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Programmable Logic Controller

XGB Pnet Slave I/F Module

XGT Series

User's Manual

XBL-PSEA

Safety Instructions

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

http://www.lsis.com

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 maycause 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 oroperation.
- **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 equipments** Read specific instructions thoroughly when conducting control operations with PLC.

Safety Instructions for design process

⚠ 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.

Revision History

Version	Date	Contents	Chapter
V 1.0	’14.11	First edition	-

※ The number of User’s manual is indicated right part of the back cover.

Thank you for purchasing PLC of LSIS 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 (http://www.lsis.com/) and download the information as a PDF file.

Relevant User's Manuals

Title	Description
XG5000 User's Manual (for XGK, XGB)	XG5000 software user manual describing online function such as programming, print, monitoring, debugging by using XGK, XGB CPU
XG5000 User's Manual (for XGI, XGR)	XG5000 software user manual describing online function such as programming, print, monitoring, debugging by using XGI, XGR CPU
XGK/XGB Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions that are used PLC system with XGK, XGB CPU.
XGI/XGR/XEC Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions that are used PLC system with XGI, XGR,XEC 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, IO module, specification of extension cable and system configuration, EMC standard
XGI CPU User's Manual (XGI-CPUU/CPUH/CPUS)	XGI-CPUU/CPUH/CPUS user manual describing about XGI CPU module, power module, base, IO module, specification of extension cable and system configuration, EMC standard
XGR redundant series User's Manual	XGR- CPUH/F, CPUH/T user manual describing about XGR CPU module, power module, extension drive, base, IO module, specification of extension cable and system configuration, EMC standard

Current user manual of XBL-PSEA is written based on the following version.

Related OS version list

Product name	OS version
XBC H Type	V2.40
XBC SU Type	V1.50
XEC SU Type	V1.40
XEC H Type	V1.80
XBM Type	V3.50
XG5000	V4.0

◎ Contents ◎

Chapter 4 Communication Programming

Chapter 5 Profibus-DP Communication

Chapter 6 Installation and Wiring

Chapter 7 Maintenance and Repair

Chapter 8 Trouble Shooting

Appendix

Chapter 1 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 Slave 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 slave I/F module

CHAP.3 System Configuration
Describes the kinds of product available for Pnet slave I/F module and system configuration method

CHAP.4 Communication Programming
Describes common communication program operating method to act Pnet 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/XEC Instruction manual
- XGK CPU manual
- XGI/XGR CPU manual
- XBC Standard/Economic type Main Unit user's manual
- XEC Standard/Economic type Main Unit user's manual
- XGT Pnet I/F module user manual
- XGB Pnet I/F module user manual

Notice

1) This manual is based on XG5000 V4.0.

1.2 Characteristics of Product

1.2.1 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 1~125 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) When using our master module, communication programming is simple
    - Uses high-speed link parameter of GMWIN/KGLWIN/XG5000
(9) Easy I/O configuration by setting high-speed link parameter with XG5000
(10) Online network monitoring function is provided.
    - Available to check the communication state of the communication module through high-speed link monitor
(11) High speed communication
(12) Flexible communication relation by deciding communication speed automatically based on the master speed
(13) The master can enable/disable "Data Swap" and "Diagnostic function"
(14) You can know error information and operating mode of the CPU module through diagnostic function of the master station
(15) Global instructions are supported.
    -Synchronizes I/O data according to Sync, Unsync, Freeze, Unfreeze instruction
(16) Available to be used with diverse CPU modules
    - Available to be used with XBC-U, XBC-H, XBC-SU, XEC-H, XEC-SU, XBM-S and so on XGB CPU modules

1.3 Product configuration

1.3.1 Product Configuration of the Pnet slave I/F module

1) System configuration of the Pnet slave module

Installable CPU	Installation position Note1)	The maximum number of installed modules Note2)	Remarks
XBC-U	Expansion of up to 10-stage	2EA	-
XBC-H	Expansion of up to 10-stage	2EA	-
XBC-SU	Expansion of up to 7-stage	2EA	-
XEC-H	Expansion of up to 10-stage	2EA	-
XEC-SU	Expansion of up to 7-stage	2EA	-
XBM-S	Expansion of up to 7-stage	2EA	-

Notice

[Note 1] The XGB series adopt the connector connection method so the expansion modules can be installed up to 10-stage.
[Note 2] For the XGB CPU series, the additional communication modules can be installed up to 2EA through expansion modules.

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
XBL-PSEA	Communication module for XGB	XG5000

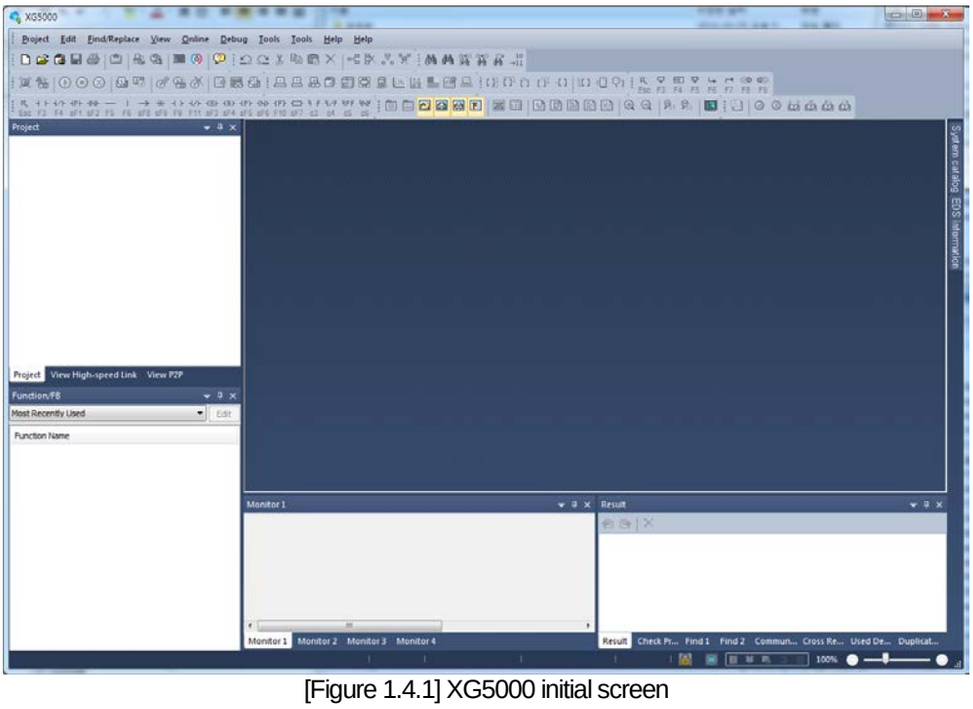
Note

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 : http://www.lsis.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

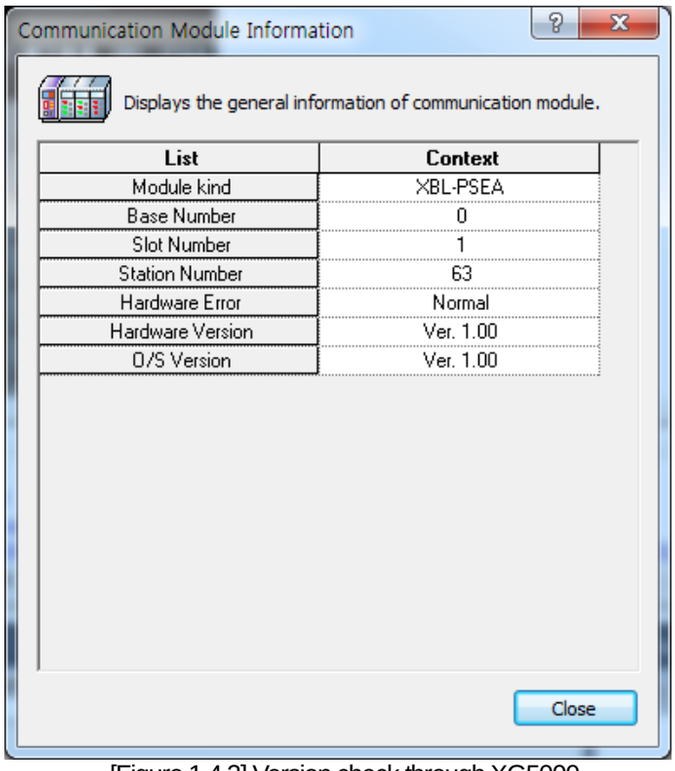
1.4.3 Check of version

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 Slave I/F Module Version Compatibility List

The below table shows the O/S versions list of the CPUs that are compatible with the XGB Pnet slave modules. So for the proper system configuration, make sure to refer to the below table before use. XGK/XGI/XGR can be available for all versions.

Item	Available modules		Remarks
	Model	O/S version	
CPU	XBC-U	More than version 1.00	-
	XBC-H	More than version 2.40	-
	XBC-SU	More than version 1.50	-
	XEC-H	More than version 1.80	-
	XEC-SU	More than version 1.40	-
	XBM-S	More than version 3.50	-
PADT	XG5000	More than version 4.0	-
Communication Master	G3/4/6L-PUEA/B	More than version 1.0	-
	XGL-PMEA/C	More than version 1.0	-
	XBL-PMEC	More than version 1.0	-

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 temperature 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 the 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 vibration 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 panel.
EMC Environment	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 potential

Chapter 2 Product Specifications

2.1 General Specifications

General specifications of XGT series are as specified below in Table 2.1.

<table>
<tr><th>No.</th><th>Item</th><th colspan="6">Specification</th><th>Related specifications</th></tr>
<tr><td>1</td><td>Operating temp.</td><td colspan="6">0℃～+55℃</td><td>-</td></tr>
<tr><td>2</td><td>Storage temp.</td><td colspan="6">-25℃～+70℃</td><td>-</td></tr>
<tr><td>3</td><td>Operating humidity</td><td colspan="6">5～95%RH, no dew allowed</td><td>-</td></tr>
<tr><td>4</td><td>Storage humidity</td><td colspan="6">5～95%RH, no dew allowed</td><td>-</td></tr>
<tr><td rowspan="8">5</td><td rowspan="8">Vibration immunity</td><td colspan="4">For discontinuous vibration</td><td colspan="2">Number</td><td>-</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td><td colspan="2" rowspan="6">Each 10 times in X,Y,Z directions</td><td rowspan="6">IEC61131-2</td></tr>
<tr><td>5≤f< 8.4Hz</td><td colspan="2">-</td><td>7.5mm</td></tr>
<tr><td>8.4≤f≤150Hz</td><td colspan="2">9.8㎨ (1G)</td><td>-</td></tr>
<tr><td colspan="4">For continuous vibration</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td></tr>
<tr><td>5≤f< 8.4Hz</td><td colspan="2">-</td><td>3.5mm</td></tr>
<tr><td>8.4≤f≤150Hz</td><td colspan="2">4.9㎨ (0.5G)</td><td>-</td></tr>
<tr><td>6</td><td>Impact immunity</td><td colspan="6">* Max. impact acceleration: 147㎨ (15G)
* Authorized time: 11㎳
* Pulse wave : Sign half-wave pulse
(Each 3 times in X,Y,Z directions)</td><td>IEC61131-2</td></tr>
<tr><td rowspan="4">7</td><td rowspan="4">Noise immunity</td><td>Square wave impulse noise</td><td colspan="5">AC: ±1,500V
DC: ±900V</td><td>Test specification of LS Industrial Systems</td></tr>
<tr><td>Static electric discharging</td><td colspan="5">Voltage: 4kV (Contact discharge)</td><td>IEC 61131-2, IEC 61000-4-2</td></tr>
<tr><td>Radiation electromagnetic field noise</td><td colspan="5">80 ~1,000MHz, 10 V/m</td><td>IEC 61131-2, IEC 61000-4-3</td></tr>
<tr><td rowspan="2">Fast Transient /burst noise</td><td>Class</td><td colspan="2">Power Supply</td><td colspan="2">Digital/Analog I/O communication interface</td><td rowspan="2">IEC 61131-2, IEC 61000-4-4</td></tr>
<tr><td>Voltage</td><td colspan="2">2kV</td><td colspan="2">1kV</td></tr>
<tr><td>8</td><td>Ambient conditions</td><td colspan="6">No corrosive gas or dust</td><td>-</td></tr>
<tr><td>9</td><td>Operating height</td><td colspan="6">2,000m or less</td><td>-</td></tr>
<tr><td>10</td><td>Pollution level</td><td colspan="6">2 or less</td><td>-</td></tr>
<tr><td>11</td><td>Cooling type</td><td colspan="6">Natural air cooling</td><td>-</td></tr>
</table>

Table 2.1 General Specifications

Remark

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

2.2 Performance Specifications

Performance specifications of Pnet I/F module are as described below.

Item	Details	
Module Type	Slave	
Network Type	Profibus-DP	
Standard	EN50170/DIN19245	
Interface	RS-485 (Electric)	
Media access	Polling	
Topology	Bus type	
Modulation Type	NRZ (Non Return to Zero)	
Protocol	Profibus DP-V0	
Max. Distance & Send Speed	Distance (m)	Send Speed (bps)
	1,200	9.6k/19.2k/93.7k/187.5k
	400	500k
	200	1.5M
	100	3M/6M/12M
Max. number of stations per segment	32 (including master & repeater)	
Station	1~125	
Cable used	Electric-twist shielded pair cable	
Max. Communication size	Input : 122 Word Output : 122 Word	
Max. Communication size per block	Input : 64 Word Output : 64 Word	
Communication Send cycle	10/20/50/100/200/500ms, 1/5/10s	
Communication Receive cycle	Main unit scan ×2 + Data receive time + Communication module scan	
Max. number of units installed	2 units	
Communication Parameters to set	XG5000(setting station and high-speed link parameter block)	
Internal-consumed current (mA)	250	
Weight (g)	85 (Including connector 122)	

[Table 2.2.1] Performance Specifications

Remark

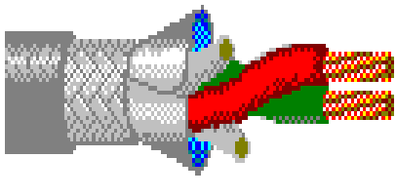
Note 1) High-speed link communication period
Communication period means the cycle of sending data to the XBL-PSEA from the basic unit and it's independent of the cycle of sending to the base unit from the XBL-PSEA. When sending High-speed link data to the XBL-PSEA from the basic unit, it takes 25us to sending serial-based byte data. Therefore, if the data size is large, it may be updated later than the period that has been set.
Note 2) The maximum number of can be installed per basic unit
In case of install two communication modules to the basic unit, it guarantees minimum 20ms High-speed link period type due to influence of sending speed.

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	8500pF/ft
Characteristic impedance	150 Ω
Core count.	2 Core



2) Connector's structure and connector wire method

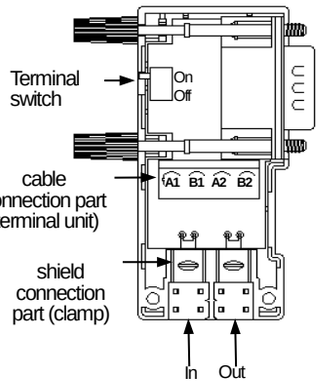
(1) Input wire: green line is connected to A1, red line is connected to B1.

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

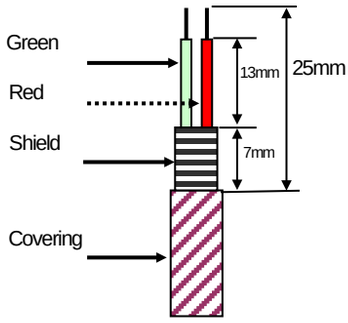
(3) Shield is connected to connector's clamp.

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

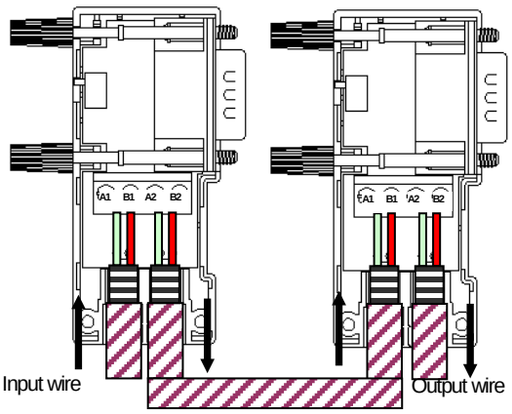
<connector structure>



<cable structure>



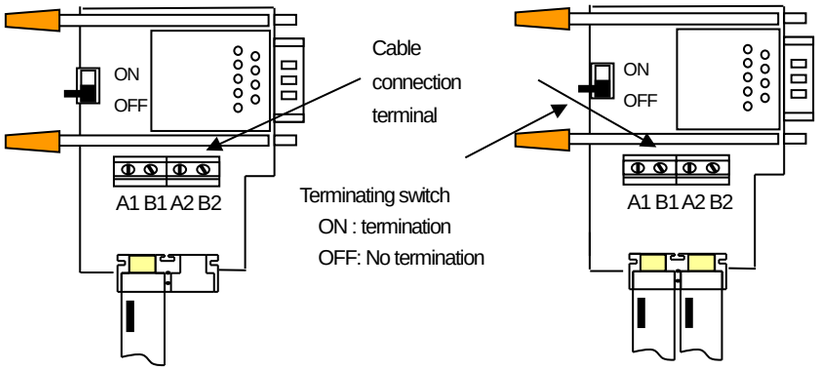
<connector wire method>



2.4 Terminating

2.4.1 Pnet Terminating

- Connection Connector



<Terminal connection>

<Branch connection>

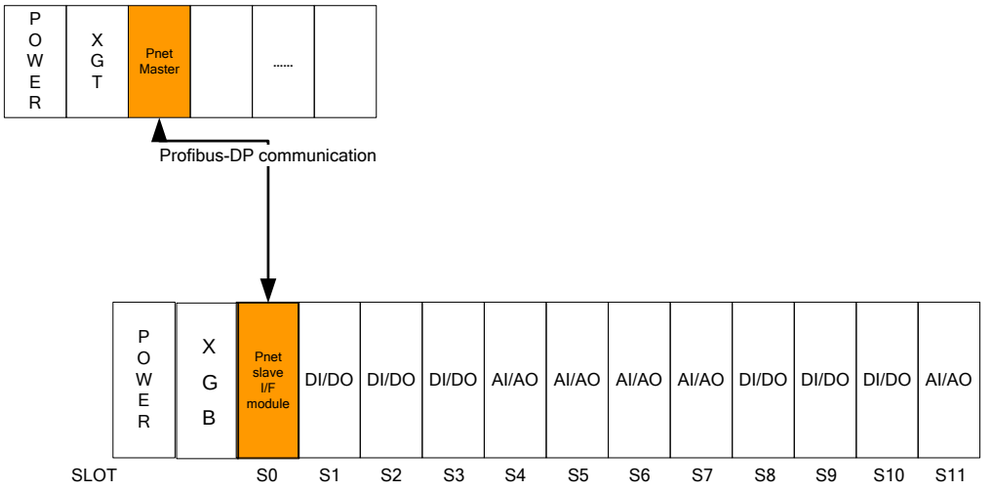
Chapter 3 System Configuration

The Pnet Slave I/F module has various kinds of products for system configuration. This chapter describes the configurations and characteristics of each system.

3.1 Names of parts of the XGB Pnet Slave I/F module

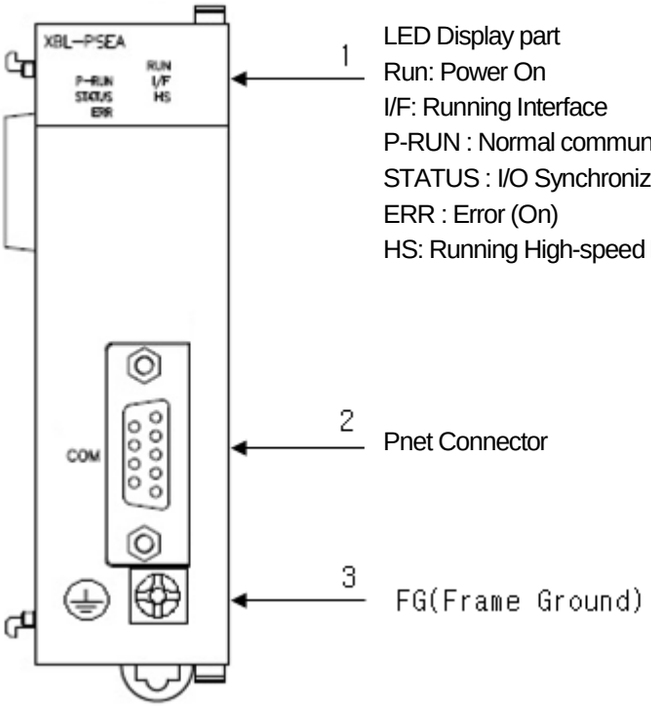
3.1.1 Basic System Configuration

The CPU controls expanded I/O modules with the send and receive data of Slave modules and Master modules.



3.1.2 Names and Roles of Each Part

1) Pnet Slave I/F module



1 LED Display part
Run: Power On
I/F: Running Interface
P-RUN : Normal communication(On)
STATUS : I/O Synchronization(On)
ERR : Error (On)
HS: Running High-speed Link

2 Pnet Connector

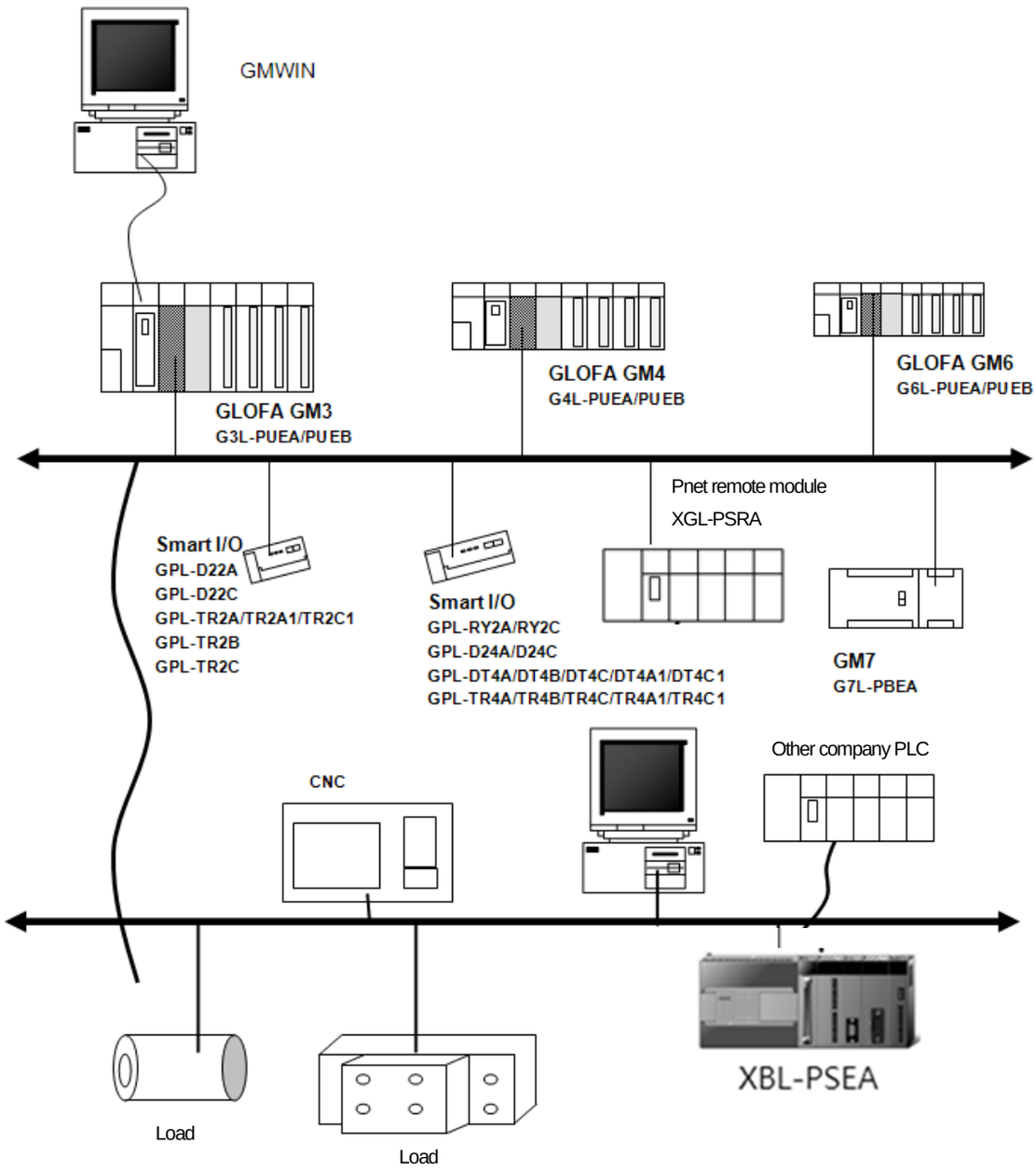
3 FG(Frame Ground)

2) Details displayed on the LED

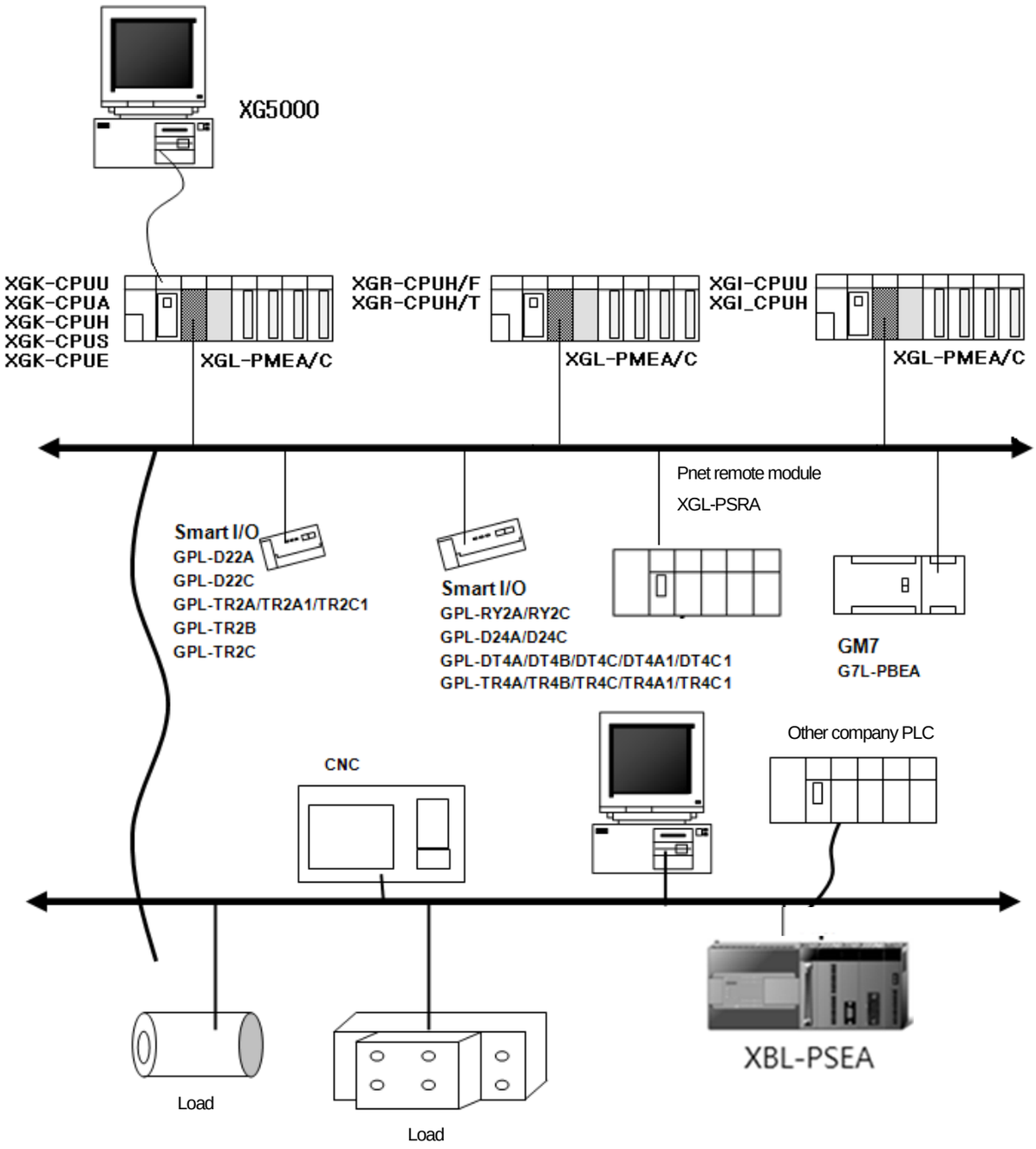
No.	Name	Normal	Abnormal	Details displayed on the LED
1	RUN	On	-	Initialization is completed and it works normally. (Normal operation of system O/S)
		-	Off	Major failures occur. (Malfunction of OS caused by H/W problems)
2	P-RUN	On	-	Master and data communication work normally.
		-	Off	In case it is not connected to the Master and data communication does not work.
3	STATUS	On	-	In case communication works normally since the Master's system configuration matches up with the Slave's I/O configuration.
		-	Off	In case communication does not work normally since the Master's system configuration does not match up with the Slave's I/O configuration.
4	IF	Flickering	-	The CPU module and interface work normally.
		-	Off	The CPU and interface do not work.
5	HS	On	-	In case the high-speed link parameters downloaded from the XG5000 are normally set and the high-speed link is Enable.
		-	Off	In case the high-speed link parameters downloaded from the XG5000 are incorrectly set or do not exist or the high-speed link is Disable.
6	ERR	Off	-	In case there is no error factor.
		-	Flickering	In case communication does not work normally.

