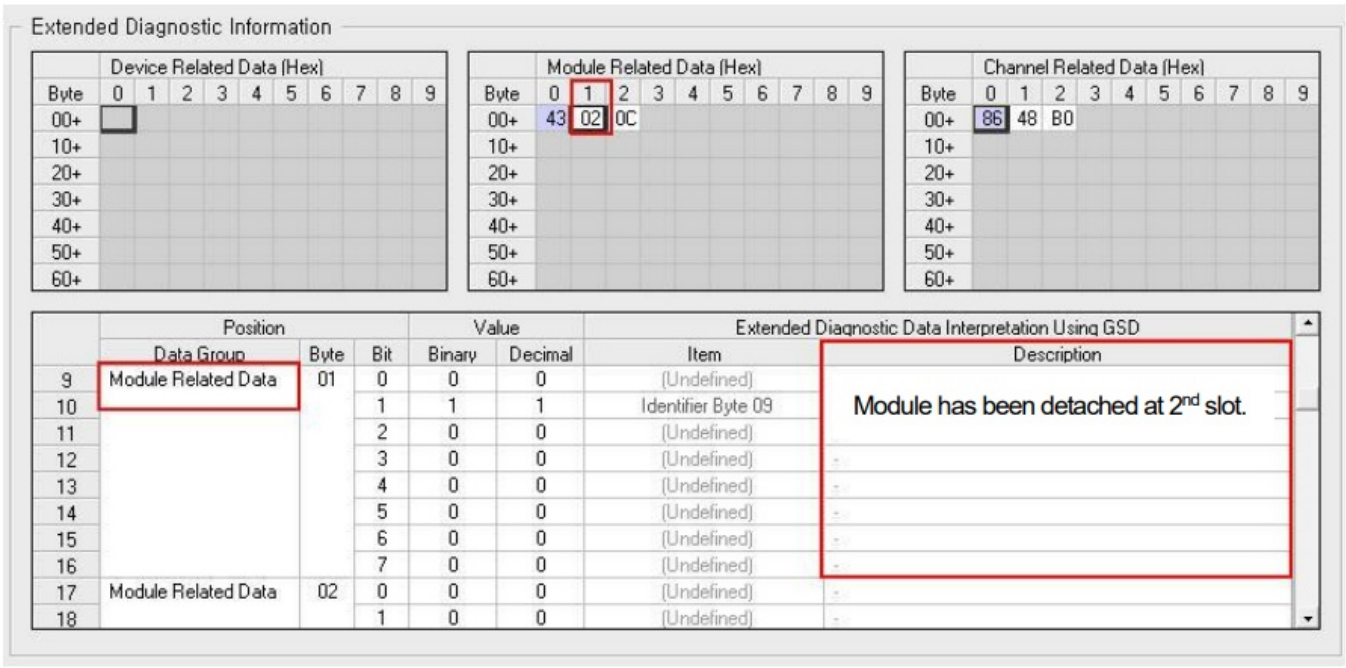
slot to 7th slot Third byte: means from 8th slot to 12th slot

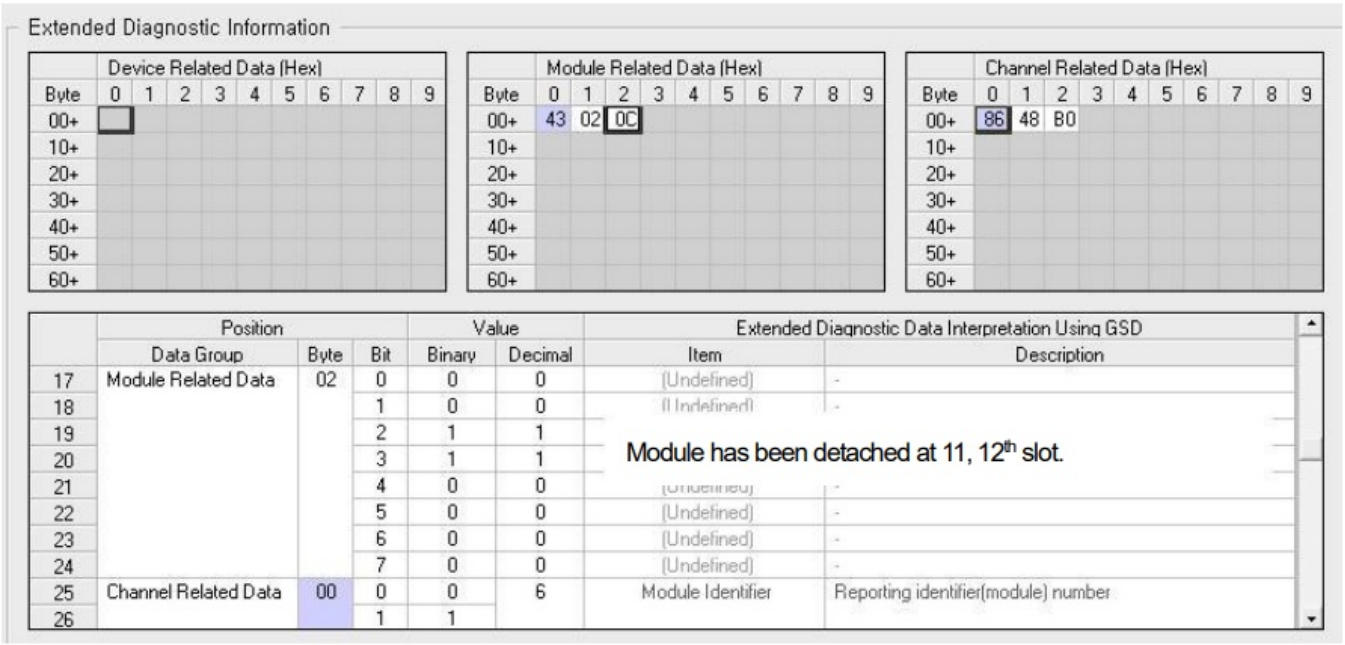
(1) PSRA supports both channel and ID diagnostic message. We assume that module detachment occurs at 11th and 12th slot and channel disconnection occurs at CH8 of 6th slot analog module.

