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Programmable Logic Control

XGB Pnet I/F

XGT Series

User Manual

XBL-PMEC



Safety Instructions

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

LS[®]**ELECTRIC**

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



Caution

- ▶ **Design the analog input / output signal or pulse input / output line at least 100mm away from high voltage line or power line so that it is not affected by noise or magnetic field change.** It may cause malfunction due to noise.
- ▶ **If there is a lot of vibration in the installation environment, take measures to prevent direct vibration from being applied to the PLC.** It may cause electric shock, fire or malfunction.
- ▶ **If metallic dust is present in the installation environment, take measures to prevent metallic dust from entering the product.** It may cause electric shock, fire or malfunction.

Safety Instructions on Installation Process



Caution

- ▶ **Use PLC only in the environment specified in PLC manual or general standard of datasheet.**
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.
- ▶ **Make sure that the I / O connector is securely fastened.** It may cause wrong input or output.

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.



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 PE 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.

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.



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.

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	Remark	Page
V 1.0	'13.11	First Edition	-
V1.1	'15.03	XG5000 V4.0 UI Updated	Entire
V1.2	'20.06	Corporate Identity Changed (LSIS→LS ELECTRIC)	Entire

About User's manual

Thank you for purchasing PLC of LS ELECTRIC Co., Ltd.

Before use, make sure to carefully read and understand the User's Manual about the functions, performances, installation and programming of the product you purchased in order for correct use and importantly, let the end user and maintenance administrator to be provided with the User's Manual.

The User's Manual describes the product. If necessary, you may refer to the following description and order accordingly. In addition, you may connect our website (<http://www.lselectric.co.kr/>) and download the information as a PDF file.

Relevant User's Manuals

Title	Description	No. of User's Manual
XG5000 User's Manual	It describes how to use XG5000 software especially about online functions such as programming, printing, monitoring and debugging by using XGT series products.	10310000512
XG5000 User's Manual	It describes how to use XG5000 software especially about online functions such as programming, printing, monitoring and debugging by using XGB(IEC)	10130000834
XGK/XGB Series Instruction	It describes how to use the instructions for programming using XGK/XGB series.	10310000510
XGI/XGR/XEC Series Instruction	It describes how to use the instructions for programming using XGB(IEC) series.	10130000833
XGB Hardware User's Manual	It describes how to use the specification of power/input/output/expansion modules, system configuration and built-in High-speed counter for XGB basic unit.	10310000926
XGB Hardware User's Manual (IEC)	It describes how to use the specification of power/input/output/expansion modules, system configuration and built-in High-speed counter for XGB basic unit.	10130001059
XGB Analog User's Manual	It describes how to use the specification of analog input/analog output/temperature input module, system configuration and built-in PID control for XGB basic unit.	10310000920
XGB Position User's Manual	It describes how to use built-in positioning function for XGB unit.	10310000927

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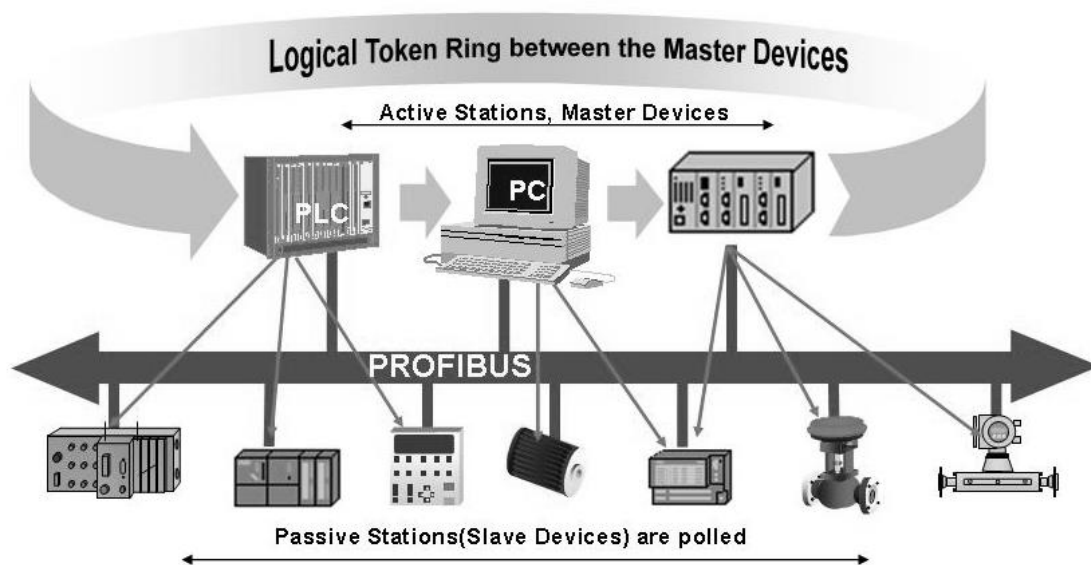
Chapter 1 Introduction

1.1 Introduction

This user's manual is to describe Profibus-DP (Decentralized Peripherals) Master I/F module (here in after referred to as **Pnet I/F module**) among communication modules of XGB PLC system.

Profibus-DP is specified in IEC Fieldbus Standard IEC 1158.

In this communication, Token Passing is used to control the communication and to configure the network easily. Pnet I/F module is a module to control the field bus with Twisted Shielded Pair Copper Cable applied.



1.2 Characteristics

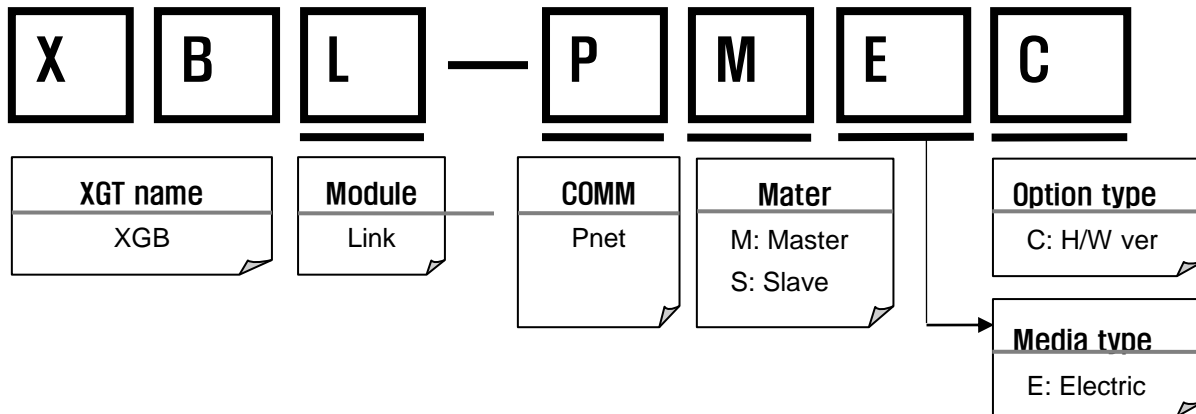
XGB Pnet I/F module has the characteristics as follows;

- ▶ Conforms to the international standard of EN 50170
- ▶ Supports Auto Baud Rate Detect
- ▶ Supports Sync/Freeze mode
- ▶ Max. input data : 244 Bytes/Slave
- ▶ Max. output data: 244 Bytes/Slave
- ▶ Communication speed : 9.6k, 19.2k, 93.7k, 187.5k, 500k, 1.5M, 3M, 6M, 12M

1.3 Product Configuration

1.3.1 Model Name

This describes on the product configuration of the XGB Pnet I/F module.



Remark

- (1) XGB Pnet supports only Profibus-DP. FMS, PA are not supported and protocol conversion is available by the coupler
- (2) Support of the DP version
 - 1) DP-V0: Periodical data exchange between the PLC and the slave device
(Node diagnosis, module status, specific channel diagnosis)
 - 2) DP-V1: Asynchronous data exchange between the PC or PLC and the slave device, integration of EDD and FDT, fail-safe communication, alarm
 - 3) DP-V2: supports broadcast, clock synchronization and time stamp, HART, upload/download, redundancy

1.3.2 Available number by CPU

You can mount up to 2 Pnet I/F module. If possible, mount the module in the basic unit for best performance of the communication module. The following table indicates the available service type by the CPU. When configuring the system, apply this considering the number of the communication module.

1.3.3 Slave Device

The Pnet I/F module can be connected with Smart I/O series and available product list is as follows.

Item	Model	Product Code	Contents	PNO ID	Remark
Block type PLC	G7L-PBEA	46270031	Connected at the K120S expansion part	0x7100	
Smart I/O (Block type)	GPL-D22A	47060007	DC input 16 points	0x07B1	Fixed type, 9-pin communication connector
	GPL-D24A	47060009	DC input 32 points	0x07B2	
	GPL-TR2A	47060008	TR output 16 (0.1A, Sink)	0x07B4	
	GPL-TR4A	47060010	TR output 32 (0.1A, Sink)	0x07B5	
	GPL-RY2A	47060011	Relay output 16	0x07B6	
	GPL-DT4A	47060012	DC input 16/ TR output 16	0x07B3	
	GPL-D22C	47060046	DC input 16	0x07B1	Removable type, 9-pin communication connector
	GPL-D24C	47060047	DC input 32	0x07B2	
	GPL-TR2C	47060048	TR output 16 (0.5A, Source)	0x07B4	
	GPL-TR4C	47060049	TR output 32 (0.5A, Source)	0x07B5	
	GPL-RY2C	47060051	Relay output 16	0x07B6	
	GPL-DT4C	47060050	DC input16/ TR output 16	0x07B3	
	GPL-TR2B	47060059	TR output 16 (0.5A, Source)	0x07B4	Fixed type, 9-pin communication connector
	GPL-TR4B	47060058	TR output 32 (0.5A, Source)	0x07B5	
	GPL-DT4B	47060060	DC input16/ TR output 16	0x07B3	
	GPL-TR2A1	47060084	TR output 16 (0.5A, Sink)	0x07B4	
	GPL-TR4A1	47060076	TR output 32(0.5A, Sink)	0x07B5	
	GPL-DT4A1	47060078	DC input 16/ TR output 16	0x07B3	
	GPL-TR2C1	47060085	TR output 16 (0.5A, Sink)	0x07B4	Removable type, 9-pin communication connector
	GPL-TR4C1	47060077	TR output 32 (0.5A, Sink)	0x07B4	
	GPL-DT4C1	47060079	DC input 16/ TR output 16	0x07B3	
	GPL-AV8C	47060123	Analog voltage input, 8 channels	0x09FB	
	GPL-AC8C	47060124	Analog current input 8 channels	0x09f8	
	GPL-DV4C	47060125	Analog voltage output, 8	0x09FC	
	GPL-DC4C	47060126	Analog current output, 8	0x09FE	
Smart I/O (Extension type)	XPL-BSSA	47060130	Expansion type Pnet I/F module	0x09F7	
Remote Module	XGL-PSRA	47200128	Pnet Remote I/F module	0x0CB1	
Communication Module	XGL-PSEA	47200132	Pnet Communication I/F ,module	0x0CBE	
	XBL-PSEA	47230156	Pnet Communication I/F ,module	0x0F24	

[Table1.3.1] Pnet I/F module product list

Remark

- 1) Fixed type: The product whose I/O terminal block is fixed at the module
- 2) Removable type: The product whose I/O terminal block can be removed

1.4 Software

This describes on the software tool for the Pnet I/F module. For programming and application, refer to the followings

1.4.1 Check list for the software

(1) Software list

- Programming tool : XG5000
- Communication configuration tool : PROFICON

(2) Selecting the CPU (Version) to use the Pnet I/F module

Item	Model	Available version	Remark
XBC	High performance	V2.22	
	Standard(USB)	V1.32	
XEC	High performance	V1.53	
	Standard	V1.11	
XBM	Modular type	V3.32	
Software	XG5000	V4.00	
	PROFICON	V2.2	

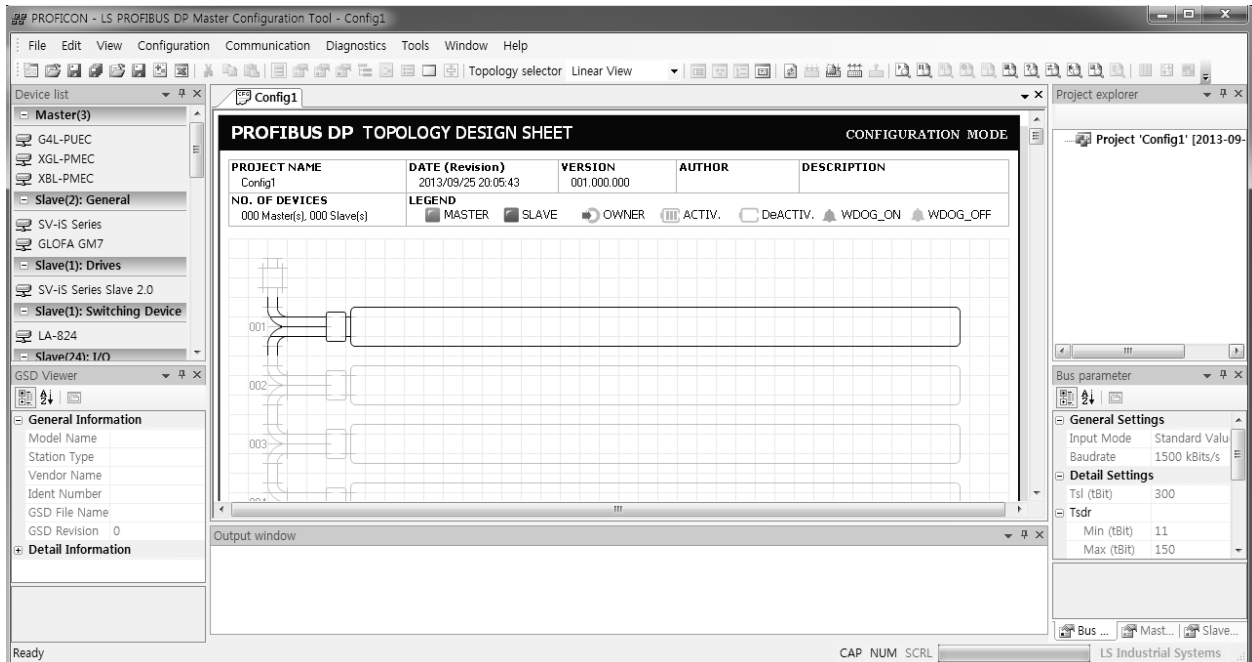
Remark

- (1) You can download the above software from our web site. In case Internet is available, visit the nearest distributor and get the installation CD.
Web site address: <http://www.lselectric.co.kr>
- (2) You can program through the RS-232C port and USB of the CPU module. For the cable, refer to wiring diagram of the CPU module.
- (3) In case you use the product other than available version, some function may not work properly. If possible, use the recommended version and check the compatibility.

1.4.2 PROFICON

PROFICON is software tool dedicated for Pnet I/F module. This is used for configuration, diagnostics. More detail, refer to ch6. PROFICON.

The following figure is an initial screen of the PROFICON.



[Figure 1.4.1] PROFICON initial screen

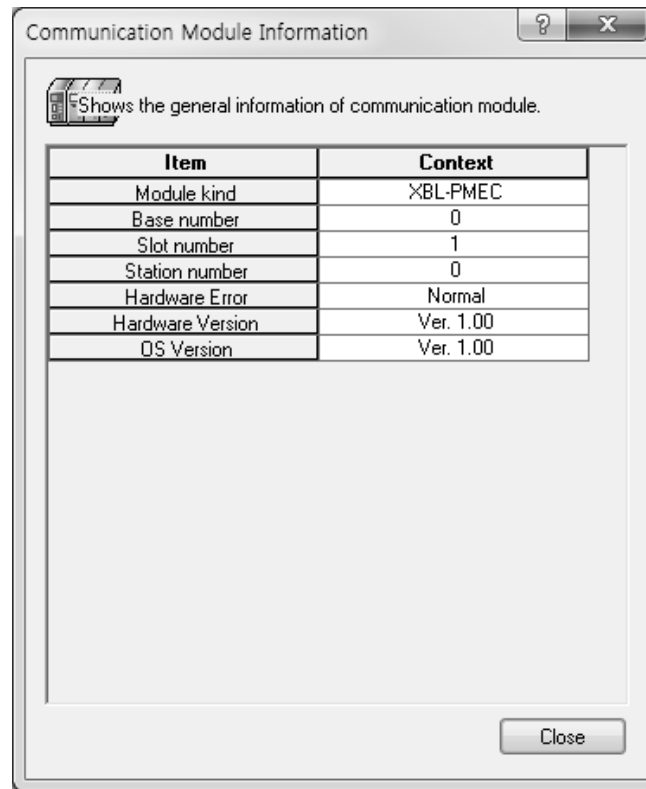
1.4.3 Check the version

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

(1) Check through the XG5000

This is method reading the communication module information through online connection
If it is under normal interface with the CPU, you can get the information as follows.