3.2 System Configuration Example

3.2.1 Pnet System (GMWIN)



3.2.2 Pnet system (XG5000)



Chapter 4 Communication Programming

4.1 How to Set Master Module

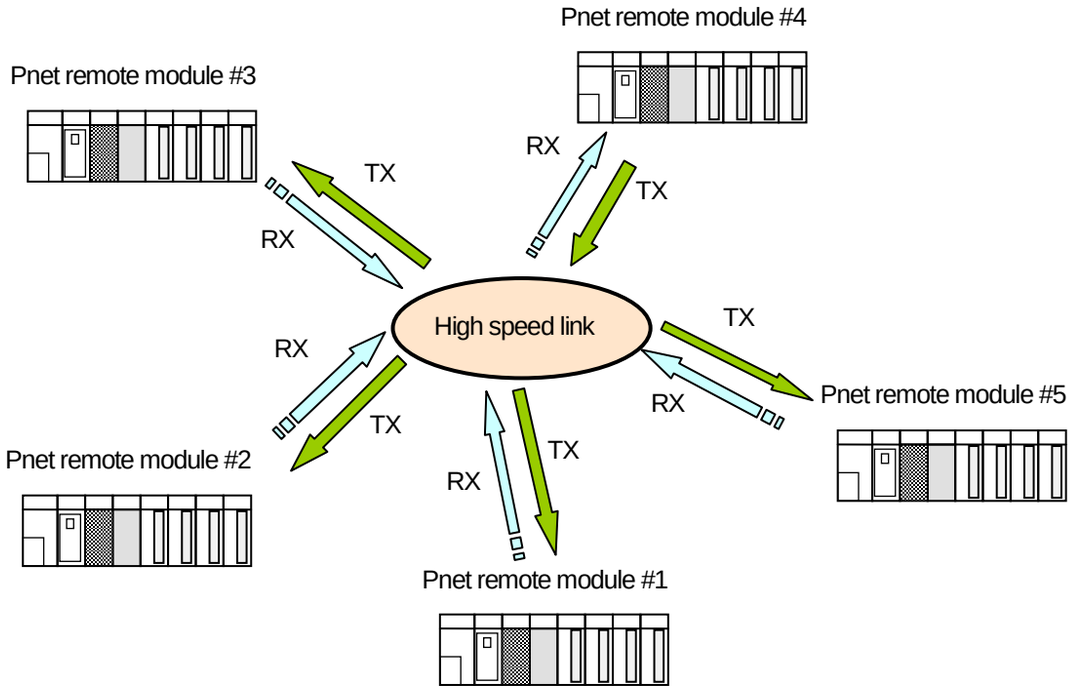
Describes how to set master module to use Pnet remote module
For more detail, refer to master module's user manual.

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 Link parameter Setting

If you use LSIS's master module, you can easily and simply set up the send and receive device area and data size between CPU modules the communication modules(master module and slave module).

1) Details of setting the Pnet high-speed link

Details		High-speed link		
Communication module setup	Communication module setup	Module type	XGL-PMEA/PMEC, XBL-PMEC	
		Base No.	Maximum: 0 ~ 7(The setting range may be different depending on the CPU modules.)	
		Slot No.	Maximum: 0 ~ 11(The setting range may be different depending on the bases and CPU module types.)	
	Communication cycle setup (Cycle types)	Select among 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s(It depends on the master module types) -The default value is 20ms.		
	Setup of output data in case of emergency	CPU Error	Latch	Maintains the previous output state.
			Clear	Clears all outputs.
		CPU STOP	Latch	Maintains the previous output state.
			Clear	Clears all outputs.
	Mode	Send: Transmits the data to the salve module from the master module. Receive: Transmits the data to the master module from the slave module.		
	Station No.	Slave station No. (range: 1 ~ 125)		
	Area to be read (master module → slave module)	Address	Start address of the device to be sent Available devices: P, M, K, F, T, C, U, Z, L, N, D, R, ZR	
		Size (Byte)	Displays the number of I/O points of the slave module as byte. -The I/O module of less than 8 bit is processed as 1 byte.	
	Area to be saved (slave module → Master module)	Address	Start address of the device to received Available devices: P, M, K, F, T, C, U, Z, L, N, D, R, ZR	
		Size (Byte)	Displays the number of I/O points of the slave module as byte. -The I/O module of less than 8 bit is processed as 1 byte.	
PLC connection		RS-232C or USB port of the CPU module		
Control conditions		Controllable regardless of the position of the CPU module's operation mode switch (RUN, STOP)		
Maximum I/O size per slave		send: 1952 points, receive: 1952 points, respectively 244 byte		
Maximum number of blocks		64 EA(1EA per salve)		
Maximum data size per block		64 words		
Number of configurable high-speed links		XGL-PMEA/PMEC: Up to 12EA XBL-PMEC: Up to 2EA		

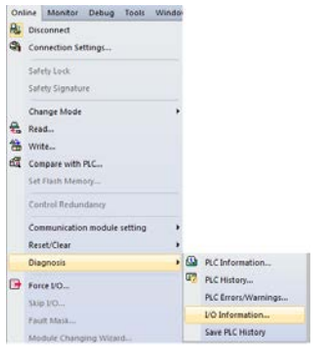
02) How to use XG5000

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

Execute XG5000

(a) I/O Synchronization
1) Change PLC to stop mode
2) Select Online → Diagnosis → I/O Info.
(b) Select I/O synchronization on I/O info. Windows.

Information of Pnet I/F module

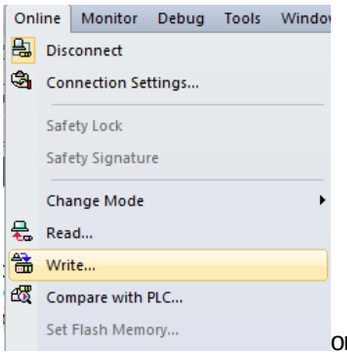


(b) High-speed Link Setting
1) Communication module setting
a) Communication module setting: Pnet
- Type of module, Base, Slot
b) Communication period setting
c) Data setting when emergency.
- CPU module error, CPU module stop
2) Block setting
- Online → SyCon Upload
- Read area/Save area setting

1) Connect Pnet I/F module read from I/O information with High-speed Link.
2) Read system information set by SyCon.
3) Designate device and address used in program to connect I/O point about the slave module which is composed in SyCon with PLC program.

(c) Write Parameter

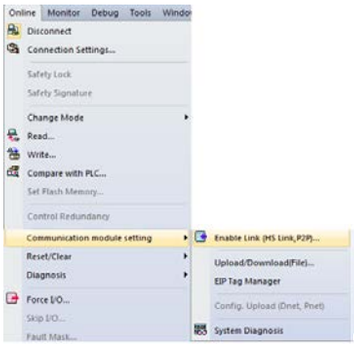
Write High-speed Link parameter to Pnet I/O Module



or 

(d) Enable Link

Enable Pnet I/F module's communication.



or 

4.1.3 High-speed Link communication status flag information

Communication Flag List corresponding to High-speed Link Number High-speed Link No.1, 2

No.	Keyword	Type	Contents	Contents Explanation
L000000	_HS1_RLINK	Bit	All stations of High-speed Link No.1 are normal.	It indicates normal status of all stations which operate according to parameter set in the High-speed Link. If the following condition is met, It would be turned On. 1. All stations set in parameter are RUN mode and there is no Error. 2. All data blocks set in parameter operate properly. 3. When parameter of each station in parameter communicates normally, after Run_Link is On, Run_Link maintains On continuously unless quitted by disable.
L000001	_HS1_LTRBL	Bit	Indicates abnormal After _HS1RLINK ON	When _HSmRLINK Flag is On, if station set in parameter and communication status is same as the followings, this 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 parameter is not proper. If above condition is met, Link_Troble set On. If condition is normal, Link_Troble set Off.
L000020 ~ L00009F	_HS1_STATE[k] (k=000~127)	Bit Array	Indicates High-speed Parameter No.1 Kth Block's total status	It indicates total status about each data block set in parameter. HS1STATE[k]=HS1MOD[k]&_HS1TRX[k]&(~_HSmERR[k])
L000100 ~ L00017F	_HS1_MOD[k] (k=000~127)	Bit Array	Run Mode of High-speed Parameter No.1 Kth Block	It indicates operation mode of station set in Kth block of parameter.
L000180 ~ L00025F	_HS1_TRX[k] (k=000~127)	Bit Array	Indicates normal Communication status with High-speed Parameter No.1 Kth Block	It indicates whether communication status of parameter's Kth data block operates normally or not according to setting.
L000260 ~ L00033F	_HS1_ERR[k] (k=000~127)	Bit Array	Error Mode of High-speed Parameter No.1 Kth Block	It indicates whether communication status of parameter's Kth data block has error or not.
L000340 ~ L00041F	_HS1_SETBLOCK[k]	Bit Array	Indicates setting of High-speed Parameter No.1 Kth Block	It indicates whether Kth data block of parameter is set or not.

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

Note

High-speed Link Number	L Region Address Number	Reference
2	L000500~L00099F	When [Table 1]'s High-speed Link is 1, other Flag address number is as follows according to simple calculation. ∗Calculation: L region address number = L000000 + 500 X (High-speed Link Number-1) In the case of using the High-speed Link Flag for the program and monitoring, use Flag Map registered in the 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	

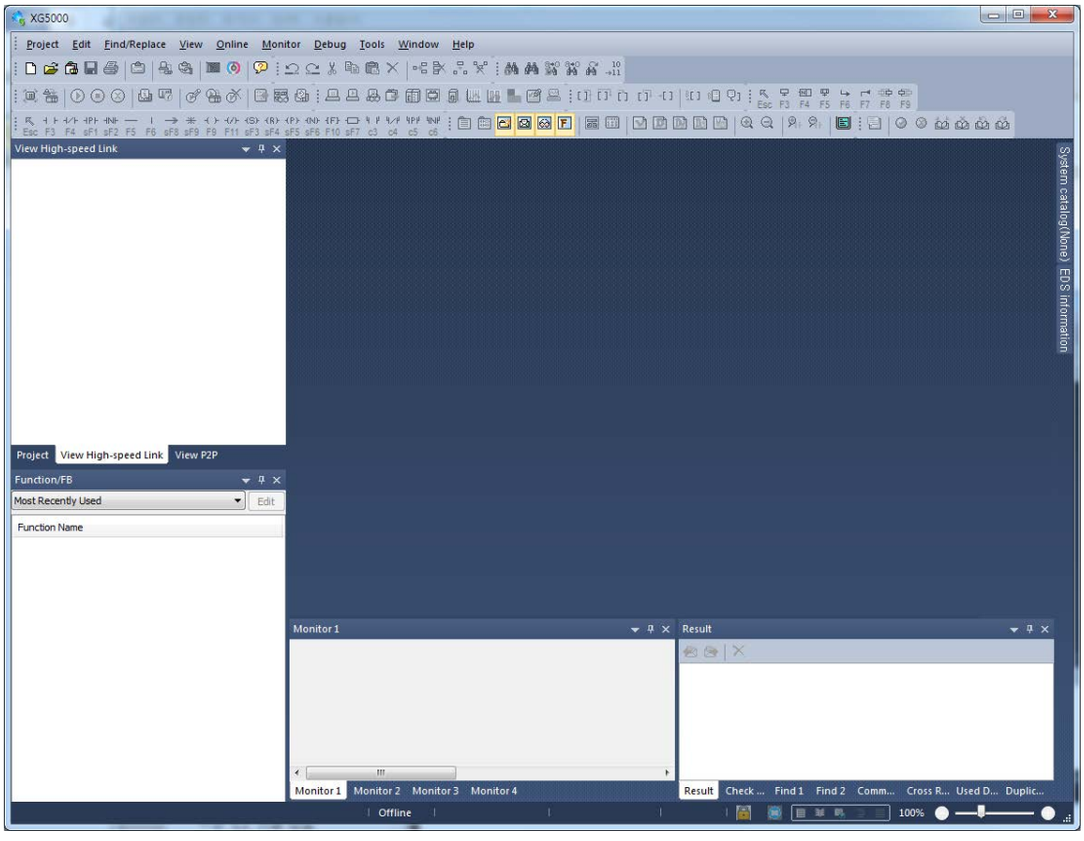
K indicates information about 128 Blocks from Block No.000 to 127 through 8 word (Each word consist of 16 block.). For example, mode information (_HS1MOD) has information about block 0 ~15 in the L00010. (16~31, 32~47,48~63, 64~79, 80~95, 96~111, 112~127 in the L00011, L00012, L00013, L00014, L00015, L00016, L00017) So block no. 55's mode information in the L000137

4.2 How to set up the XGB Pnet slave I/F module's parameters

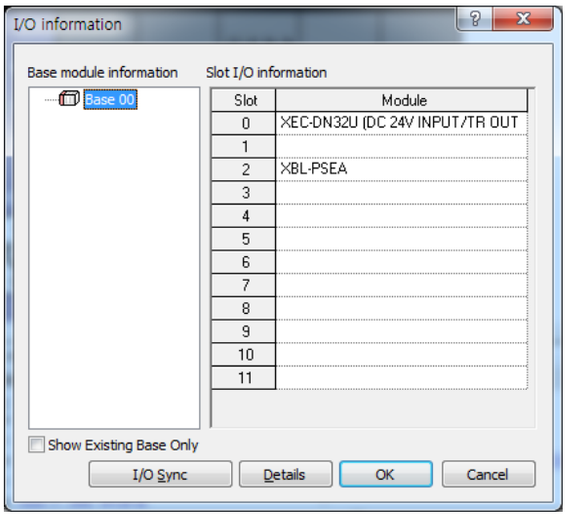
In order to apply the Pnet slave I/F module, you need to register the high-speed link parameters by using XG5000.

4.2.1 Setup of high-speed link parameters

If you make a new project by running XG5000, the below window will show up.

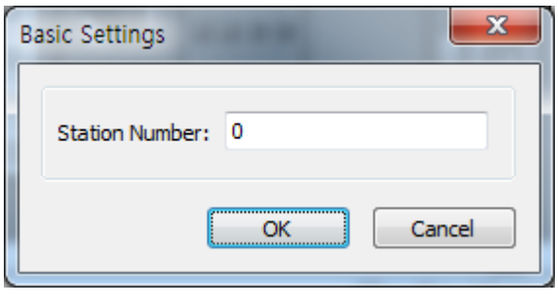


When you select "Online"→"diagnosis"→"I/O information" in the project window, the I/O information window will show up as below.

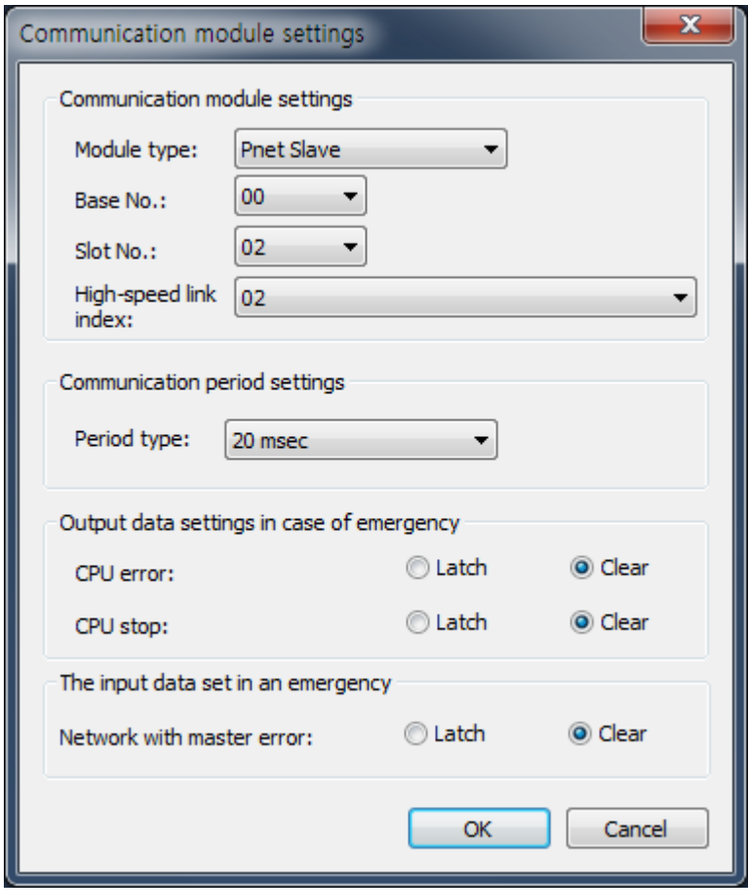


If you select 'I/O synchronization' and press the OK button, communication modules will be added.

Double-click 'Pnet Slave' in the basic network window and input the station No. as below.



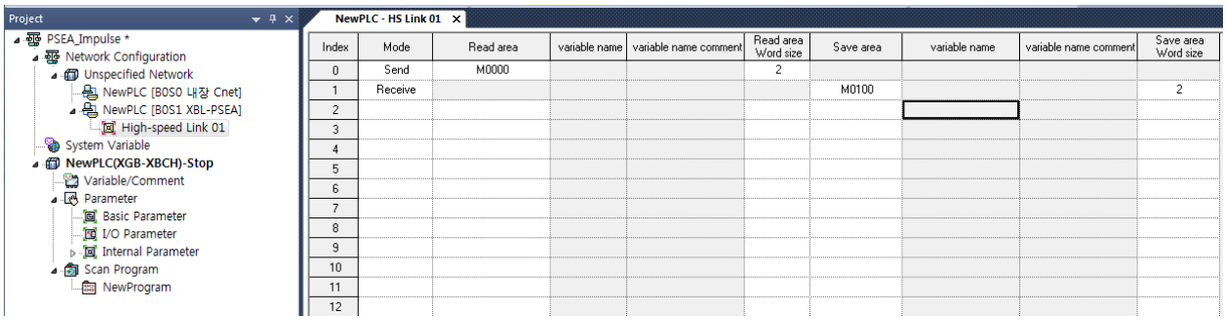
If you select "Network Configuration"→"Basic Network"→ Click with the right mouse button in "XBL-PSEA" →"Add Items"→"high-speed link communication" in the project window, the below window for setting communication modules will show up. In the communication module setup window, you can set up the communication cycle, I/O data in case of emergency.



Notice

The item of input data setup in case of emergency works normally only when the XBL-PSEA's watchdog is Enable. If the watchdog is Disable, the XBL-PSEA acts as Latch in case of master and communication errors.

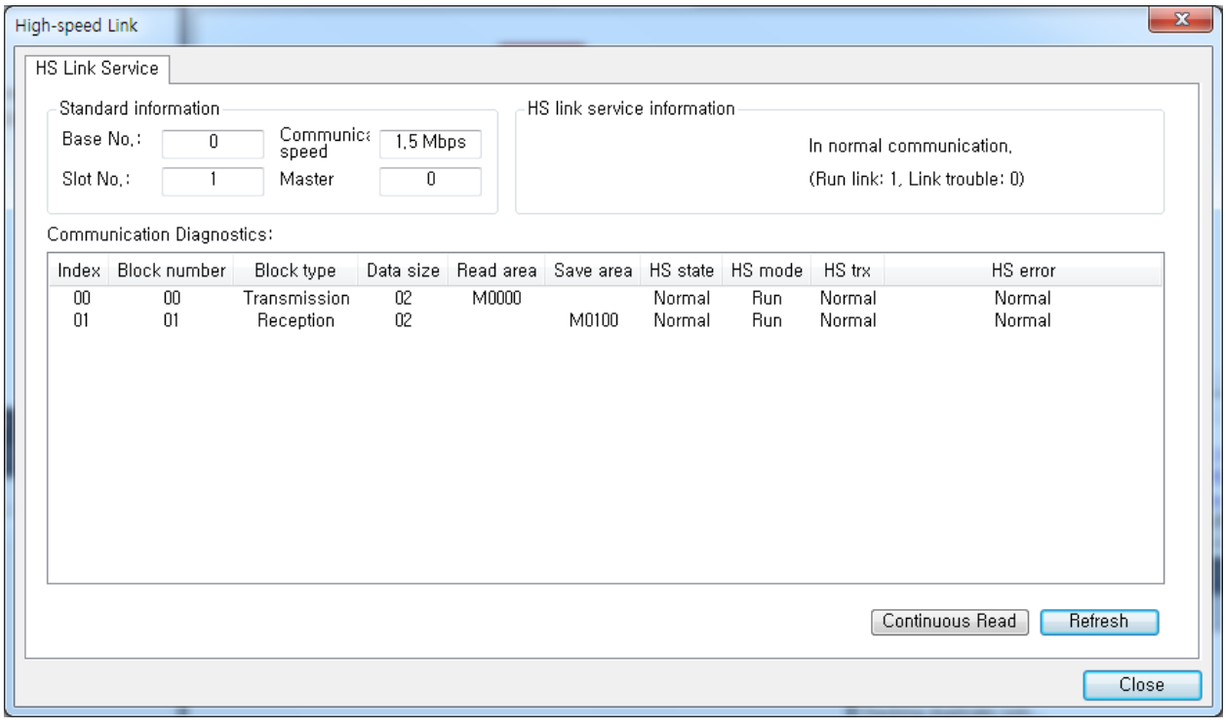
Double-click “Network Configuration”→“Basic Network”→ high-speed link of “XBL-PSEA” in the project window to set up high-speed link communication items.
The below figure shows you how to set up the block in case of send 2 word data of M0000 and receive 2 word data of M0100.



Index	Mode	Read area	variable name	variable name comment	Read area Word size	Save area	variable name	variable name comment	Save area Word size
0	Send	M0000			2				
1	Receive					M0100			2
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

4.2.2 Diagnosis of high-speed link communication state

You can check the Pnet slave I/F module's data communication state through the communication module's LED.
If you want to monitor the high-speed link data of each block in detail, select "Online"→"Communication Module Setup"→"System Diagnosis". Then, if you click the high-speed link service in the system monitor window, you can monitor the information of each block as below.

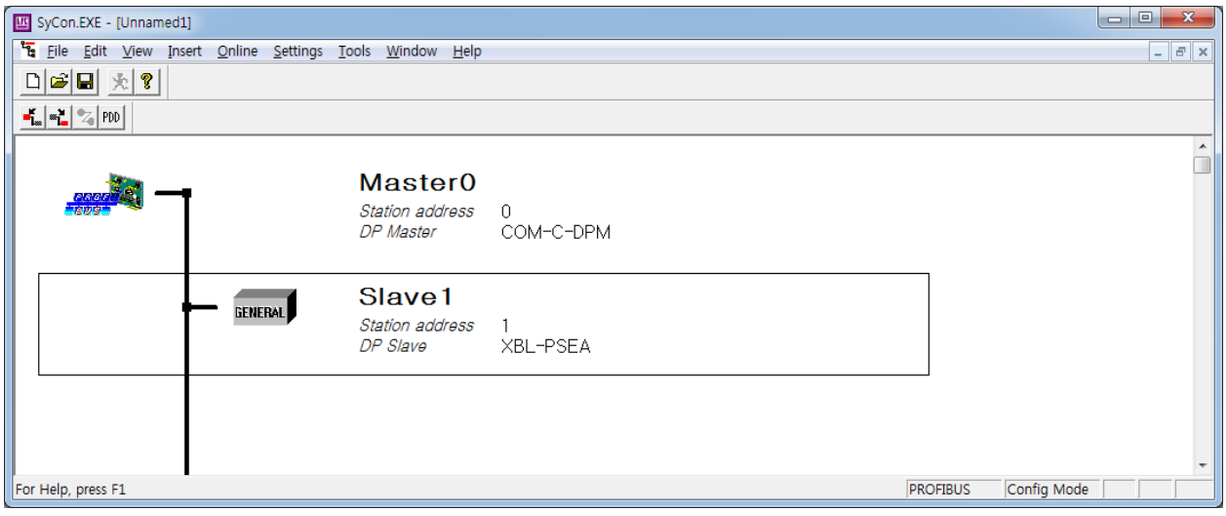


4.2.3 Setup of SyCon parameters

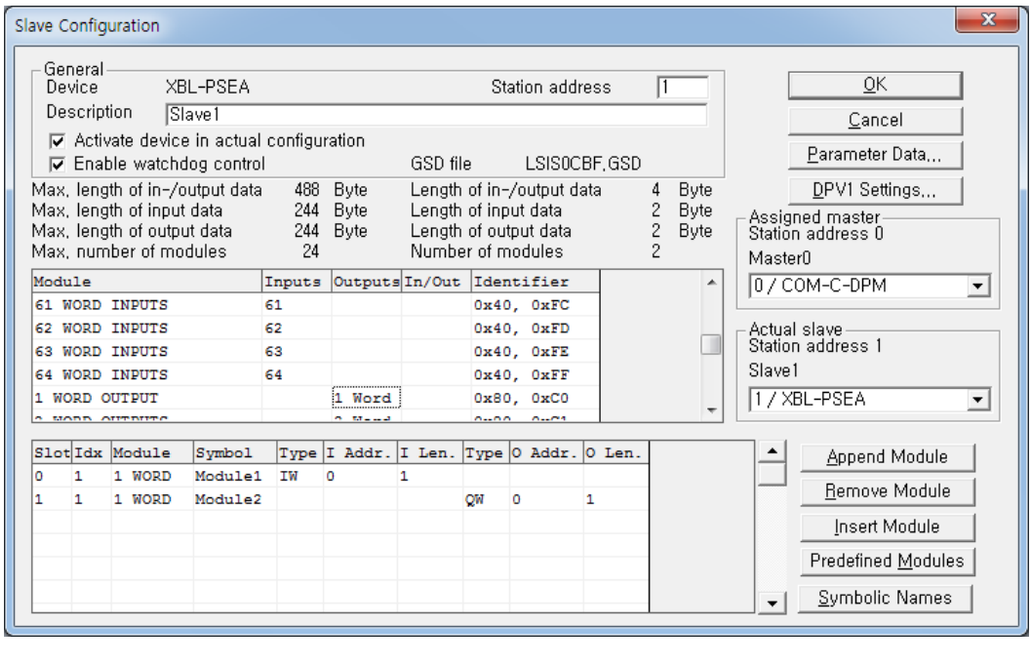
It is the function to set up parameters of the slave module by using SyCon.

1) Setup of module parameters

Double-click the slave in the main screen of SyCon as below.



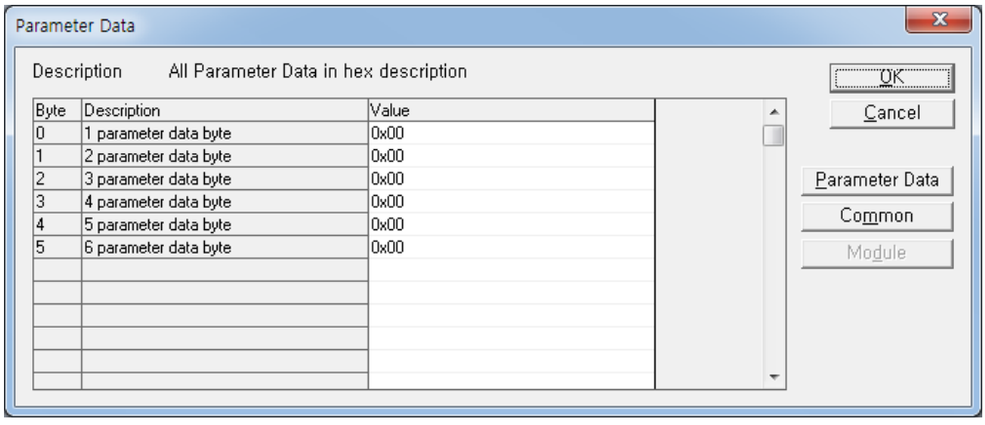
The configuration window of the slave station will show up as below.



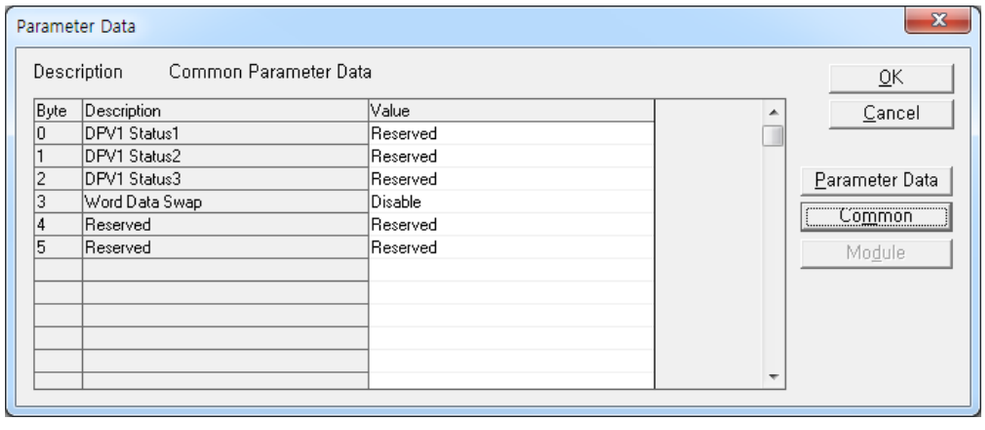
If you select the available modules from the list box in the middle and click the “Append Module” button in the bottom-right, the modules will be inserted to the below list box. The maximum number of available modules is 24EA. You need to set up the modules in accordance with the high-speed link blocks set in XG5000.

2) Setup of slave parameters

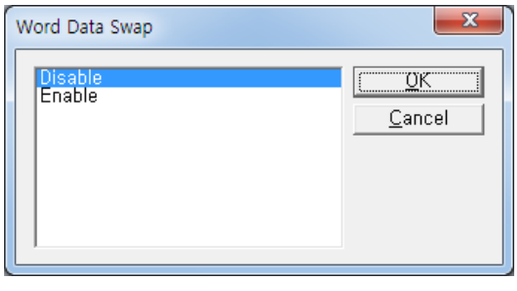
If you click “Parameter Data” in the configuration window to set up the slave station’s parameters, the parameter data window will show up.



The parameter data is all composed of 6 byte. To verify the meaning of each parameter by items, click the “Common” button. 0~2 byte that are the parameters related to DP-V1 are not available since they are not supposed by the current version.