In normal data communication status, no message appears as figure above. If situation described above occurs, diagnostic message is displayed as follows. In case of module detachment, you should reset PSRA to return to data communication status. If you detach module by using module change switch, it is not considered as diagnostic message.



If we analyze the data in module diagnostic data area in accordance with Pnet standard, it is as follows. Specific message is displayed under that.





The above figure means 2, 11, 12th slot module is detached.

8.2.11 Trouble Shooting Questionnaire

If the trouble occurs when using Pnet remote I/O module, fill in the following questionnaire and contact to the customer center by phone or by fax.

- In case of error related to special and communication module, use the questionnaire added to the user's manual of the corresponding product

1. User contact point : TEL.) FAX)
2. Model : ( )
3. Applied machine details
   - Network status : – OS version ( ), – Serial no. of product ( )
   - GMWIN version no. used in program compile : ( )
4. brief description of control object machine and system :
5. Network model using :
6. ERR LED 'OFF' of network unit? Yes( ), No( )
7. Error message content by GMWIN :
8. Action trial status for the error code. :
9. Trouble shooting method for other error action :
10. Error features
    - Repeat( ) : periodical( ) , specific sequence level related( ) environment related( )
    - Intermittent( ) : error interval :
11. Detail description for the error phenomena :
12. Configuration diagram of applied system :

Appendix

A.1 List of Flags

A.1.1 List of Special Relays (F)

Device 1	Device 2	Type	Variable	Function	Description
		DWORD	_SYS_STATE	Mode & Status	PLC mode & run status displayed.
	F00000	BIT	_RUN	RUN	RUN status.
	F00001	BIT	_STOP	STOP	STOP status.
	F00002	BIT	_ERROR	ERROR	ERROR status.
	F00003	BIT	_DEBUG	DEBUG	DEBUG status.
	F00004	BIT	_LOCAL_CON	Local control	Local control mode.
	F00005	BIT	_MODBUS_CON	Modbus mode	Modbus control mode.
	F00006	BIT	_REMOTE_CON	Remote mode	Remote control mode.
	F00008	BIT	_RUN_EDIT_ST	Modification during run	Program being downloaded during run.
	F00009	BIT	_RUN_EDIT_CHK	Modification during run	Modification in progress during run.
	F0000A	BIT	_RUN_EDIT_DONE	Modification complete during run	Modification complete during run.
	F0000B	BIT	_RUN_EDIT_END	Modification complete during run	Modification complete during run.
	F0000C	BIT	_CMOD_KEY	Run Mode	Run Mode changed by key.

F0000	F0000D	BIT	_CMOD_LPADT	Run Mode	Run Mode changed by local PADT.
	F0000E	BIT	_CMOD_RPADT	Run Mode	Run Mode changed by remote PADT.
	F0000F	BIT	_CMOD_RLINK	Run Mode	Run Mode changed by remote communication module.
	F00010	BIT	_FORCE_IN	Compulsory input	Compulsory input status.
	F00011	BIT	_FORCE_OUT	Compulsory output	Compulsory output status.
	F00012	BIT	_SKIP_ON	I/O SKIP	I/O SKIP being executed.
	F00013	BIT	_EMASK_ON	Error mask	Error mask being executed.
	F00014	BIT	_MON_ON	Monitor	Monitor being executed.
	F00015	BIT	_USTOP_ON	STOP	Stopped by STOP function
	F00016	BIT	_ESTOP_ON	ESTOP	Stopped by ESTOP function.
	F00017	BIT	_CONPILE_MODE	Compiling	Compile being performed.
	F00018	BIT	_INIT_RUN	Initializing	Initialization task being performed.
	F0001C	BIT	_PB1	Program code 1	Program code 1 selected.
	F0001D	BIT	_PB2	Program code 2	Program code 2 selected.

Device 1	Device 2	Type	Variable	Function	Description
F0000	F0001E	BIT	_CB1	Compile code 1	Compile code 1 selected.
	F0001F	BIT	_CB2	Compile code 2	Compile code 2 selected.
		DWORD	_CNF_ER	System error	Serious error in system reported.
	F00020	BIT	_CPU_ER	CPU error	CPU configuration error found.
	F00021	BIT	_IO_TYER	Module type error	Module type not identical.
	F00022	BIT	_IO_DEER	Module installation error	Module displaced.
	F00023	BIT	_FUSE_ER	Fuse error	Fuse blown.
	F00024	BIT	_IO_RWER	Module I/O error	Module I/O error found.
	F00025	BIT	_IP_IFER	Module interface error	Error found in Special/communication module interface.
	F00026	BIT	_ANNUM_ER	External equipment Error	Serious error detected in external equipment.
	F00028	BIT	_BPRM_ER	Basic parameter	Basic parameter abnormal.
	F00029	BIT	_IOPRM_ER	IO parameter	IO configuration parameter abnormal.

F0002	F0002A	BIT	_SPPRM_ER	Special module parameter	Special module parameter abnormal.
	F0002B	BIT	_CPPRM_ER	Communication module parameter	Communication module parameter abnormal.
	F0002C	BIT	_PGM_ER	Program error	Program error found.
	F0002D	BIT	_CODE_ER	Code error	Program code error found.
	F0002E	BIT	_SWDT_ER	System watch-dog	System watch-dog active.
	F0002F	BIT	_BASE_POWER_E R	Power error	Base power abnormal.
	F00030	BIT	_WDT_ER	Scan watch-dog	Scan watch-dog active.
		DWORD	_CNF_WAR	System warning	Slight error in system reported.
	F00040	BIT	_RTC_ER	RTC error	RTC data abnormal.
	F00041	BIT	_DBCK_ER	Back-up error	Data back-up error found.
	F00042	BIT	_HBCK_ER	Restart error	Hot restart unavailable.
	F00043	BIT	_ABSD_ER	Run error stop	Stopped due to abnormal run.
	F00044	BIT	_TASK_ER	Task impact	Task being impacted.
	F00045	BIT	_BAT_ER	Battery error	Battery status abnormal.