- a) Execute the XG5000
- b) Connect to the CPU through "Connect" on the "Online" menu.
- c) In the "System Diagnosis" screen, select "Module Information" by double-clicking the communication module and pop-up window
- d) You can check version of the module.

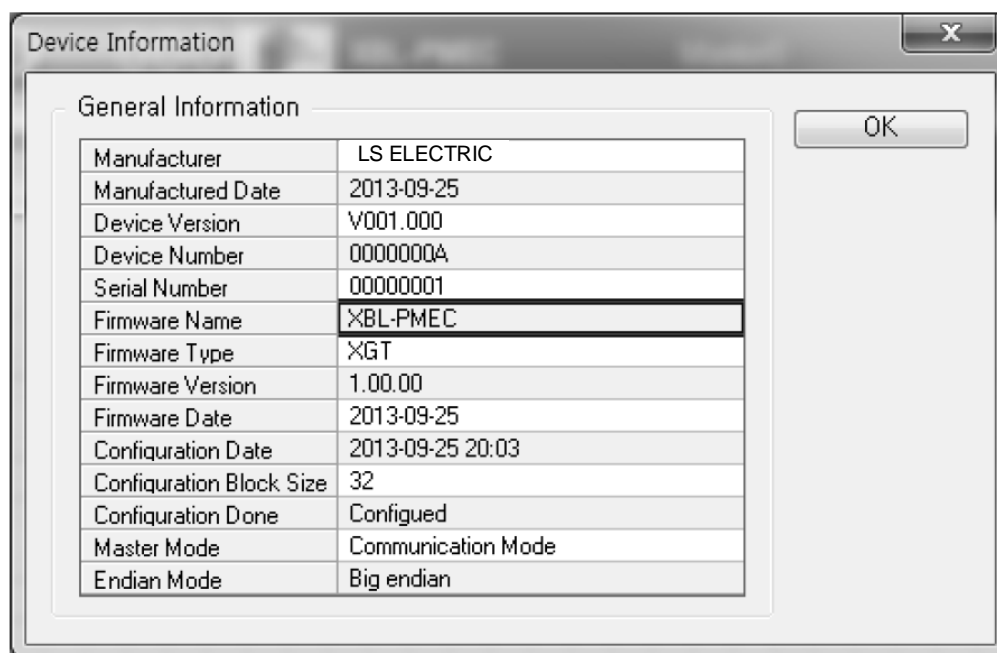


[Figure 1.4.3] Checking the version of the module through the XG5000

(2) Check through the PROFICON

This is method reading the communication module information through online connection
If it is under normal interface with the CPU, you can get the information as follows.

- a) Execute the PROFICON
- b) Select [Settings] on the [Communication] menu.
More detail, refer to [Communication connection settings] on the [ch5.3.1 Download Network Settings].
- c) Select [Device Information] on the [Diagnostics] menu.
- d) You can check version of the module.



[Figure 1.4.3] Checking the version of the module through the PROFICON

(3) Check through the case label of the product

The module information is attached at the external case every communication modules

In case online connection is not available, take a module apart and check the label in the module case.

Chapter 2 Specifications

2.1 General Specifications

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

No.	Item	Specification				Related specifications	
1	Operating temp.	0℃ ~ +55℃				-	
2	Storage temp.	-25℃ ~ +70℃				-	
3	Operating humidity	5 ~ 95%RH, no dew allowed				-	
4	Storage humidity	5 ~ 95%RH, no dew allowed				-	
5	Vibration immunity	For discontinuous vibration				-	
		Frequency	Acceleration	Amplitude	Number	IEC61131-2	
		5≤f< 8.4 Hz	-	3.5mm	Each 10 times in X,Y,Z directions		
		8.4≤f≤150 Hz	9.8 m/s ² (1G)	-			
		For continuous vibration					
		Frequency	Acceleration	Amplitude			
		5≤f< 8.4 Hz	-	1.75mm			
		8.4≤f≤150 Hz	4.9 m/s ² (0.5G)	-			
6	Impact immunity	* Max. impact acceleration: 147 m/s ² (15G) * Authorized time: 11 ms * Pulse wave : Sign half-wave pulse (Each 3 times in X,Y,Z directions)					IEC61131-2
7	Noise immunity	Square wave impulse noise		AC: ±1,500V DC: ±900V		LS ELECTRIC Standard	
		Static electric discharging		Voltage : 4kV (contact discharging)		IEC 61131-2, IEC 61000-4-2	
		Radiation electromagnetic field noise		80 ~1,000MHz, 10 V/m		IEC 61131-2, IEC 61000-4-3	
		Fast Transient /burst noise	Class	Power module	Digital/Analog I/O communication interface		IEC 61131-2, IEC 61000-4-4
			Voltage	2kV	1kV		
8	Ambient conditions	No corrosive gas or dust					
9	Operating height	2,000m or less					
10	Pollution level	2 or less					
11	Cooling type	Natural air cooling					

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	Master	
Network Type	Profibus-DP	
Standard	EN50170/DIN19245	
Interface	RS-485 (Electric)	
Transmission Route	Bus type	
Modulation Type	NRZ (Non Return to Zero)	
MAC	Token Passing	
Max. Distance & Transmission Speed	Distance (m)	Transmission 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 network	64	
Max. number of stations per segment	32 (including master & repeater)	
Cable used	Electric-twist shielded pair cable	
Max. input size per slave	244 bytes	
Max. output size per slave	244 bytes	
Max. input size of master	15,616 bytes (64 station * 244bytes/station)	
Max. output size of master	15,616 bytes (64 station * 244bytes/station)	
Communication Transmission cycle ^{*1}	10/20/50/100/200/500ms, 1/5/10s	
Communication Reception cycle	Main unit scan ×2 + Data reception time ^{*2} + Communication module scan	
Communication Parameters to set	PROFICON (XBL-PMEC Dedicated Configuration Tool)	
Internal-consumed current (mA)	300	
Weight (g)	86 (Including connector 122)	

[Table 2.2.1] Performance Specifications

Remark

1) Transmission cycle means the data cycle from main unit to communication module regardless of the cycle from master module to slave module. It is necessary to consider scan time, number of communication module, number of set blocks, communication data size per block when you set the transmission cycle. It takes $25\mu\text{s}$ per a byte when HS link data transmits from main unit to master module. As it is based on serial communication. So, the number of blocks per cycle is limited and if the load is above it, the cycle might be delayed more than you set. Calculation formula is as below.

a) Add the bytes of block within 1000bytes.

pack1 number of bytes = (Block₁ data size+8) + (Block₂ data size +8) ... + (Block_{pack1end} data size +8)

pack2 number of bytes = (Block_{(pack1end) + 1} data size +8) + (Block_{(pack1end) + 2} data size +8)...

+ (Block_(pack2end) data size +8)

... packN number of bytes = (Block_{(packN-1) + 1} data size +8) + (Block_{(packN-1) + 2} data size +8)

... + (Block_(packNend) data size +8)

Number 8 means the size of block information in here.

b) Calculate all of HS links transmission time. HS link cycle have to be set bigger than whole HS link transmission time. At this time, if calculated transmission time of each pack is smaller than 10ms, transmission time of applicable pack have to be calculated as 10ms.

All of HS links Transmission time = pack1 Transmission time + pack2 Transmission time + ...
+ packN Transmission time

pack1 Transmission time = pack1 number of bytes * $25\mu\text{s}^{-1}$ + main unit scan time + communication module scan and margin (5 ms)

pack2 Transmission time = pack2 number of bytes * $25\mu\text{s}^{-1}$ + main unit scan time + communication module scan and margin (5 ms)

...

packN Transmission time = packN number of bytes * $25\mu\text{s}^{-1}$ + main unit scan time + communication module scan and margin (5 ms)

c) The number of blocks which can be set per HS link cycle.

As shown below table, in case that the scan time of main unit is within 2ms and only one communication module is equipped, the number of blocks which can be used for HS link cycle service.

HS link cycle	Data size of each block	Number of blocks (Stations)
10 ms	244 byte	1
20 ms	244 byte	2
50 ms	244 byte	5
100 ms	244 byte	10
200 ms	244 byte	20
500 ms	244 byte	50
1s, 5s, 10s	244 byte	64
10 ms	4 byte	64

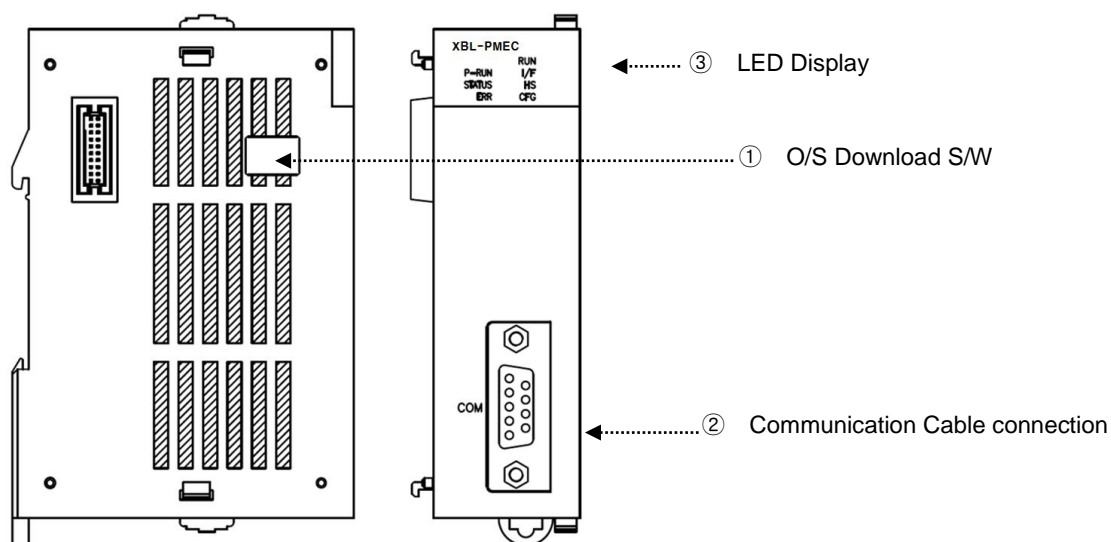
Example) The number of blocks which can be set per HS-link cycle

2) It is necessary to calculate lead time of transmitting depending on the number of blocks and data size per block. Because data receiving cycle is same with 1) which take $25\mu\text{s}$ to transmits per 1byte.

2.3 Structure & Characteristics

2.3.1 Structure of Pnet I/F module

(1) Structure of XBL-PMEC



Division	Color	Action Description		
RUN	Green	On	Normal	Initialize Completed
		Off	Error	Fatal error occurred
I/F	Yellow	Flickering	Normal	Normal Interface status with CPU
		Off	Error	Error in CPU interface
HS	Green	On	Normal	At HS_Link enable
		Flickering	Stand-by	On Downloading throug PROFIcon at HS_Link enable
		Error	Error	Fatal error of HS_Link service occurred at HS_link enable
P-RUN	Green	On	On communication	Executing normal access with all slave device
		Flickering	On communication	On CLEAR service with slave device(Input and output data is '0')
		Off	Off communication	Communication with slave devices is stopped
STATUS	Green	On	Error	System error
		Flickering	Autoscan	System Autoscan mode
		Off	Normal	Normal
ERR	Red	On	Error	Bus error(Line short, Link speed unmatched and etc)
		Flickering	Error	Disconnection with slave module on operating
		Off	Normal	Normal
CFG	Green	On	Error	No Configuration for Profibus-DP Master module
		Flickering	Normal	Downloading or Uploading Configuration parameter to Master module
		Off	Normal	Configuration is installed successfully

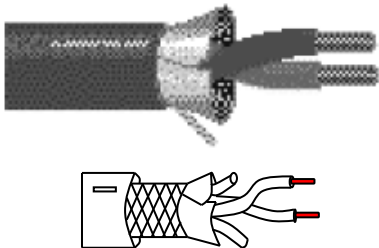
[Table 2.3.1] LED display of XBL-PMEC

Division	Color	Action Description		
RUN	Green	On	Normal	Initialize Completed
		Off	Error	Fatal error occurred
I/F	Yellow	Flickering	Normal	Normal Interface status with CPU
		Off	Error	Error in CPU interface
HS	Green	On	Normal	At HS_Link enable
		Flickering	Stand-by	On Downloading through PROFIcon at HS_Link enable
		Error	Error	Fatal error of HS_Link service occurred at HS_link enable
P-RUN	Green	On	On communication	Executing normal access with all slave devices
		Flickering	On communication	On CLEAR service with slave device(Input and output data is '0')
		Off	Off communication	Communication with slave devices is stopped
STATUS	Green	On	Error	System error
		Flickering	Autoscan	System Autoscan mode
		Off	Normal	Normal
ERR	Red	On	Error	Bus error(Line short, Link speed unmatched and etc)
		Flickering	Error	Disconnection with slave module on operating
		Off	Normal	Normal
CFG	Green	On	Error	No Configuration for Profibus-DP Master module
		Flickering	Normal	Downloading or Uploading Configuration parameter to Master module
		Off	Normal	Configuration is installed successfully

[Table 2.3.1] LED display of XBL-PMEC

2.4 Cable Specifications

2.4.1 Cable Specifications

Classification	Details	
AWG	22	
Type	BC-Bare Copper	
Insulation	PE-Polyethylene	
Insulated strength	0.035 (Inch)	
Shield	Aluminum Foil- Polyester Tape/Braid Shield	
Capacitance	8500 pF/ft	
Characteristic impedance	150Ω	
Number of cores	2 Core	

Remark

1. Cable type
- 1) Tomas cable: Profibus-DP UNITRONIC-BUS L2/FIP/BUS
 - 2) Belden cable: 3079A

Chapter 3 Installation and Test Operation

3.1 Installation Environment

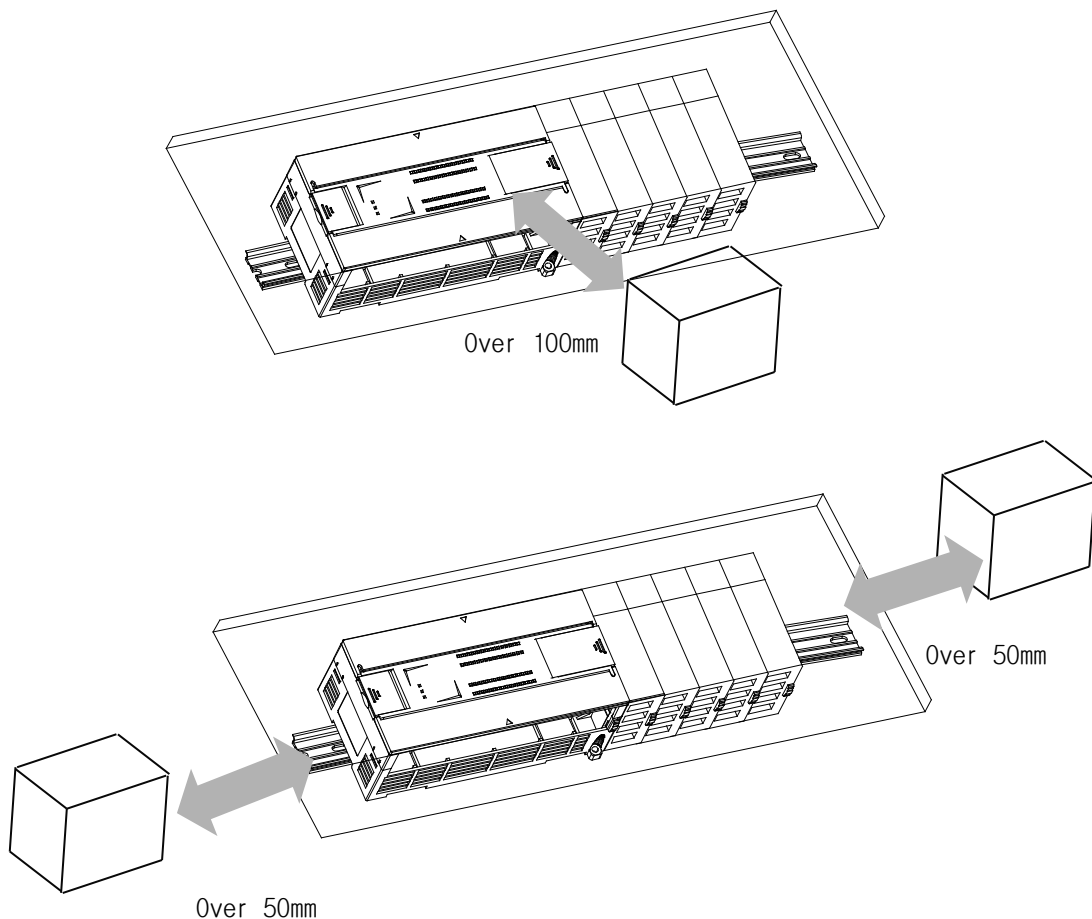
This product is very reliable regardless of installation environments, but to guaranty the reliability and stability of the system, pay attention to the following items.