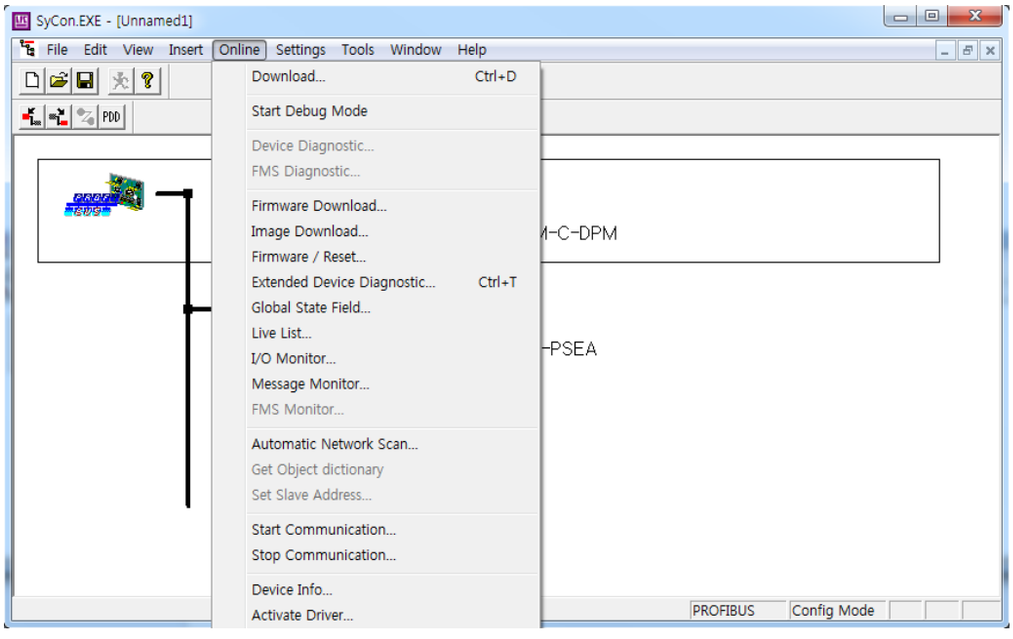
3 byte is the parameter related to Word Data Swap. Double-click the Disable item in order to change the state from Disable into Enable. The Disable state is based on Little Endian and the Enable state is based on Big Endian.



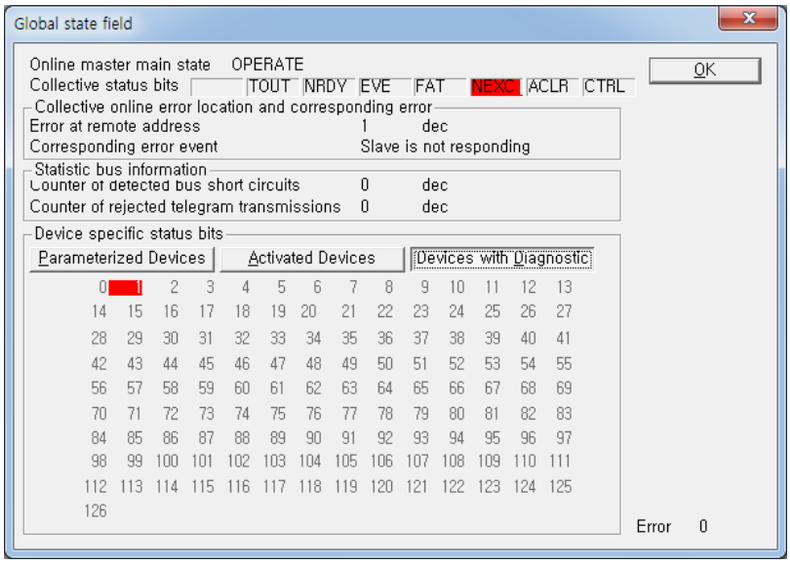
If you select Enable and click the OK button, the Word Data Swap function will enable. In this state, the lower and upper values of data are switched and receive/send in units of word.
If parameters setup is completed, download the parameters to the Pnet master module to apply the set parameters.

3) Slave diagnosis monitoring

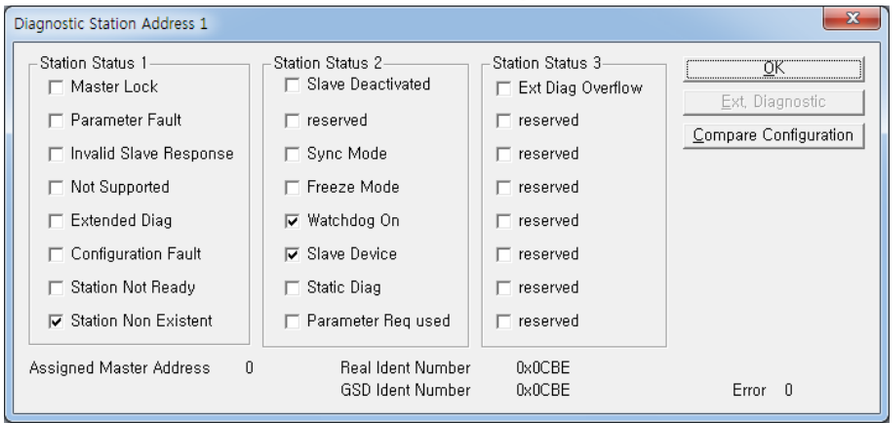
When the diagnostic parameters are set as Enable, in case operation mode of the CPU module where the slave module is embedded is not in RUN state or the CPU module is in error state, you can execute 'Online – Global State Field' in the SyCon menu to diagnose the slave station. The data communication goes on even under diagnosis state.



If you click the "Devices With Diagnostic" button in the Global State Field window, the slave station with the diagnosis information will show up as below. Click the relevant slave station.



Then, the information window for slave station diagnosis shows up, indicating Extended Diagnostic has occurred.



4) Sync, Freeze Operations

XBL-PSEA supports Sync and Freeze commands with global commands in accordance with the Profibus-DP standard. You can use the Sync and Freeze functions by using the master that supports Sync and Freeze commands.

- Sync command: It is used to synchronize the output data of the slave station with the master. When the slave station receives the Sync command from the master, it maintains the output data last received as the current one. The slave repeats this process every time it receives the Sync command from the master and then, the output data will be synchronized in accordance with the Sync command. Then, the master sends the Unsync command to cancel the slave's Sync operation.

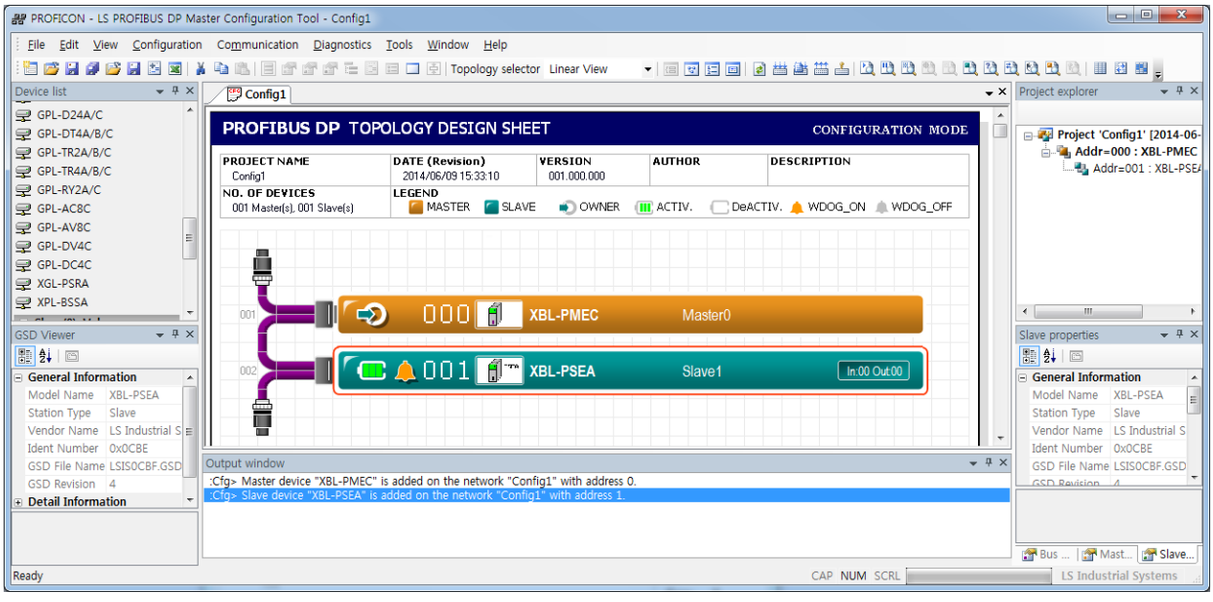
- Freeze command: It is used when you want to read the temporary value of the slave station's input data in the master. If the slave station receives the Freeze command, it maintains the input data of the time as the input data. Although the actual input data changes, it maintains the input data of the time when receiving the Freeze command and it repeats this process every time it receives the Freeze command. The master cancels the Freeze state by using the UnFreeze command.

4.2.4 Setup of PROFICON parameters

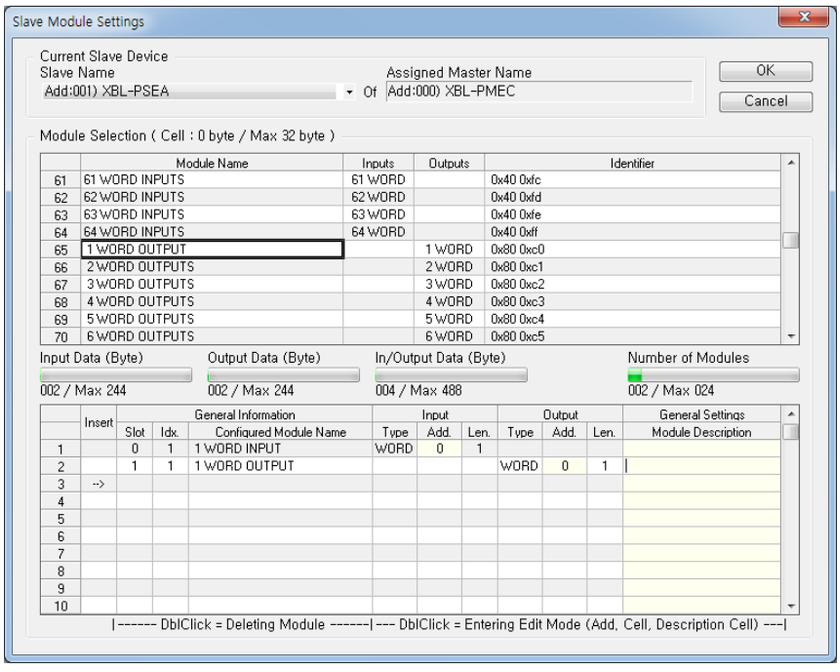
It is the function to set up the slave module's parameters by using the SyCon.

1) Setup of module parameters

Double-click the slave in the main screen of PROFICON as below.



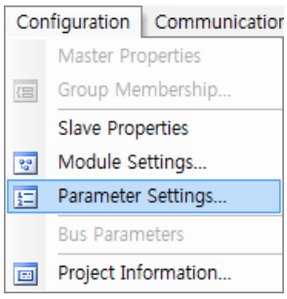
The configuration window of the slave station will show up as below.



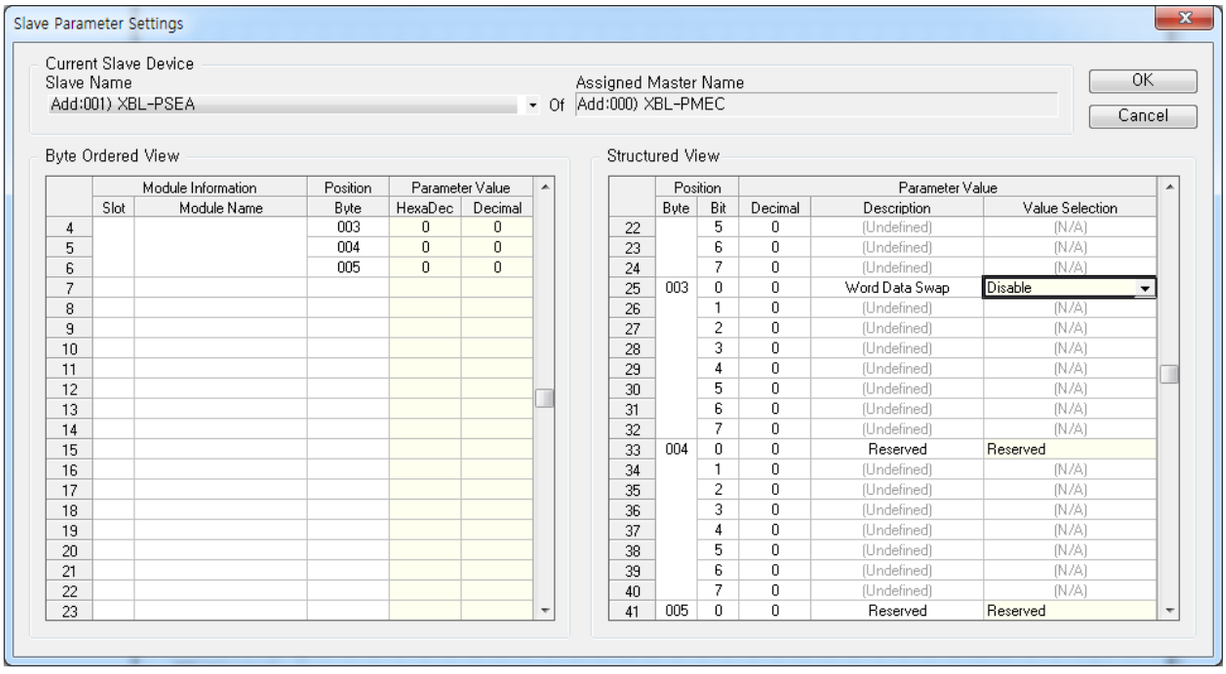
If you double-click the modules to use from the Module Selection box in the middle, the modules will be inserted to the below list box. The maximum number of available modules is 24EA. You need to set up the modules in accordance with the high-speed link blocks set in XG5000.

2) Setup of slave parameter

If you click “Configuration -> Parameter Settings...”after selecting the slave in the main screen to set up the slave station’s parameters, the parameter setup window will show up.



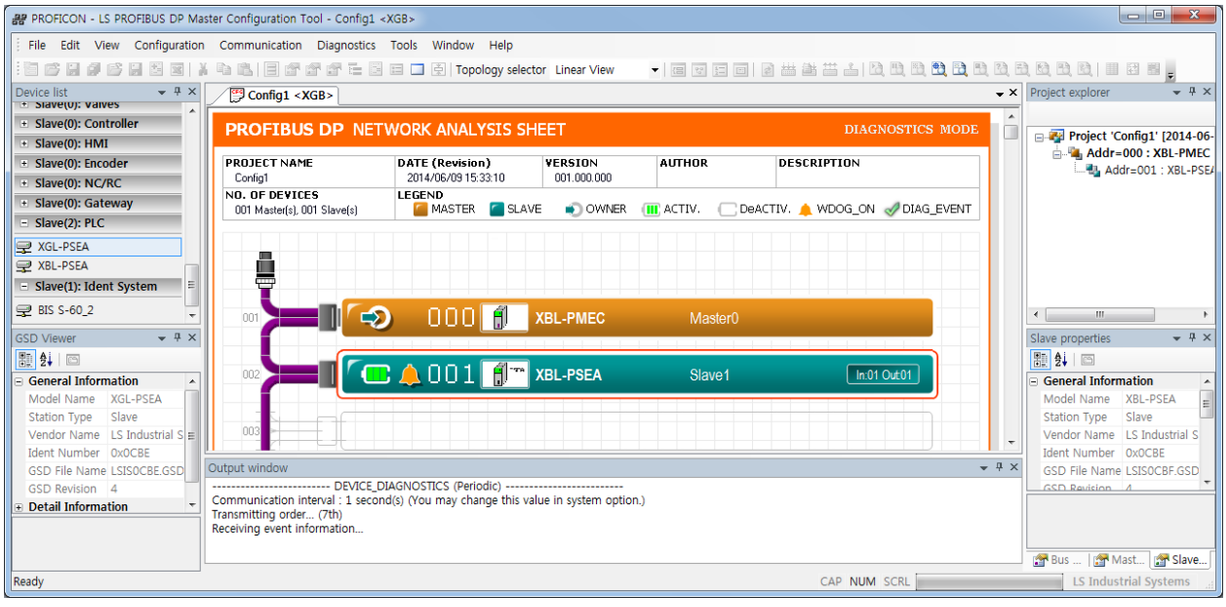
The parameter data is all composed of 6 byte. 0~2 byte that are the parameters related to DP-V1 are not available since they are not supposed by the current version.
3 byte is the parameter related to Word Data Swap. Double-click the Disable item in order to change the state from Disable into Enable. The Disable state is based on Little Endian and the Enable state is based on Big Endian.



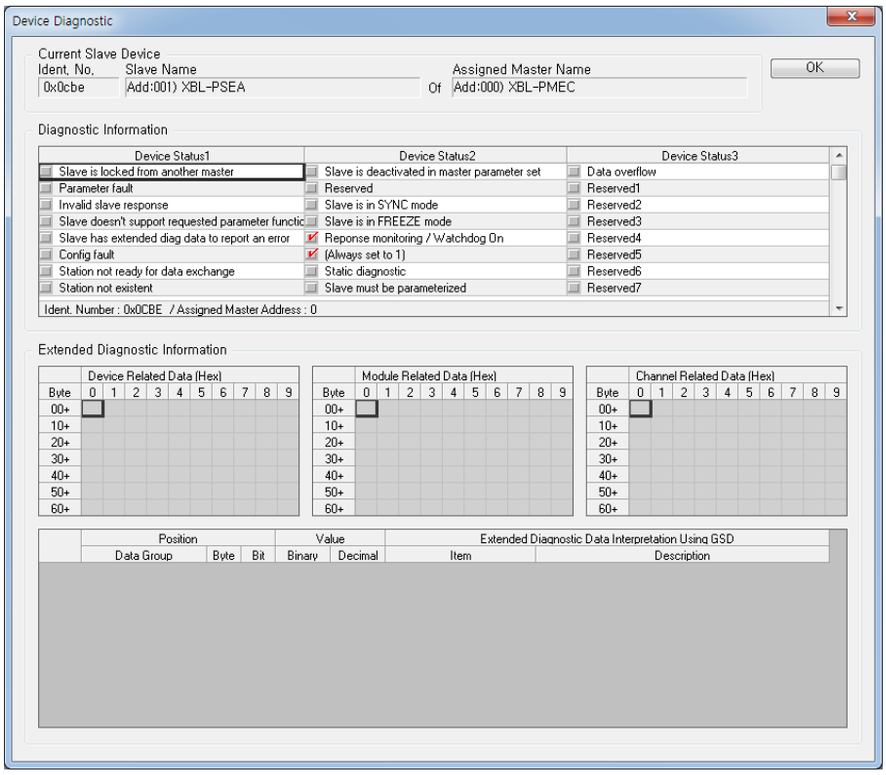
If parameters setup is completed, download the parameters to the Pnet master module to apply the set parameters.

3) Slave diagnosis monitoring

When the diagnostic parameters are set as Enable, in case the main screen is under “DIAGNOSTICS MODE” as below by executing “Diagnostics -> Start Debug Mode” of the PROFICON, you can diagnose the salve’s station. The data communication goes on even under diagnosis state.



If you double-click the slave in the main screen of “DIAGNOSTICS MODE”, the diagnosis window will show up as below.



Chapter 5 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.

The communication of the Pnet slave I/F module supports Profibus-DP through GM3/4/6, XGT master module.
(G3L-PUEA, G3L-PUEB, G4L-PUEA, G4L-PUEB, G6L-PUEA, G6L-PUEB, XGL-PMEA, XGL-PMEC, XBL-PMEC)

For further information for Profibus-DP, please refer to 'Korea Profibus Association's homepage'. (http://www.profibus.co.kr)

5.2 Communication Specification

Classification	Profibus-DP	
Module type	Slave	
Network type	Profibus-DP	
Slave protocol	DP-V0	
Standard	EN 50170 / DIN 19245	
Communication method	RS-485 (Electric)	
Topology	Bus	
Modulation method	NRZ (Non Return to Zero)	
MAX (media access method)	Local token ring	
Communication distance and send speed	Distance (m)	Send speed (bps)
	1,200	9.6k/19.2k/93.7k/187.5k
	400	500k
	200	1.5M
	100	3M/6M/12M
Max. Node/network	64 Stations	
Max. Node/segment	32 Stations(Included master and repeater)	
Cable	Electric twisted shielded pair cable	
Max. I/O data/slave	122 word	

5.3 Basic Performance

5.3.1 Overview

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

(1) It supports the high-speed link communication only.
(2) Set up the XG5000 high-speed link parameters identically with the Configuration Tool(SyCon, PROFICON).
(3) The send and receive data is consecutively saved and sent from the set area.
(4) The number and area of send and receive data can be set up by slave station through the SyCon or PROFICON. They can be downloaded to the master module with the Configuration Port or the basic unit.
(5) In XG5000, the number of send and receive data is set up in units of word
(6) You can start communication by using the high-speed link Enable function of XG5000.

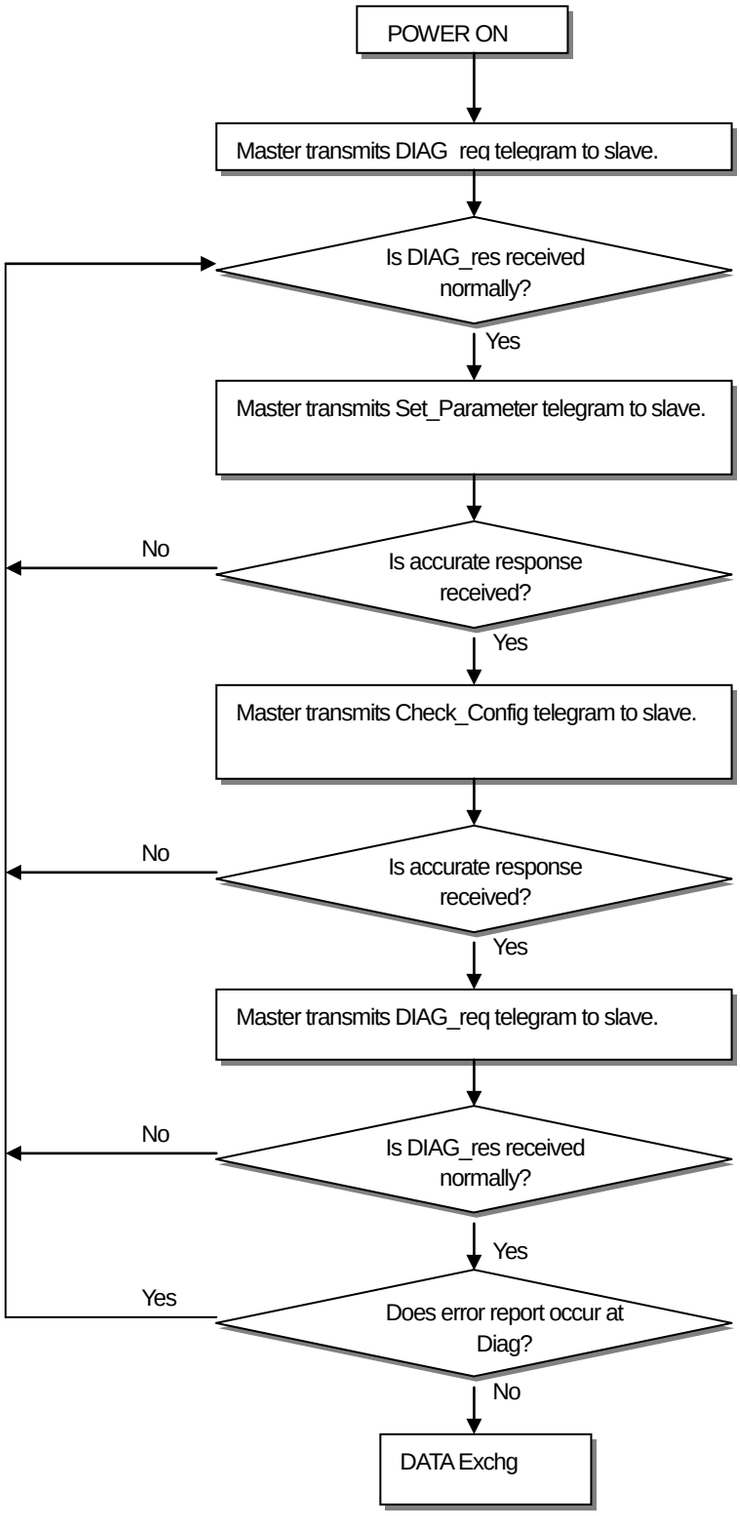
5.3.2 Operation by *High-speed Link*

(1) If Master module is the product of LSIS (G3/4/6L-PUEA/PUEB, XGL-PMEA/PMEC, XBL-PMEC), it configures Profibus Network using SyCon or Proficon.
(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

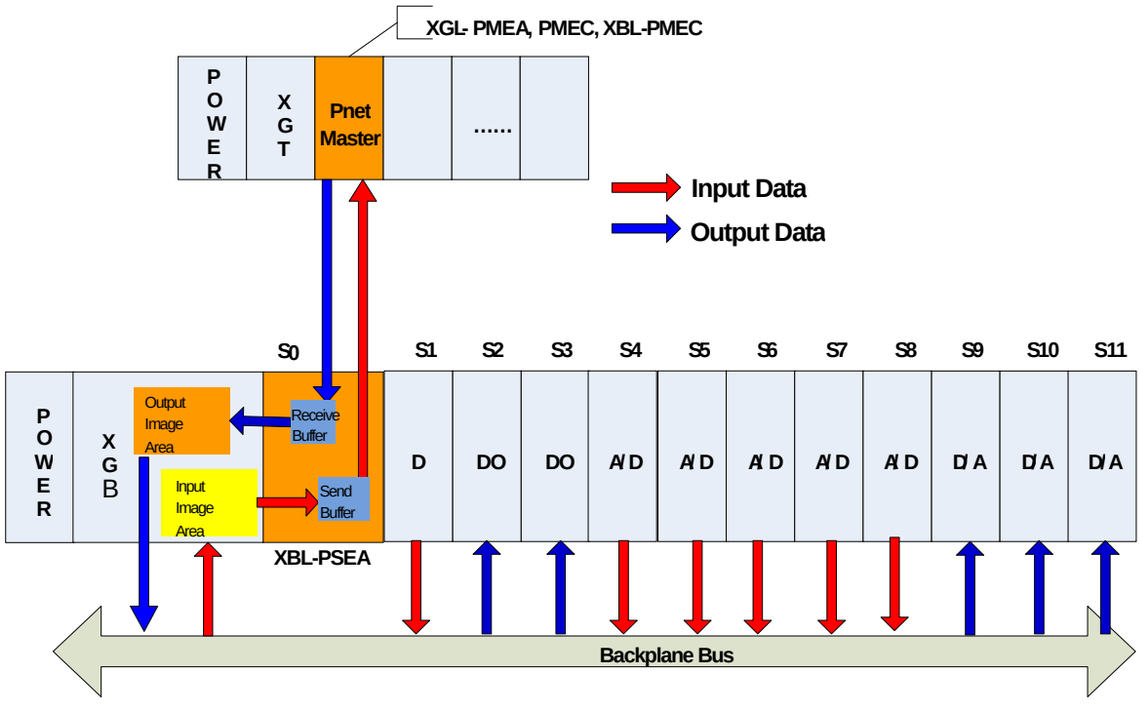
Master communicates Pnet expansion I/O module based on the downloaded setting information

1) After writing and checking parameter, I/O data communication starts.
2) If it fails to process 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 122 word.
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.



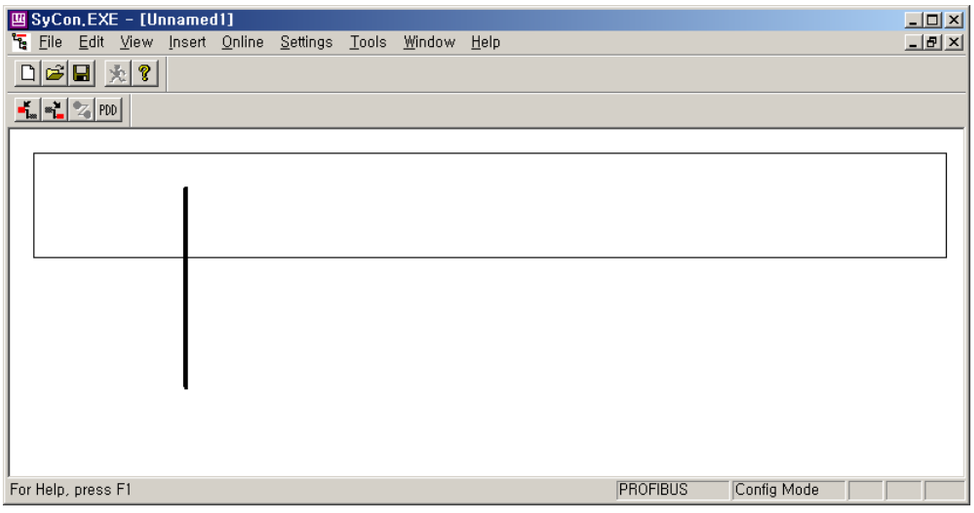
<XBL-PSEA TRX process>

5.4 Tool for Communication Setting

5.4.1 Communication Setting by SyCon

If using master module provided by LSIS (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 LSIS master module (G3/4/6L-PUEA/PUEB,XGL-PMEA), it is required to use only SyCon.

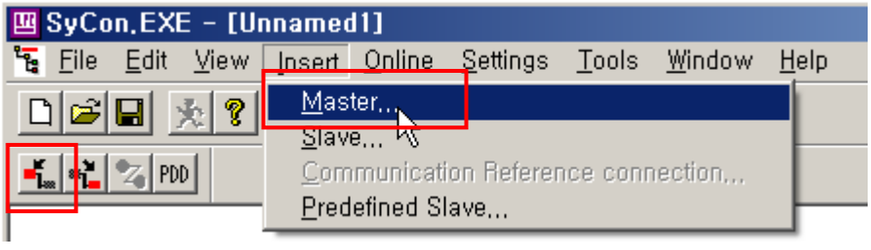
1) SyCon *execution*

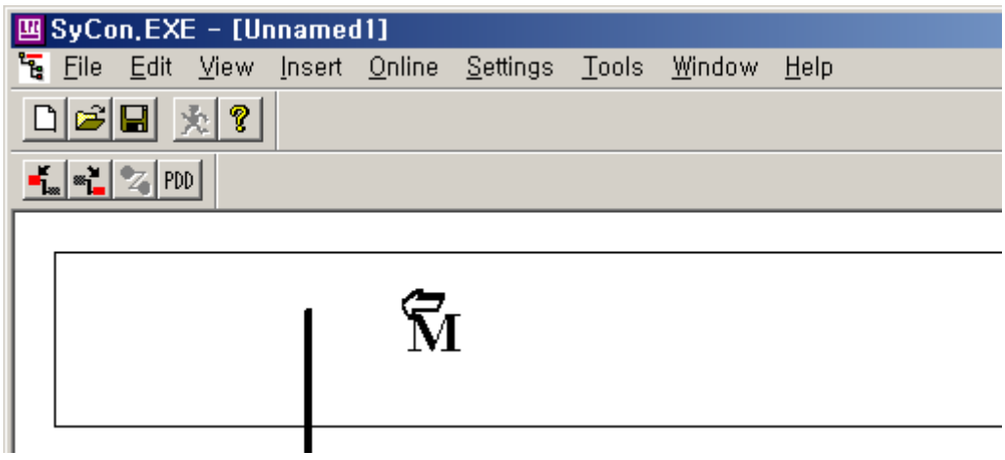


If there is no project using before executing SyCon, the initial screen same as the above figure will appear and if you are preparing the project, the latest project will be open.