F0004	F00046	BIT	_ANNUM_WAR	External equipment error	Slight error detected in external equipment.
	F00047	BIT	_LOG_FULL	Memory full	Log memory full
	F00048	BIT	_HS_WAR1	HS link 1	HS link – parameter 1 error
	F00049	BIT	_HS_WAR2	HS link 2	HS link – parameter 2 error
	F0004A	BIT	_HS_WAR3	HS link 3	HS link – parameter 3 error
	F0004B	BIT	_HS_WAR4	HS link 4	HS link – parameter 4 error

Device 1	Device 2	Type	Variable	Function	Description
	F0004C	BIT	_HS_WAR5	HS link 5	HS link – parameter 5 error
	F0004D	BIT	_HS_WAR6	HS link 6	HS link – parameter 6 error
	F0004E	BIT	_HS_WAR7	HS link 7	HS link – parameter 7 error
	F0004F	BIT	_HS_WAR8	HS link 8	HS link – parameter 8 error
	F00050	BIT	_HS_WAR9	HS link 9	HS link – parameter 9 error
	F00051	BIT	_HS_WAR10	HS link 10	HS link – parameter 10 error
	F00052	BIT	_HS_WAR11	HS link 11	HS link – parameter11 error

F0004	F00053	BIT	_HS_WAR12	HS link 12	HS link – parameter12 error
	F00054	BIT	_P2P_WAR1	P2P parameter 1	P2P – parameter1 error
	F00055	BIT	_P2P_WAR2	P2P parameter 2	P2P – parameter2 error
	F00056	BIT	_P2P_WAR3	P2P parameter 3	P2P – parameter3 error
	F00057	BIT	_P2P_WAR4	P2P parameter 4	P2P – parameter4 error
	F00058	BIT	_P2P_WAR5	P2P parameter 5	P2P – parameter5 error
	F00059	BIT	_P2P_WAR6	P2P parameter 6	P2P – parameter6 error
	F0005A	BIT	_P2P_WAR7	P2P parameter 7	P2P – parameter7 error
	F0005B	BIT	_P2P_WAR8	P2P parameter 8	P2P – parameter8 error
	F0005C	BIT	_CONSTANT_ER	Fixed cycle error	Fixed cycle error
		WORD	_USER_F	User contact point	Timer available for user.
	F00090	BIT	_T20MS	20ms	CLOCK of 20ms cycle.
	F00091	BIT	_T100MS	100ms	CLOCK of 100ms cycle.
	F00092	BIT	_T200MS	200ms	CLOCK of 200ms cycle.

F0009	F00093	BIT	_T1S	1s	CLOCK of 1s cycle.
	F00094	BIT	_T2S	2s	CLOCK of 2s cycle.
	F00095	BIT	_T10S	10s	CLOCK of 10s cycle.
	F00096	BIT	_T20S	20s	CLOCK of 20s cycle.
	F00097	BIT	_T60S	60s	CLOCK of 60s cycle.
	F00099	BIT	_ON	Always ON	Bit always ON.
	F0009A	BIT	_OFF	Always OFF	Bit always OFF
	F0009B	BIT	_1ON	1 scan ON	Bit only ON for the first scan.
	F0009C	BIT	_1OFF	1 scan OFF	Bit only OFF for the first scan.
	F0009D	BIT	_STOG	Reverse	Every scan reversed.
F0010		WORD	_USER_CLK	User CLOCK	CLOCK available to set by user.
	F00100	BIT	_USR_CLK0	Repeat specific s can	ON/OFF CLOCK 0 for specific scan
	F00101	BIT	_USR_CLK1	Repeat specific s can	ON/OFF CLOCK 1 for specific scan

Device 1	Device 2	Type	Variable	Function	Description

F0010	F00102	BIT	_USR_CLK2	Repeat specific sc an	ON/OFF CLOCK 2 for specific scan
	F00103	BIT	_USR_CLK3	Repeat specific sc an	ON/OFF CLOCK 3 for specific scan
	F00104	BIT	_USR_CLK4	Repeat specific sc an	ON/OFF CLOCK 4 for specific scan
	F00105	BIT	_USR_CLK5	Repeat specific sc an	ON/OFF CLOCK 5 for specific scan
	F00106	BIT	_USR_CLK6	Repeat specific sc an	ON/OFF CLOCK 6 for specific scan
	F00107	BIT	_USR_CLK7	Repeat specific sc an	ON/OFF CLOCK 7 for specific scan
F0011		WORD	_LOGIC_RESU LT	Logic result	Logic result displayed.
	F00110	BIT	_LER	Calculation error	ON for 1 scan if calculation in error.
	F00111	BIT	_ZERO	Zero flag	ON if calculation result is 0.
	F00112	BIT	_CARRY	Carry flag	ON if Carry found during calculation.
	F00113	BIT	_ALL_OFF	Whole output OFF	ON if all output OFF
	F00115	BIT	_LER_LATCH	Calculation error latch	ON kept if calculation in error.
		WORD	_CMP_RESULT	Compared result	Compared result displayed.
	F00120	BIT	_LT	LT flag	ON if “less than”
	F00121	BIT	_LTE	LTE flag	ON if “less than or equal”