1) Environment Conditions

- (1) Install in the control board where waterproof and dustproof are possible.
- (2) The places where constant impacts or vibrations are imposed.
- (3) The places where direct rays are not directly exposed.
- (4) The places where dew is not formed by the rapid change in temperature.
- (5) The places where surrounding temperature is maintained to be at 0-55℃.

2) Installation Constructions

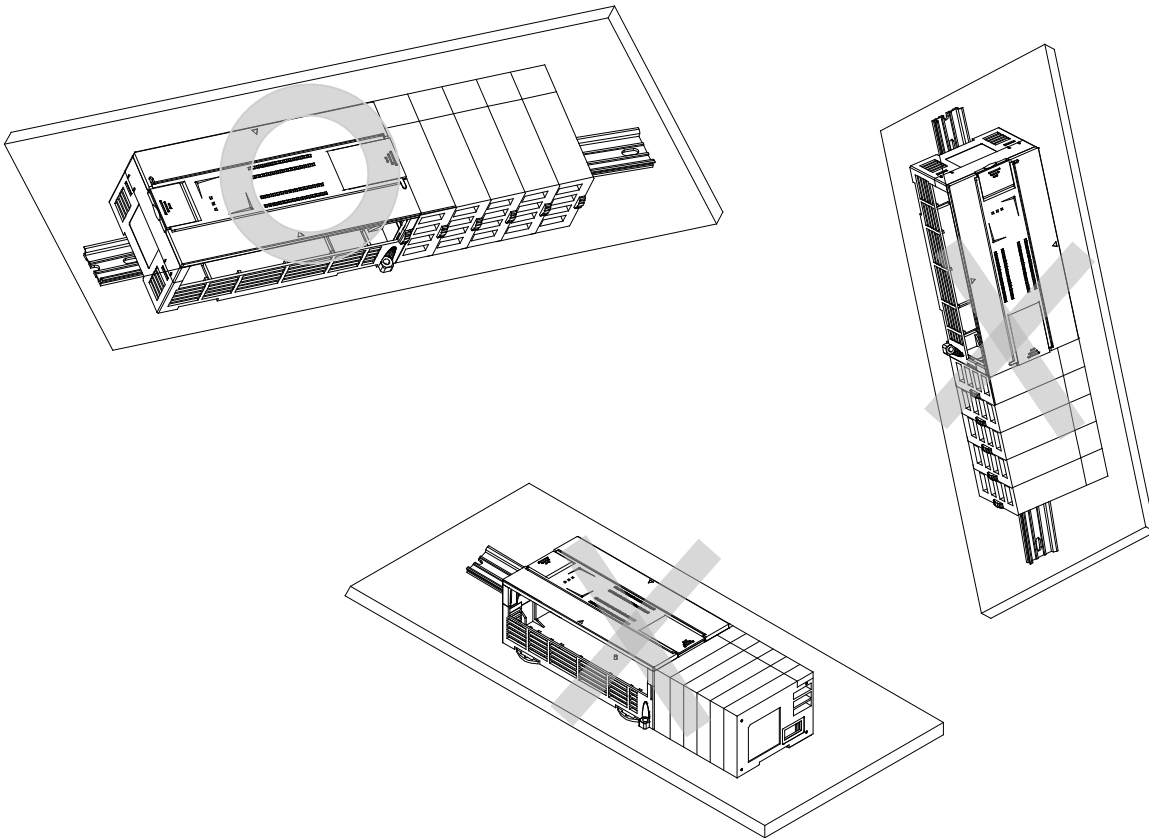
- (1) Make sure wiring leavings are not inserted inside the PLC when you process screw holes or do wiring jobs.
- (2) Install the places where it is easy to control.
- (3) Do not install into the same panel as high press machine.
- (4) Make sure the distance to the duct and the surrounding module is maintained to be more than 50mm.
- (5) Put to earth where surrounding noise environment is good.



3.2 Cautions when Handling

Observe the following directions when you configure the system using Pnet I/F module.

- 1) Do not drop or impose strong impact.
- 2) Do not separate PCB from the case. It may cause malfunctions.
- 3) Make sure foreign objects are not put into the upper area of the module while you do wiring jobs.
- 4) If foreign objects are entered, remove them.
- 5) Do not remove the module when light is On.
- 6) Use standard cables and install within maximum distance.
- 7) Make sure communication lines are not affected by surges and inductive noises that may occur from alternating current or current parts.
- 8) In case the machinery or the substances that may generate high temperature are nearby you or when wires directly come into contact oil and other things for a long time when you do wiring jobs, it may cause a short cut, damage, or malfunctions.
- 9) When you do wirings during pipe arrangement, it is necessary to put to earth to pipes.



3.3 Precautions for Installation

During the system configuration using Pnet I / F module, please check the detail contents as below.

- 1) Check the necessary basic elements to configure the system, and then select the appropriate communication module.
- 2) Select dedicated cable of Pnet to use for Pnet communication module.
- 3) Make sure whether connectors are damaged or not when you connect between connector and module.
- 4) All of communication modules can be equipped with max 2ea regardless of module type. The below table describes how many expansion module can be attached depending on the type of main unit.

Classification	XBC		XEC		XBM
	High Performance	Standard	High Performance	Standard	Modular
Max expansion number	10 modules	7 modules	10 modules	7 modules	7 modules

- 5) After attaching the module to main unit, lock the module up and then connect the communication cable.

3.3.1 Installation of cable

Shielded Twisted Pair Cable is used as Profibus cable. The maximum transmission distance by specification, speed and type of cable is as shown below [Table 3.3.1] and [Table 3.3.2].

Characteristics	Type A	Type B
Impedance	135~160Ω (freq. 3~20MHz)	100~130Ω (freq. > 100kHz)
Capacity	Lower than 30 pF/m	Lower than 60 pF/m
Resistance	Lower than 110 Ω	-
Conductor Area	Larger than 0.34 mm ² (22 AWG)	Larger than 0.22 mm ² (24 AWG)

[Table 3.3.1] Specification of cable

Baud rate (Kbit/s)	9.6	19.2	93.75	187.5	500	1500	3000	6000	12000
Cable Type A	1200m	1200m	1200m	1000m	400m	200m	100m	100m	100m
Cable Type B	1200m	1200m	1200m	600m	200m	70m	-	-	-

[Table 3.3.2] Transmission distance by Cable and Speed

Remark

- 1) It defines two type of bus cable in Profibus standards. But it is usually recommended Type A which place is newly installed. The type name of A and B ask to cable maker.
- 2) AWG(American Wire Gauge): Number system of size(a diameter) of wire

1) General safety instruction

- (1) If distance between stations, it can be extended through extension of segment (Maximum 9 repeater, 10 segment). It can be connected 32 stations (repeater included) per segment and maximum 126 stations can be connected. (Repeater has no number of station) There are extension segment that has no station.
- (2) Shield of cable is grounded to housing of connector.
- (3) It has to use exclusive connector which is inductor built-in in internal.
- (4) It can not use the Spur Line.
- (5) If the gap between stations is large, a large current is able to flow on a shield. In this case, Install the cable which is set the a potential difference of ground. Special attention is required more than 1.5Mbps.
- (6) It maintains minimum distance more than 1m between station at 12Mbps.

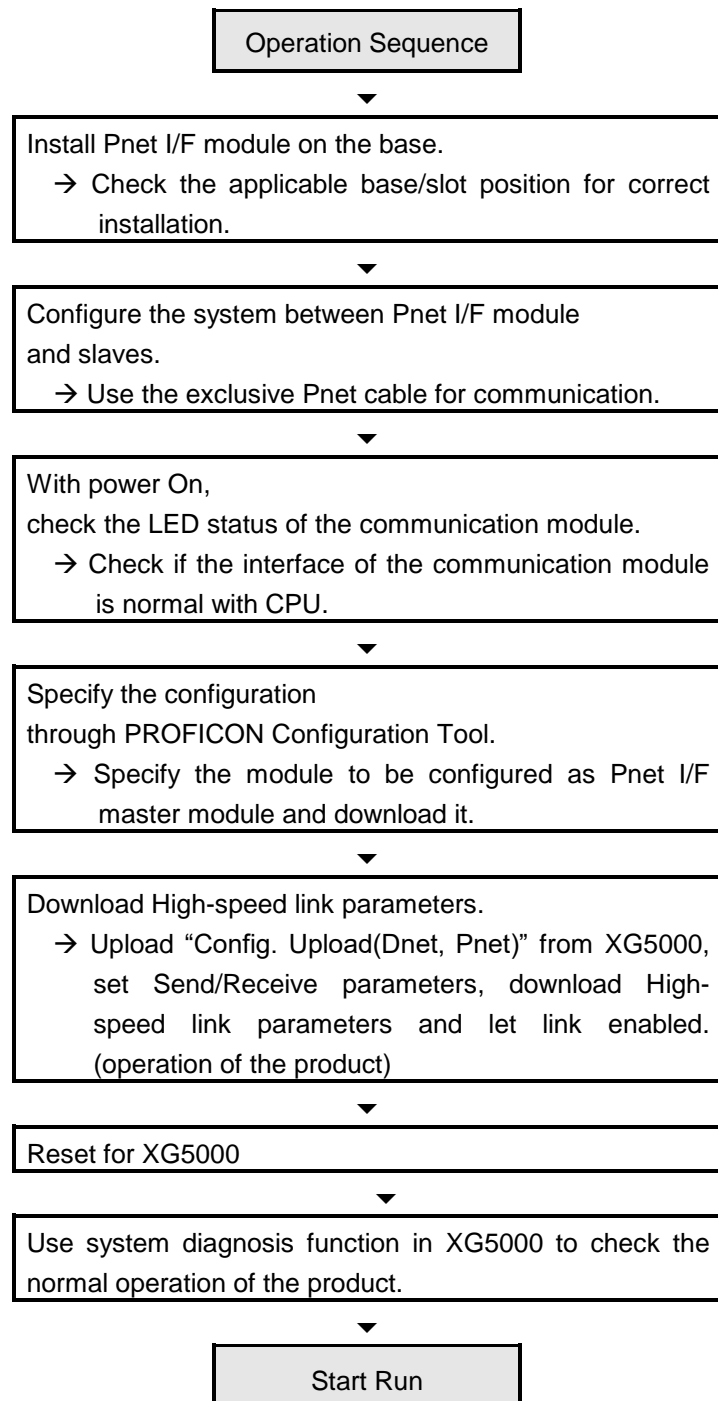
2) Termination

- (1) Each segment has to terminate the end. If segment is many, every segment have to terminate the end.
- (2) Termination is able to On/Off by switch of exclusive connetor.

Remark
1) Maximum number of repeaters is different from each repeater module.

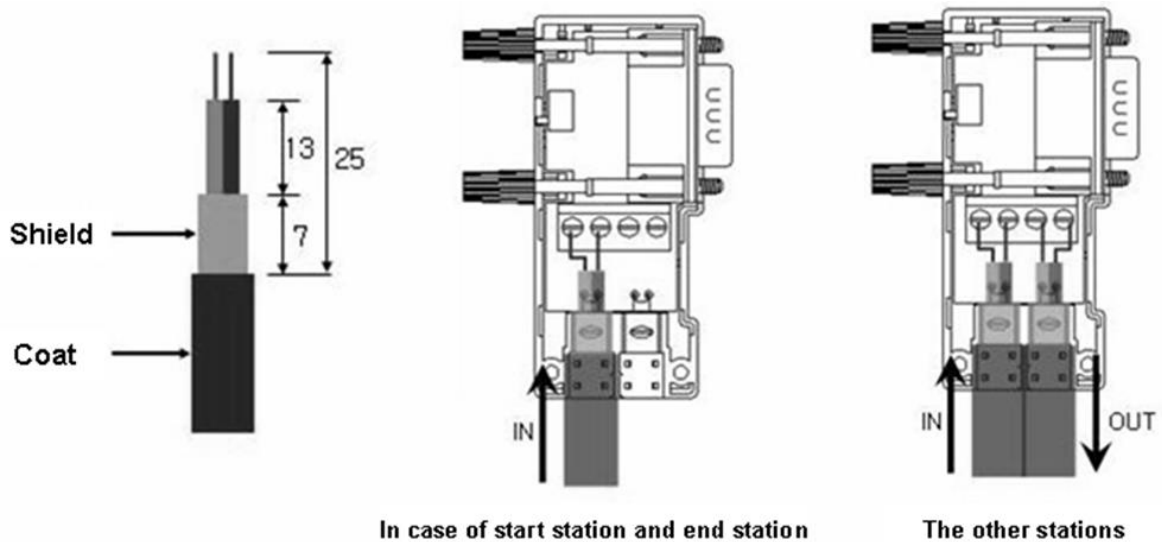
3.4 From Setting to Operation

The sequence of the product from installation to operation will be described below. After the product installation is complete, install and configure the system to be operated as specified in the following sequence.



3.5 Installation of the product

3.5.1 Installation of XBL-PMEC



[Figure 3.5.1] The method of Pnet cable installation

Remark

1) Installation length of Pnet cable depends on the communication speed. (Refer to [Table 3.3.2])

1) How to install Pnet cable

- (1) Use Profibus-DP cable.
- (2) When slipping the coat of the cable, be careful not to let the shielded line escaped from PCB of the connector.
- (3) The number of stations to be installed shall be within 32 including master and repeater for 1 segment.
- (4) The shielded line of the cable shall be in contact with the shielded area of the connector.
- (5) The cable is generally recommended to be installed at the end of the slave, diverged from the master.
- (6) If the cable is used at the object car, use the extended line.
- (7) Communication cable shall be installed at least 10cm away from the power supply cable.
- (8) Check the cable connected with the connector if tightened well with terminal block.
- (9) After the cable connected, measure the line resistance value on the master by means of digital multi-meter. (If terminal resistance at the both ends of the cable is On, it will be generally $110\Omega + \text{line resistance value} + \text{connector resistance value}$)

3.6 Test Operation

Terminal resistance switch of Pnet cable shall be On. If the switch is not On, communication errors may occur. Check LED operation status if normal with power on after communication cable is connected. If normal, download the applicable program to PLC via XG5000 so to execute the program.

3.6.1 Precautions for system configuration

- 1) Station No. of each slave shall be surely different from each other including this module. If connected with the repeated station No., communication error may occur, leading to communication trouble. High-speed link station No. of all stations also shall be different from each other to use High-speed link service.
- 2) Use the communication cable as specified only. If not, serious error may occur to communication.
- 3) Check communication cable if disconnected or shorted prior to installation.
- 4) Tighten up communication cable connector until connected firmly. If cable connection is unstable, serious error may occur to communication.
- 5) If remote communication cable is connected, keep the cable far away from power line or inductive noise.
- 6) Since the coaxial cable is not flexible, it is to be diverged min. 30cm away from the connector in communication module. If the cable is bent at a right angle or transformed compulsorily, cable disconnection or connector damage in communication module will be caused.
- 7) If LED operation is abnormal, refer to Chapter 9 Troubleshooting to check for causes and take actions against. Contact service center if the error is as before.