2) Insertion of Master Module

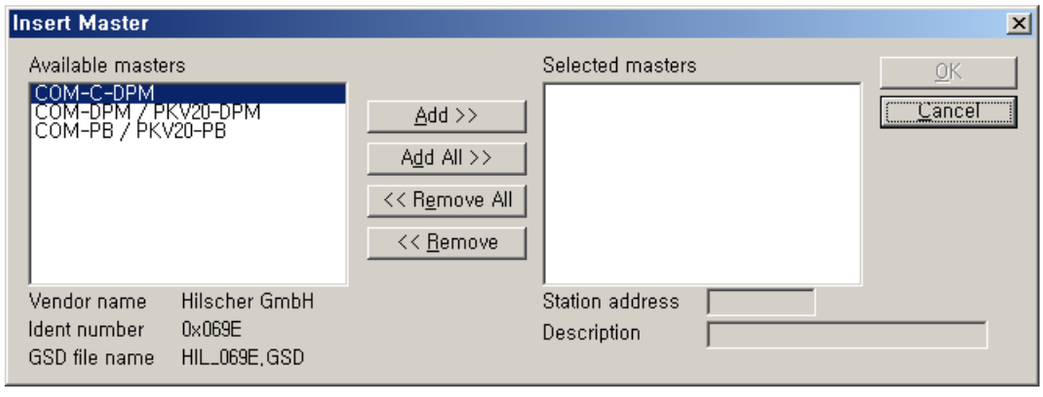
Click “Insert → Master” or select  from the left top tool bar and click the proper point of left top from the window below.

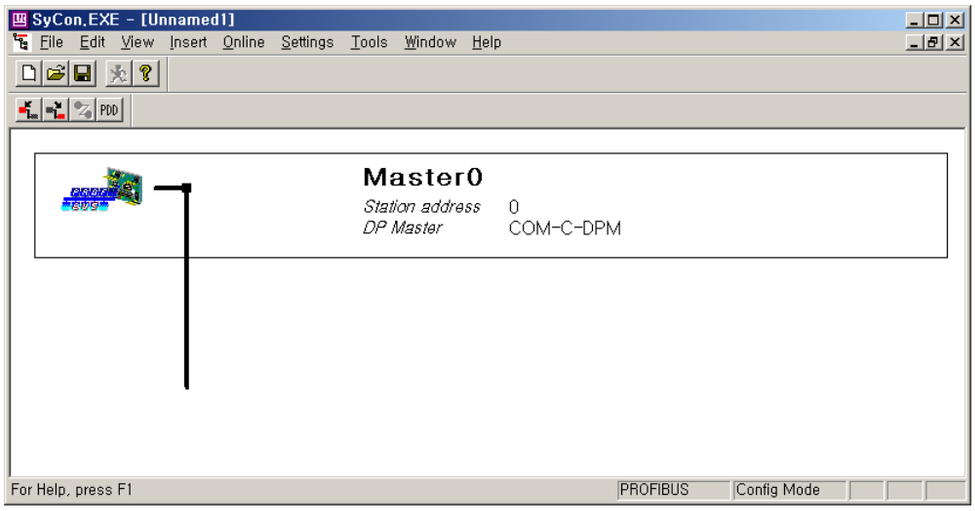




Insert the master at the top of window below

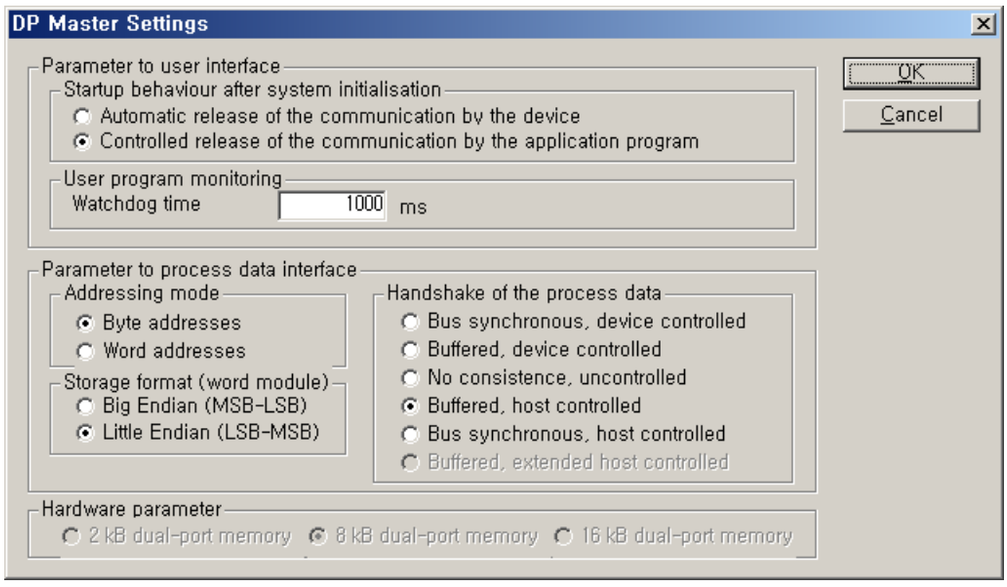
If Insert Master window is open as the above figure, select **COM-DPM/PKV20-DPM** if the using master module is **G3/4/6L-PUEA** and click Add button in the middle. If using master module is **G3/4/6L-PUEB,** select **COM-PB/PKV20-PB** and click Add button in the middle. If using master module is **XGL-PMEA,** 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.





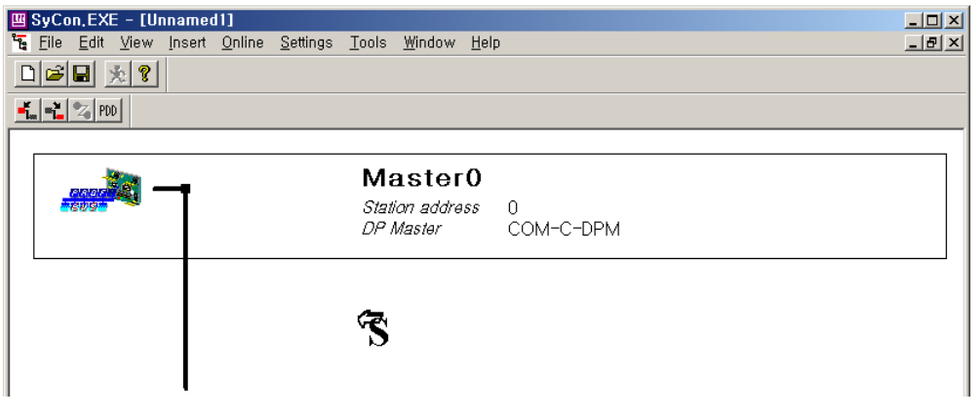
3) Master module setting

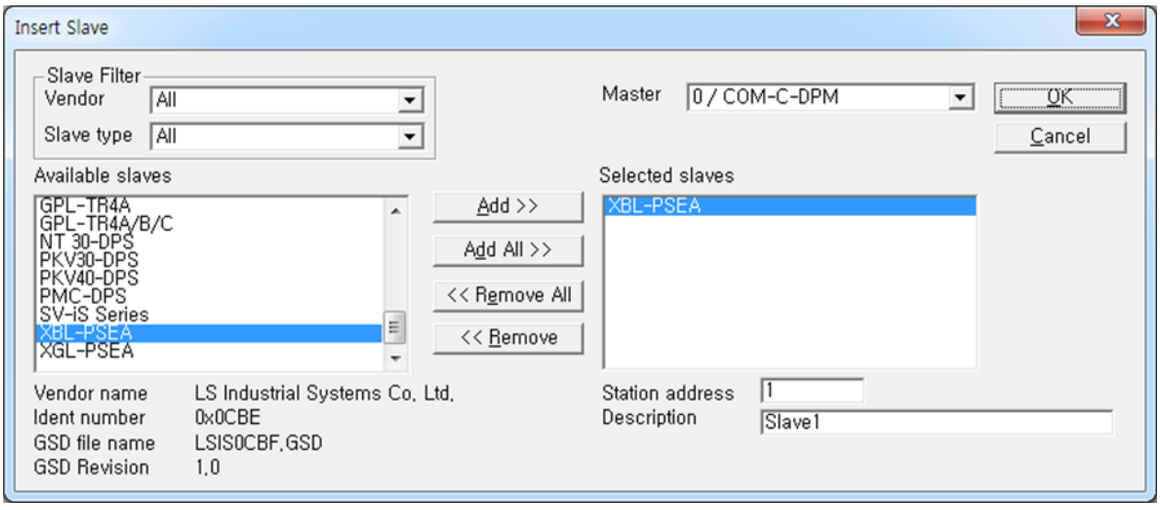
If you click the right side of mouse on the inserted master module and select "Master Settings..." from the appeared popup window, the following window will be open. Select "Controlled release of the communication by the application program" from "Parameter to user interface", "Little Endian (LSB-MSB)" 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.

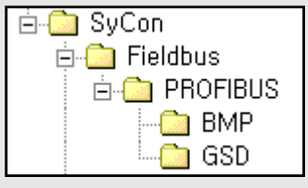




If using XBL-PSEA, select “XBL-PSEA” from the left side “Available slaves” and click “Add” button in the middle part. If there are several masters, select one from the right side “Master” and confirm “Station address” and “Description”, and then click “OK” button.

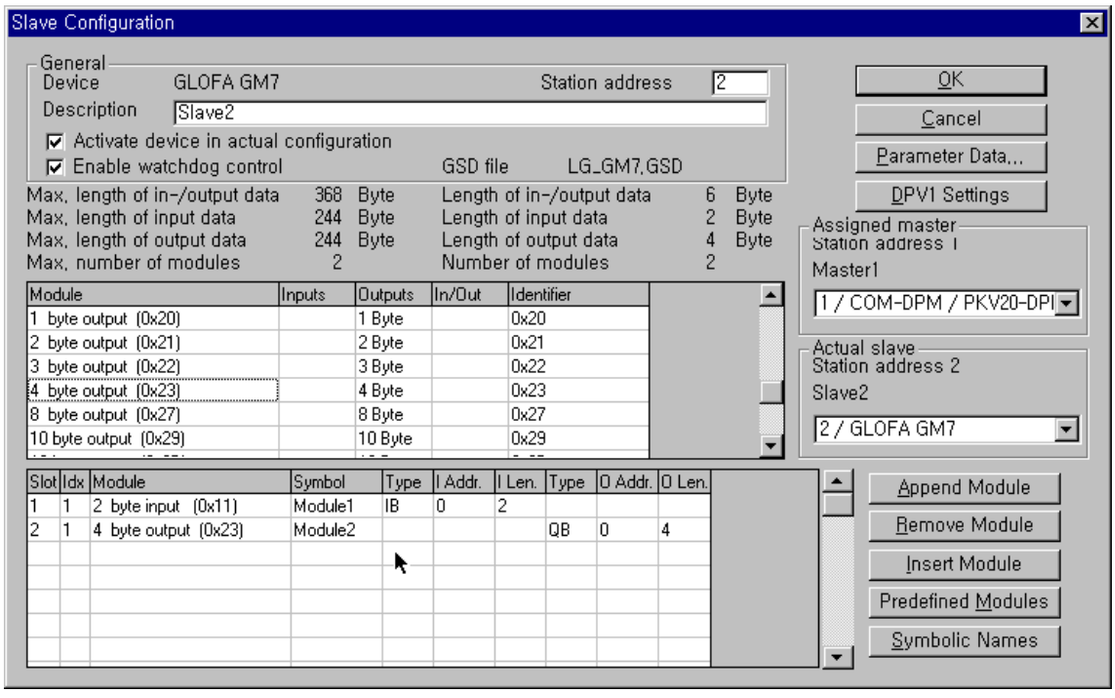
Note

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

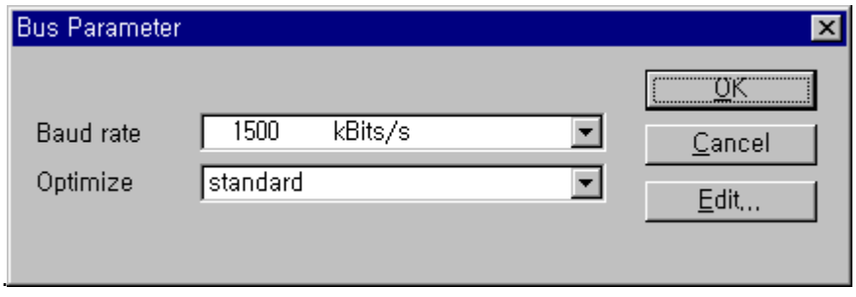
Click the inserted slave icon with the right button of mouse and select “Slave configuration” from the appeared popup window. (or double-click the left button of mouse on the slave icon.)



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 is 24 for XBL-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 Send distance.

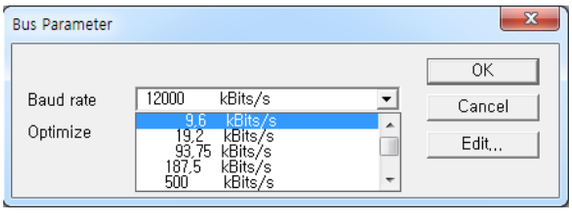
When using 12Mbps, you should use the connector only for 12Mbps and exclusive cable.

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

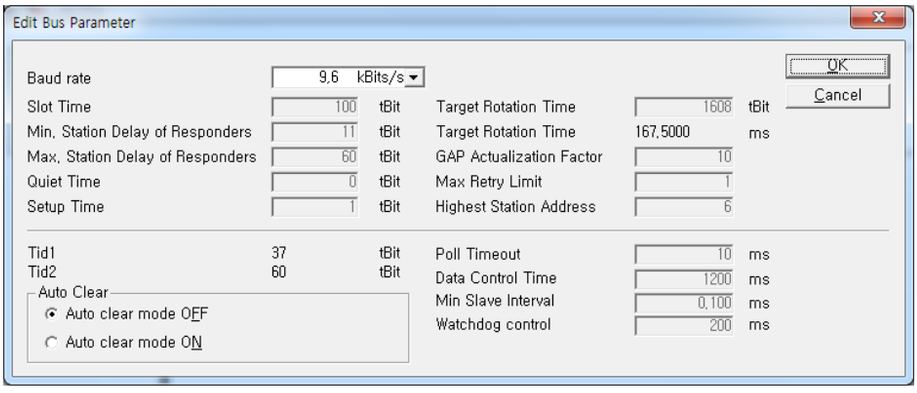
When using 12Mbps, if the communication is cut off (especially, the station far from master), search the proper end resistance value and set it random.

(1) Setup of communication speed

Select the communication speed in the Bus Parameter window.



If you select “Edit...”after selecting the communication speed, you can see the BUS parameters as below.



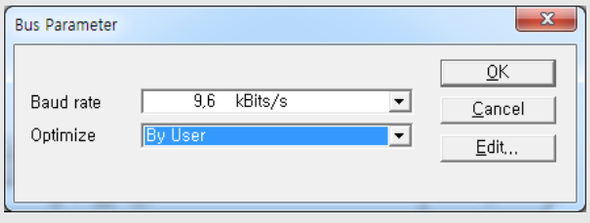
Notice

[Note 1] Computational error of the Watchdog control

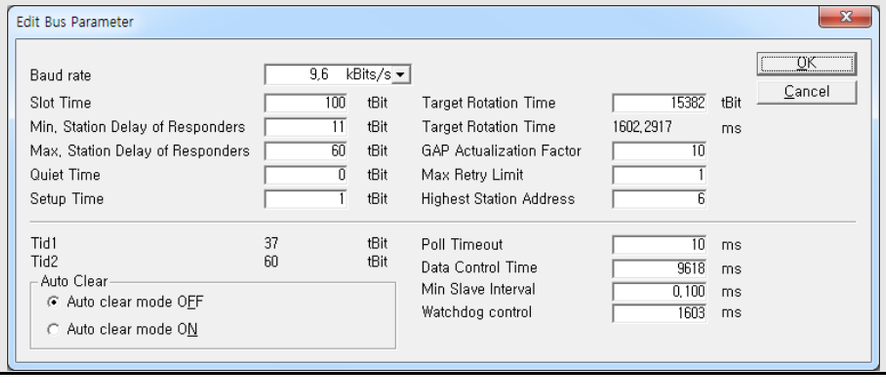
In case there are much communication data at a low communication speed or several salve modules are connected, the SyCon may have wrong “Watchdog control” value due to computational error. The “Watchdog control” value is determined depending on the whole size of the data that the master communicates and the number of slaves connected to the master. If the “Watchdog control” value is miscalculated due to errors, the master and the slave are connected and disconnected repetitively.

To solve this problem, you need to input the “Watchdog control” value manually based on the below procedures.

1. Select the item of “Optimize” as “By User” in the Bus Parameter window and execute “Edit...”.



2. Calculate the Watchdog control value through the below formula and input it by means of [Note 2] and press the “OK” button.



Formula) Watchdog control = ((2(T_{id1} + T_{id2})+ Header + I/O Data x 11 + 242 + T_{sl}) x Slave) x tBit

T_1: Min. value of Station Delay of Responders in the Edit Bus Parameter window

T_2: Max. value of Station Delay of Responders in the Edit Bus Parameter window

Header: Internal value of the protocol, fixed as 198.

I/O Data: The average value of the I/O data size(Byte) of each salve

Ex.) Slave 1: Input 50Byte, output 50Byte = Total 100Byte

Slave 2: input 100Byte, output 100Byte = Total 200Byte

Under the above conditions, I/O Data: (100Byte + 200Byte)/2 = 150Byte

T_{sl}: Slot Time value of the Edit Bus Parameter window

Slave: The number of salve modules connected to the master

tBit: The following tBit values are given for each communication speed.

Baudrate	tBit(Bit Time)
9.6k	104.167㎲
19.2k	52.038㎲
93.75k	10.667㎲
187.5k	5.333㎲
500k	2.0㎲
1.5M	0.667㎲
3M	0.333㎲
6M	0.167㎲
12M	0.083㎲

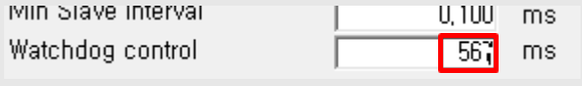
Ex.) In case 10 salves that respectively communicates by 8 byte for input and output are installed in the network of 9.6kbps

((2(37+60)+198+16 x 11+242+100) x 10) x 104.167㎲ = 947,919.7㎲ = 948㎳

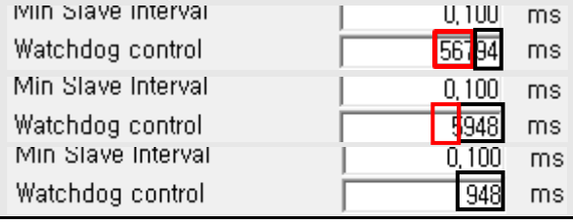
[Note 2] Input of the Watchdog control value

Input the Watchdog control value calculated in [Note 1] based on the below procedures.

1. Move the cursor positioning to the very end of the input cell in the Watchdog control.



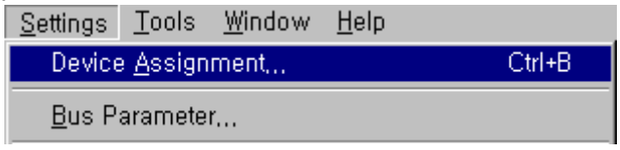
2. Input the value calculated from [Note 1]. When inputting the value, delete the previous one by one since the Watchdog control value should be set within 3 ~ 5-digit.



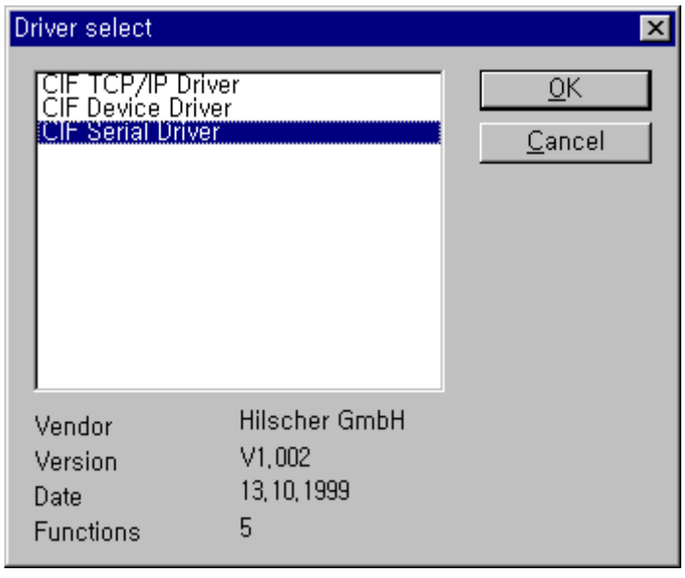
7) Device Allocation

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

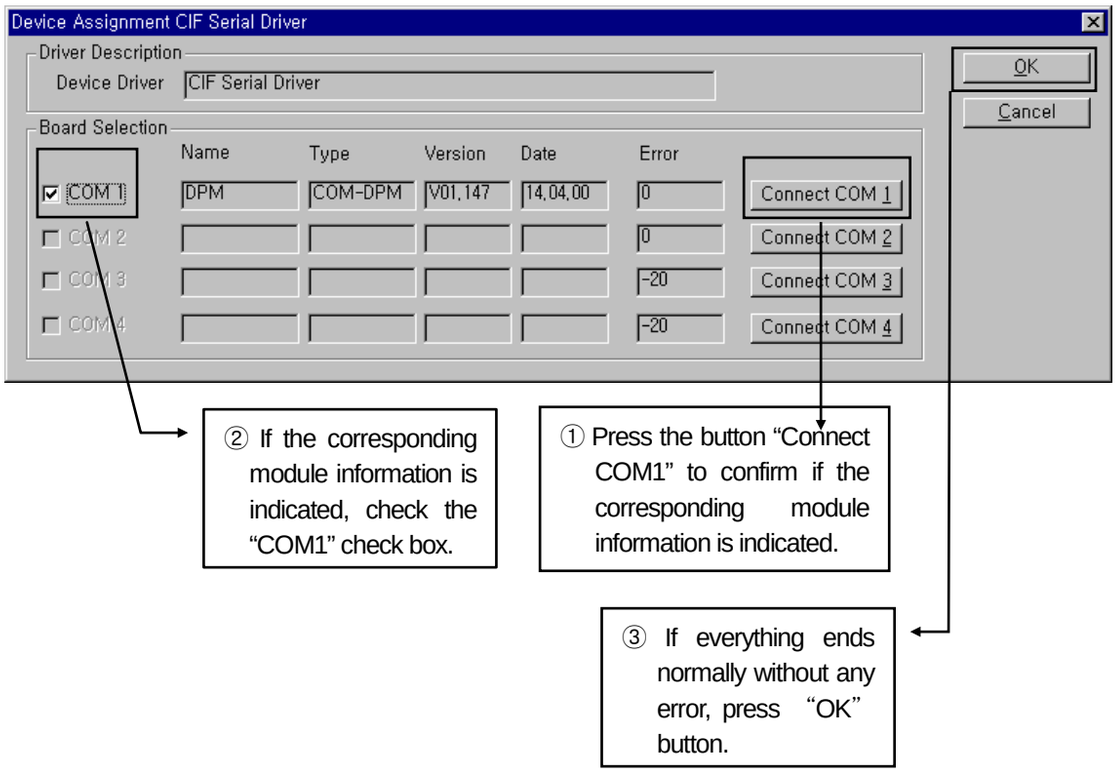


If driver selection window is open, select “CIF Serial Driver”.

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

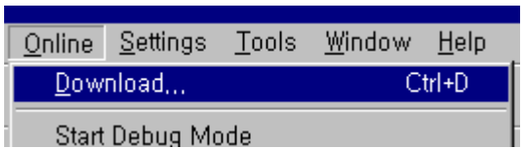


Connect PC serial port and Configuration Port of Profibus-DP master module. And apply the power of master module. Press "connect COM1" or other button according to PC serial port and confirm if the corresponding module is selected. On the figure, "Version" and "Date" may have different value. If there is no error, check the check box of the left side and click "OK" button.

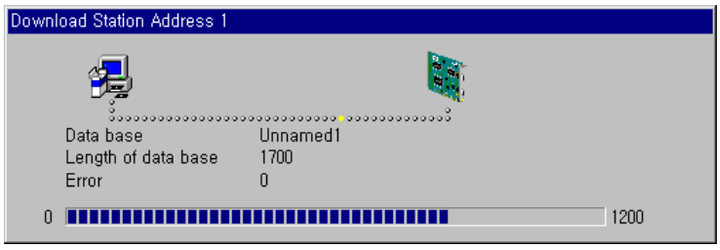
Note

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.

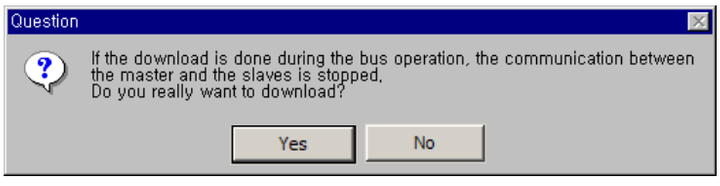
8) Configuration Download



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.



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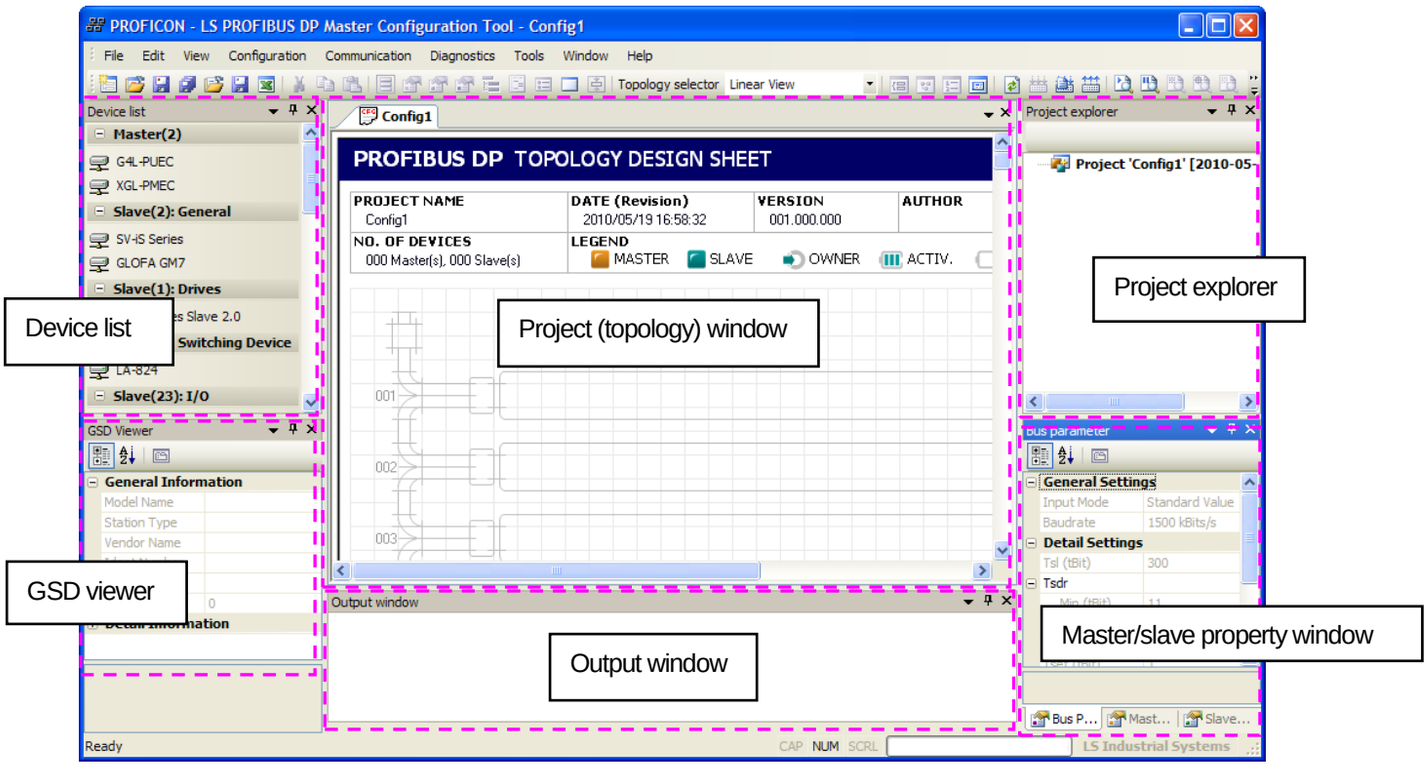
5.4.2 Communication Setting through PROFICON

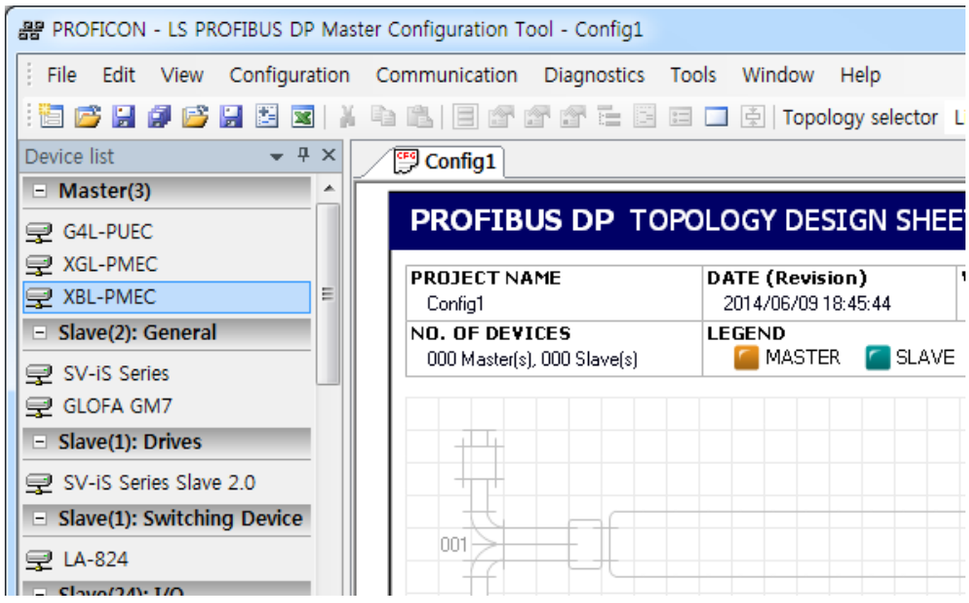
If you use LSIS's master module (G3/4/6L-PUEA/PUEB, XGL-PMEA), you can configure Profibus Network and download it by using Proficon.
Screen of Proficon is as follows.