F0012	F00122	BIT	_EQU	EQU flag	ON if “equal”
	F00123	BIT	_GT	GT flag	ON if “greater than”
	F00124	BIT	_GTE	GTE flag	ON if “greater than or equal”
	F00125	BIT	_NEQ	NEQ flag	ON if “not equal”
F0013		WORD	_AC_F_CNT	Inspected power cut	Number of inspected power-cuts displayed.
F0014		WORD	_FALS_NUM	FALS No.	FALS No. displayed.
F0015		WORD	_PUTGET_ERR0	PUT/GET error 0	Main base PUT / GET error
F0016		WORD	_PUTGET_ERR1	PUT/GET error 1	Added base step 1 PUT / GET error
F0017		WORD	_PUTGET_ERR2	PUT/GET error 2	Added base step 2 PUT / GET error
F0018		WORD	_PUTGET_ERR3	PUT/GET error 3	Added base step 3 PUT / GET error
F0019		WORD	_PUTGET_ERR4	PUT/GET error 4	Added base step 4 PUT / GET error
F0020		WORD	_PUTGET_ERR5	PUT/GET error 5	Added base step 5 PUT / GET error
F0021		WORD	_PUTGET_ERR6	PUT/GET error 6	Added base step 6 PUT / GET error
F0022		WORD	_PUTGET_ERR7	PUT/GET error 7	Added base step 7 PUT / GET error
F0023		WORD	_PUTGET_NDR0	PUT/GET complete 0	Main base PUT / GET complete

F0024		WORD	_PUTGET_NDR1	PUT/GET complete 1	Added base step 1 PUT / GET complete
F0025		WORD	_PUTGET_NDR2	PUT/GET complete 2	Added base step 2 PUT / GET complete
F0026		WORD	_PUTGET_NDR3	PUT/GET complete 3	Added base step 3 PUT / GET complete
F0027		WORD	_PUTGET_NDR4	PUT/GET complete 4	Added base step 4 PUT / GET complete
F0028		WORD	_PUTGET_NDR5	PUT/GET complete 5	Added base step 5 PUT / GET complete

Device 1	Device 2	Type	Variable	Function	Description
F0029		WORD	_PUTGET_NDR6	PUT/GET complete 6	Added base step 6 PUT / GET complete
F0030		WORD	_PUTGET_NDR7	PUT/GET complete 7	Added base step 7 PUT / GET complete
F0044		WORD	_CPU_TYPE	CPU type	Information on CPU type displayed.
F0045		WORD	_CPU_VER	CPU version	CPU version displayed.
F0046		DWORD	_OS_VER	OS version	OS version displayed.
F0048		DWORD	_OS_DATE	OS date	OS released date displayed.
F0050		WORD	_SCAN_MAX	Max. scan time	Max. scan time displayed
F0051		WORD	_SCAN_MIN	Min. scan time	Min. scan time displayed

F0052		WORD	_SCAN_CUR	Present scan time	Present scan time displayed.
F0053		WORD	_MON_YEAR	Month / Year	PLC’s time information (Month/Year)
F0054		WORD	_TIME_DAY	Hour / Date	PLC’s time information (Hour/Date)
F0055		WORD	_SEC_MIN	Second / Minute	PLC’s time information (Second/Minute)
F0056		WORD	_HUND_WK	100 years / Day	PLC’s time information (100 years/Day)
F0057		WORD	_FPU_INFO	FPU calculation result	Floating decimal calculation result displayed.
	F00570	BIT	_FPU_LFLAG_I	Incorrect error latch	Latched if in incorrect error.
	F00571	BIT	_FPU_LFLAG_U	Underflow latch	Latched if underflow found.
	F00572	BIT	_FPU_LFLAG_O	Overflow latch	Latched if overflow found.
	F00573	BIT	_FPU_LFLAG_Z	Latch divided by 0	Latched if divided by 0.
	F00574	BIT	_FPU_LFLAG_V	Invalid calculation latch	Latched if invalid calculation.
	F0057A	BIT	_FPU_FLAG_I	Incorrect error	Reported if incorrect error found.
	F0057B	BIT	_FPU_FLAG_U	Underflow	Reported if underflow found.
	F0057C	BIT	_FPU_FLAG_O	Overflow	Reported if overflow found.

	F0057D	BIT	_FPU_FLAG_Z	Division by 0	Reported if divided by 0.
	F0057E	BIT	_FPU_FLAG_V	Invalid calculation	Reported if calculation invalid.
	F0057F	BIT	_FPU_FLAG_E	Irregular value inp ut	Reported if irregular value input.
F0058		DWOR D	_ERR_STEP	Error step	Error step saved.
F0060		DWOR D	_REF_COUNT	Refresh	Increased when module refresh exec uted.
F0062		DWOR D	_REF_OK_CNT	Refresh OK	Increased if module refresh normal
F0064		DWOR D	_REF_NG_CNT	Refresh NG	Increased if module refresh abnormal .
F0066		DWOR D	_REF_LIM_CN T	Refresh LIMIT	Increased if module refresh abnormal (TIME OUT).
F0068		DWOR D	_REF_ERR_CN T	Refresh ERROR	Increased if module refresh abnormal .
F0070		DWOR D	_MOD_RD_ER R_ CNT	Module READ ER ROR	Increased if module reads 1 word abn ormally.
F0072		DWOR D	_MOD_WR_ER R_ CNT	Module WRITE E RROR	Increased if module writes 1 word ab normally.

Device 1	Device 2	Type	Variable	Function	Description

F0074		DWORD	_CA_CNT	Block service	Increased if module’s block data serviced
F0076		DWORD	_CA_LIM_CNT	Block service LIMIT	Increased if module’s block data service abnormal.
F0078		DWORD	_CA_ERR_CNT	Block service ERROR	Increased if module’s block data service abnormal.
F0080		DWORD	_BUF_FULL_CNT	Buffer FULL	Increased if CPU’s internal buffer is FULL.
F0082		DWORD	_PUT_CNT	PUT count	Increased if PUT executed.
F0084		DWORD	_GET_CNT	GET count	Increased if GET executed.
F0086		DWORD	_KEY	Present key	Local key’s present status displayed.
F0088		DWORD	_KEY_PREV	Previous key	Local key’s previous status displayed.
F0090		WORD	_IO_TYER_N	Discordant slot	Slot number with discordant module type displayed.
F0091		WORD	_IO_DEER_N	Displaced slot	Slot number with displaced module displayed.
F0092		WORD	_FUSE_ER_N	Fuse blown slot	Slot number with fuse blown displayed.
F0093		WORD	_IO_RWER_N	RW error slot	Slot number with module Read/Write error displayed.