Chapter 4 System Configuration

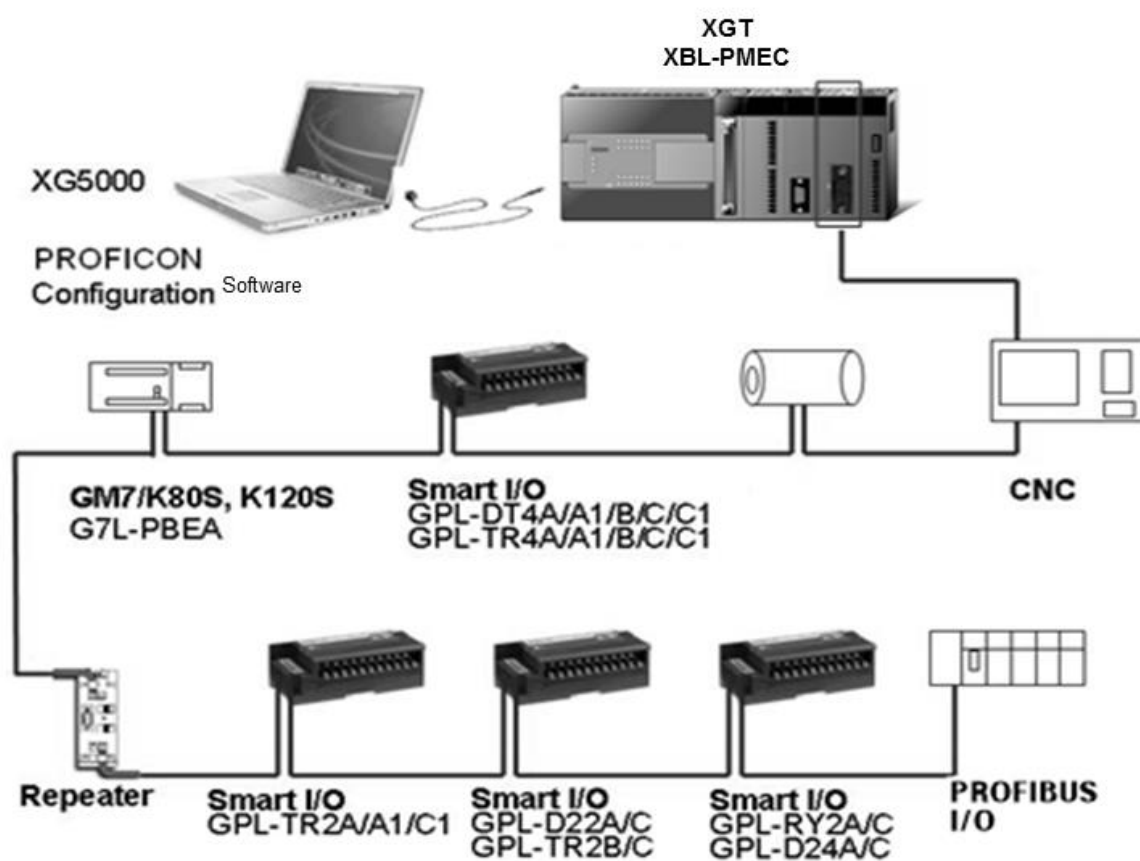
4.1 System Configuration of Network

Communication system of Pnet I/F modules is as shown below.

Master have to be set XBL-PMEC, the others have to be set slave modules.

To connect LS inverter with master module, the inverter module have to attach Pnet option module.

If it is used with another company product, GSD file provided by the maker is needed. After GSD file is copied to GSD folder of Pnet configuration software tool and then if you use Pnet configuration software tool, you can configure the slave modules in the network automatically.



[Figure 4.1] XBL-PMEC + Composite system Diagram

Chapter 5 PROFICON Setting

5.1 Overview

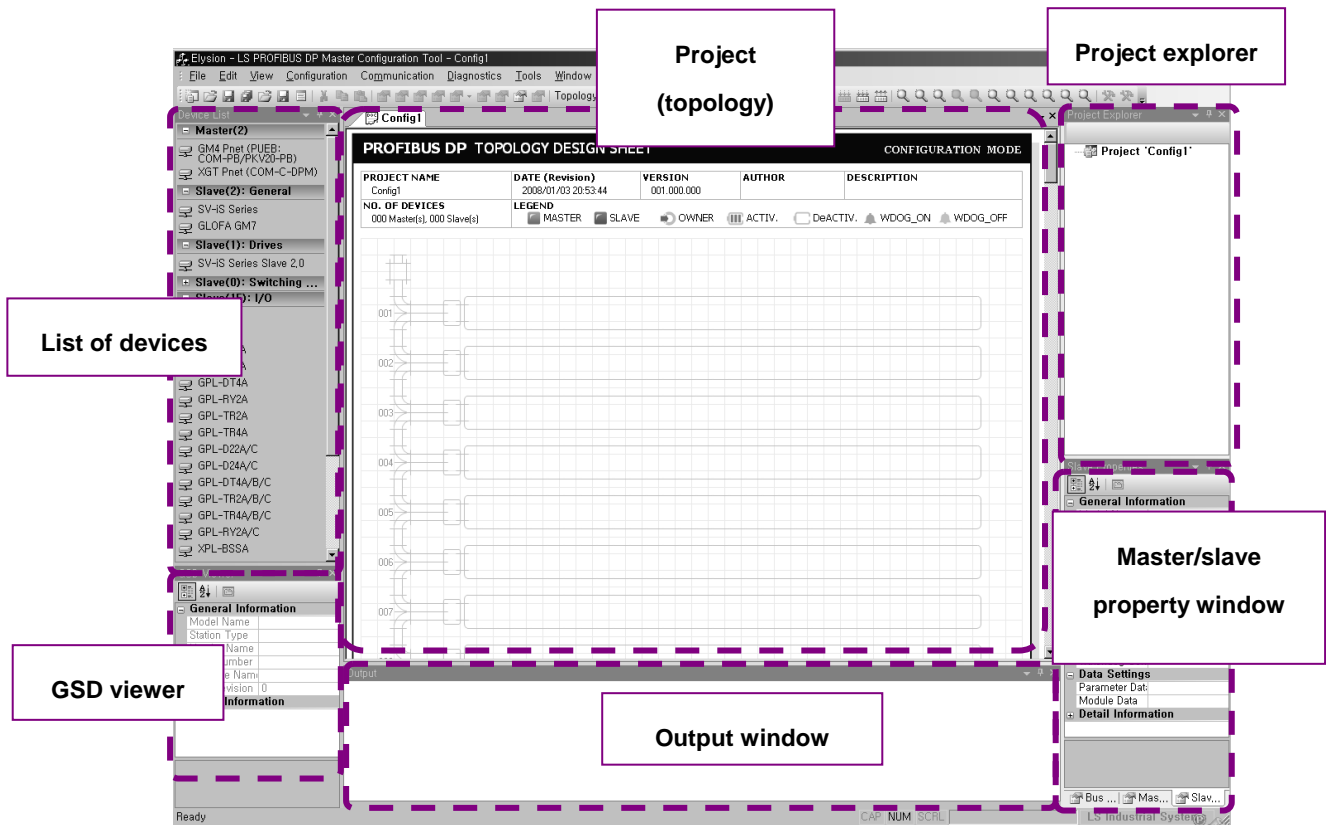
5.1.1 Main functions

Category	Function	Description
Configuration	Master property	Master property, group settings
	Slave property	slave property, module and parameter settings
	Bus parameter	communication bus parameter settings
	Configuration down	Network Configuration download
	Configuration upload	Network Configuration upload
Diagnostic	Start/Stop Communication	Start/Stop Profibus-DP Communication
	Start/Stop Debug Mode, Device Diagnostics	Slave's status is continually read and shown on the topology design sheet
	Live list	Showing normally communicating devices
	Automatic network scan	Automatically scanning all of devices connected with master.
	I/O Monitoring	Read/Write data from slaves
	Disconnection Report	Showing the number of disconnections
	Device information	Information of master

5.1.2 Characteristics

- PROFICON is a configuration tool of Pnet I/F module which is global standard PROFIBUS-DP Master.
- PROFICON configures with standardized GSD file.
- PROFICON has diagnostic function.
- PROFICON has a function to upload network settings which was previously downloaded.

5.1.3 Screen composition



[Figure 5.1.1] PROFICON screen composition

- Device list: Lists the devices interpreted by GSD file to drag & drop them to topology of project window
- Project: Topology to compose PROFIBUS Network
- Project explorer: Stratify the configured topology on the project window in the order of Project-Master-Relevant Slave
- GSD viewer: Detailed information of GSD of the device selected from the list
- Output window: Action result of the Configuration Tool
- Master property window: Set up property of master device composed on the project window
- Slave property window: Set up property of slave device composed on the project window
- Bus parameter window: Set up communication property of PROFIBUS Network composed on the project window

5.1.4 GSD Register

After installation of XG5000, the folder was made as below.



[Figure 5.1.2] Installation directory structure

- bmp: Bitmap storage place for use on the GSD file
- bnr: Network Configuration binary image storage place
- gsd: GSD file storage place provided by the Profibus-DP communication module manufacturers
- prj: Network Configuration project storage place
- sys: Application configuration directory used by tool

(1) How to register GSD files

If the GSD file for the product you want to use is not registered, follow the below steps to register GSD file.

Copy the GSD file to [GSD] directory. And then copy bitmap image file used in the applicable GSD to [bmp] directory. In order to apply GSD file, restart the PROFICON program.

If the GSD file that is already registered is changed, overwrite the GSD file to the [gsd] folder. And then restart the PROFICON program after deleting the files under the [sys] folder.

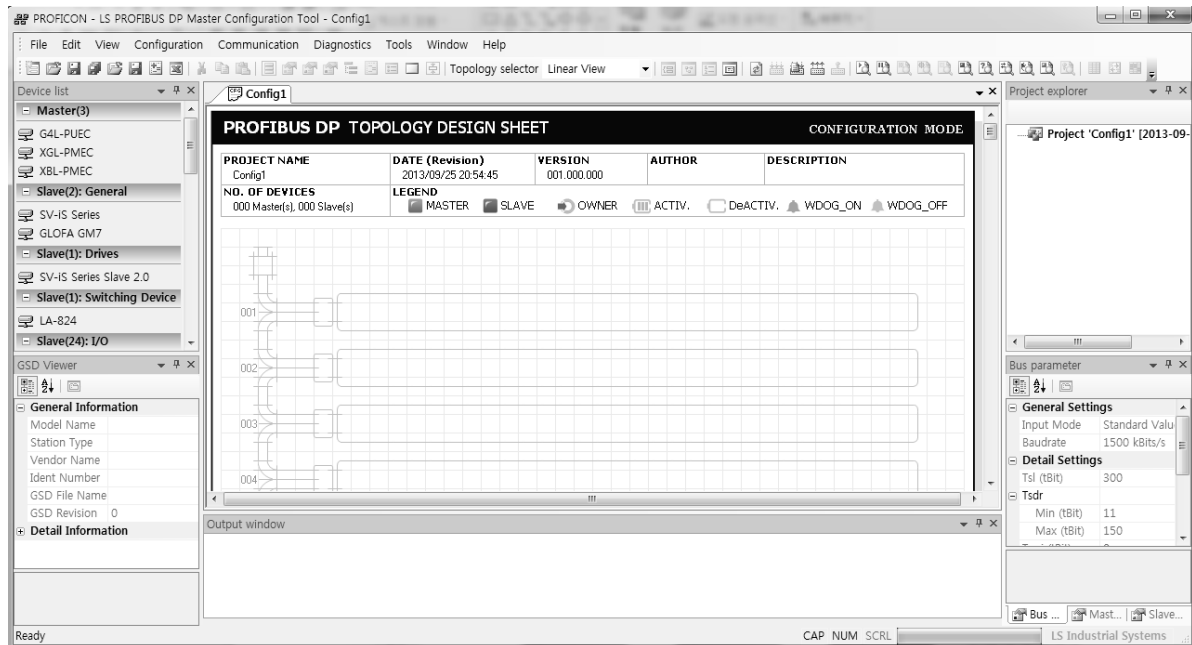
Remark

- 1) PROFICON doesn't reinterpret GSD files every time for quick start. So if you changed the GSD after loading, you have to delete files in [sys] folder and then restart PROFICON.
- 2) PROFICON supports only one language for GSD files (it support one filename extension). In order to change the language, select [Tools\System Options] menu and then select Startup under [Common Settings] folder on the left side. And change the GSD Type and select the path of the file. When PROFICON is restarted, the changes are applied.

5.2 Network composition through PROFICON

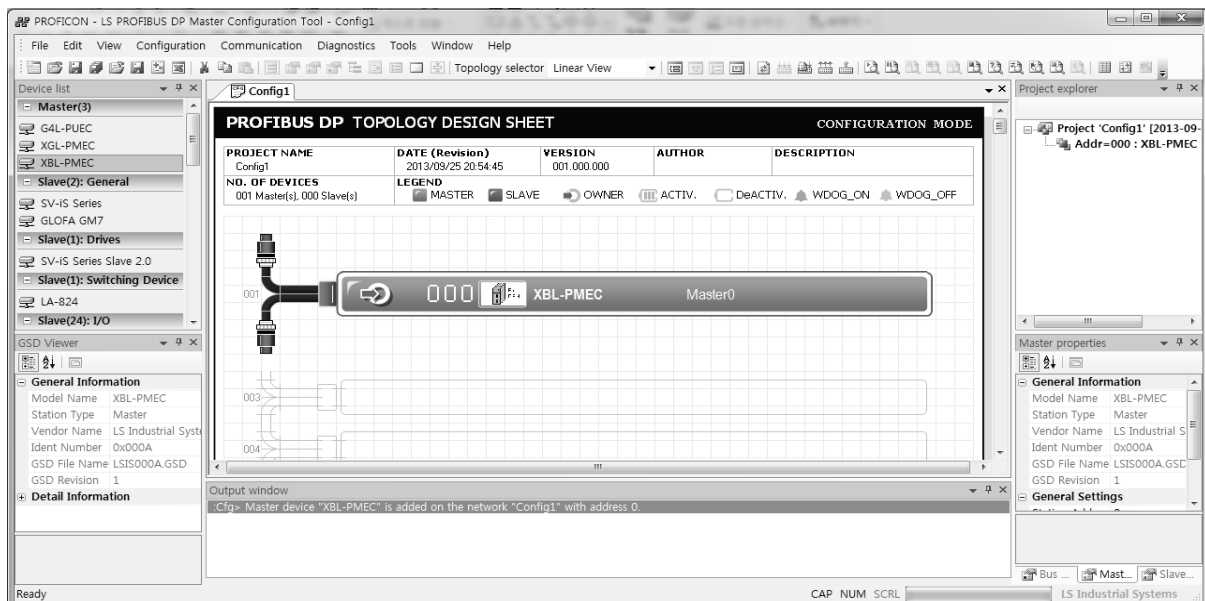
5.2.1 Master composition

Master device is displayed on the top of the device list, then select XBL-PMEC as shown in the figure below.