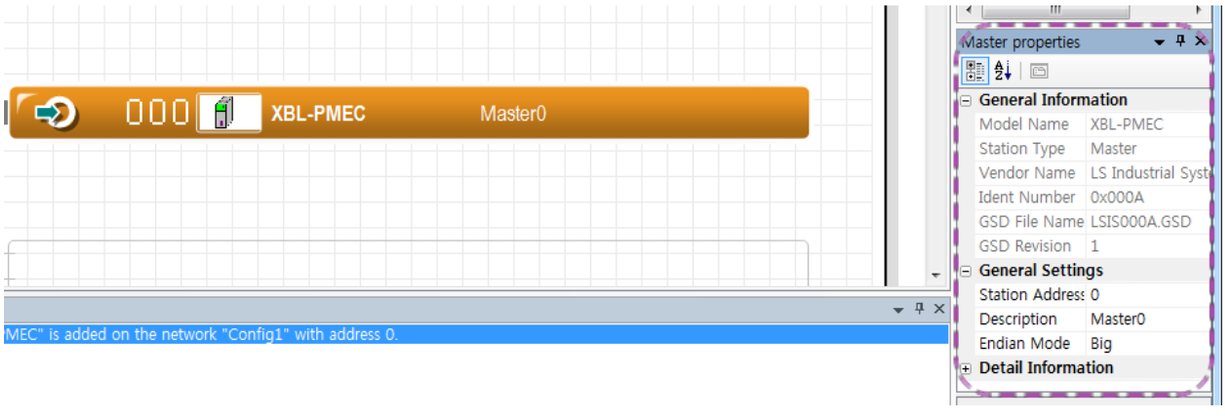
- Device list: List of devices analyzed from GSD. You can drag & drop these devices to Project (topology) Window
- Project: PROFIBUS network topology
- Project explorer: classifies the topology configured in project window in Project-Master-affiliated slave
- GSD viewer: GSD detail information on the 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.



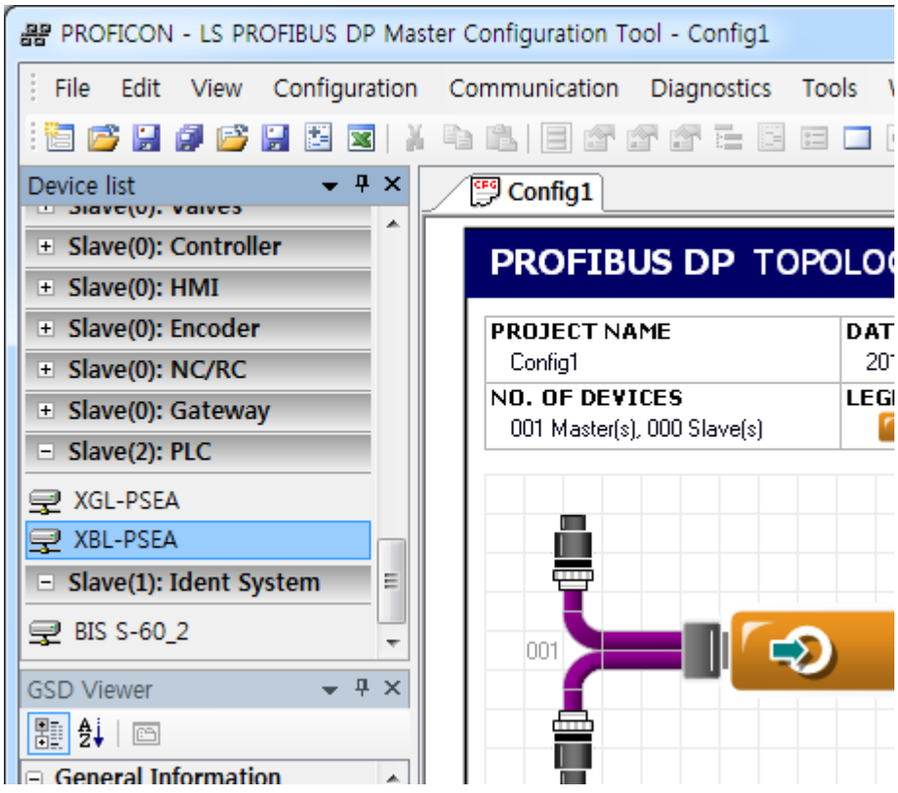
If you want to change the properties of master such as station number or description, press ""Master Properties" of "Configuration" menu. Master property window is activated as figure below.



2) Slave configuration

Slave configuration is available after master configuration.

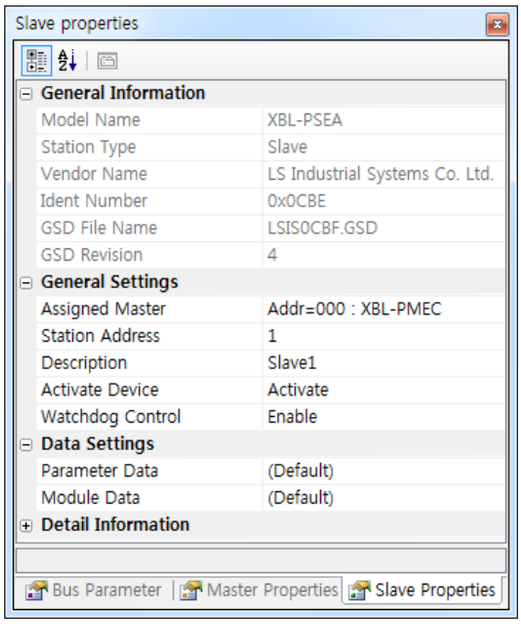
How to configure slave is same as that of master. Select the slave device you want to add in the device list as figure below.



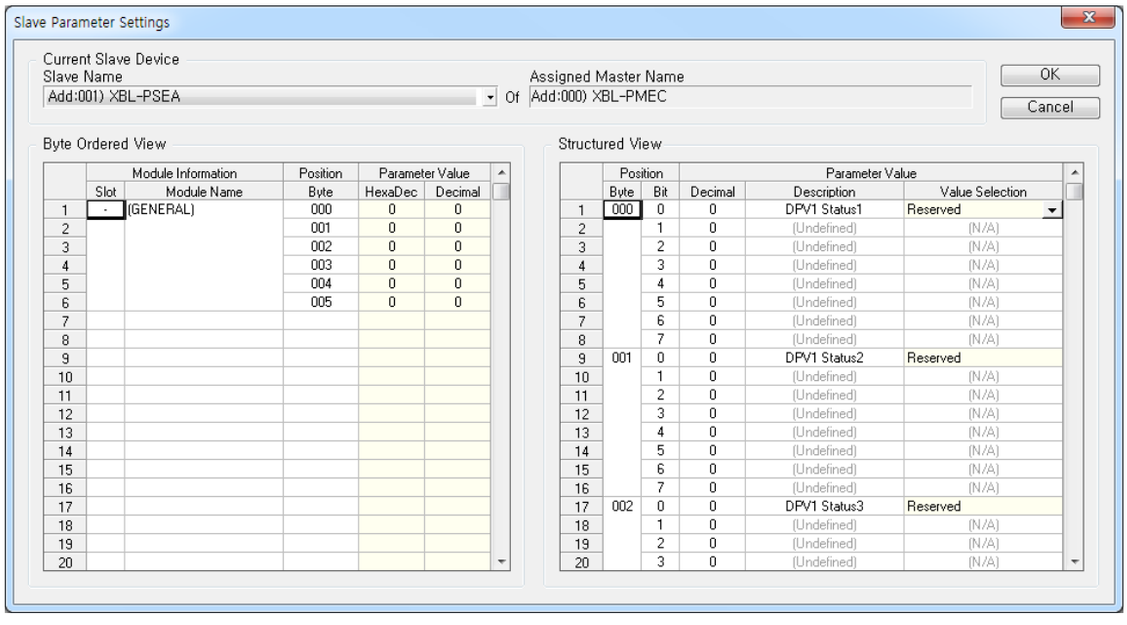
Basically the tool allocates station number in order when adding each device to topology. So if you want to change station number and properties of slave, user “Slave Properties” item of “Configuration” menu.
Affiliated items of “Slave Properties” are as follows

- Station Address
- Description
- Activate Device
- Communication Watchdog
- User parameter setting
- Module setting

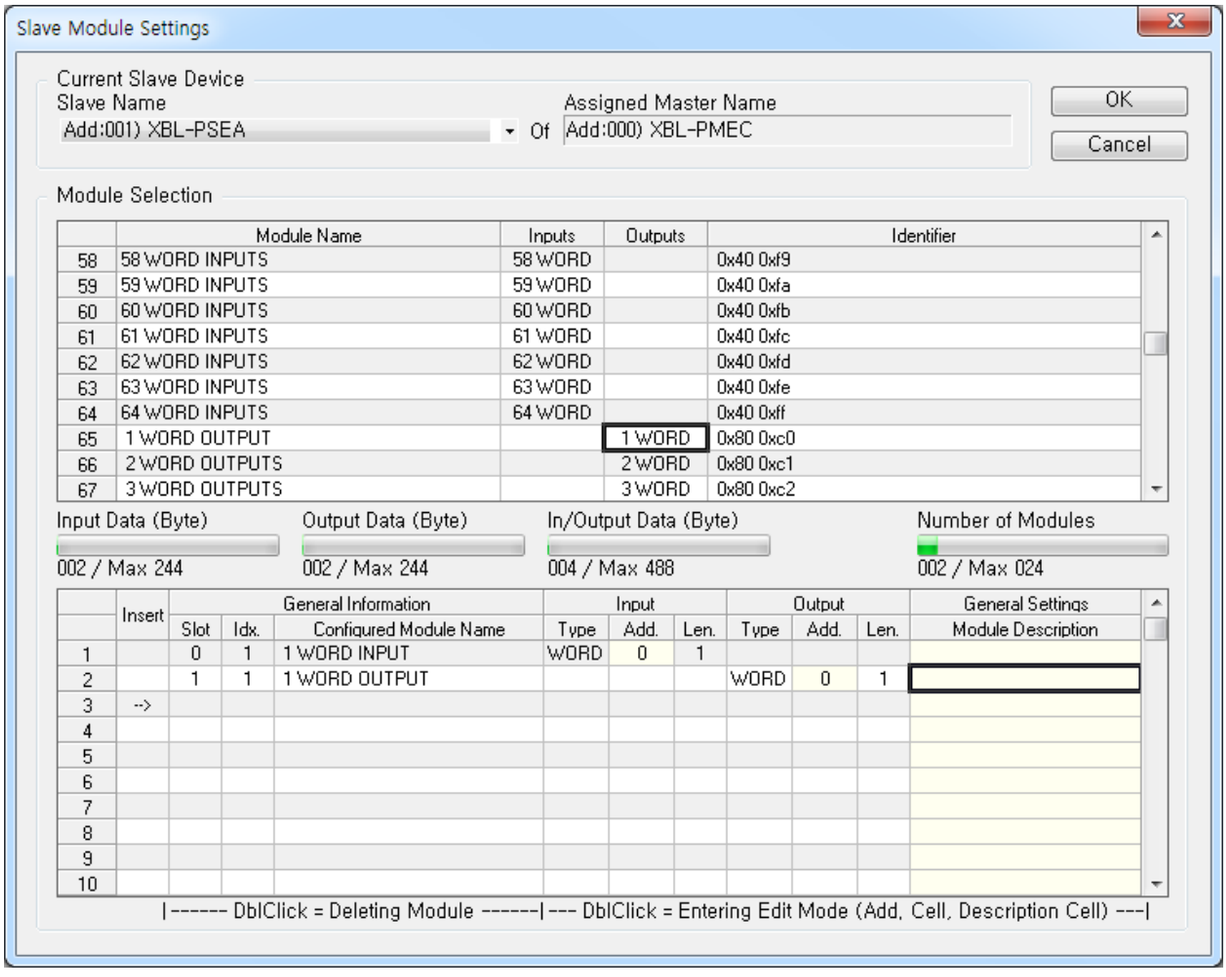
For user parameter setting and module setting, additional window appears.



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

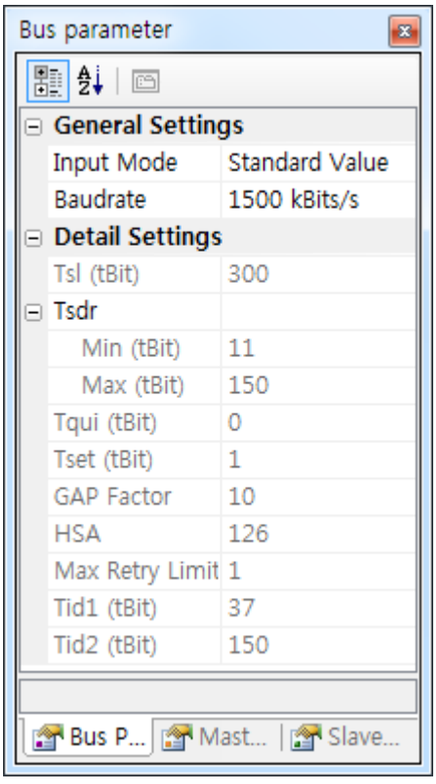


"Slave Module Settings" window is as follows. Double-click the actually configured module in the Module Selection area. If you select wrong module, double-click the module then the module is removed.



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



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

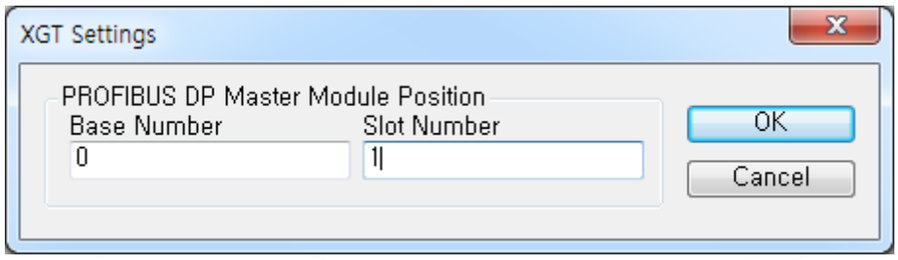
4) Configuration download and upload

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 master module of XGT PLC, XGL-PMEC is used for example.

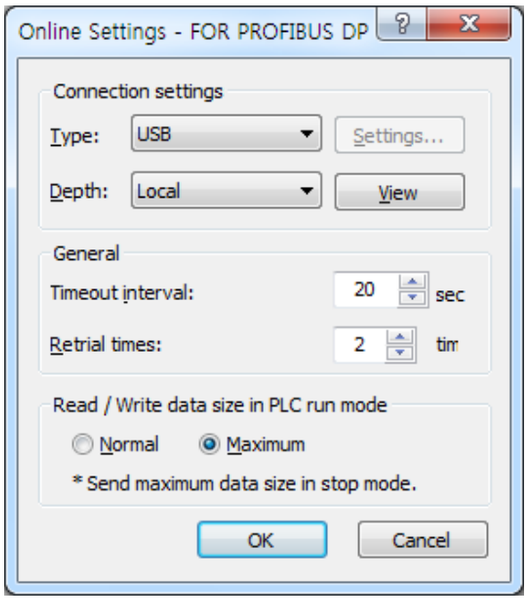
(1) Communication connection settings

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”

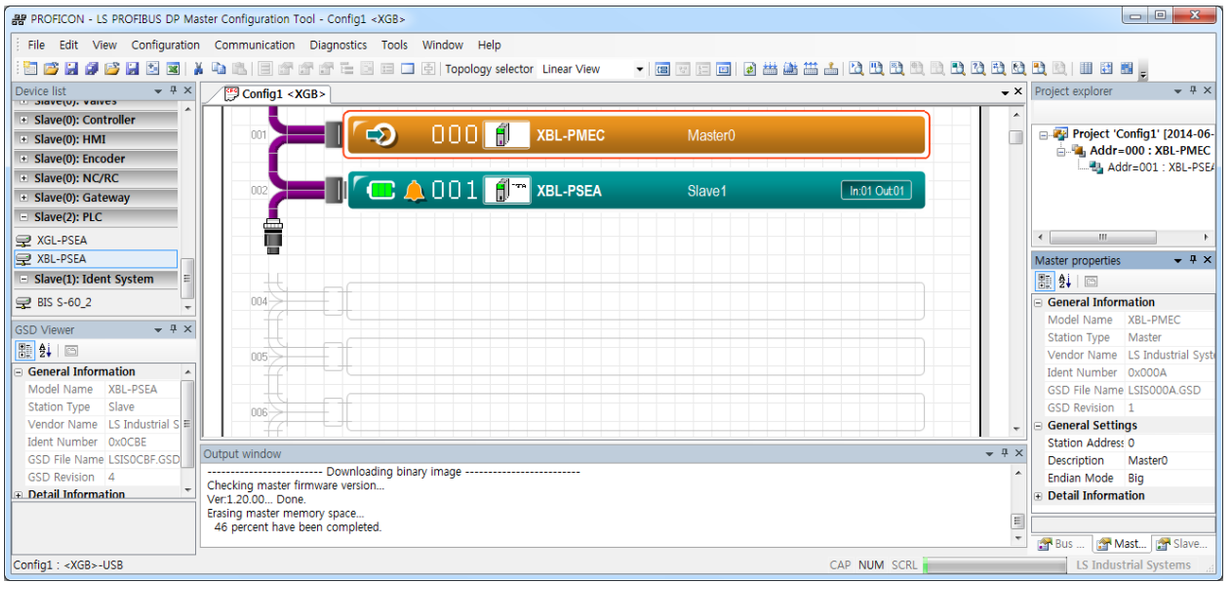


Then XGT CPU “Connection Settings” window appears. After setting, press “OK” button and complete the connection setting.

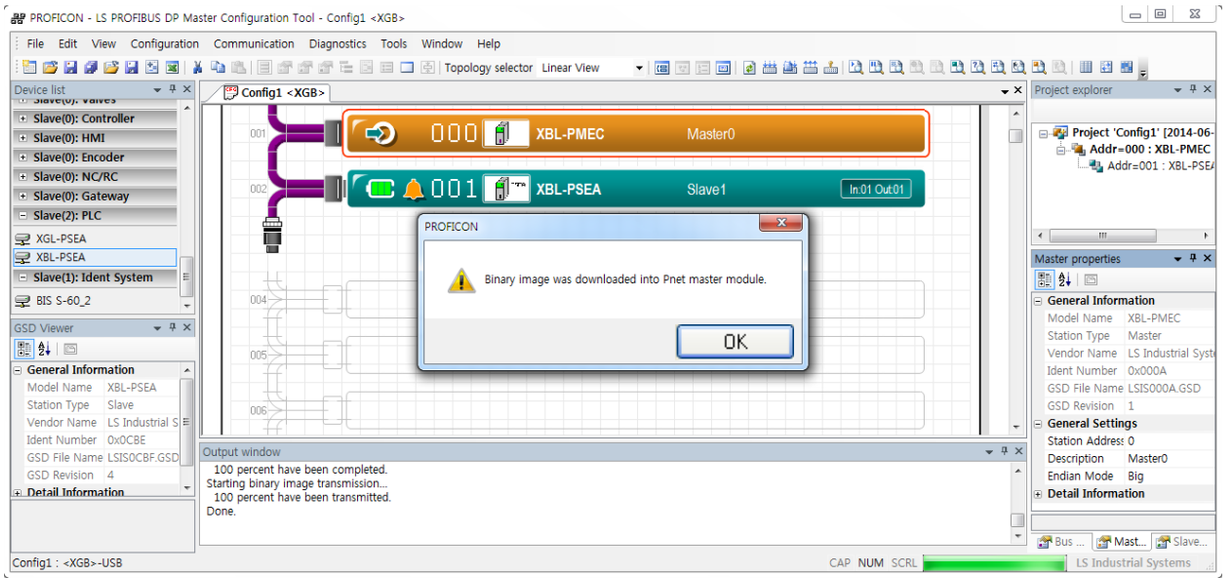


(2) Network Configuration download

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.

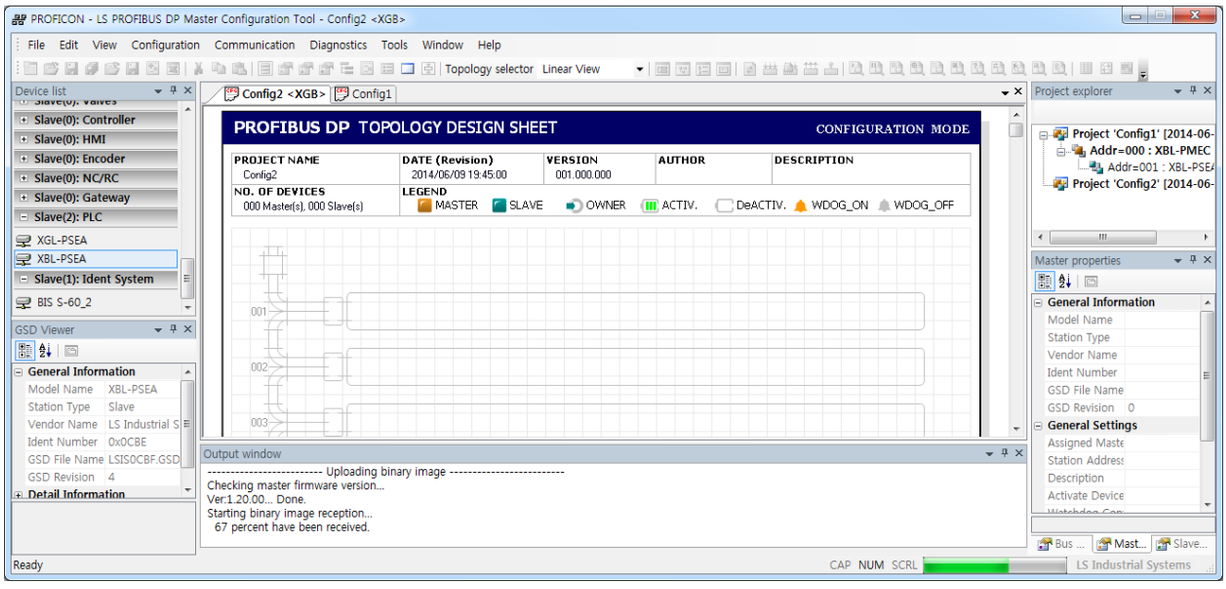


If downloading is complete, Progress Bar becomes full and “Done” is displayed in the output window.

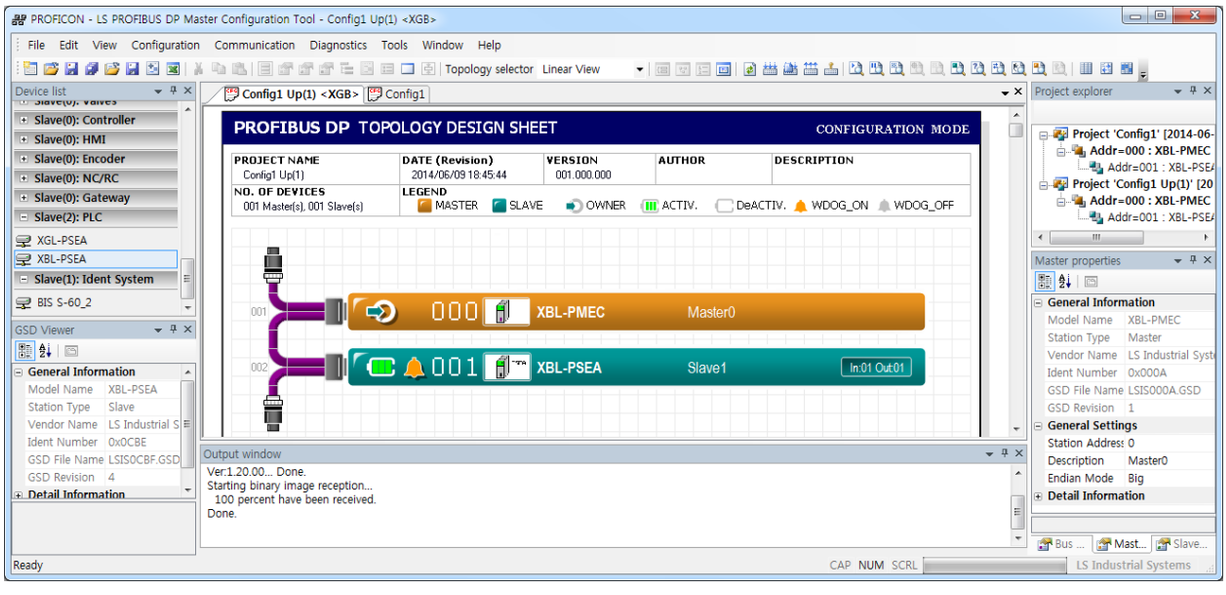


(3) Network Configuration upload

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 XG5000

1) Operation sequence of High-speed link

No.	S/W applied	Operation	Details
1	XG5000 (slave)	Run XG5000	RUN XG5000
2		Create a new project	Project→ New project Setting the project name, project type, CPU type
3		XG5000 access setting	XG5000→ Online → Select the relevant connecting driver in access setting
4		Connect to XG5000	XG5000→ Online → Access
5		Add communication module	Online →Diagnosis→I/O information→I/O synchronization
6		Specify high-speed link project	Click the right mouse button on XBL-PSEA of the project window→Add items → High-speed link communication
7		High-speed link block setting	Click the cell of “high-speed link” screen 1) Send: Specify the reading area(CPU area) 2) Receive: Specify the saving area(CPU area)
8		Write high-speed link Parameters	Online → Write
9		High-speed link Enable	Online →Communication module setting →link Enable: The relevant high-speed link Enable
10	SyCon or PROFICON (master)	RUN private Configuration tool	RUN the SyCon for XGL-PMEA; RUN the PROFICON for XBL-PMEC
11		Network Configuration setting	Refer to 5.4. Communication Setting Tools.
12		Communication port access	Refer to 5.4. Communication Setting Tools.
13		Network Configuration Download	Refer to 5.4. Communication Setting Tools.
14	XG5000 (master) XG5000 (slave)	RUN XG5000	RUN XG5000
15		Create a new project	Project→ New project Setting the project name, project type, CPU type
16		XG5000 access setting	XG5000→ Online → Select the relevant connecting driver in access setting
17		XG5000 Access	XG5000→ Online →Access
18		Add communication module	Online →Diagnosis→I/O information → I/O synchronization
19		Specify high-speed link project	Click the right mouse button on XBL-PSEA of the project window→Add items → High-speed link communication
20		SyCon or PROFICON upload	Double-click the created “block” and click the cursor on the “high-speed link” window. Online →Communication module setting →Config. upload
21		High-speed link block setting	Click the cell of “high-speed link” screen 1) Send: Specify the reading area(CPU area) 2) Receive: Specify the saving area(CPU area)
22		Write high-speed link parameter	Online → Write
23		High-speed link Enable	Online →Communication module setting →link Enable: The relevant high-speed link Enable

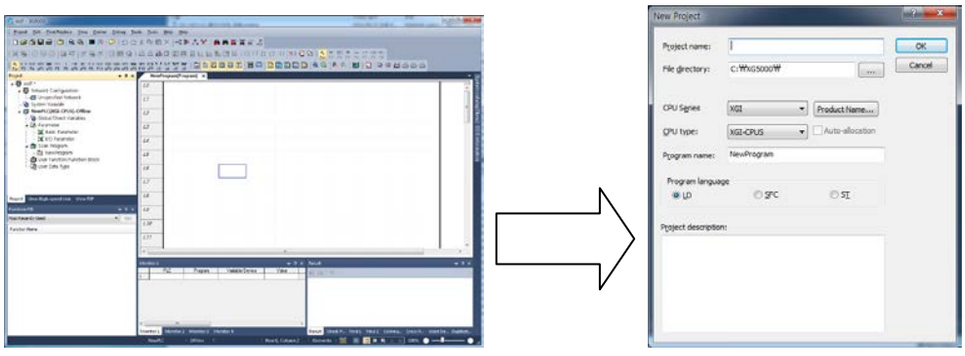
Operation sequence of High-speed link

2) High Speed Link Parameter Setting

The high-speed link parameter chooses a high-speed link parameter with a project screen of XG5000 and sets an applicable item. Please perform reference of 4.2 sections by the setting order.