F0094		WORD	_IP_IFER_N	IF error slot	Slot number with module interface err or displayed.
F0096		WORD	_IO_TYER0	Module type 0 err or	Main base module type error.
F0097		WORD	_IO_TYER1	Module type 1 err or	Added base step 1 module type error.
F0098		WORD	_IO_TYER2	Module type 2 err or	Added base step 2 module type error.
F0099		WORD	_IO_TYER3	Module type 3 err or	Added base step 3 module type error.
F0100		WORD	_IO_TYER4	Module type 4 err or	Added base step 4 module type error.
F0101		WORD	_IO_TYER5	Module type 5 err or	Added base step 5 module type error
F0102		WORD	_IO_TYER6	Module type 6 err or	Added base step 6 module type error
F0103		WORD	_IO_TYER7	Module type 7 err or	Added base step 7 module type error
F0104		WORD	_IO_DEER0	Module installatio n 0 error	Main base module installation error
F0105		WORD	_IO_DEER1	Module installatio n 1 error	Added base step 1 module installatio n error
F0106		WORD	_IO_DEER2	Module installatio n 2 error	Added base step 2 module installatio n error

F0107		WORD	_IO_DEER3	Module installation 3 error	Added base step 3 module installation error
F0108		WORD	_IO_DEER4	Module installation 4 error	Added base step 4 module installation error
F0109		WORD	_IO_DEER5	Module installation 5 error	Added base step 5 module installation error
F0110		WORD	_IO_DEER6	Module installation 6 error	Added base step 6 module installation error
F0111		WORD	_IO_DEER7	Module installation 7 error	Added base step 7 module installation error
F0112		WORD	_FUSE_ER0	Fuse blown 0 error	Main base Fuse blown error
F0113		WORD	_FUSE_ER1	Fuse blown 1 error	Added base step 1 Fuse blown error
F0114		WORD	_FUSE_ER2	Fuse blown 2 error	Added base step 2 Fuse blown error
F0115		WORD	_FUSE_ER3	Fuse blown 3 error	Added base step 3 Fuse blown error

Device 1	Device 2	Type	Variable	Function	Description
F0116		WORD	_FUSE_ER4	Fuse blown 4 error	Added base step 4 Fuse blown error
F0117		WORD	_FUSE_ER5	Fuse blown 5 error	Added base step 5 Fuse blown error

F0118		WORD	_FUSE_ER6	Fuse blown 6 error	Added base step 6 Fuse blown error
F0119		WORD	_FUSE_ER7	Fuse blown 7 error	Added base step 7 Fuse blown error
F0120		WORD	_IO_RWER0	Module RW 0 error	Main base module Read/Write error
F0121		WORD	_IO_RWER1	Module RW 1 error	Added base step 1 module Read/Write error
F0122		WORD	_IO_RWER2	Module RW 2 error	Added base step 2 module Read/Write error
F0123		WORD	_IO_RWER3	Module RW 3 error	Added base step 3 module Read/Write error
F0124		WORD	_IO_RWER4	Module RW 4 error	Added base step 4 module Read/Write error
F0125		WORD	_IO_RWER5	Module RW 5 error	Added base step 5 module Read/Write error
F0126		WORD	_IO_RWER6	Module RW 6 error	Added base step 6 module Read/Write error
F0127		WORD	_IO_RWER7	Module RW 7 error	Added base step 7 module Read/Write error
F0128		WORD	_IO_IFER_0	Module IF 0 error	Main base module interface error
F0129		WORD	_IO_IFER_1	Module IF 1 error	Added base step 1 module interface error

F0130		WORD	_IO_IFER_2	Module IF 2 error	Added base step 2 module interface error
F0131		WORD	_IO_IFER_3	Module IF 3 error	Added base step 3 module interface error
F0132		WORD	_IO_IFER_4	Module IF 4 error	Added base step 4 module interface error
F0133		WORD	_IO_IFER_5	Module IF 5 error	Added base step 5 module interface error
F0134		WORD	_IO_IFER_6	Module IF 6 error	Added base step 6 module interface error
F0135		WORD	_IO_IFER_7	Module IF 7 error	Added base step 7 module interface error
F0136		WORD	_RTC_DATE	RTC date	RTC’s present date
F0137		WORD	_RTC_WEEK	RTC day	RTC’s present day of the week
F0138		DWORD	_RTC_TOD	RTC time	RTC’s present time (ms unit)
F0140		DWORD	_AC_FAIL_CNT	Power-cut times	Power-cut times saved.
F0142		DWORD	_ERR_HIS_CNT	Errors found	Number of found errors saved.
F0144		DWORD	_MOD_HIS_CNT	Mode conversion times	Mode conversion times saved.

F0146		DWORD	_SYS_HIS_CNT	History updated times	System’s history updated times saved.
F0148		DWORD	_LOG_ROTATE	Log rotate	Log rotate information saved.
F0150		WORD	_BASE_INFO0	Slot information 0	Main base slot information
F0151		WORD	_BASE_INFO1	Slot information 1	Added base step 1 slot information
F0152		WORD	_BASE_INFO2	Slot information 2	Added base step 2 slot information
F0153		WORD	_BASE_INFO3	Slot information 3	Added base step 3 slot information
F0154		WORD	_BASE_INFO4	Slot information 4	Added base step 4 slot information
F0155		WORD	_BASE_INFO5	Slot information 5	Added base step 5 slot information

Device 1	Device 2	Type	Variable	Function	Description
F0156		WORD	_BASE_INFO6	Slot information 6	Added base step 6 slot information
F0157		WORD	_BASE_INFO7	Slot information 7	Added base step 7 slot information
F0158		WORD	_RBANK_NUM	Used block number	Presently used block number
F0159		WORD	_RBLOCK_STATE	Flash status	Flash block status