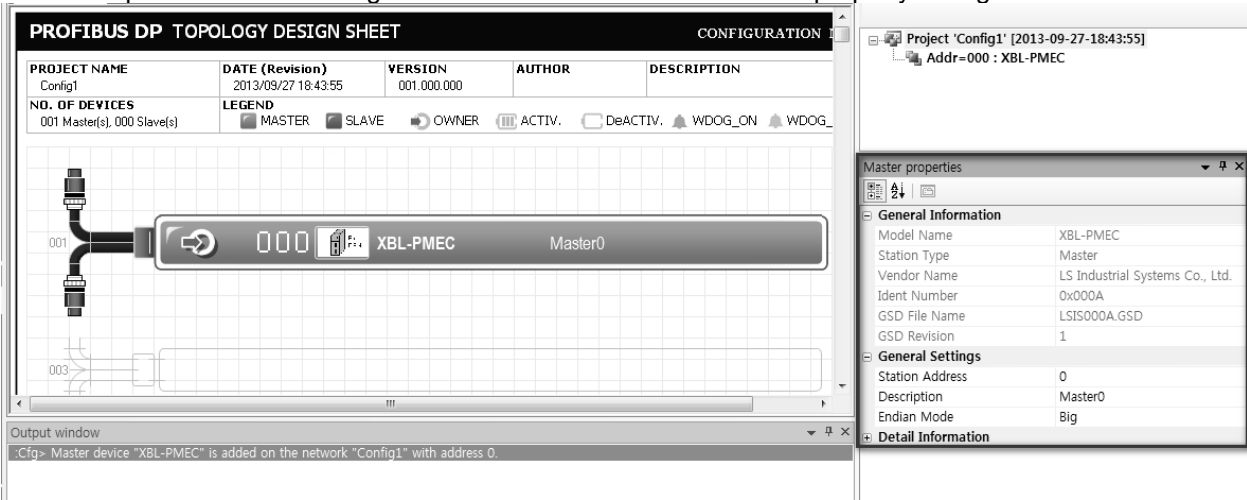
[Figure 5.2.1] XBL-PMEC selected from the list of device

If you drag & drop the selected XBL-PMEC on the topology sheet of the project window, then the master is simply composed as shown below. At this time, the composed master information is also displayed on the project explorer.



[Figure 5.2.2] Compose XBL-PMEC Master by drag & drop

If you change properties like station address of the master or description, click “Master Properties” of the “Configuration” menu to activate the master property change tab as below

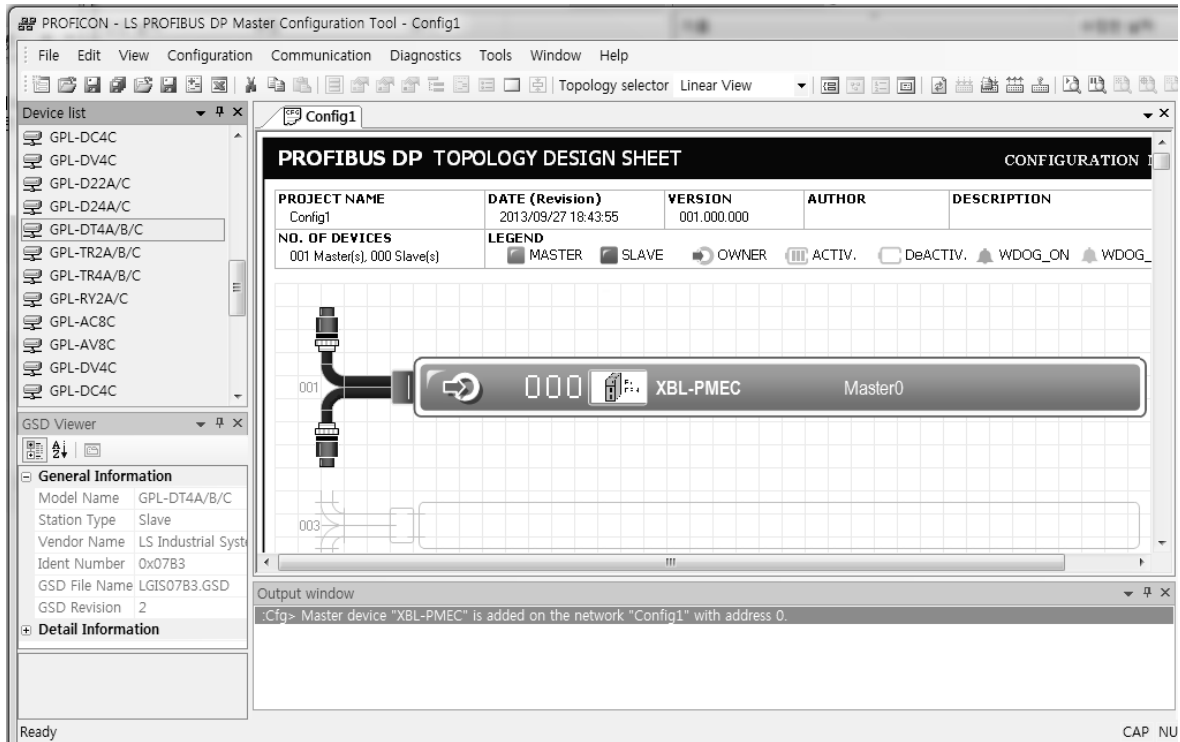


[Figure 5.2.3] Master property tab

5.2.2 Slave composition

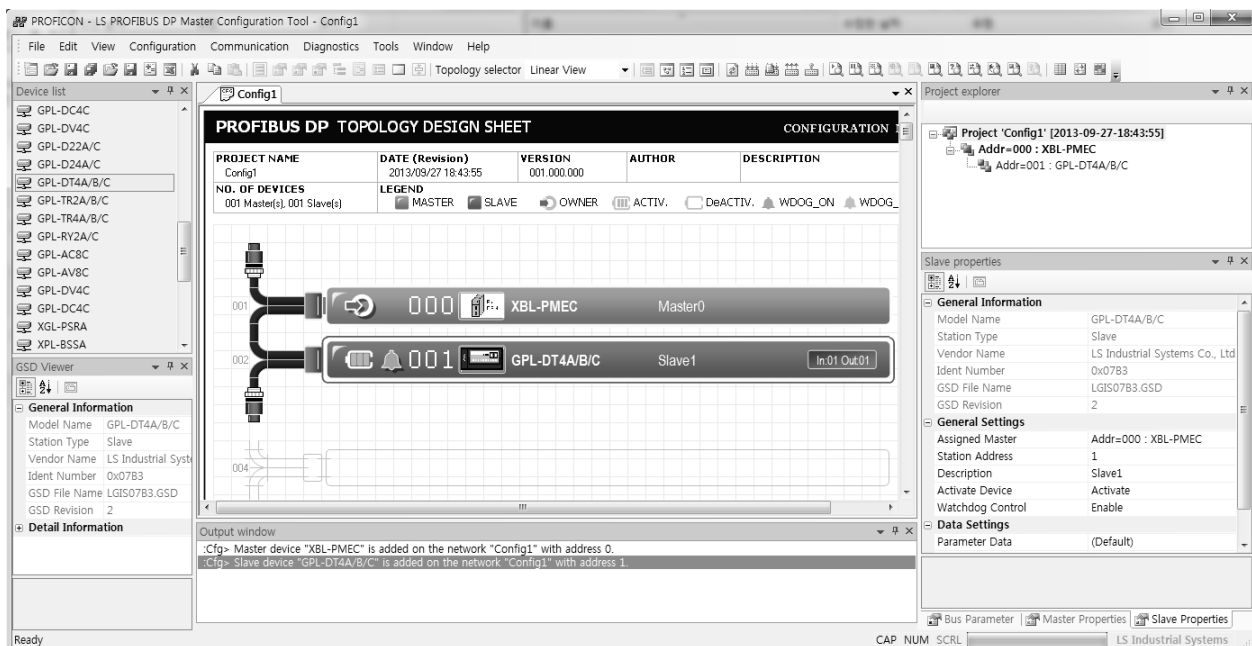
The composition of slave can be done after the master is composed.

The method of composition for slave is same as the master. Select the slave from the device list as shown in the figure below.



[Figure 5.2.4] Select slave from the device list

Simply drag & drop the selected slave on the topology to complete the composition of slave. (See Figure 5.2.5, at this time, it is confirmed that the slave is subordinated to the relevant master through the project explorer.)

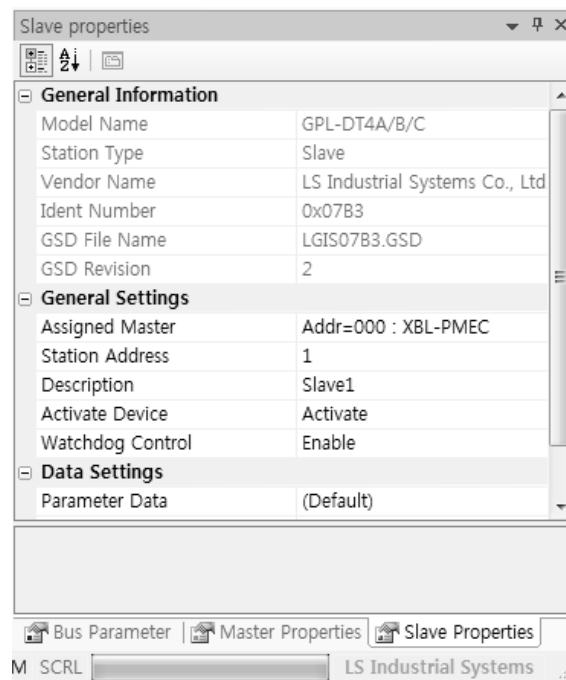


[Figure 5.2.5] Compose slave to master

Basically the tool allocates the station address in sequence when composing each device to the topology. Therefore, if you want to change the station address and property of the slave, then use “Slave Properties” of “Configuration” menu to change it. Followings are the items to be available for setting by using slave property tab(See Figure 5.2.6).

- Station Address: 1 ~ 123
- Description texts
- Activate Device
- Communication watchdog
- User's parameter settings
- Module settings

User's parameter and module are configured by using separate window.



[Figure 5.2.6] slave property tab

First of all, the parameter is configured by using slave parameter settings window as shown below.

The Slave Parameter Settings window displays configuration for the 'Current Slave Device' (Slave Name: Add:001) GPL-DT4A/B/C and 'Assigned Master Name' (Add:000) XBL-PMEC. It features two main views: 'Byte Ordered View' and 'Structured View'.

Byte Ordered View:

Position	Module Information	Byte	HexaDec	Decimal
1	(GENERAL)	000	0	0
2		001	0	0
3		002	0	0
4		003	0	0
5		004	0	0
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Structured View:

Position	Byte	Bit	Decimal	Description	Value Selection
1	000	0	0	(Undefined)	(N/A)
2		1			
3		2			
4		3			
5		4			
6		5			
7		6			
8		7			
9	001	0	0	(Undefined)	(N/A)
10		1			
11		2			
12		3			
13		4			
14		5			
15		6			
16		7			
17	002	0	0	(Undefined)	(N/A)
18		1			
19		2			
20		3			

[Figure 5.2.7] Slave parameter settings window

Slave module settings window is as shown below. If a slave module is an expansion adapter such as XPL-BSSA, you can add the module to the expansion adapter by double clicking the module at the above module list. If you add wrong one, double click the item to delete it.

The Slave Module Settings window displays configuration for the 'Current Slave Device' (Slave Name: Add:001) GPL-DT4A/B/C and 'Assigned Master Name' (Add:000) XBL-PMEC. It features a 'Module Selection' table and a 'General Information' table.

Module Selection:

	Module Name	Inputs	Outputs	Identifier
1	2 Byte Out, 2 Byte In		2 BYTE	0x21 0x11
2	2 Byte Out, 2 Byte In	2 BYTE		0x21 0x11
3				
4				
5				
6				
7				
8				
9				
10				

General Information:

Insert	General Information		Input		Output		General Settings
	Slot	Idx.	Type	Add.	Type	Add.	
1	0	1	2 Byte Out, 2 Byte In		BYTE	0	2
2	0	2	2 Byte Out, 2 Byte In	BYTE	0	2	
3							
4							
5							
6							
7							
8							
9							
10							

Input Data (Byte): 002 / Max 002 Output Data (Byte): 002 / Max 002 In/Output Data (Byte): 004 / Max 004 Number of Modules: 001 / Max 001

Legend: |----- DbClick = Deleting Module -----| |----- DbClick = Entering Edit Mode (Add, Cell, Description Cell) -----|

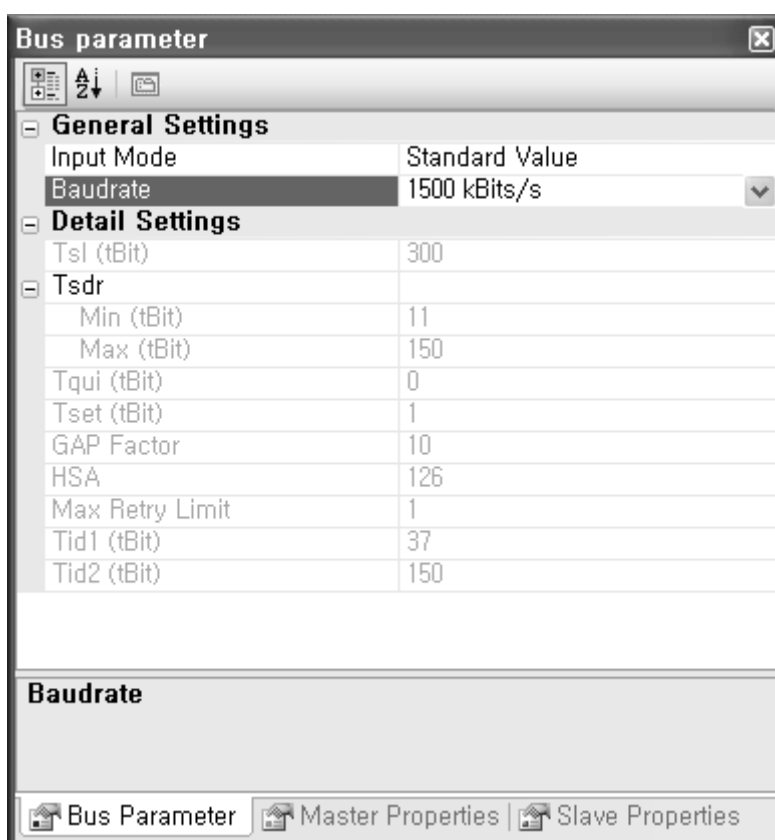
[Figure 5.2.8] Slave module settings window

5.2.3 Bus parameter

In this chapter, we will find out how to configure the network bus parameter of these. Network bus parameter can simply change the communication speed, or adjust the timing for communication parameter precisely.

Generally, default value is used without change in the communication parameter timing. Therefore, this manual describes how to change the communication speed, and more details can be found from PROFIBUS DP specification or software manual with careful consideration.

Since master only has the authority to configure the network bus parameter, you should choose master from topology to activate the “Bus Parameters” item from the “Configuration” menu. Select the activated “Bus Parameters” item to activate the bus parameter settings tab as shown below.



[Figure 5.2.9] bus parameter settings tab

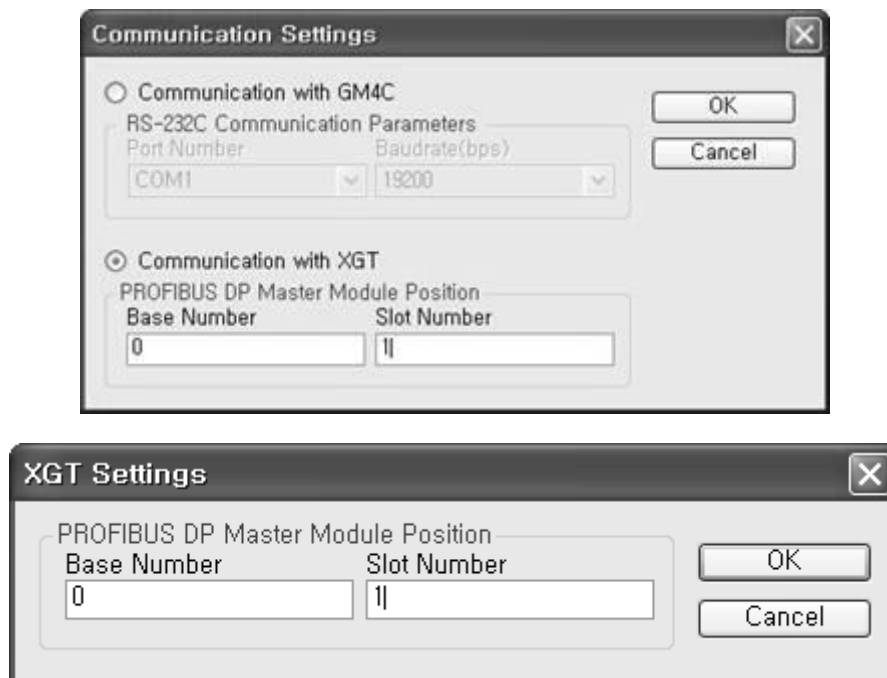
5.3 Download and upload Network Configuration

PROFIBUS DP Master is communicated through Network Configuration. To do so, there is a downloading function to apply the composed Network Configuration to the Master. In addition, the uploading function, which is core technology of our company, can read and restore the Network Configuration downloaded to the existing Master.