(1) Execution of XG5000 and creation of new file

XG5000 is executed firstly. And you can see the below the picture
New project makes the method such as 'Project -> New project'

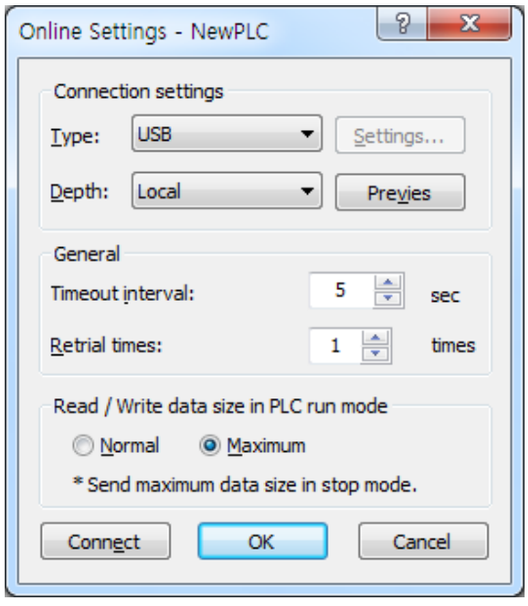


Basic screen of XG5000

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

Setting of connection option

(3) XG5000 connection

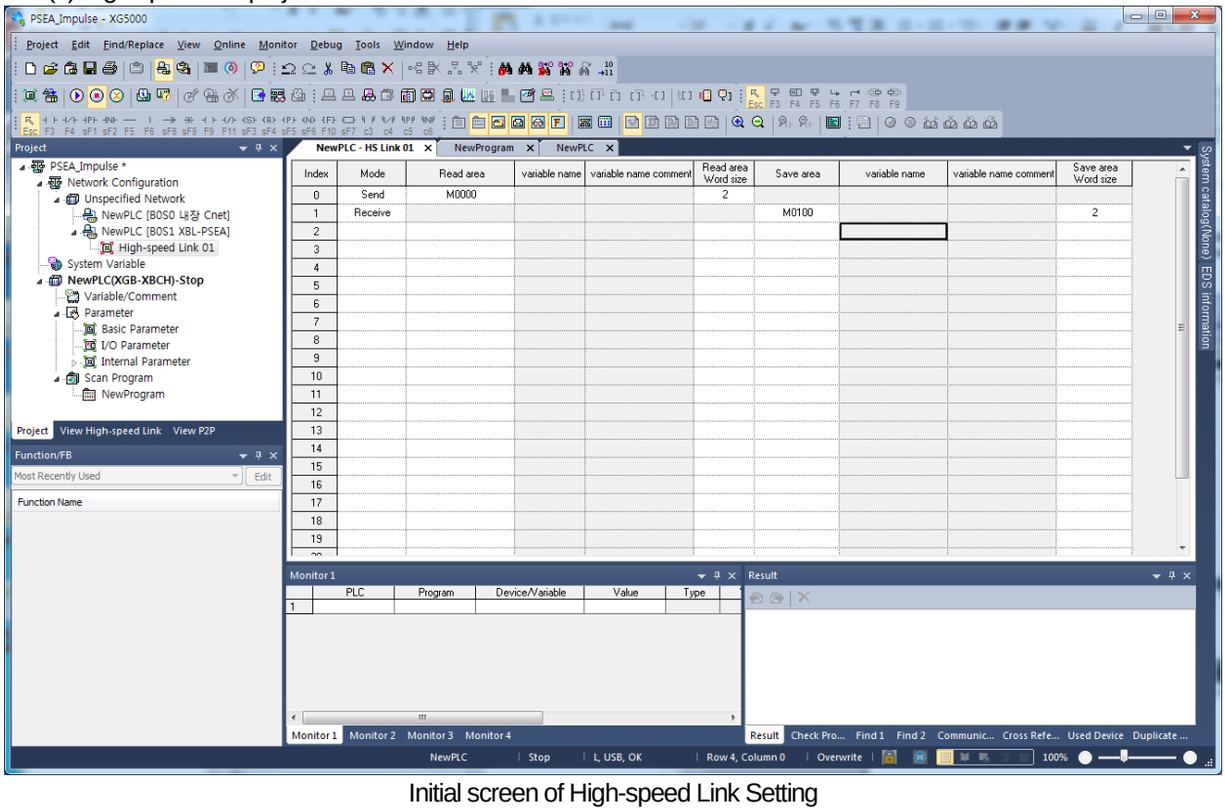
XG50000 is connected to CPU by “Online” → “Connect”.

(4) I/O synchronization

Select “Online” → “Diagnosis” → “I/O information” → “I/O Sync” to read modules installed on the base.

Surely execute “I/O Sycn” for High-speed link setting.

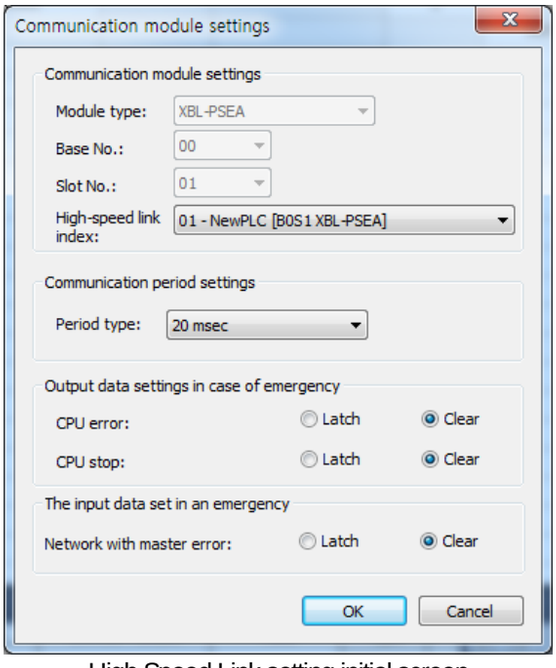
(5) High-speed link project



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.



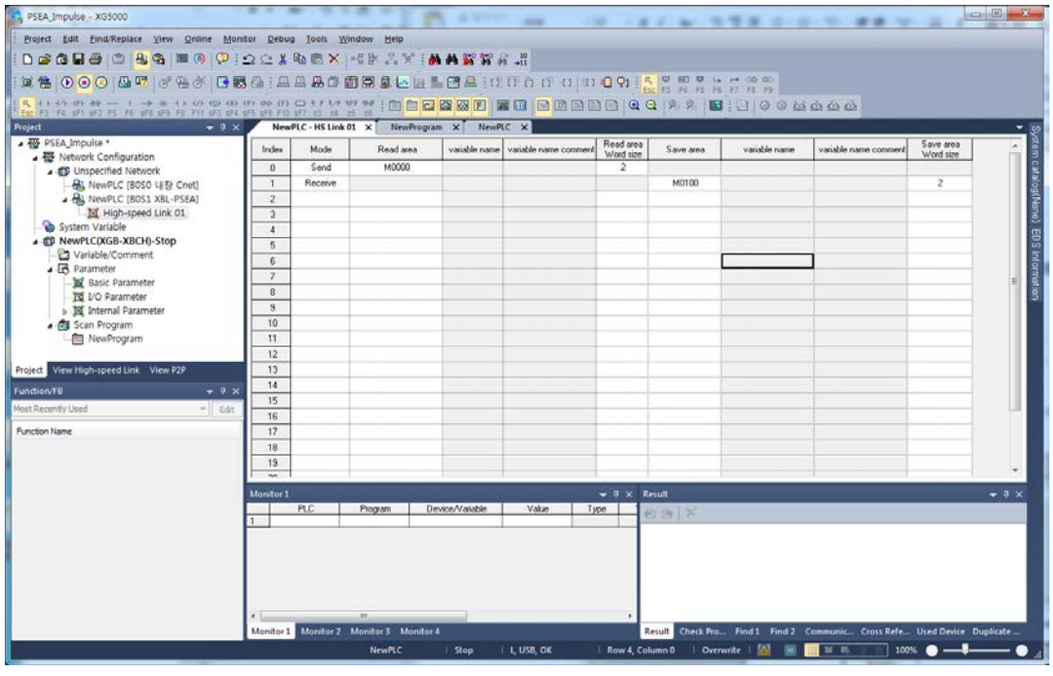
High Speed Link setting initial screen

Items			Description
Communication module settings		Module type	Pnet slave I/F module setting
		Base No.	Setting of base position installed Range of Setting: 0(In XGB, only '0')
		Slot No.	Setting of slot position installed Range of Setting: 1 ~ 10 (A set range is a difference by the kind of the CPU module)
Communication period settings		Period type	Range of setting: 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s - Default is 20ms - It deal with only send data - Receive data will be updated data in every scan regardless of communication period.
Output data setup in case of emergency settings	CPU error	Latch	Keep output data(But P device data is clear)
		Clear	Clear output data
	CPU stop	Latch	Keep output data(But P device data is clear)
		Clear	Clear output data
Input data setup in case of emergency settings	Communication error with master	Latch	Keep Input data
		Clear	Clear Input data

Setting of communication module

(7) 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.



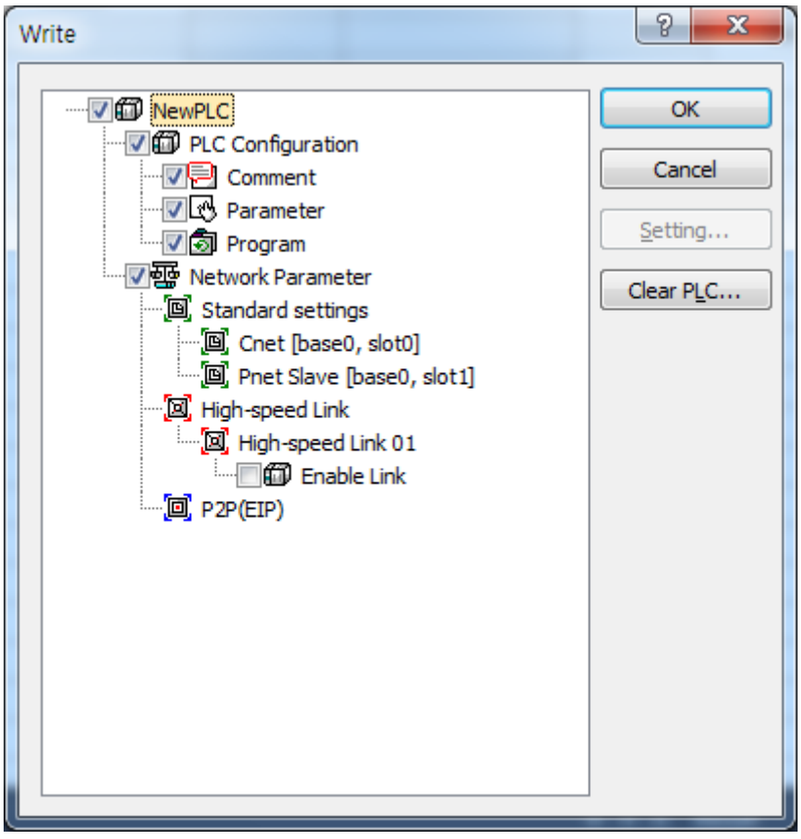
Setting of High-speed link block

Classification	Details	
Mode	Send: Transmission the data from master module to slave module. Receive: Transmission the data from slave module to master module.	
Read area (Master module → Slave module)	XGK,XBC	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,XEC	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 (Slave module → Master module)	XGK,XBC	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,XEC	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 Receive data (word)	Display input/output points of slave module by the Word. - In case of I/O module of 16 bits or less, please set 1word.	

Setting of High-speed link block

(8) Write the High-speed link parameter

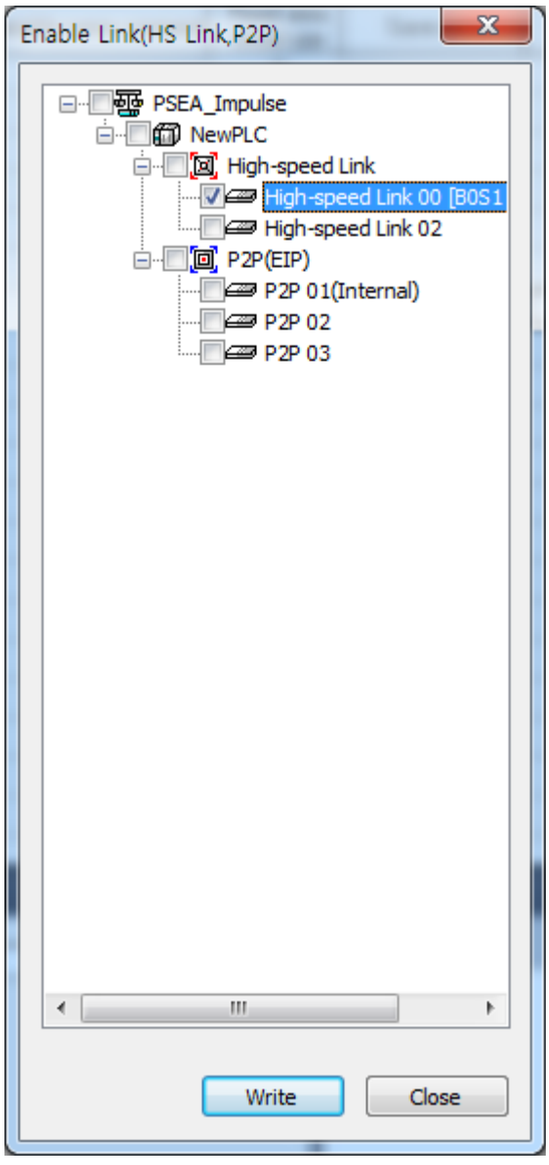
Click “Online” → “Write” in XG5000, check the applicable High-speed link and then click [OK].



Screen of Write the parameter

(9) Enable of High-speed link

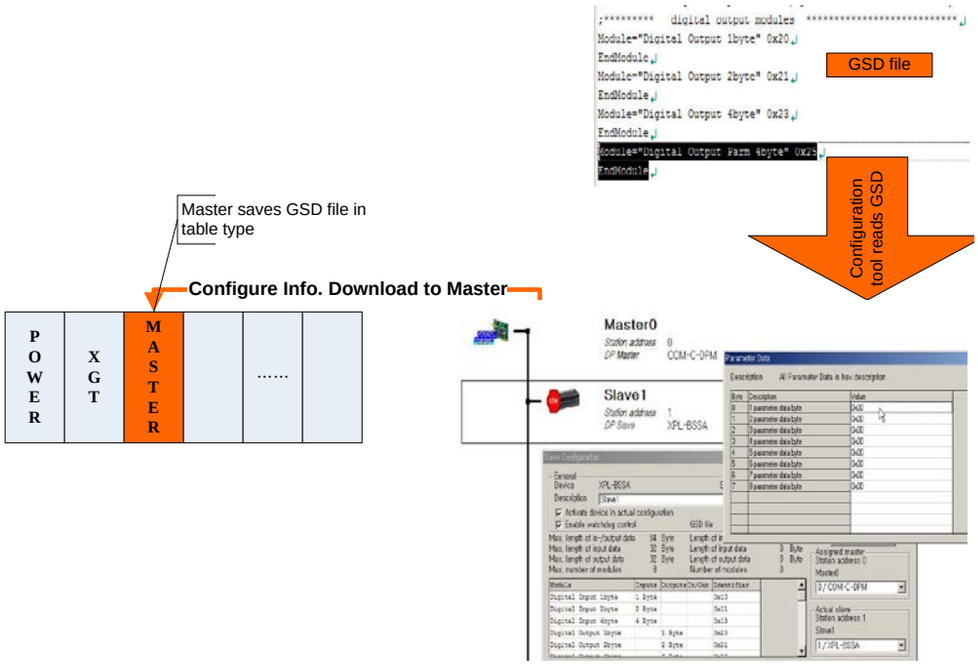
Click “Online” → “Link Enable” in XG5000, check the applicable High-speed link and then click [Write]. If High-speed link is enabled, on the module’s LED display High-speed LED will be On, when High-speed link starts.



Screen of Link Enable

5.5.2 How to set GSD and downloading procedure

1) Download expansion I/O module and Pnet slave I/F 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 slave I/F module and check information of expansion I/O modules based on the downloaded information



<Download GSD data to Pnet master>

5.6 Communication Settings with other companies' modules (Siemens S7 300 series)

5.6.1 How to set up

3) Operation Sequence of High-speed Link

No.	Applicable S/W	Operations	Details
1	XG5000 (slave)	RUN XG5000	RUN XG5000
2		Create a new project	Project→ New project Setting the project name, project type, CPU type
3		Connect to XG5000	XG5000→ Online → Select the relevant connecting driver in access setting
4		Connect to XG5000	XG5000→ Online → Access
5		Add communication module	Online →Diagnosis→I/O information → I/O synchronization
6		Specify high-speed link project	Click the right mouse button on XBL-PSEA of the project window→Add items → High-speed link communication
7		High-speed link block setting	Click the cell of "high-speed link" screen 1)Send: Specify the reading area(CPU area) 2) Receive: Specify the saving area(CPU area)
8		Write high-speed link parameter	Online → Write
9		High-speed link Enable	Online →Communication module setting →link Enable: The relevant high-speed link Enable
10	STEP7 (master)	RUN H/W Config tool	Double-click the hardware of the SIMATIC Manager's object to execute the HW Config.
11		Install GSD file	To open the PROFIBUS-DP communication, install the GSD file including the information on the salve module to the PROFILE.
12		Create PROFIBUS network	To configure the initial network, double-click the CPU's DP port and create the network BUS line.
13		Basic settings of the master	After establishing the basic settings of the master ; name and station number, click the OK button.
14		Add slaves	In common with adding modules, drag the relevant slave from the Profile and add it to the communication BUS
15		Change slave settings	Set up the I Address, Q Address through the subcomponents of GSD file where the slave values set by XG5000 are added
16		Compile and download	If all settings are completed, proceed with the download after compiling. Download is recommended to be done in HW Config.
17		Make communication program	M area is used to send and receive data so make the program with the command that can access to the relevant area.
18		Program download	After completing to make the ladder program, download shall be done.

4) Example

The high-speed link parameter chooses a high-speed link parameter with a project screen of XG5000 and sets an applicable item. Please perform reference of 4.2 sections by the setting order.

(1) Execution of XG5000

Double-click XG5000 icon and execute XG5000.

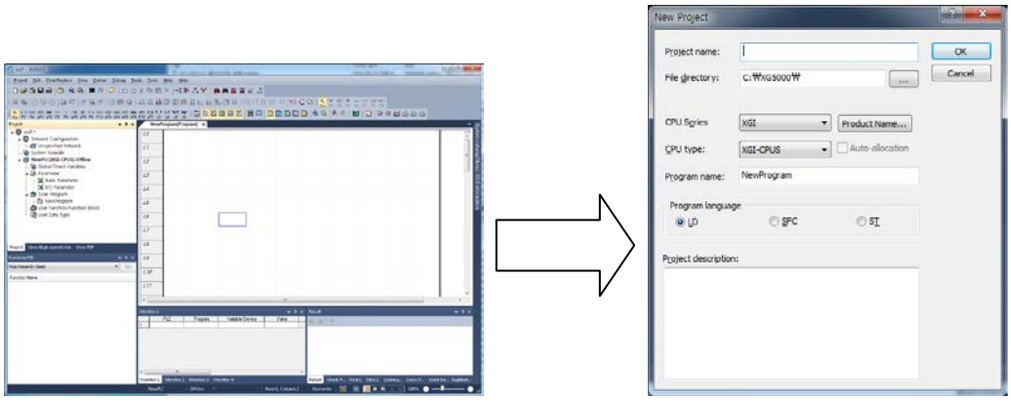
When it is not installed, connect to www.LSIS.com and download XG5000.

(Member participation is necessary.)

(2) creation of new project

XG5000 is executed firstly. And you can see the below the picture

New project makes the method such as 'Project -> New project'

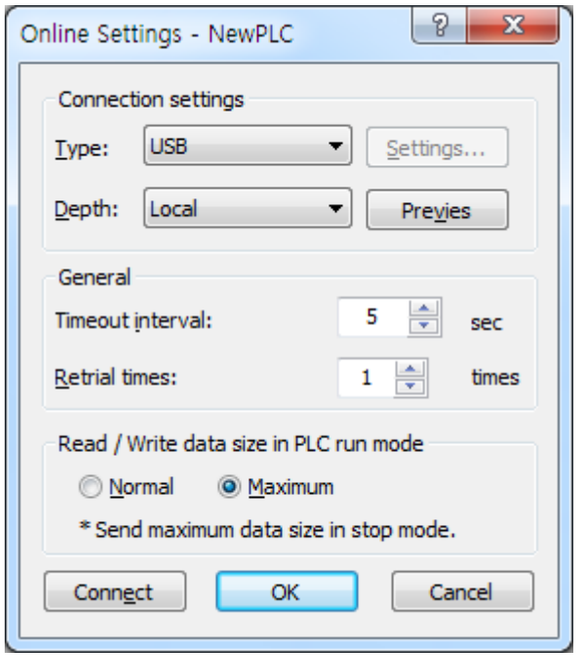


Basic screen of XG5000

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	-

(3) 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

Setting of connection option

(4) XG5000 connection

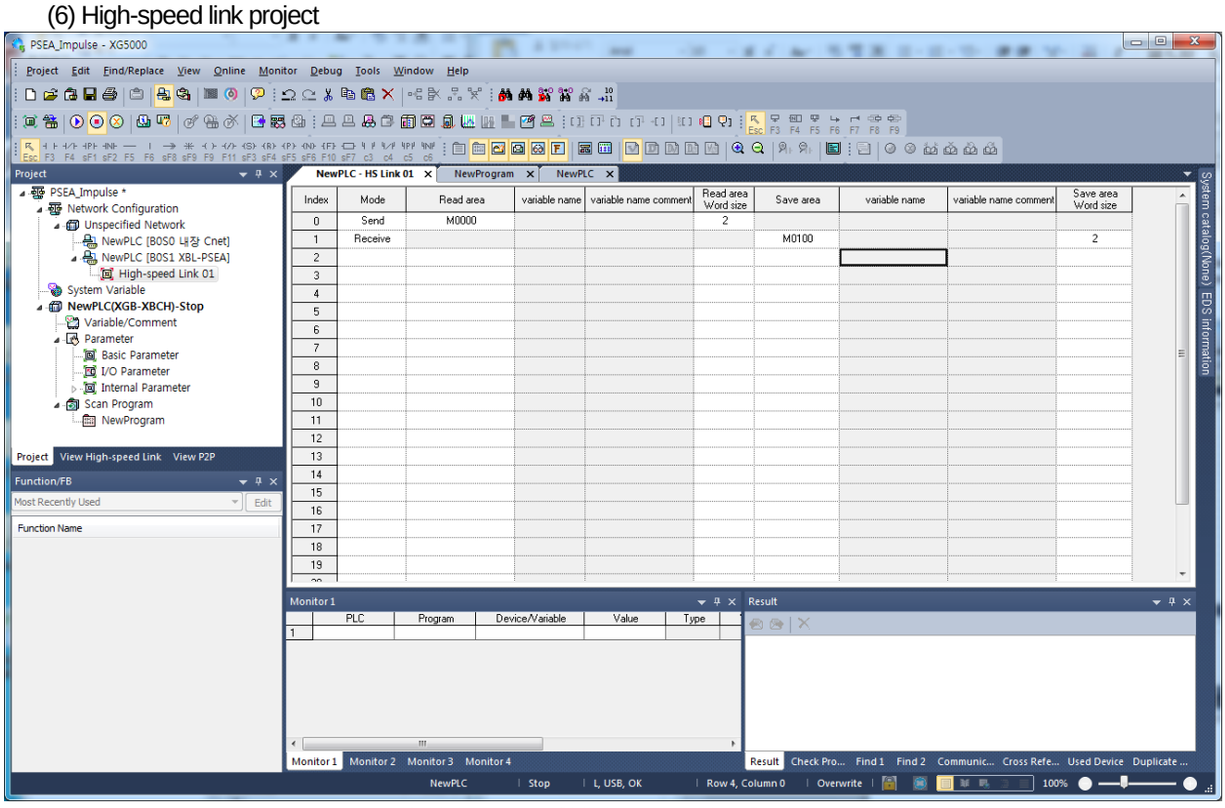
XG50000 is connected to CPU by “Online” → “Connect”.

(5) I/O synchronization

Select “Online” → “Diagnosis” → “I/O information” → “I/O Sync” to read modules installed on the base.

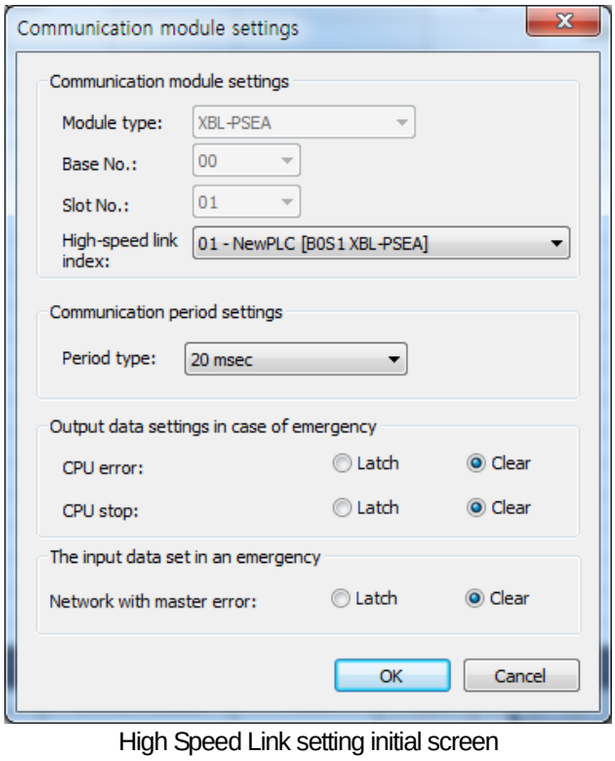
Surely execute “I/O Sycn” for High-speed link setting.

(6) High-speed link project



Initial screen of High-speed Link 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.



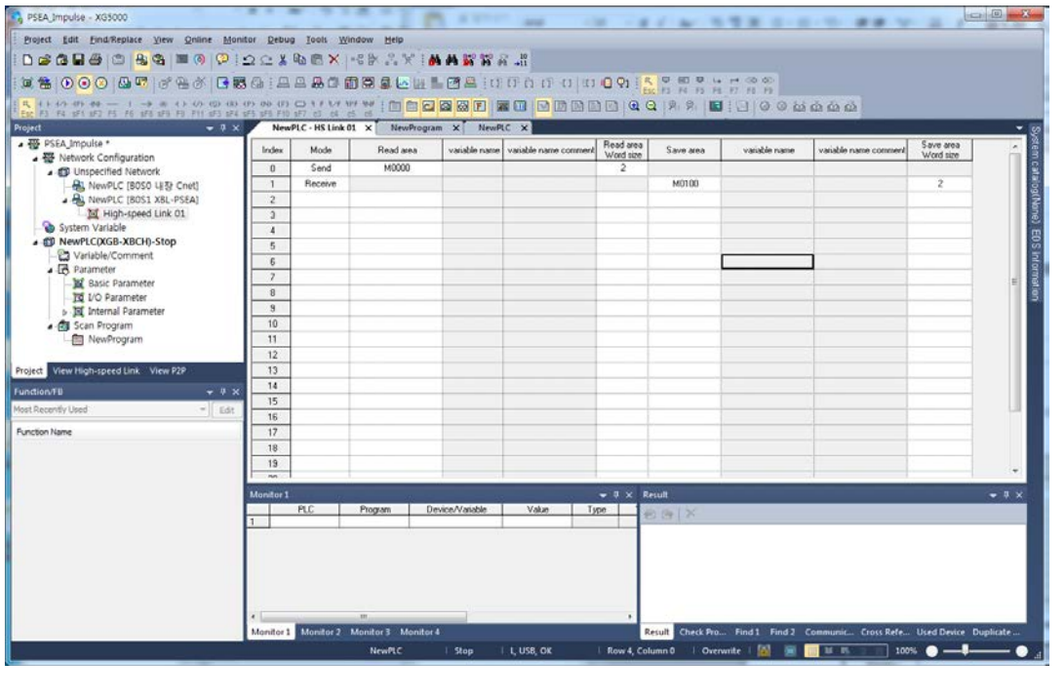
High Speed Link setting initial screen

Items			Description
Communication module settings		Module type	Pnet slave I/F module setting
		Base No.	Setting of base position installed Range of Setting: 0(In XGB, only '0')
		Slot No.	Setting of slot position installed Range of Setting: 1 ~ 10 (A set range is a difference by the kind of the CPU module)
Communication period settings		Period type	Range of setting: 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s - Default is 20ms - It deal with only send data - Receive data will be updated data in every scan regardless of communication period.
Output data setup in case of emergency settings	CPU error	Latch	Keep output data(But P device data is clear)
		Clear	Clear output data
	CPU stop	Latch	Keep output data(But P device data is clear)
		Clear	Clear output data
Input data setup in case of emergency settings	Communication error with master	Latch	Keep Input data
		Clear	Clear Input data

Setting of communication module

(7) 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.

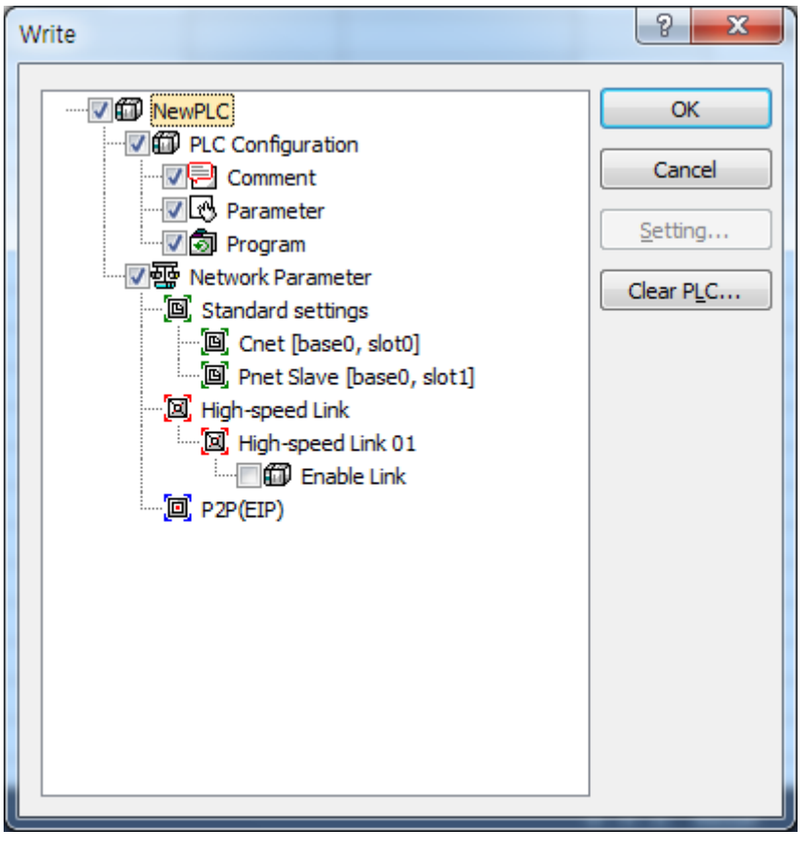


Setting of High-speed link block

Classification	Details	
Mode	Send: Transmission the data from master module to slave module. Receive: Transmission the data from slave module to master module.	
Read area (Master module → Slave module)	XGK,XBC	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,XEC	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 (Slave module → Master module)	XGK,XBC	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,XEC	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 Receive data (Word)	Display input/output points of slave module by the Word. - In case of I/O module of 16 bits or less, please set 1word.	