F0160		DWORD	_RBLOCK_RD_FL AG	Flash Read	ON when reading Flash N block data.
F0162		DWORD	_RBLOCK_WR_FL AG	Flash Write	ON when writing Flash N block data.
F0164		DWORD	_RBLOCK_ER_FL AG	Flash error	Error found during Flash N block service.
F1024		WORD	_USER_WRITE_F	Available contact	Contact point available in program
	F10240	BIT	_RTC_WR	RTC RW	Data Write & Read in RTC
	F10241	BIT	_SCAN_WR	Scan WR	Scan value initialization
	F10242	BIT	_CHK_ANC_ERR	Detect external serious error	Detection of serious error in external equipment requested.
	F10243	BIT	_CHK_ANC_WAR	Detect external slight error	Detection of slight error in external equipment requested.
F1025		WORD	_USER_STAUS_F	User contact point	User contact point
	F10250	BIT	_INIT_DONE	Initialization complete	Initialization complete displayed.
F1026		WORD	_ANC_ERR	External serious error information	Serious error information in external equipment displayed.

F1027		WORD	_ANC_WAR	External slight error information	Slight error information in external equipment displayed.
F1034		WORD	_MON_YEAR_DT	Month / Year	Time information data (Month/Year)
F1035		WORD	_TIME_DAY_DT	Hour / Date	Time information data (Hour/Date)
F1036		WORD	_SEC_MIN_DT	Second / Minute	Time information data (Second/Minute)
F1037		WORD	_HUND_WK_DT	100 years / Day	Time information data (100 years/Day)

A.1.2 List of Communication Relays (L)

– Special register for data

* HS link No. 1

No.	Keyword	Type	Detail	Description
L00000 00	_HS1_RLINK	Bit	HS link parameter No.1's all stations normally operated	Displays all stations normally operated as specified in HS link parameter, which will be On if 1. There is no error with all stations specified in parameter in RUN mode 2. All data block is in normal communication as specified in parameter. 3. The parameter specified in each station itself is in normal communication. Run_link will be kept On if once On until stopped by link disenable.

L0000 01	_HS1_LTRBL	Bit	After _HS1RLINK is ON, abnormal status displayed	This flag will be On if the station specified in parame ter and the data block's communication status are a s described below with _HSmRLINK flag On,. 1. when the station specified in parameter is not in RUN mode, 2. when the station specified in parameter is in erro r, 3. when data block's communication status specifie d in parameter is unstable, The link trouble will be On if one of those conditions 1,2 and 3 above occurs. And if such a co ndition is back to normal, it will be Off.
L0000 20 ~ L0000 9F	_HS1_STATE [k] (k=000~127)	Bit Arr ay	HS link parameter No.1, B lock No.k's general status displayed	Displays the general status of the communication in formation for the specified parameter's respective d ata blocks. HS1STATE[k]=HS1MOD[k]&_HS1TRX[k]&(~_HSm ERR[k])
L0001 00 ~ L0001 7F	_HS1_MOD[k] (k=000~127)	Bit Arr ay	HS link parameter No.1, B lock No.k station's Run op eration mode	Displays the operation mode of the station specified in parameter's data block k.
L0001 80 ~ L0002 5F	_HS1_TRX[k] (k=000~127)	Bit Arr ay	Normal communication di splayed with HS link para meter No.1, Block No.k st ation	Displays the communication status of parameter's d ata block k to check if normal as specified.
L0002 60 ~ L0003 3F	_HS1_ERR[k] (k=000~127)	Bit Arr ay	HS link parameter No.1, B lock No.k station's Run err or mode	Displays the communication status of parameter's d ata block k to check for any error.
L0003 40 ~ L0004 1F	_HS1_SETBL OCK [k=000~ 127]	Bit Arr ay	HS link parameter No.1, B lock No.k setting displayed	Displays the setting status of parameter's data bloc k k.

K as a block number is displayed through 8 words by 16 for 1 word for the information of 128 blocks from 000 to 127.
For example, block information of 16~31, 32~47, 48~63, 64~79, 80~95, 96~111, 112~127 will be displayed in L00011, L00012, L00013, L00014, L00015, L00016, L00017 from block 0 to block 15 for mode information (_HS1MOD).

* High speed link number 2~12

HS link No.	L area address	Remarks
2	L000500~L00099F	Compared with HS link of 1 in [Table 1], other HS link station number's flag address will be simply calculated as follows; *Calculation formula: L area address = L000000 + 500 x (HS link No. – 1) In order to use HS link flag for program and monitoring, use the flag map r egistered in XG5000 for convenient application.
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	

[Table 2] Relation between high speed link and L device
P2P parameters: 1~8, P2P block: 0~63

No.	Keyword	Type	Detail	Description
L006250	_P2P1_NDR00	Bit	P2P parameter No.1, block No.00 service complete nor mally	P2P parameter No.1, block No.0 service co mplete normally
L006251	_P2P1_ERR00	Bit	P2P parameter No.1, block No.00 service complete abn ormally	P2P parameter No.1, block No.0 service co mplete abnormally
L00626	_P2P1_STATUS 00	Word	Error code if P2P parameter No.1, block No.0 0 service complete abnormally	Error code displayed if P2P parameter No. 1, block No.0 service complete abnormally

L00627	_P2P1_SVCCNT00	DWord	P2P parameter No.1, block No.00 service normal execution times	P2P parameter No.1, block No.0 service normal execution times displayed
L00629	_P2P1_ERRCNT00	DWord	P2P parameter No.1, block No.00 service abnormal execution times	P2P parameter No.1, block No.0 service abnormal execution times displayed
L006310	_P2P1_NDR01	Bit	P2P parameter No.1, block No.01 service complete normally	P2P parameter No.1, block No.1 service complete normally
L006311	_P2P1_ERR01	Bit	P2P parameter No.1, block No.01 service complete abnormally	P2P parameter No.1, block No.1 service complete abnormally
L00632	_P2P1_STATUS01	Word	Error code if P2P parameter No.1, block No.01 service complete abnormally	Error code displayed if P2P parameter No.1, block No.1 service complete abnormally
L00633	_P2P1_SVCCNT01	DWord	P2P parameter No.1, block No.01 service normal execution times	P2P parameter No.1, block No.1 service normal execution times displayed
L00635	_P2P1_ERRCNT01	DWord	P2P parameter No.1, block No.01 service abnormal execution times	P2P parameter No.1, block No.1 service abnormal execution times displayed

[Table 3] List of communication flags based on P2P service setting

A.1.3 List of Link device (N)

– Device saving the size and contents about P2P number and block number
– P2P No.: 1 ~ 8, P2P block: 0 ~ 63

No.	Keyword	Type	Detail	Description
N00000	_P1B00SN	Word	P2P parameter No.1, block No.00’s correspondent station No.	P2P parameter No.1, block No.00’s correspondent station No. saved Use P2PSN command to modify during Run if correspondent station number is used in XG5000.