5.3.1 Download Network Settings

(1) Communication connection settings

In order to download the Network Configuration composed on the topology window to the XGB Pnet Master module, first of all, you should set up connection to XGB main unit. If you select "Settings..." item from the "Communication" menu, the window will be popped up as seen below. Here you should select "Communication with XGT" and enter the information with current XGL-PMEC module, and click "OK" button.

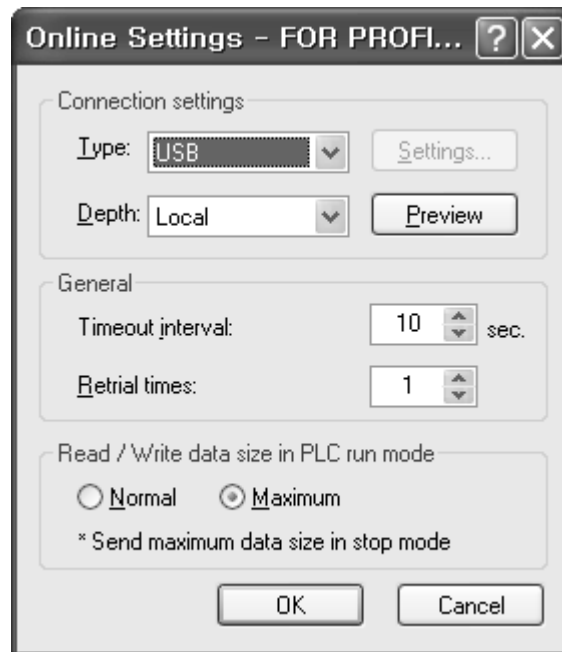


[Figure 5.3.1] Communication Settings window: Information of XBL-PMEC settings

Then, XGB connection settings window will pop up as shown below. If a user clicks "OK" button by selecting the settings connected by the user, then the connection settings will be finished.

Remark

- 1) When the master is absent on the PROFICON screen, if you select "Communication Settings", it can't know whether GM4C master or XGT master. So after determining what kind of master you use, select "Communication Settings" and then you can see the pop up window related to the master.



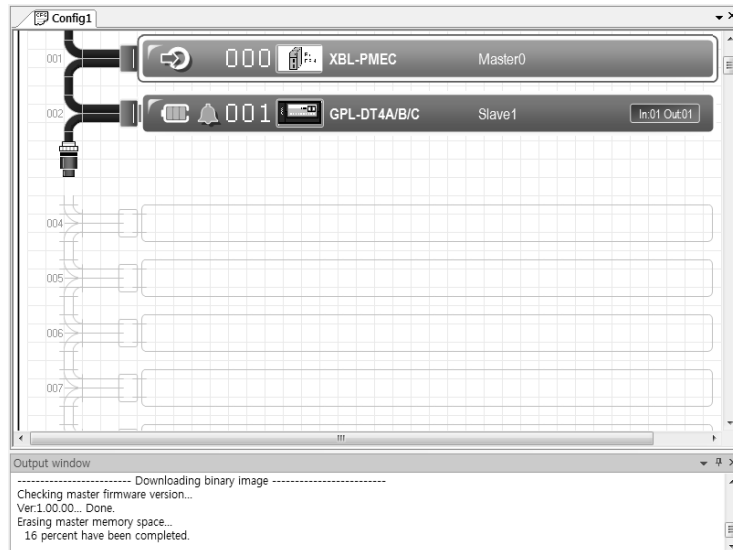
[Figure 5.3.2] Connection setting

Remark

- 1) Once the communication settings have done, when you execute image download/upload, diagnostic function, it will communicate with recent setting values.
in case that communication setting is changed, set communication again and then execute image download/upload, diagnostic function.

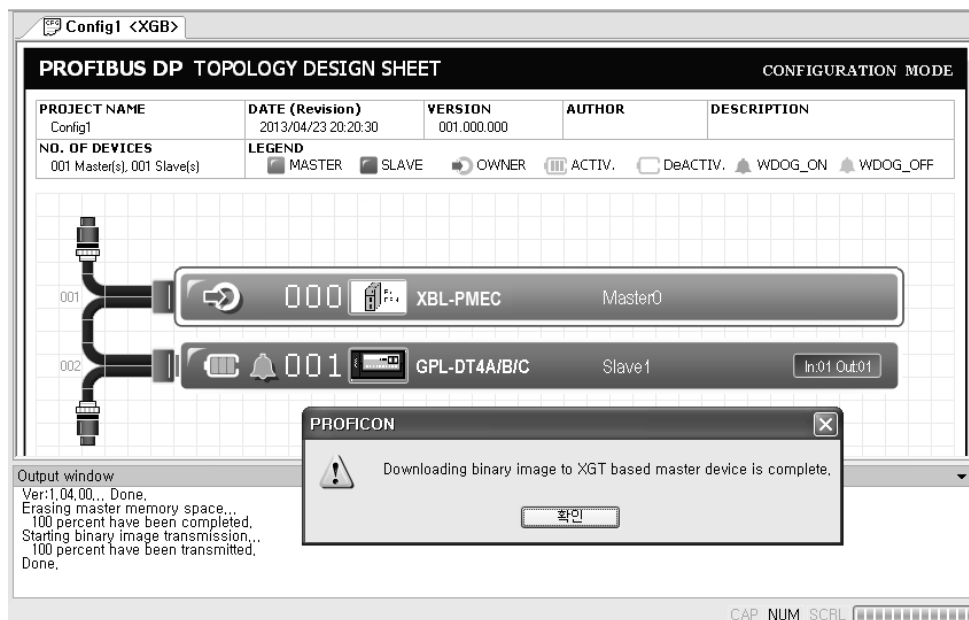
(2) Network Configuration download

If you already composed network in the topology, select “Download Image” item from the “Communication” menu to begin downloading. The figure below shows downloading status. The status bar runs progress bar, and the output window shows the progress rate.



[Figure 5.3.3] Download status

If downloading is completed, the progress bar is full, and “Done” message will be displayed on the output window.



[Figure 5.3.4] Downloading completed

Remark

- 1) After downloading, PLC is needed to reset.

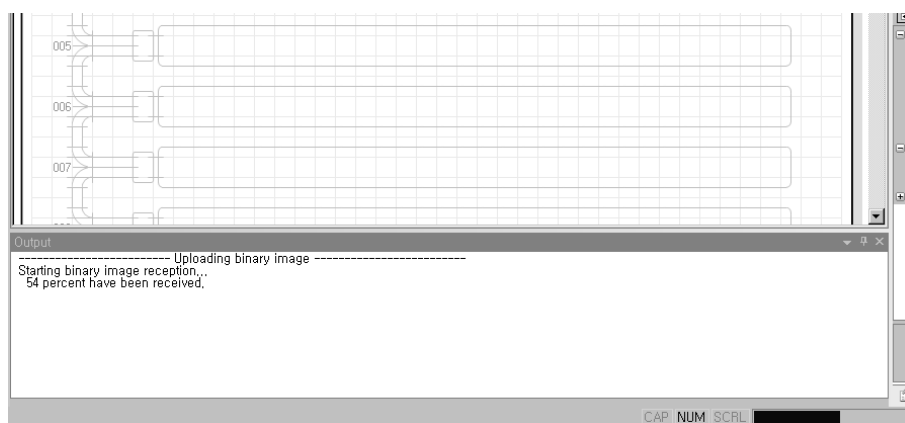
5.3.2 Upload Network Settings

(1) Communication connection settings

The method of connection settings can be referred from 5.3.1 Network Settings downloading

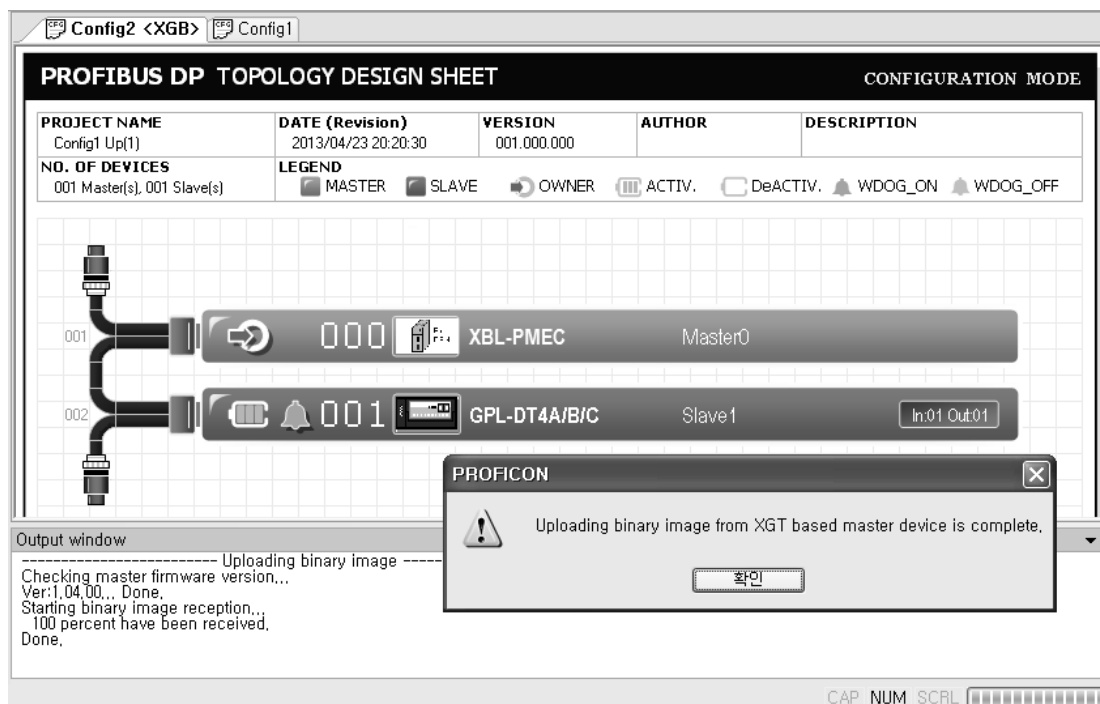
(2) Network Settings uploading

Conduct uploading by selecting “Upload image” from “Communication” menu. At this time, new project will be automatically generated, and uploading is proceeded.



[Figure 5.3.5] Upload status

If uploading is completed, “Done” message will be displayed on the output window. Project topology will show the Network Configuration composition uploaded from current master.



[Figure 5.3.6] Uploading completed

5.4 Diagnosis function

Applied functions of PROFIBUS DP include network diagnosis function and monitoring function.

Please see software manual for details.

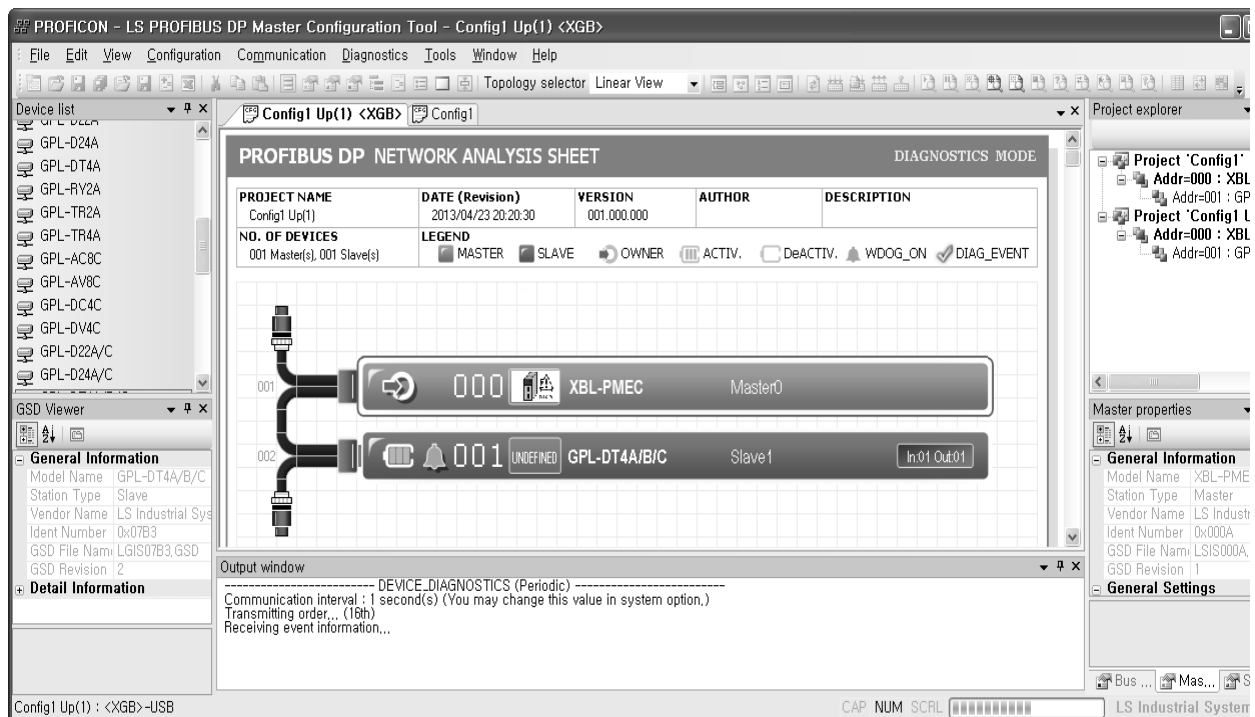
5.4.1 Start / Stop Communication

“Start Communication” and “Stop Communication” item of “Diagnostics” starts or finishes the PROFIBUS DP communication by setting up master mode as ‘OPERATE or STOP mode.

5.4.2 Debug mode (Start/Stop Debug Mode, Device Diagnostics)

(1) Start Debug Mode

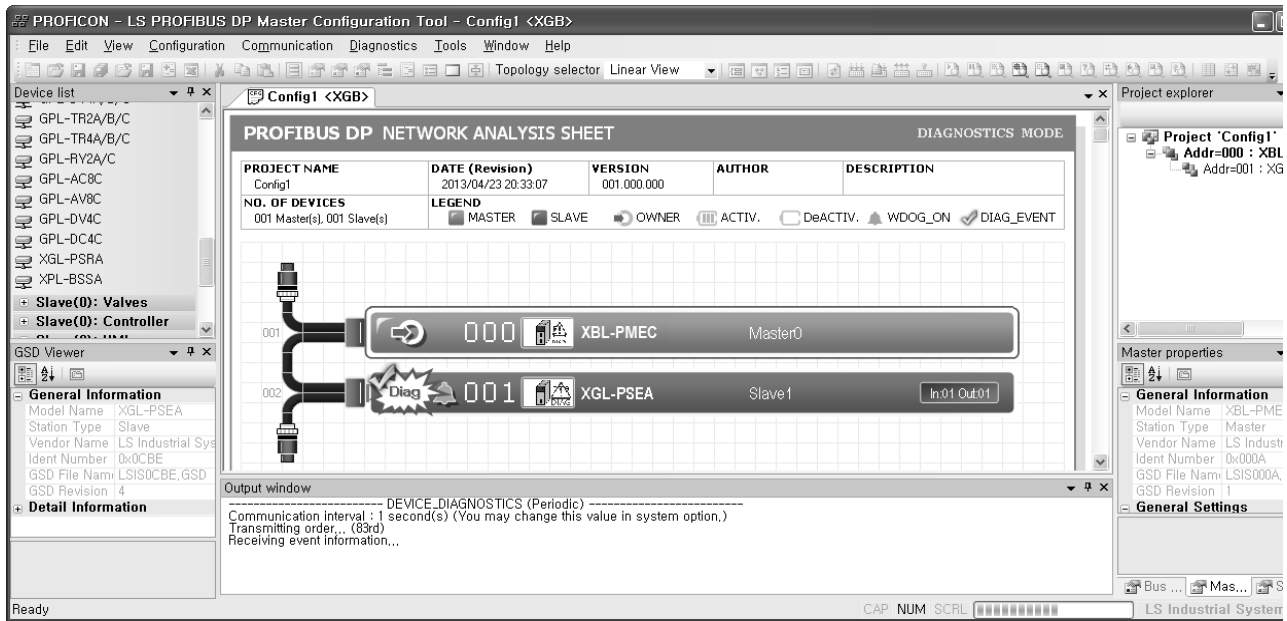
The “Start Debug Mode” of “Diagnostics” menu continuously monitors the status of slave in debug mode. At this time, the topology is activated, and regularly checks out the status information of slaves from master.