(8) Write the High-speed link parameter

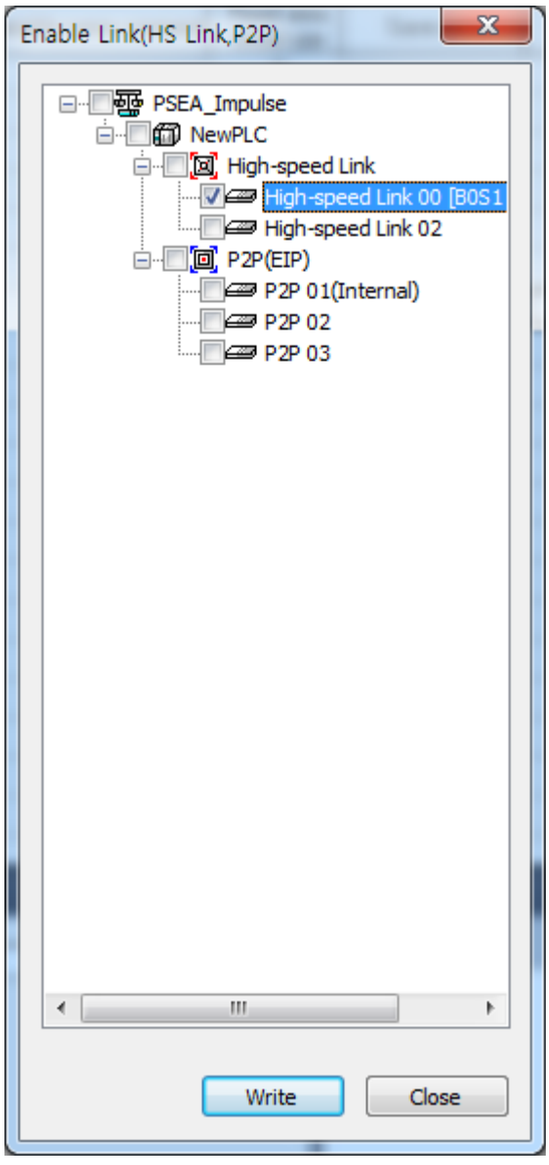
Click “Online” → “Write” in XG5000, check the applicable High-speed link and then click [OK].



Screen of Write the parameter

(9) Enable of High-speed link

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

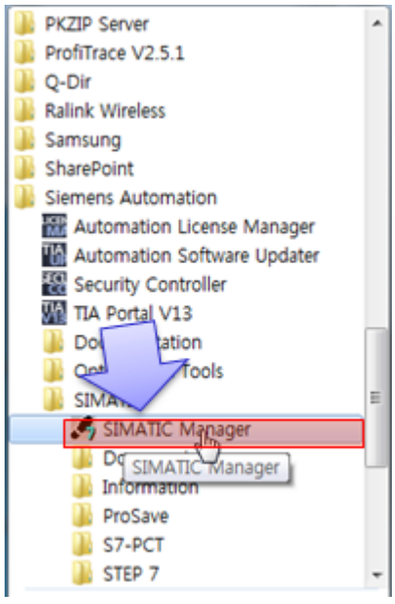


Screen of Link Enable

(10) Running the H/W Config tool

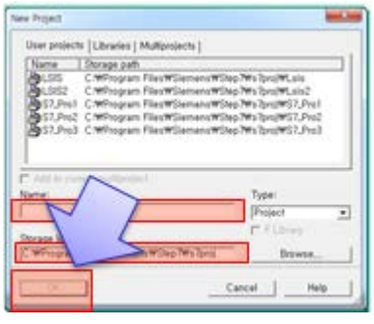
To open the communication, STEP7 is basically composed of SIMATIC Manager, HW Config, Net Pro, LAD, STL programming tool and in addition, it also has Set PG-PC Interface, PID Assignment, Simulator, etc.

a) First of all, click 'Start of Windows-> Siemens Automation ->SIMATIC ->SIMATIC Manager to run the SIMATIC Manager.

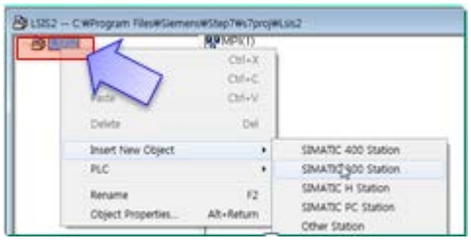


b) Click the icon of 'New Project' to create a new project.

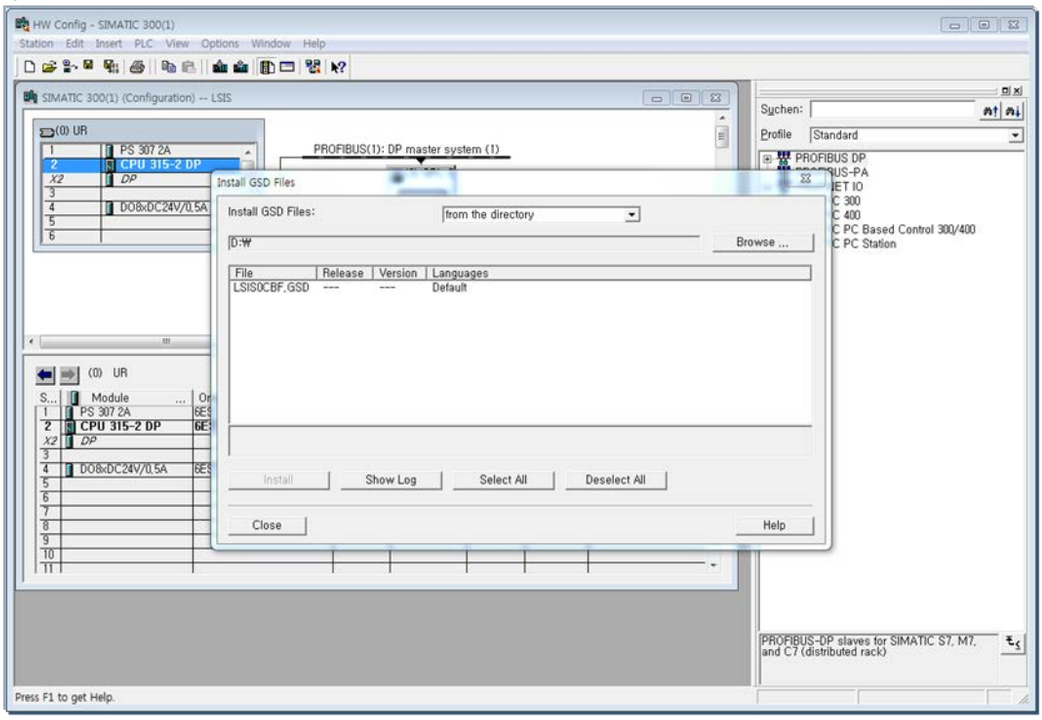
c) After specifying the project's name and path in the window for creating a project, click the OK button.



d) Click the right mouse button on the project name and add the series to be configured in the 'Insert New Object'. (The example is based on 300 series)



(11) Installation of the GSD file



a) Click Install GSD File in the options of HW Config.

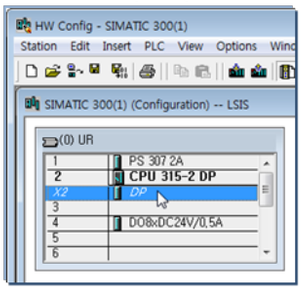
b) Click the Browse to select the folder where the GSD files are located.

c) If you select the folder, the GSD files of the relevant folder will be listed.

d) Select the required GSD files among them and then, click the 'Install' button.

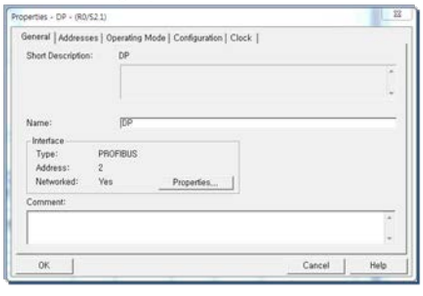
(12) Configuration of the PROFIBUS network

In order to build up the initial network, you need to create the network BUS of the protocol to be configured. Double-click the relevant port (Double-click DP) of the master to create the network BUS line.



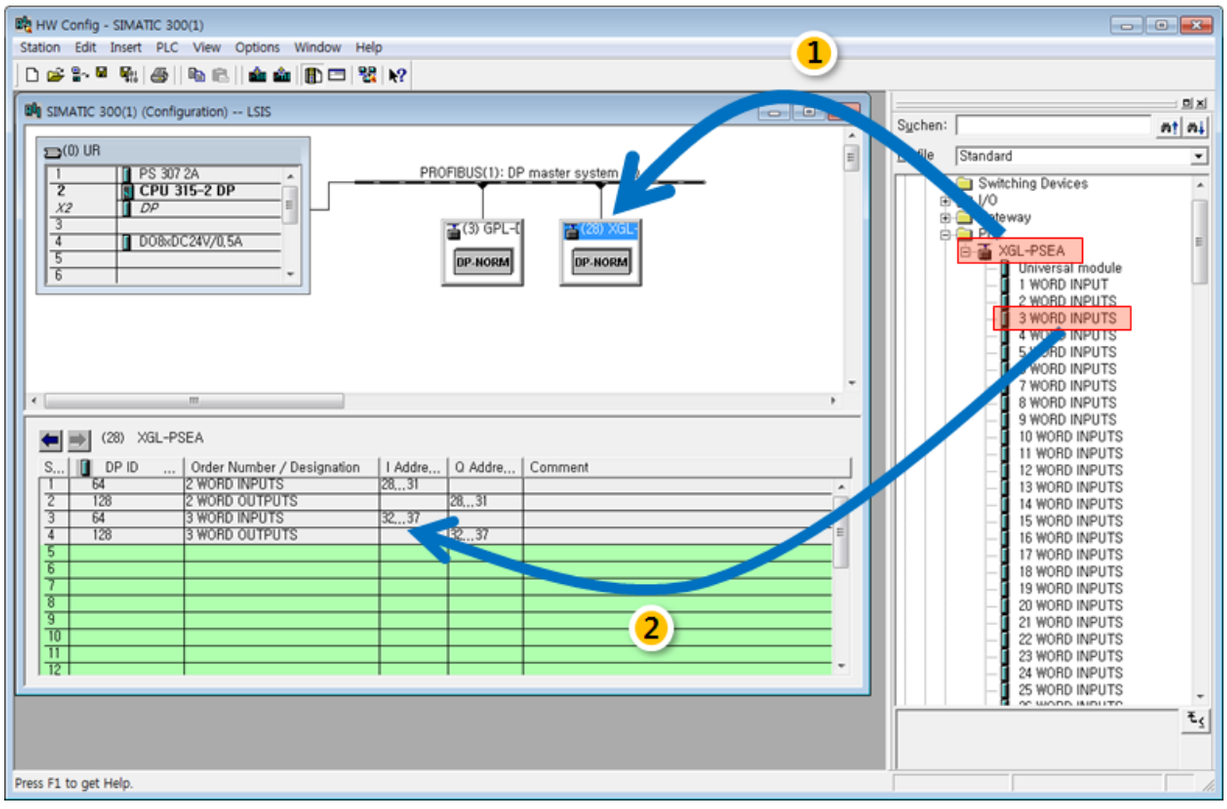
(13) Basic settings of the master

After setting up the name and station number that are the default settings of the master, click the OK button.



(14) Adding slaves

In common with adding modules, drag the relevant slave from the Profile and add it to the communication BUS line. Double-click the slave to change the detailed settings such as I Address(specifying input area, address from the master point of view), Q Address(specifying output area, address from the master point of view), etc.



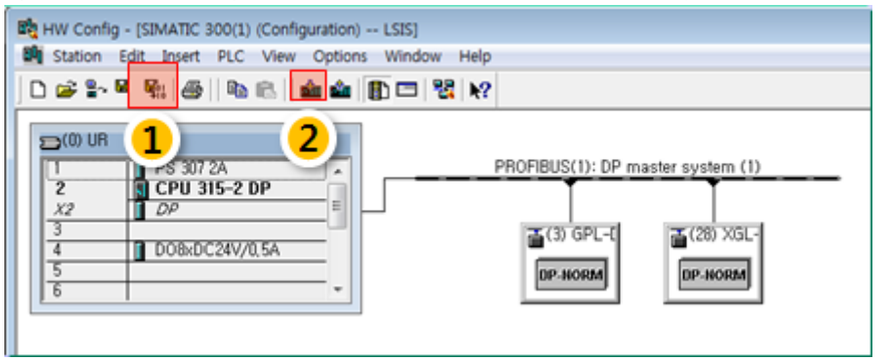
(15) Adding modular to the node

In the case of expended type or device memory communication like PSEA, add the modular by Drag & Drop in accordance with the settings but in the case of fixed modules, such works are not needed.

(16) Compile and Download

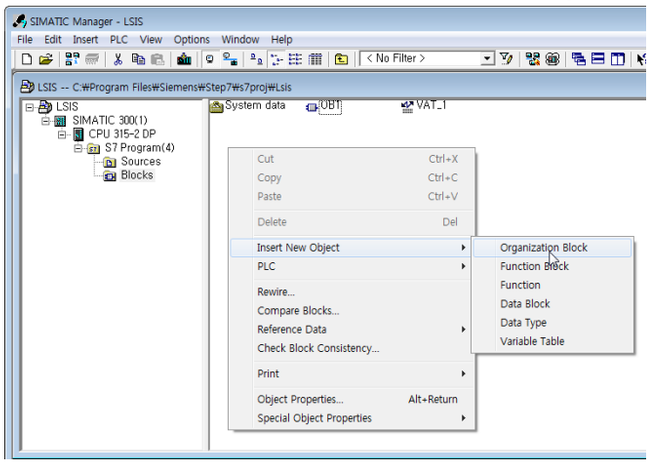
a) If all settings are completed, click the Compile button to compile parameters.

b) Download the compiled values to the modules. It STOPs during download so you need to be careful.

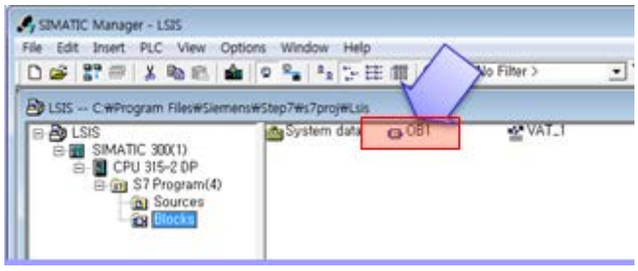


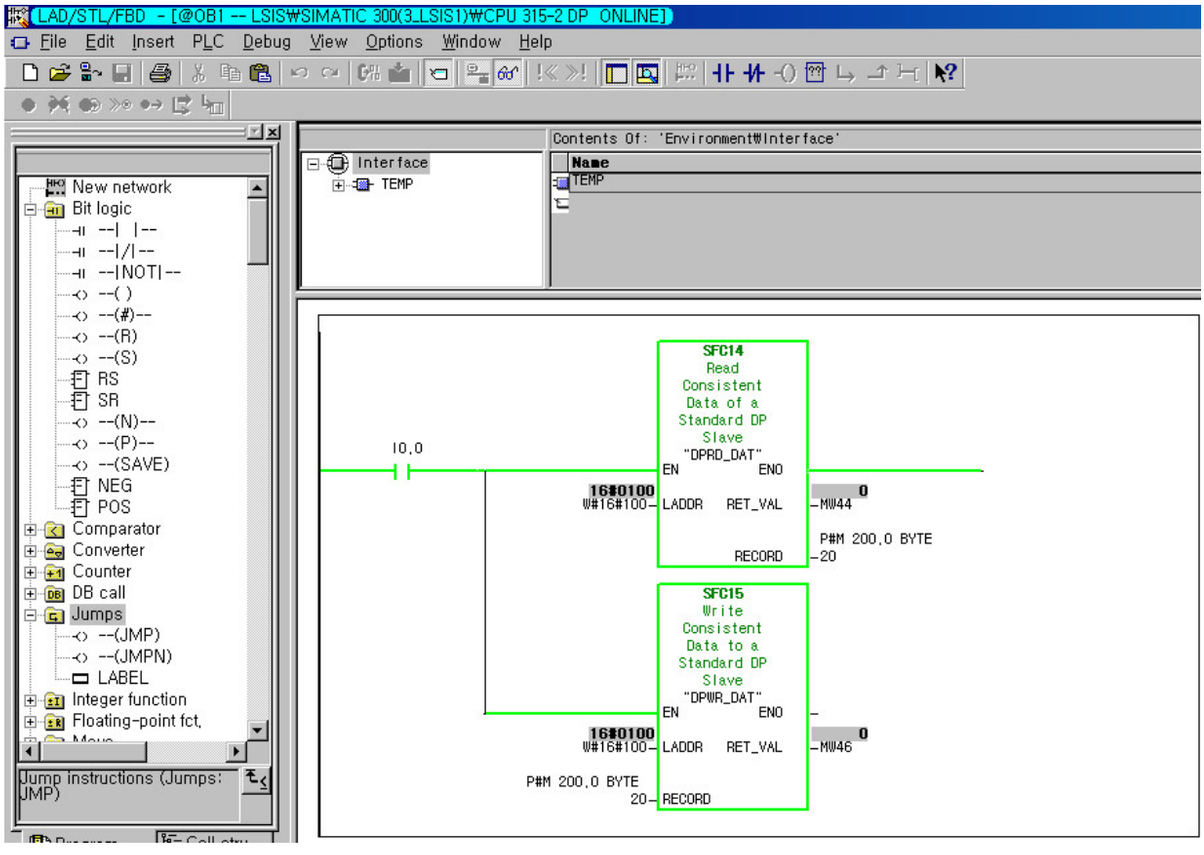
(17) Making communication programs

The Siemens programs are managed in units of block and you need to create or modify OB1 to make a program. If you double-click blocks of the CPU tree in SIMATIC Manager, the blocks will be listed in a taskpad window.



If you click 'Insert New Object' by using the right mouse button on an empty space, you can create various blocks.





a) Contacts setting

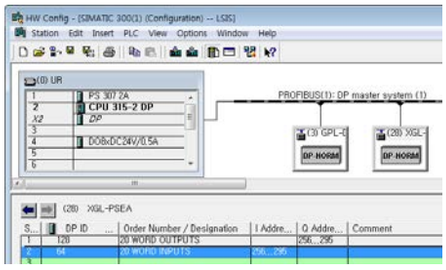
Drag the contacts from the left Bit Logic and insert them to the program window.

* To input the pulse type signals, you need to insert the pulse coil to between contacts and function blocks. (--(P)--)

b) Insertion of communication function blocks

Add SFC14(Read), SFC15(Write) as shown in the figure.

(a) LADDR: The data address of the module to be used, input the data address set in the HW Config.



(b) Specify the CPU memory in the array pattern by using a point

(c) RET_VAL: Specify the address that will store the state information.

Notice

If you want to use the functions such as Sync, Freeze, etc. other than opening the basic communication mentioned above, please take the education course of Siemens communication separately. Detailed inquiries on Siemens PLC are not supported by LSIS.

Chapter 6 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 0~55°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 Slave module can set max. 64 Stations. (Including master)
But for XBL-PSEA, station number 1~125 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(0.18mm^2).

(3) Environment

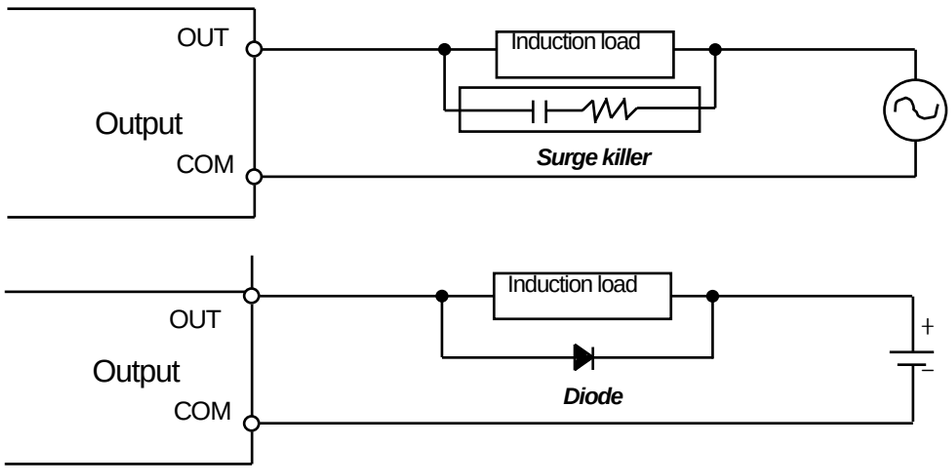
When I/O wiring, if it is close to heat generating machine or material or if the wiring is contacted directly to oil for long time, it may cause short-circuit, breakage and failure.

(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.

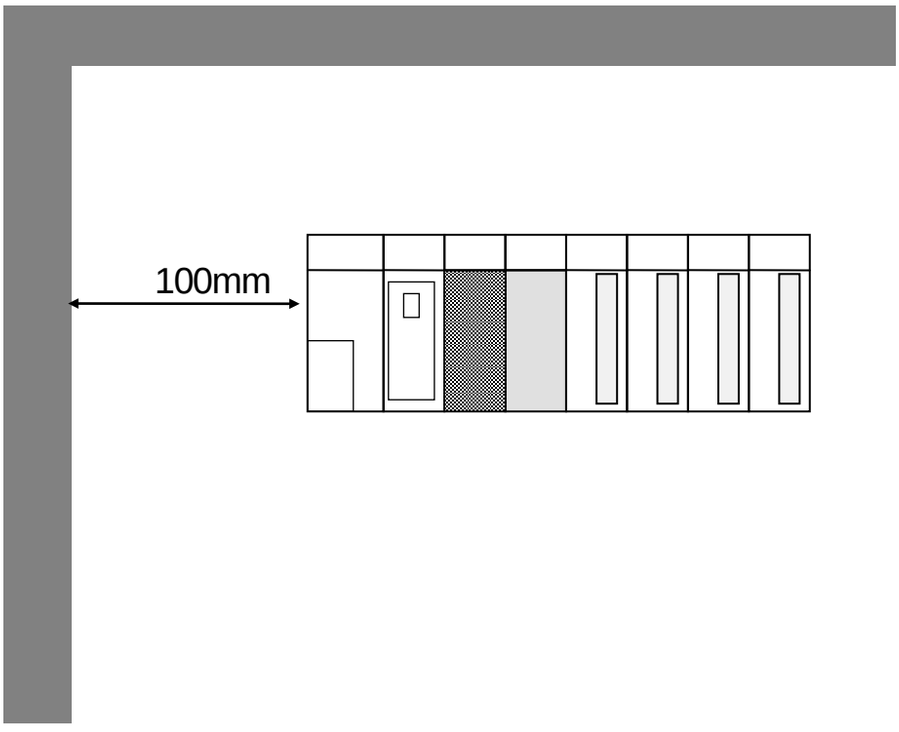
(7) Except for the mentioned above, do not apply strong impact to the basic or extended unit or remove the PCB from the case.

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.

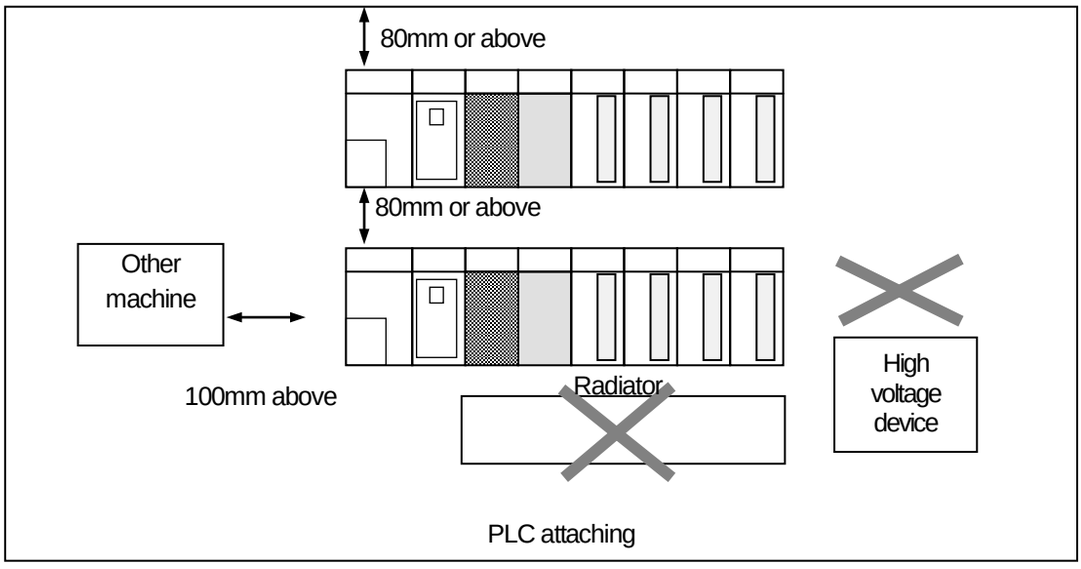


(3) Use different panel for large sized electronic contactor or vibration source such as no-fuse breaker etc. and install separately.

(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.

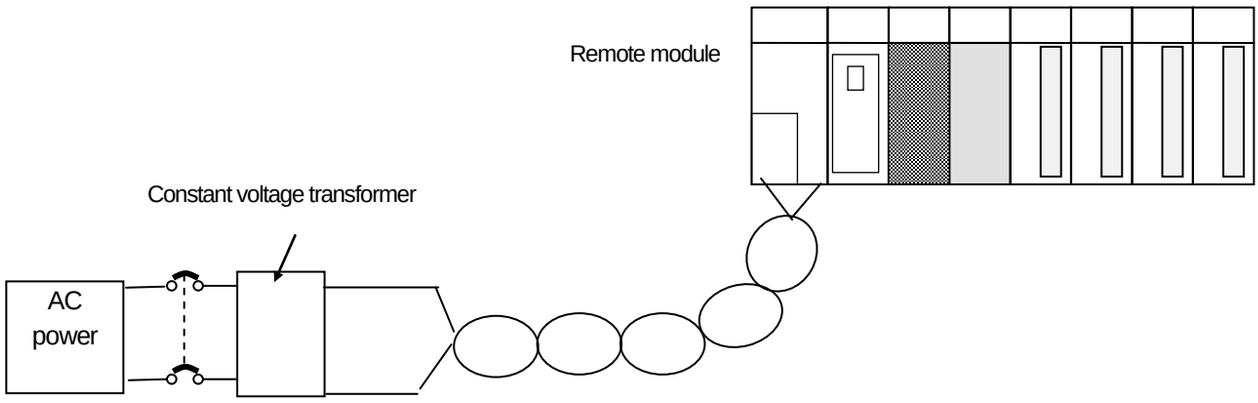


6.2 Wiring

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

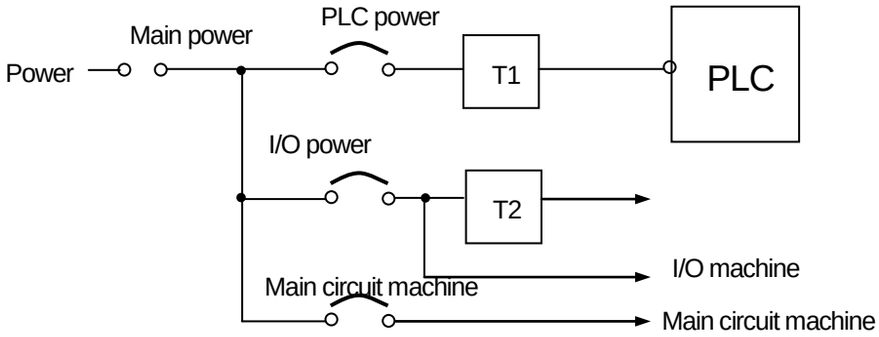
6.2.1 Power Wiring

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.

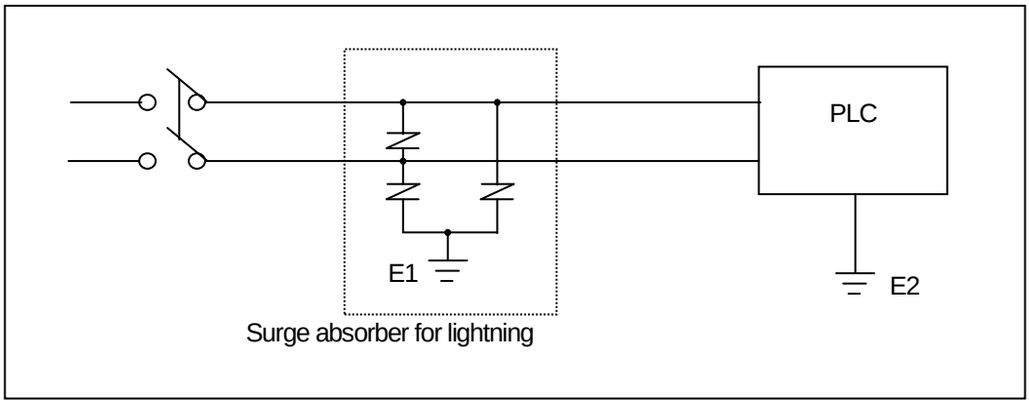


※ T1,T2: Constant voltage transformer

6) For the power cable, it is required to use a thick one ($2mm^2$) 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

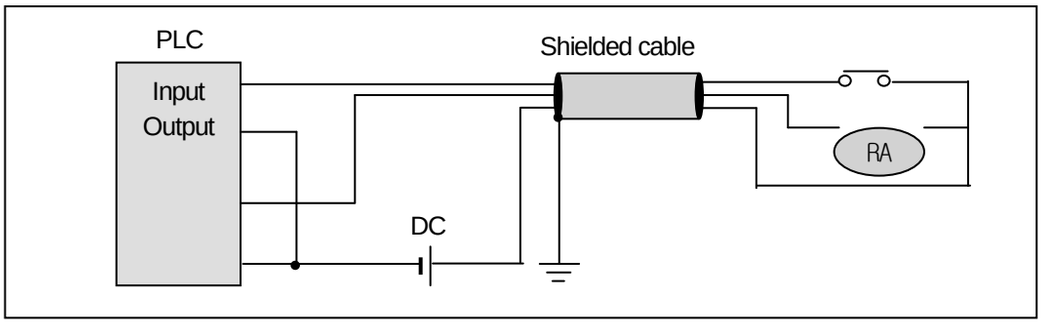
1) Separate the earth (E1) of the surge absorber for lightning and the earth (E2) of PLC.
2) Select the surge absorber for lightning so that it does not exceed max. allowable voltage of the absorber even when the power voltage is rising maximum.