N00001 ~ N00004	_P1B00RD1	Device structure	P2P parameter No.1, block No.00 area device 1 to read	P2P parameter No.1, block No.00 area device 1 to read saved
N00005	_P1B00RS1	Word	P2P parameter No.1, block No.00 area size 1 to read	P2P parameter No.1, block No.00 area size 1 to read saved
N00006 ~ N00009	_P1B00RD2	Device structure	P2P parameter No.1, block No.00 area device 2 to read	P2P parameter No.1, block No.00 area device 2 to read saved
N00010	_P1B00RS2	Word	P2P parameter No.1, block No.00 area size 2 to read	P2P parameter No.1, block No.00 area size 2 to read saved
N00011 ~ N00014	_P1B00RD3	Device structure	P2P parameter No.1, block No.00 area device 3 to read	P2P parameter No.1, block No.00 area device 3 to read saved
N00015	_P1B00RS3	Word	P2P parameter No.1, block No.00 area size 3 to read	P2P parameter No.1, block No.00 area size 3 to read saved
N00016 ~ N00019	_P1B00RD4	Device structure	P2P parameter No.1, block No.00 area device 4 to read	P2P parameter No.1, block No.00 area device 4 to read saved
N00020	_P1B00RS4	Word	P2P parameter No.1, block No.00 area size 4 to read	P2P parameter No.1, block No.00 area size 4 to read saved
N00021 ~ N00024	_P1B00WD1	Device structure	P2P parameter No.1, block No.00 saved area device 1	P2P parameter No.1, block No.00 saved area device 1 saved
N00025	_P1B00WS1	Word	P2P parameter No.1, block No.00 saved area size 1	P2P parameter No.1, block No.00 saved area size 1 saved

N00026 ~ N00029	_P1B00WD2	Device structure	P2P parameter No.1, block No.00 saved area device 2	P2P parameter No.1, block No.00 saved area device 2 saved
N00030	_P1B00WS2	Word	P2P parameter No.1, block No.00 saved area size 2	P2P parameter No.1, block No.00 saved area size 2 saved
N00031 ~ N00034	_P1B00WD3	Device structure	P2P parameter No.1, block No.00 saved area device 3	P2P parameter No.1, block No.00 saved area device 3 saved
N00035	_P1B00WS3	Word	P2P parameter No.1, block No.00 saved area size 3	P2P parameter No.1, block No.00 saved area size 3 saved
N00036 ~ N00039	_P1B00WD4	Device structure	P2P parameter No.1, block No.00 saved area device 4	P2P parameter No.1, block No.00 saved area device 4 saved
N00040	_P1B00WS4	Word	P2P parameter No.1, block No.00 saved area size 4	P2P parameter No.1, block No.00 saved area size4 saved
N00041	_P1B01SN	Word	P2P parameter No.1, block No.01 correspondent station No.	P2P parameter No.1, block No.01’s correspondent station No. saved Use P2PSN command to modify during Run if correspondent station number is used in XG5000.
N00042 ~ N00045	_P1B01RD1	Device structure	P2P parameter No.1, block No.01 area device 1 to read	P2P parameter No.1, block No.01 device area 1 to read saved
N00046	_P1B01RS1	Word	P2P parameter No.1, block No.01 area size 1 to read	P2P parameter No.1, block No.01 area size 1 to read saved
N00047 ~ N00050	_P1B01RD2	Device structure	P2P parameter No.1, block No.01 area device 2 to read	P2P parameter No.1, block No.01 area device 1 to read saved

No.	Keyword	Type	Detail	Description
N00051	_P1B01RS2	Word	P2P parameter No.1, block No.01 area size 2 to read	P2P parameter No.1, block No.01 area size 2 to read saved
N00052 ~ N00055	_P1B01RD3	Device structure	P2P parameter No.1, block No.01 area device 3 to read	P2P parameter No.1, block No.01 area device 3 to read saved
N00056	_P1B01RS3	Word	P2P parameter No.1, block No.01 area size 3 to read	P2P parameter No.1, block No.01 area size 3 to read saved
N00057 ~ N00060	_P1B01RD4	Device structure	P2P parameter No.1, block No.01 area device 4 to read	P2P parameter No.1, block No.01 area device 4 to read saved
N00061	_P1B01RS4	Word	P2P parameter No.1, block No.01 area size 4 to read	P2P parameter No.1, block No.01 area size 4 to read saved
N00062 ~ N00065	_P1B01WD 1	Device structure	P2P parameter No.1, block No.01 saved area device 1	P2P parameter No.1, block No.01 saved area device 1 saved
N00066	_P1B01WS 1	Word	P2P parameter No.1, block No.01 saved area size 1	P2P parameter No.1, block No.01 saved area size 1 saved
N00067 ~ N00070	_P1B01WD 2	Device structure	P2P parameter No.1, block No.01 saved area device 2	P2P parameter No.1, block No.01 saved area device 2 saved
N00071	_P1B01WS 2	Word	P2P parameter No.1, block No.01 saved area size 2	P2P parameter No.1, block No.01 saved area size 2 saved
N00072 ~ N00075	_P1B01WD 3	Device structure	P2P parameter No.1, block No.01 saved area device 3	P2P parameter No.1, block No.01 saved area device 3 saved