[Figure 5.4.1] Master debug mode

Chapter 5 PROFICON Setting

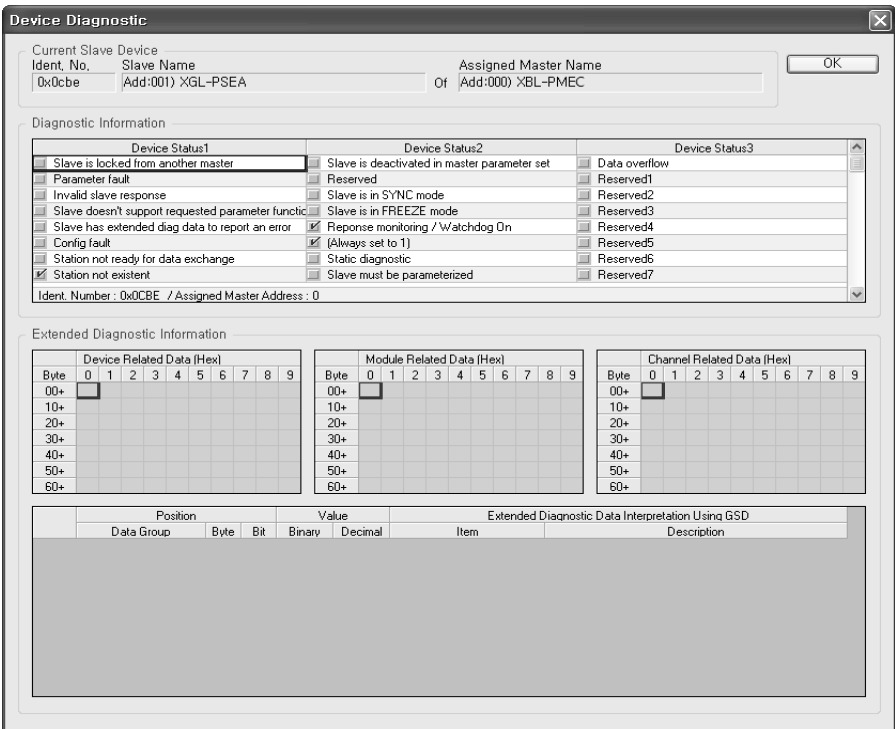
If any slave generates diagnostic information for cable cut-off, incorrect parameter or configuration, then “Diag” event is displayed at the slave on the topology as shown in the Figure 5.4.2 to inform the user.



[Figure 5.4.2] Slave diagnosis event occurs

(2) Device Diagnostics...

In order to verify the diagnostic information of slave, users should select the slave on the topology, and select “Device Diagnostics...” from “Diagnostics” menu to verify the diagnostic information like the Figure 7.6.3. Also, if the slave is double clicked on the topology, then the diagnostic information can be verified identically.



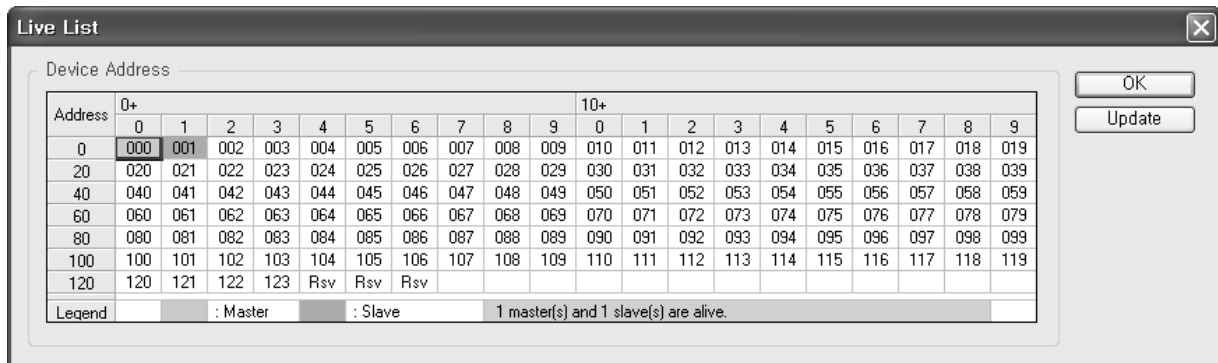
[Figure 5.4.3] Slave diagnostic Information

(3) Stop Debug Mode

Finally, if you want to terminate the debug mode, select “Stop Debug Mode” from the “Diagnostics” menu.

5.4.3 Live List

This is the function to display the information of the network which is under normal data communication. If “Live List...” is selected from “Diagnostics,” then the live list window appears as shown below.

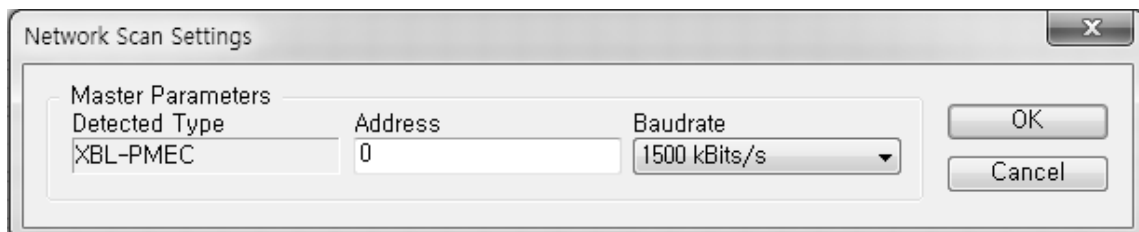


[Figure 5.4.4] Live list

If “Update” button on the right side is clicked, then the contents of the live list will be updated.

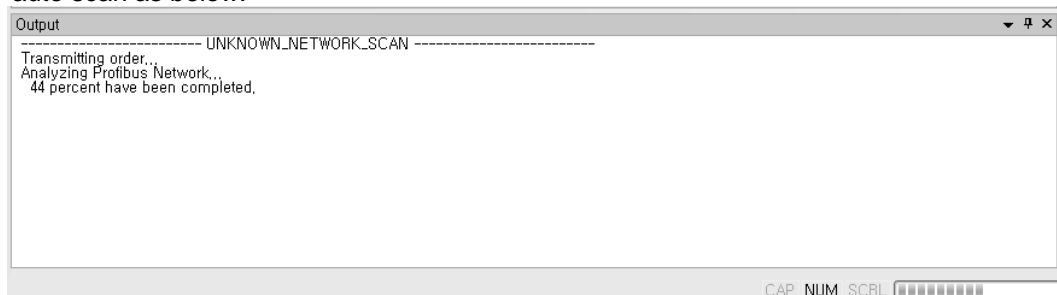
5.4.4 Automatic Network Scan

This is the function to automatically scan all slaves physically connected to master through cable. This helps to figure out the Network Configuration easily. If you select “Auto. Network Scan...” item from “Diagnostics,” then the dialogue window where the master address and communication speed are configured appears as shown below.



[Figure 5.4.5] Automatic network scan communication settings

After setting up master address and communication speed, click OK button to operate the auto scan as below.



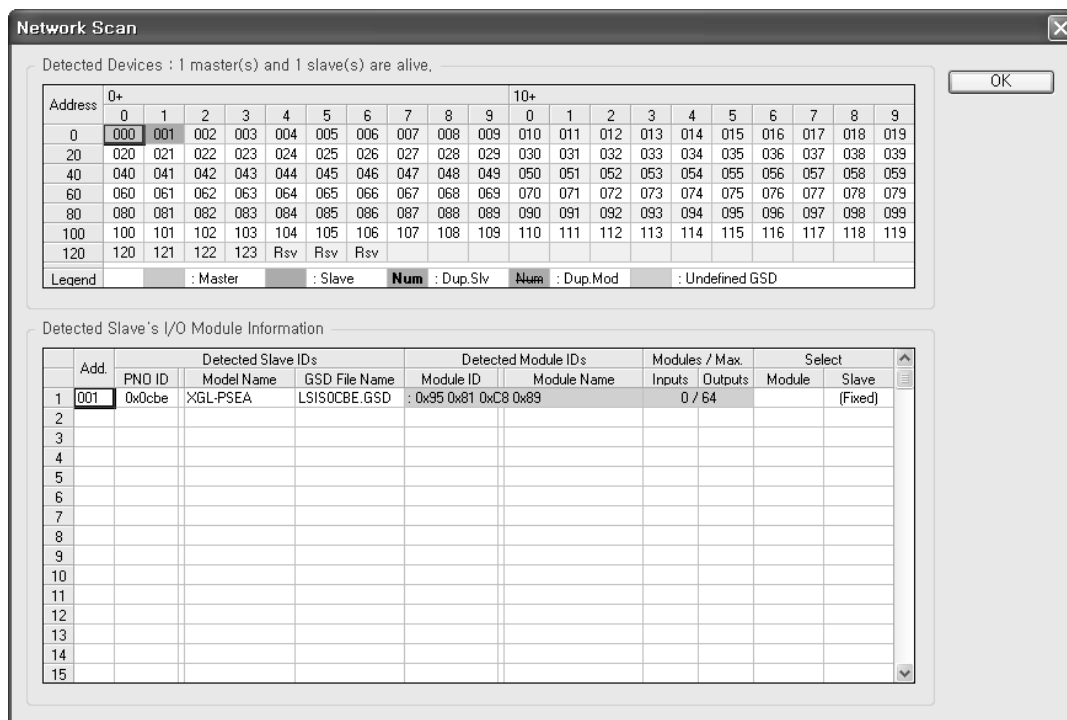
[Figure 5.4.6] Display automatic network scan operation status

Remark

- 1) Communication speed is shown by the speed of image downloaded. And communication speed is shown by 1.5Mbps if there is no image downloaded.
Warning message will be incurred when you change the different speed from speed as shown window.
When you change speed, some slaves couldn't be recognized. As the time of speed detection is different depending on the slave.
- 2) When auto scanning, reading data is starting after waiting time as below.

Communication Speed	PROFICON Waiting time
9.6 kbps	50s
19.2 kbps	30s
93.75 kbps	15s
187.5 kbps	15s
500 kbps	15s
1.5 Mbps	15s
3 Mbps	15s
6 Mbps	15s
12 Mbps	15s

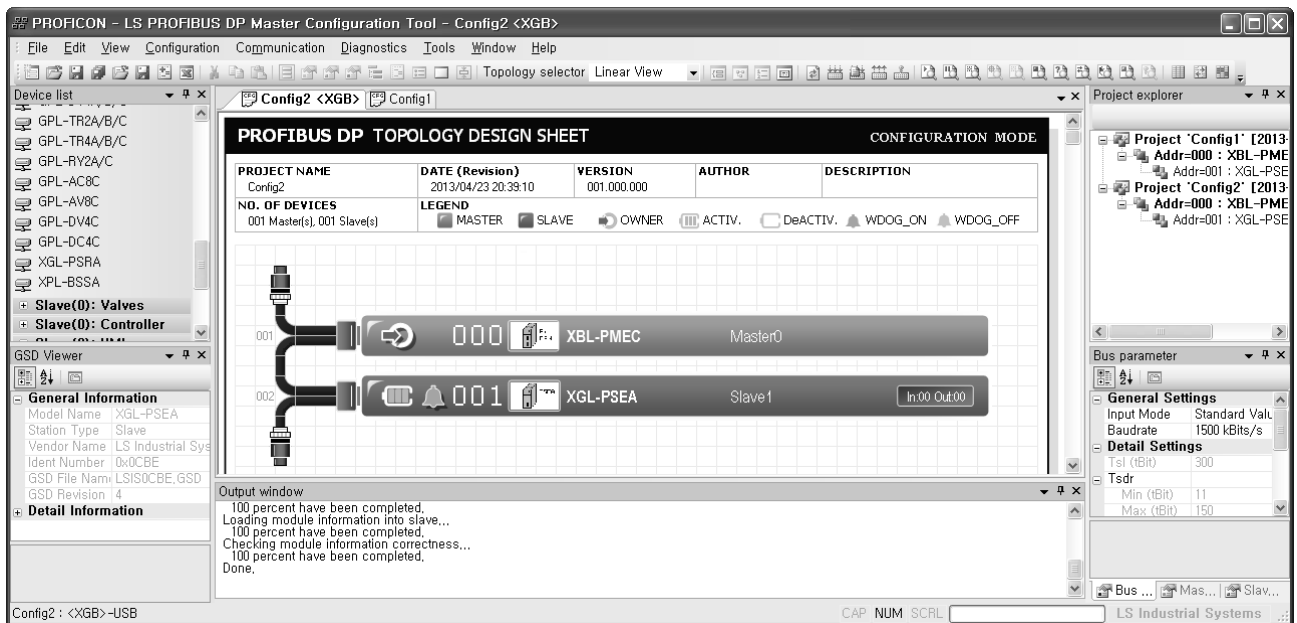
After the automatic network scan is completed, the slave list collected by master and I/O information and GSD file information are displayed on the network scan window as below.



[Figure 5.4.7] Network scan window

This window displays information of slaves. Users check out whether this information is matched to actual slave information. If GSD file and I/O information is not matched, or there is no GSD file, then obtain formal GSD file provided by the manufacturer of the slave and compose the Network by yourself.

If the scanned contents are correct, then click OK button to check out the collected Network composition as shown below.



[Figure 5.4.8] Network topology collected and composed

Remark

- 1) The following is a description of the exception cases that there are GSDs which have same PNO ID or there is no module ID when you execute auto network scanning.
 - a) If between the GSD file and the module are not matched, add Scanned Module. After then you can see the checked Select button. In case of below, the slave that Scanned Module is added can't be displayed properly. In order to successfully open, after copying [sys] folder under the PROFICON installation folder of the PC which is already auto scanned, overwrite the file in same location that you want to open the project. And open the project.
 - If you open project files that are already auto scanned in another PC.
 - If you upload images that are already auto scanned in another PC.
 - If you open it in another PC after saving auto scanned contents as a binary.
 - b) If there are more than two slaves that have same PNO ID compared with loaded slaves, select button will be shown.

If the slaves don't have same module ID or the slave is compact slave that have to be defined more than one, Discard will be shown and Select button will not be shown.

If there are slaves that don't have same PNO ID compared with loaded slaves at the same time modular type which don't need module, Discard will not be shown and Select button will be shown. It's because PROFICON judges that the user intends for adding module through Configuration.

 - Compact slave: If Modular_Station = 0 is shown in the GSD file or there is no Modular_Station key, the module have to be defined more than one.
 - Modular slave: If Modular_Station = 1 is shown in the GSD file.
 - c) In case that there are more than two selectable slaves, the Select button is checked. So If you want to change slave, change the checking status and select the slave that you want.

Network Scan

Detected Devices : 1 master(s) and 64 slave(s) are alive.