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

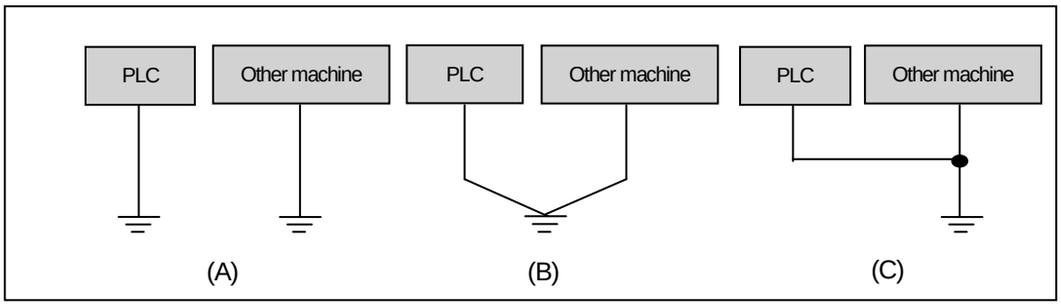
1) The spec. of I/O wiring cable is 0.18~2 mm^2 and it is recommended to use the cable spec. (0.5mm^2) conveniently.
2) Input cable and output cable should be separated for wiring.
3) I/O signal cable should be separated at least 80mm from main circuit cable of high voltage, high current when wiring.
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.
3) For he grounding construction, please use the 3rd class grounding (grounding resistance less than 80 Ω).
4) 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

5) Please use the electric wire for grounding more than 2 mm^2. 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) XBL-PSEA has the ground terminal on the bottom of the communication port. For stable and safe use, connect the ground.

- Before system configuration, connect the ground since you need to separate the communication connector for ground wiring.
- For ground wiring, refer to 6.2.4 Cable Specifications for Wiring.

6.2.4 Cable Specification for Wiring

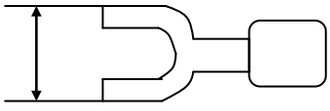
The Cable specification to be used for the wiring is as follows

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

For the power and I/O wiring 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)

Less than 6.2mm 

Chapter 7 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 screw.
Indication LED	RUN LED	Check 'ON'	Module operates normally (normal operation of system OS)	Refer to Chapter 3.
	P-N LED	Check 'ON'	Power and communication normal	Refer to Chapter 3.
	STATUS LED	Check 'ON'	Expansion I/O module information match	Refer to Chapter 3.
	ERR LED	Check 'ON'	Module detached, invalid module installed, Out of I/O data range, 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 ~ 28.8V	Power supply change

Chapter 8 Trouble Shooting

This chapter describes various errors that may occur during system operation and provides the causes of error, corrective measures. If errors occur in communication modules, the error details will be displayed with the LED of communication modules. In this case, read the instructions on LED display part stated in the product specifications and perform trouble shooting in accordance with the error codes described in this chapter.

8.1 Problems and Corrective Measures depending on the LED state

You can find the simple symptoms through the state of the communication module's LED and take proper corrective measures. (In case of high-speed link Enable).

RUN	I/F	HS	P-RUN	STATUS	ERR	Problems	Corrective measures
On	Flickering	Off	Off	Off	Off	- high-speed link Disable	-
On	Flickering	On	Off	Off	On	- Conflicts of station No.	- Check the station No.
						- Bad contact of connectors	- Check the state of connectors and communication line
						- Errors of high-speed link parameters	- Check high-speed link parameters
On	Flickering	Off	Off	On	On	- Bad contact of connectors	- Check the state of connectors and communication line
Off	Off	Off	Off	Off	Off	- Occurrence of serious failures	Contact the repair shop

[Table 8.1] Problems related to communication modules (In case of high-speed link Enable)

8.2 System Diagnosis of XG5000

The diagnosis items for each module provided by XG5000 are as below.

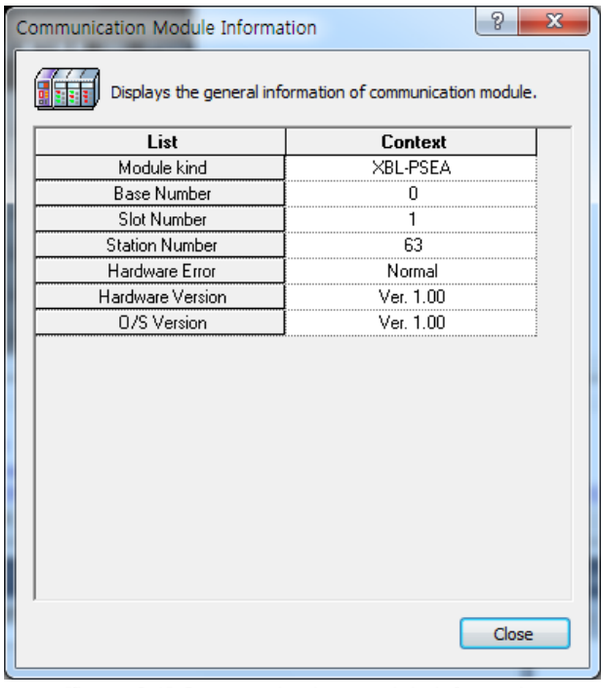
Diagnosis items	Descriptions
Information on communication modules	Displays the basic information on communication modules.
High-speed link	Displays the information on high-speed link flags.

[Table 8.2] System diagnosis provided by XG5000

You can start the service in "Online" menu of XG5000
"Communication module setting" -> "System diagnosis" .

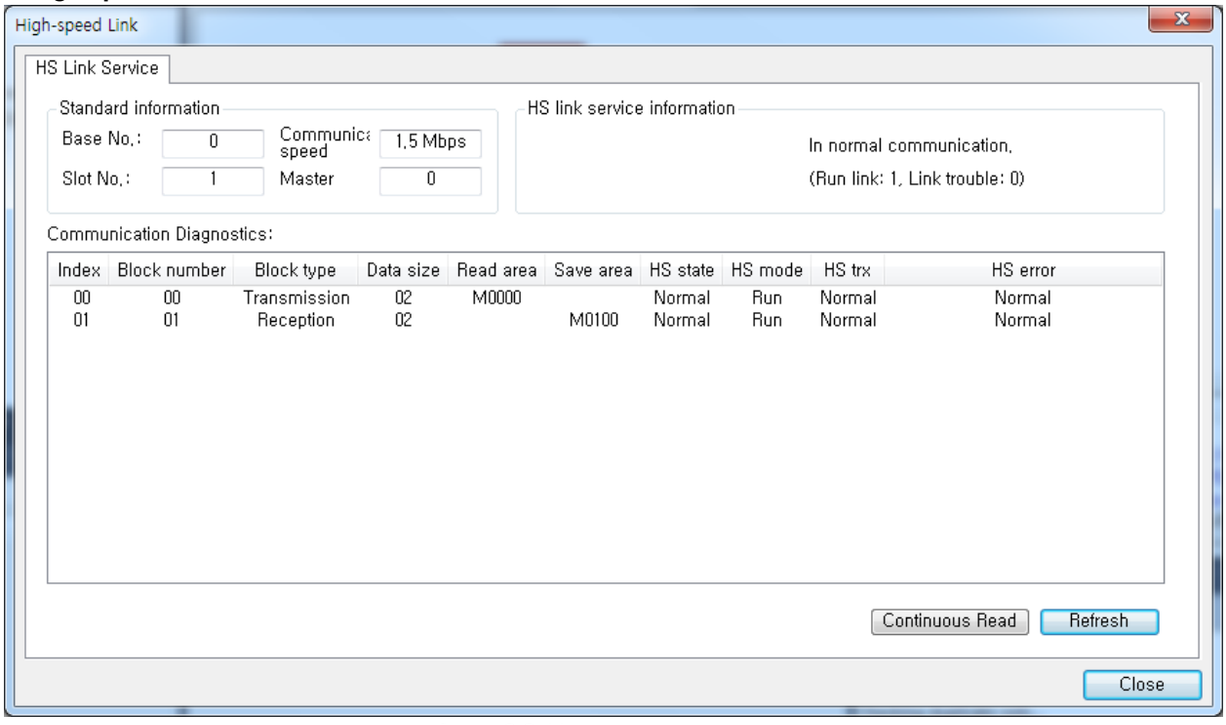
8.2.1 Information on communication module

It displays the information on the Pnet slave I/F module.



[figure 8.1] Communication module information

8.2.2 High-speed link



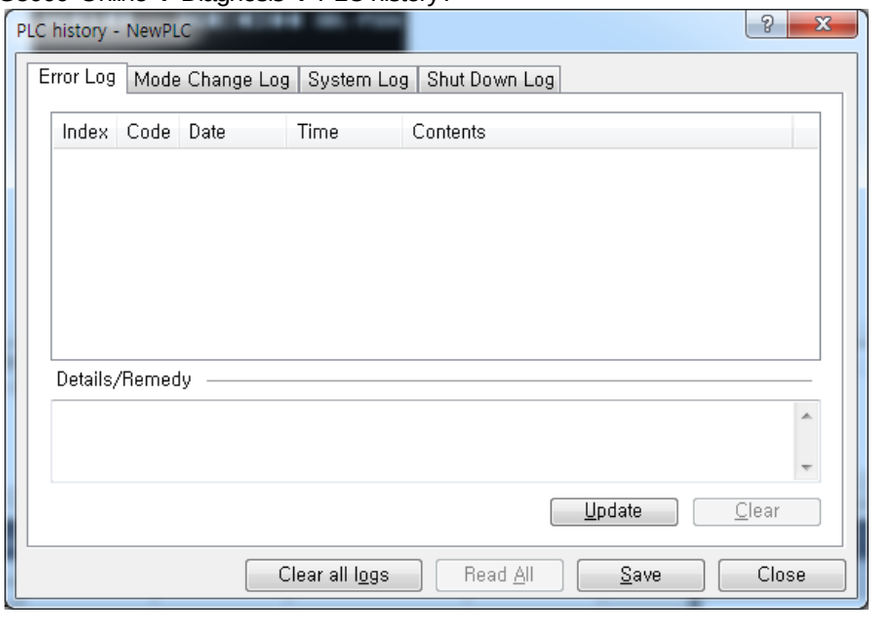
[figure 8.2] High-speed link

high-speed link diagnosis		
Category(Large)	Category(Small)	Description
Basic information	Base No.	Base No. with modules
	Slot No.	Slot No. with modules
	Communication speed	Communication speed
	Master station No.	Displaying the connected master station No.
Whole information of high-speed link	Run Link	Displaying Link Enable (Enable: 1, Disable: 0)
	Link trouble	In case errors occur after Run Link backs to normal.
Individual information of high-speed link	Index	Index of high-speed link parameters
	Block No.	No. of high-speed link blocks
	Block type	Display whether the block is sent or received one.
	Data size	Size of the send and receive data
	Area to be read	Start address of the device to send
	Saving area	Start address of the device to receive
	High-speed link state	Displaying the high-speed link state of slaves
	Mode	Displaying the communication state of masters and salve stations
	Send, receive state	Displaying send, receive state or error state
	Error	Displaying errors that occur during processing high-speed link data.

[Table 8.3] High-speed link diagnosis

8.3 Communication module diagnosis through XG5000

You can monitor whether there is any problem with communication modules through the access program. After connecting to the basic unit, select XG5000 'Online'→'Diagnosis'→'PLC history'.

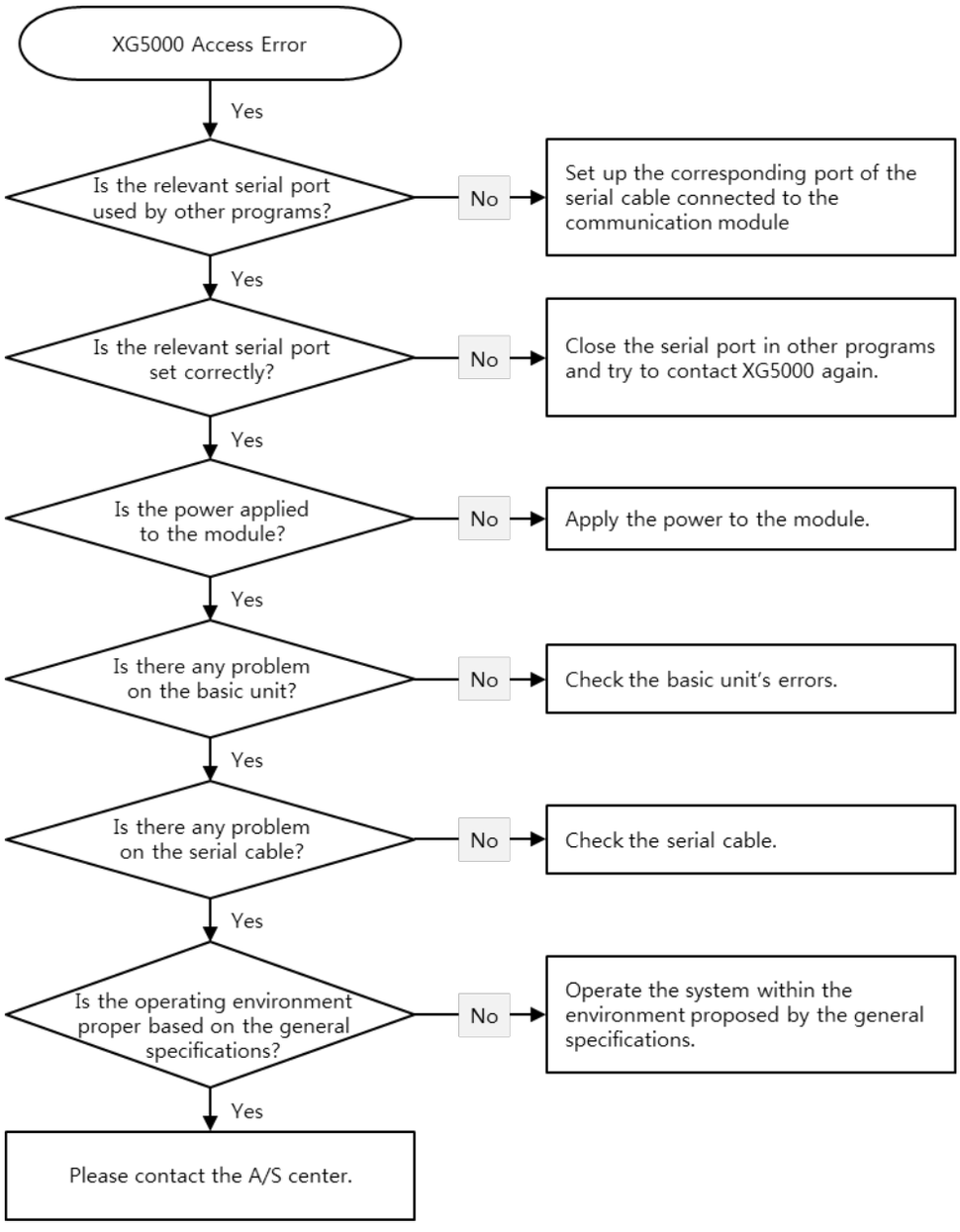


[Fig. 8.5] Monitoring the detailed information of PLC History

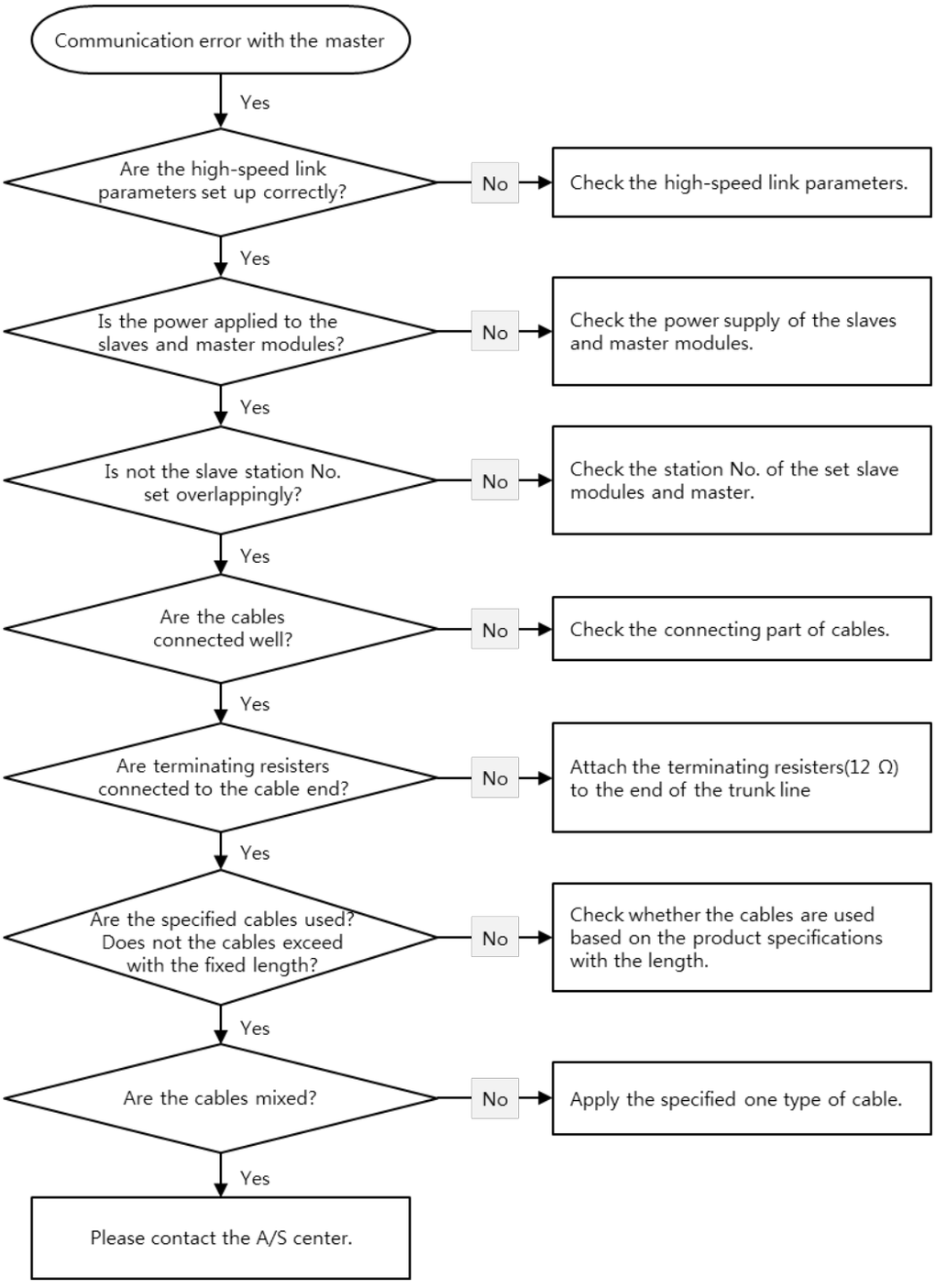
If hardware errors or interface errors of the basic unit occur, it is usual communication module's LED works abnormally. In this case, you can simply check the state information through the private program.

8.4 Trouble Shooting by Errors

8.4.1 XG5000 Access Error



8.4.2 Communication error with the master



Appendix

A.1 List of Flags

A.1.1 List of Special Relays (F)

Device 1	Device 2	Type	Variable	Function	Description
F0000	-	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.
-	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
-	F0001E	BIT	_CB1	Compile code 1	Compile code 1 selected.
-	F0001F	BIT	_CB2	Compile code 2	Compile code 2 selected.
F0002	-	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.
-	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_ER	Power error	Base power abnormal.
-	F00030	BIT	_WDT_ER	Scan watch-dog	Scan watch-dog active.
F0004	-	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.
-	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
-	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
F0009	-	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.
-	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 scan	ON/OFF CLOCK 0 for specific scan
-	F00101	BIT	_USR_CLK1	Repeat specific scan	ON/OFF CLOCK 1 for specific scan

Device 1	Device 2	Type	Variable	Function	Description
-	F00102	BIT	_USR_CLK2	Repeat specific scan	ON/OFF CLOCK 2 for specific scan
-	F00103	BIT	_USR_CLK3	Repeat specific scan	ON/OFF CLOCK 3 for specific scan
-	F00104	BIT	_USR_CLK4	Repeat specific scan	ON/OFF CLOCK 4 for specific scan
-	F00105	BIT	_USR_CLK5	Repeat specific scan	ON/OFF CLOCK 5 for specific scan
-	F00106	BIT	_USR_CLK6	Repeat specific scan	ON/OFF CLOCK 6 for specific scan
-	F00107	BIT	_USR_CLK7	Repeat specific scan	ON/OFF CLOCK 7 for specific scan
F0011	-	WORD	_LOGIC_RESULT	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.
F0012	-	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”
-	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 input	Reported if irregular value input.
F0058	-	DWORD	_ERR_STEP	Error step	Error step saved.
F0060	-	DWORD	_REF_COUNT	Refresh	Increased when module refresh executed.
F0062	-	DWORD	_REF_OK_CNT	Refresh OK	Increased if module refresh normal
F0064	-	DWORD	_REF_NG_CNT	Refresh NG	Increased if module refresh abnormal.
F0066	-	DWORD	_REF_LIM_CNT	Refresh LIMIT	Increased if module refresh abnormal (TIME OUT).
F0068	-	DWORD	_REF_ERR_CNT	Refresh ERROR	Increased if module refresh abnormal.
F0070	-	DWORD	_MOD_RD_ERR_CNT	Module READ ERROR	Increased if module reads 1 word abnormally.
F0072	-	DWORD	_MOD_WR_ERR_CNT	Module WRITE ERROR	Increased if module writes 1 word abnormally.

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 error displayed.
F0096	-	WORD	_IO_TYER0	Module type 0 error	Main base module type error.
F0097	-	WORD	_IO_TYER1	Module type 1 error	Added base step 1 module type error.
F0098	-	WORD	_IO_TYER2	Module type 2 error	Added base step 2 module type error.
F0099	-	WORD	_IO_TYER3	Module type 3 error	Added base step 3 module type error.
F0100	-	WORD	_IO_TYER4	Module type 4 error	Added base step 4 module type error.
F0101	-	WORD	_IO_TYER5	Module type 5 error	Added base step 5 module type error
F0102	-	WORD	_IO_TYER6	Module type 6 error	Added base step 6 module type error
F0103	-	WORD	_IO_TYER7	Module type 7 error	Added base step 7 module type error
F0104	-	WORD	_IO_DEER0	Module installation 0 error	Main base module installation error
F0105	-	WORD	_IO_DEER1	Module installation 1 error	Added base step 1 module installation error
F0106	-	WORD	_IO_DEER2	Module installation 2 error	Added base step 2 module installation 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.

Device 1	Device 2	Type	Variable	Function	Description
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
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_FLAG	Flash Read	ON when reading Flash N block data.
F0162	-	DWORD	_RBLOCK_WR_FLAG	Flash Write	ON when writing Flash N block data.
F0164	-	DWORD	_RBLOCK_ER_FLAG	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
L000000	_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.
L000001	_HS1_LTRBL	Bit	After _HS1RLINK is ON, abnormal status displayed	This flag will be On if the station specified in parameter and the data block's communication status are as 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 error, 3. when data block's communication status specified 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 condition is back to normal, it will be Off.
L000020 ~ L00009F	_HS1_STATE[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k's general status displayed	Displays the general status of the communication information for the specified parameter's respective data blocks. HS1STATE[k]=HS1MOD[k]&_HS1TRX[k]&(~_HSmERR[k])
L000100 ~ L00017F	_HS1_MOD[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k station's Run operation mode	Displays the operation mode of the station specified in parameter's data block k.
L000180 ~ L00025F	_HS1_TRX[k] (k=000~127)	Bit Array	Normal communication displayed with HS link parameter No.1, Block No.k station	Displays the communication status of parameter's data block k to check if normal as specified.
L000260 ~ L00033F	_HS1_ERR[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k station's Run error mode	Displays the communication status of parameter's data block k to check for any error.
L000340 ~ L00041F	_HS1_SETBLOCK [k=000~127]	Bit Array	HS link parameter No.1, Block No.k setting displayed	Displays the setting status of parameter's data block k.

[Table A.1] List of communication flags based on HS link number

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 registered 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 normally	P2P parameter No.1, block No.0 service complete normally
L006251	_P2P1_ERR00	Bit	P2P parameter No.1, block No.00 service complete abnormally	P2P parameter No.1, block No.0 service complete abnormally
L00626	_P2P1_STATUS00	Word	Error code if P2P parameter No.1, block No.00 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

No.	Keyword	Type	Detail	Description
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
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	_P1B01WD1	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	_P1B01WS1	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	_P1B01WD2	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	_P1B01WS2	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	_P1B01WD3	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

No.	Keyword	Type	Detail	Description
N00076	_P1B01WS3	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	_P1B01WD4	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	_P1B01WS4	Word	P2P parameter No.1, block No.01 saved area size 4	P2P parameter No.1, block No.01 saved area size 4 saved

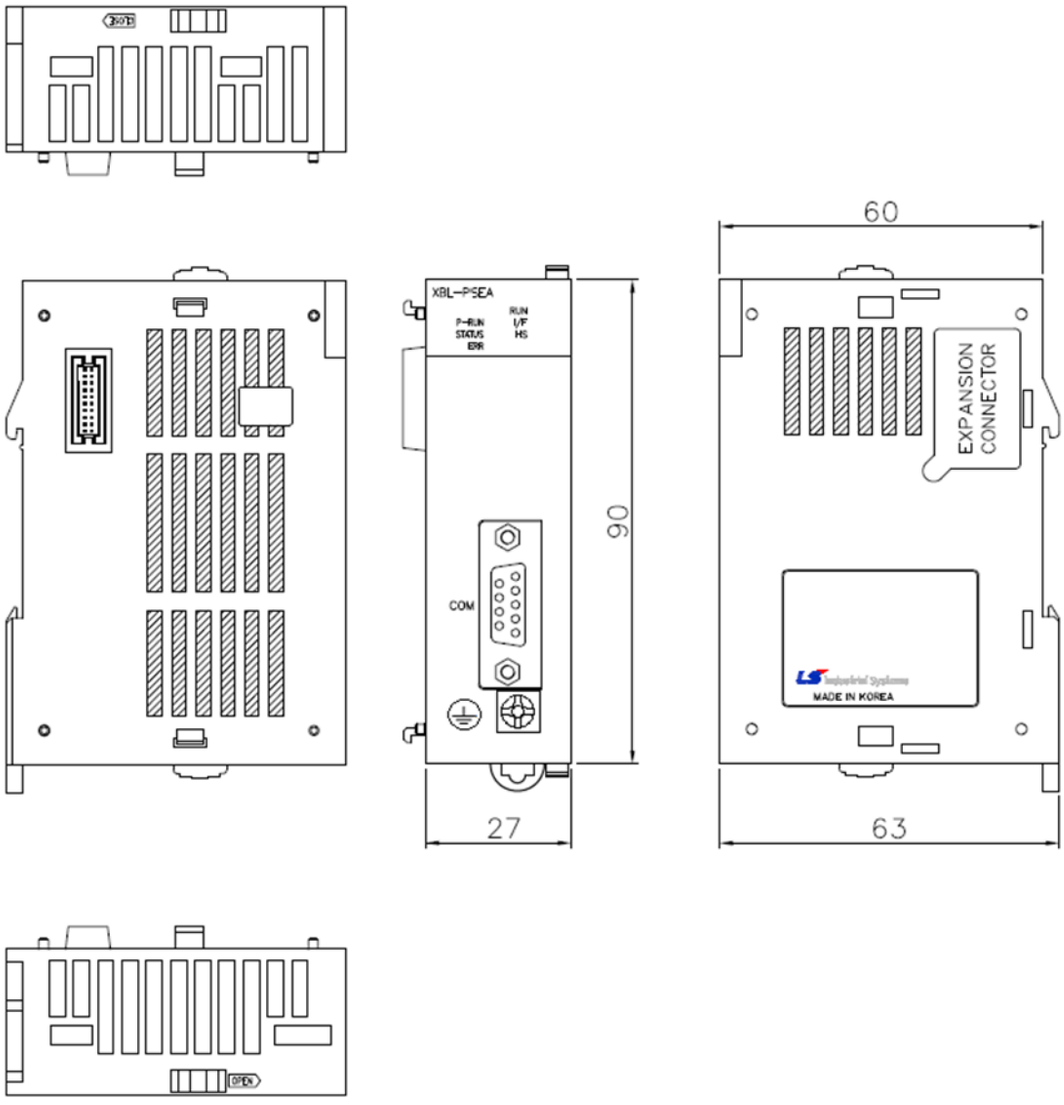
Notes

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

• XBL-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

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

Environmental Management

LSIS considers the environmental preservation as the preferential management subject and every staff of LSIS use the reasonable endeavors for the pleasurably environmental preservation of the earth.

About Disposal

LSIS' 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.

LSIS values every single customers.

Quality and service come first at LSIS.

Always at your service, standing for our customers.

http://www.lsis.com

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※ LSIS constantly endeavors to improve its product so that information in this manual is subject to change without notice.

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