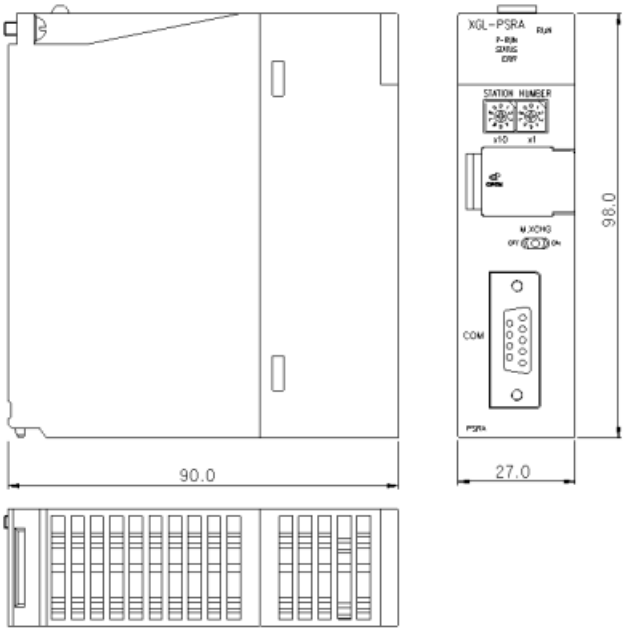
N00076	_P1B01WS 3	Word	P2P parameter No.1, block No.01 saved area size 3	P2P parameter No.1, block No.01 saved area size 3 saved
N00077 ~ N00080	_P1B01WD 4	Device structure	P2P parameter No.1, block No.01 saved area device 4	P2P parameter No.1, block No.01 saved area device 4 saved
N00081	_P1B01WS 4	Word	P2P parameter No.1, block No.01 saved area size 4	P2P parameter No.1, block No.01 saved area size 4 saved

Notes

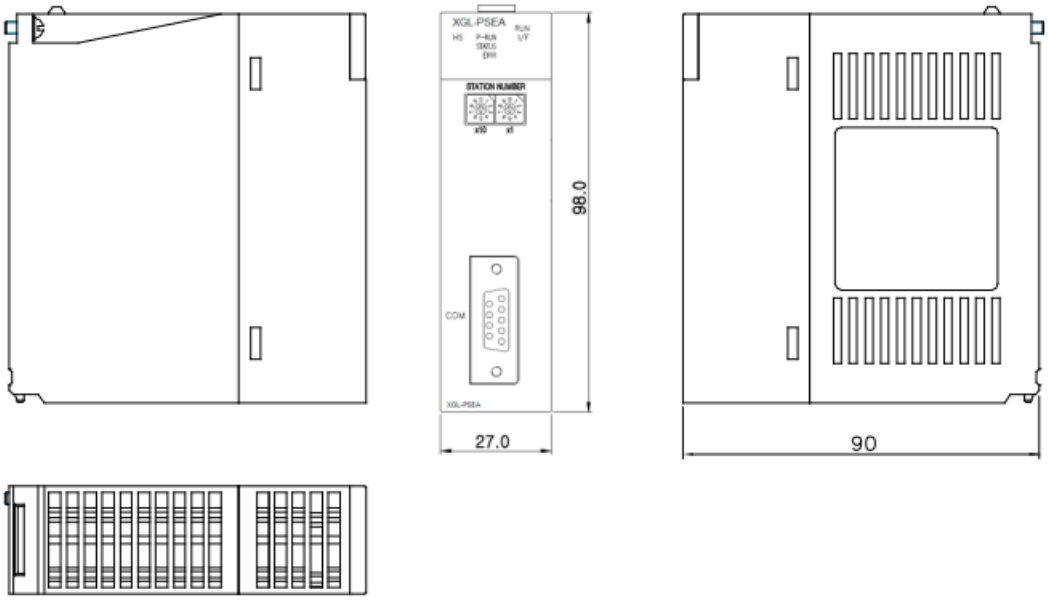
1. If P2P parameters are to be specified with XG5000 used for N area, the setting will be performed automatically. And its modification during Run is also available by P2P dedicated command.
2. Since the addresses of N area available are classified according to P2P parameter setting No. and block index No., the area not used for P2P service can be used as an internal device.

A.2 Dimension

- **XGL-PSEA**



• XGL-PSEA



Warranty

1. Warranty Period

   The product you purchased will be guaranteed for 18 months from the date of manufacturing.

2. Scope of Warranty

   Any trouble or defect occurring for the above-mentioned period will be partially replaced or repaired. However, please note the following cases will be excluded from the scope of warranty.

   (1) Any trouble attributable to unreasonable condition, environment or handling otherwise specified in the manual,

   (2) Any trouble attributable to others' products,

   (3) If the product is modified or repaired in any other place not designated by the company,

(4) Due to unintended purposes

(5) Owing to the reasons unexpected at the level of the contemporary science and technology when delivered.

(6) Not attributable to the company; for instance, natural disasters or fire

3. Since the above warranty is limited to PLC unit only, make sure to use the product considering the safety for system configuration or applications.

Environmental Policy

LS ELECTRIC Co., Ltd supports and observes the environmental policy as below.

Environmental Management	About Disposal
LS ELECTRIC considers the environmental preservation as the preferential management subject and every staff of LS ELECTRIC use the reasonable endeavors for the pleasurably environmental preservation of the earth.	LS ELECTRIC' PLC unit is designed to protect the environment. For the disposal, separate aluminum, iron and synthetic resin (cover) from the product as they are reusable.

Warranty and Environment Policy

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2021.12

Documents / Resources

	LS ELECTRIC XGL-PSRA Pnet Slave I-F Module [pdf] User Manual XGL-PSRA, XGL-PSEA, XGL-PSRA Pnet Slave I-F Module, XGL-PSRA, Pnet Slave I-F Module, Slave I-F Module, I-F Module, Module

References

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