Address	0+										10+									
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
0	000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019
20	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039
40	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059
60	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079
80	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099
100	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
120	120	121	122	123	Rsv	Rsv	Rsv													

Legend : Master : Slave Num : Dup.Slv Num : Dup.Mod : Undefined GSD

Detected Slave's I/O Module Information

Add.	PNO ID	Detected Slave IDs		Detected Module IDs		Modules / Max.		Select	
		Model Name	GSD File Name	Module ID	Module Name	Inputs	Outputs	Module	Slave
284				0x21 0x00	2 Byte Out, 0 Byte In		2 BYTE	(Fixed)	
285				0x21 0x00	2 Byte Out, 0 Byte In		2 BYTE	(Fixed)	
287	057	0x0fff(6)	GPL-D22A	GPL_D22A.GSD	0x21 0x00		0 / 1		(Discard)
288			GPL-D24A	GPL_D24A.GSD	0x21 0x00		0 / 1		(Discard)
289			GPL-DT4A	GPL_DT4A.GSD	0x21 0x00		0 / 1		(Discard)
290			GPL-RY2A	GPL_RY2A.GSD	0x21 0x00		2 / 1		(057)
291					0x21 0x00	2 Byte Out, 0 Byte In	2 BYTE	(Fixed)	
292					0x21 0x00	2 Byte Out, 0 Byte In	2 BYTE	(Fixed)	
293			GPL-TR2A	GPL_TR2A.GSD	0x21 0x00		2 / 1		(057)
294					0x21 0x00	2 Byte Out, 0 Byte In	2 BYTE	(Fixed)	
295					0x21 0x00	2 Byte Out, 0 Byte In	2 BYTE	(Fixed)	
296			GPL-TR4A	GPL_TR4A.GSD	0x21 0x00		0 / 1		(Discard)
298	058	0x09f7	XPL-BSSA	XPLBSSA.GSD	0x21 0x20 0x10		3 / 8		(Fixed)
299					0x21	Digital Output 2byte	2 BYTE	(Fixed)	

5.4.5 I/O Data Monitoring

This is the function to monitor I/O data of slaves. This can confirm whether the I/O of a certain slave is correct. If “I/O Monitor...” item is selected from “Diagnostics,” then existing data communication is stopped, and the monitor window pops up as below. If users enter the output into the output data and click update button, then the value will be displayed through slave. And then the values entered through current slave will be monitored through the input data area. (Here the number of data available for I/O is 32 bytes respectively.)

The I/O Monitor window displays two tables for monitoring data. The 'Input Data' table shows the current state of the slave's input, and the 'Output Data' table shows the current state of the slave's output. Both tables have 16 columns representing bytes (00 to 15) and 3 rows: HEX, 00+, and 16+.

HEX	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
00+	55	AA	00	00	00	00	00	00	00	00	00	00	00	00	00	00
16+	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

HEX	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
00+	55	aa	00	00	00	00	00	00	00	00	00	00	00	00	00	00
16+	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Buttons: OK, Decimal, Update

[Figure 5.4.9] I/O monitor

5.4.6 Disconnection Report

This function shows the number of frequency of connection errors for slaves under data communication. If you select “Disconnection Report...” item from “Diagnostics,” then the number of errors occurred are displayed in real time as shown below.

The Disconnection Report window displays a table showing the number of connection errors (Count) for various device addresses. The table is organized into groups of 16 addresses each, with a 'Count' row for each group. The 'Count' values are displayed in real time.

Disconnection Count / Device Address																
Address [000 - 015]	000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015
Count	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [016 - 031]	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [032 - 047]	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [048 - 063]	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [064 - 079]	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [080 - 095]	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [096 - 111]	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Address [112 - 126]	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	
Count	0	0	0	0	0	0	0	0	0	0	0	0	R	R	R	

Button: OK

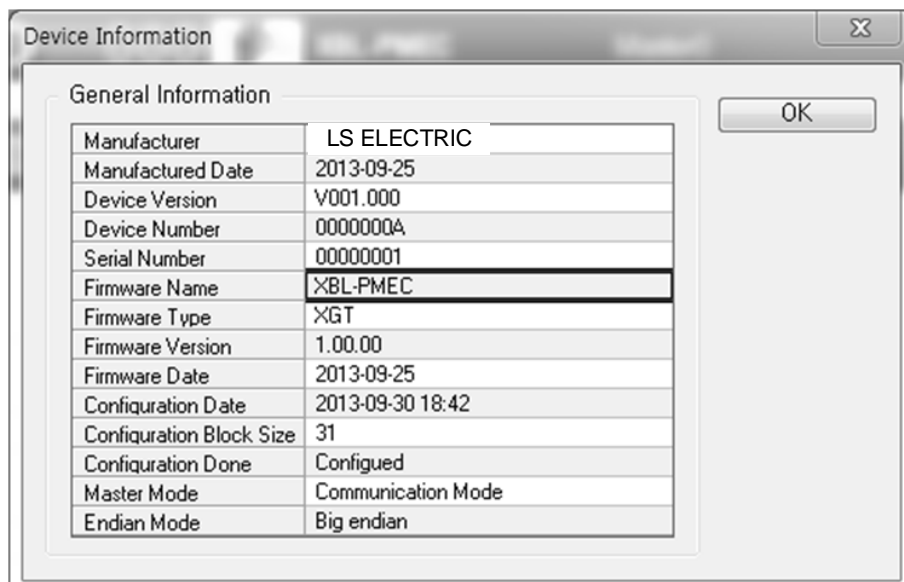
[Figure 5.4.10] Communication disconnection report

“R” means reserved station number from 124 to 126 address.

Although MAX. station number can use 127 (0~ 126) stations in the PROFIBUS standard, Pnet module is able to use 123 stations. So “R” of 124~ 126 stations are meaning the areas that are not used.

5.4.7 Master information (Device Information)

For the information of current master, select “Device Information...” item from “Diagnostics,” then the contents below are displayed as shown in the figure below.



[Figure 5.4.11] Master information

Chapter 6 XG5000 Setting

In order to use Pnet I/F module, set High-speed link parameters (after PROFICON Configuration is uploaded) and then download the specified parameters onto CPU for application, which is available through the XG5000.

6.1 XG5000 Setting Process

To do each step of process, refer to below description.

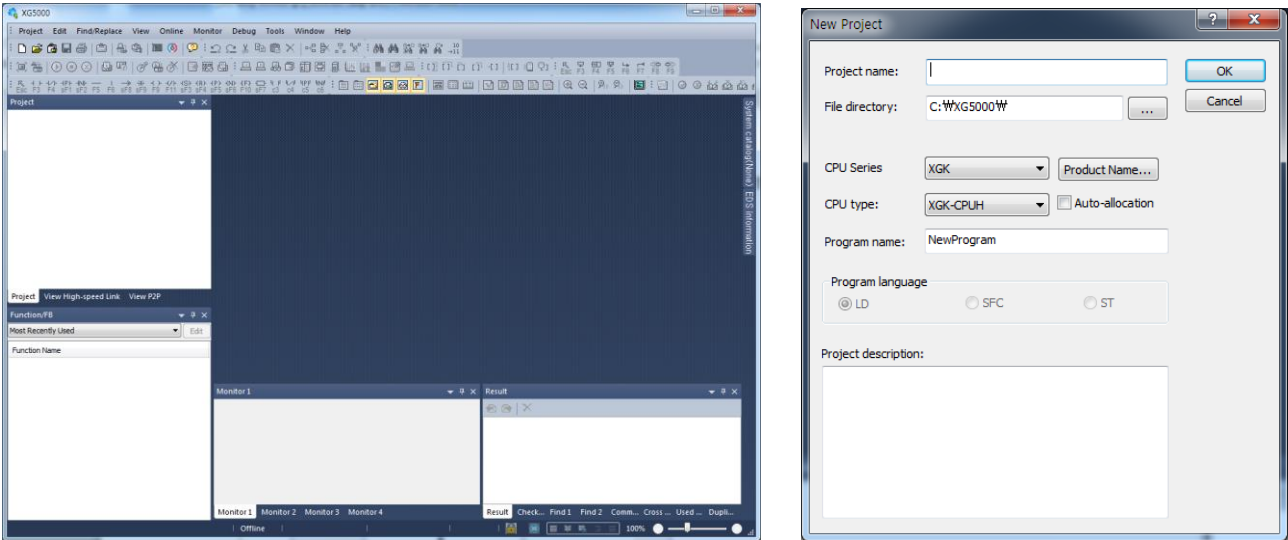
No.	Setting tool		Operation	Description
1	PROFICON Parameter		Network Configuration setting	Refer to Chap.5 PROFICON setting
2			Communication Port connection	Refer to Chap.5 PROFICON setting
3			Network Configuration download	Refer to Chap.5 PROFICON setting
4	XG5000 Parameter	Basic Setting	Execute XG5000	Execute XG5000
5			Make New project	Project → New project Set project name, Project type, CPU type
6			Set XG5000 Connection	XG5000 → Online → Select the driver in connection setting
7			Connect XG5000	XG5000 → Online → Connection
8			Add Communication module	Online → Diagnosis->Read IO information → I/O Sync
9		HS Link	Specify HS link project	Click right button "XBL-PMEC" in the project window → Add item → Click "HS link"
11			Config. Upload (Dnet, Pnet)	After double clicking "block" in the project window. Click HS link edit window. Online → Communication module setting → Config. Upload (Dnet, Pnet)
12			Set HS link blocks	Click HS link edit window 1) Send: Set Read area from Main unit 2) Read: Set Save area from Main unit
13			Write HS link parameters	Online → Write parameters
14			HS link enable	Online → Select Link enable → Enable proper HS link
15			Reset	Online → Reset

[Table 6.1.1] Process of HS parameter setting

6.2 Basic Parameter Setting

6.2.1 Execute XG5000 and Create a new project

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

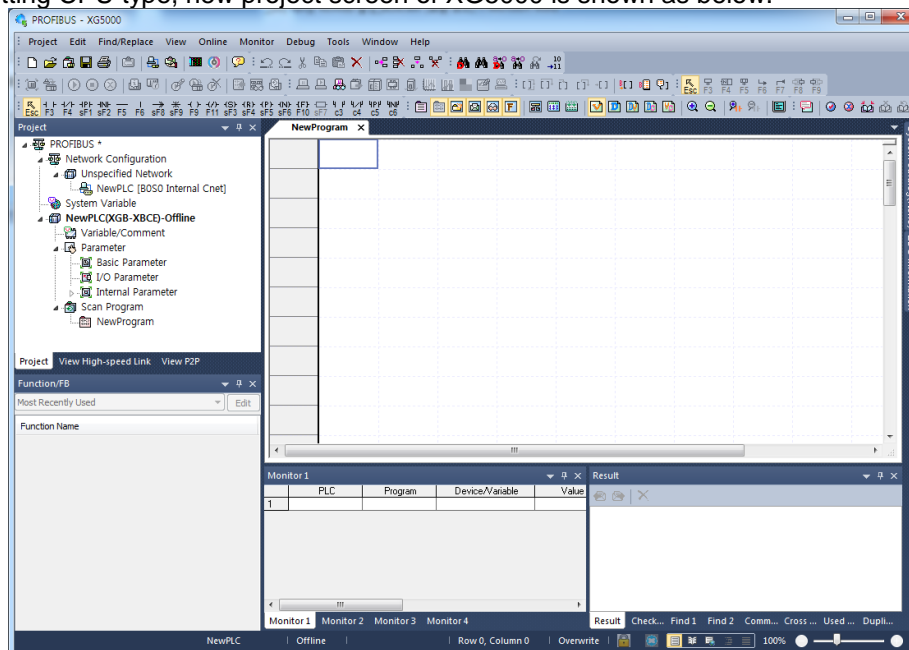


[Figure 6.2.2] Setting new project

Items	Contents	Remark
Project name	Writing the project name in the XG5000 software.	
File location	Selecting the directory to save the project.	
PLC Series	XGB	
Project comment	Writing the comment about the project.	

[Table 6.2.1] Contents of new project

After setting CPU type, new project screen of XG5000 is shown as below.



[Figure 6.2.3] New project screen of XG5000

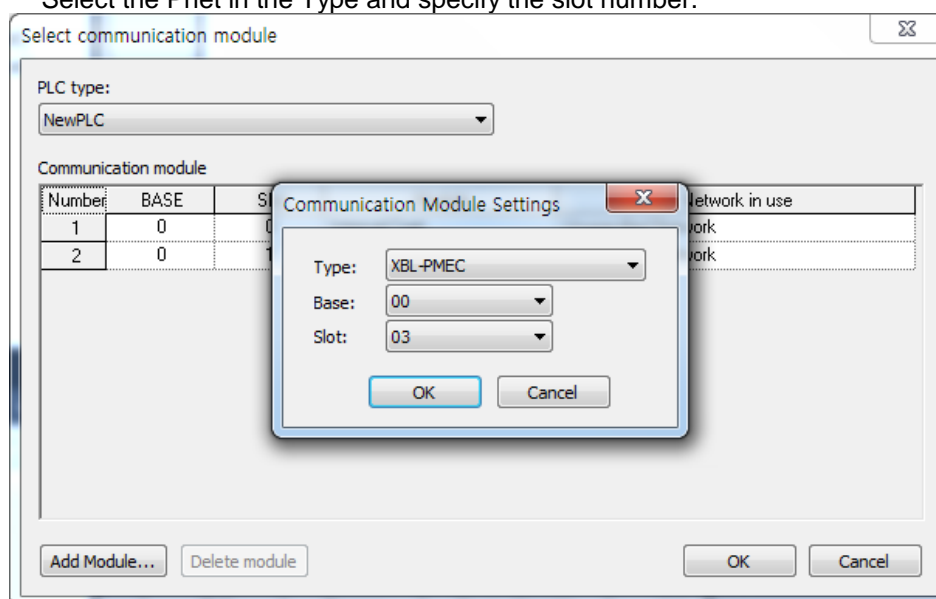
6.2.2 Registration of the communication module

For the basic setting of the communication module in the XG5000, you have to register the communication module at the applicable base, slot position of Standard setting window. You can register the communication in the both ON/OFF status.

1) Registration in the offline status

If you want to register the communication without connection, select applicable base and press the right button of the “Unspecified Network”. And then select “Communication” on the “Add Item”

Select the Pnet in the Type and specify the slot number.

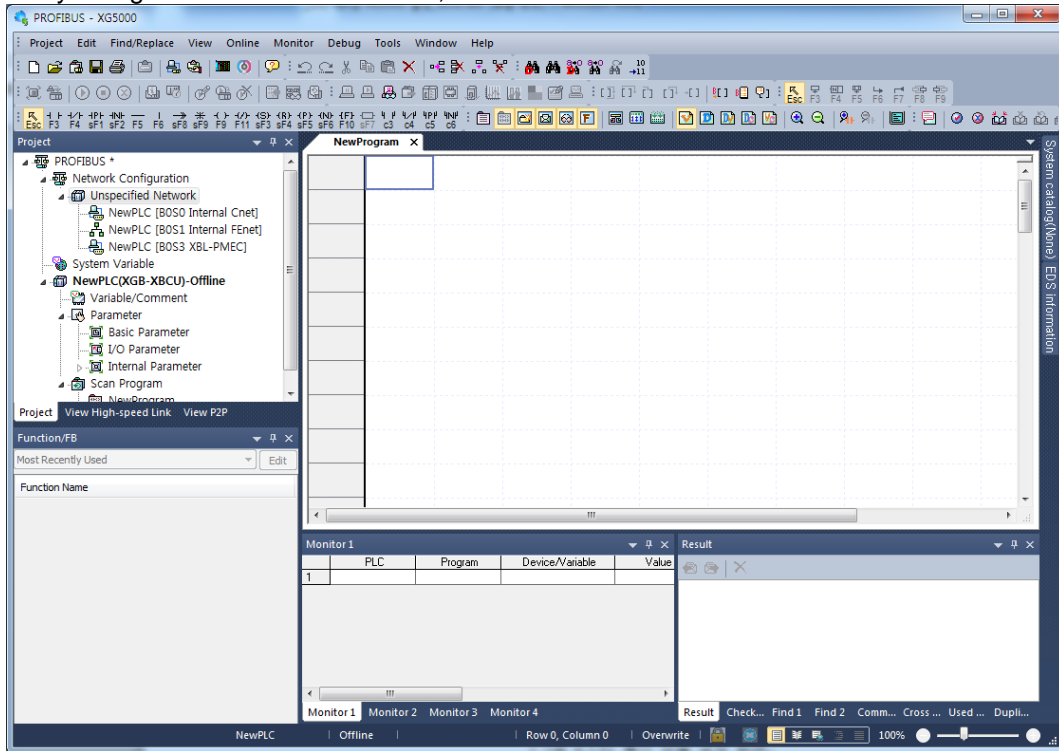


[Figure 6.2.4] Communication module setting

Item		Description
Communication module setting	Type	Selects Pnet I/F module
	Base	Fixed "0" (In case of XGB, there is no base.)
	Slot	Specifies the slot position of the module Setting range is different depending on the base type

[Table 6.2.2] Registration of the communication module

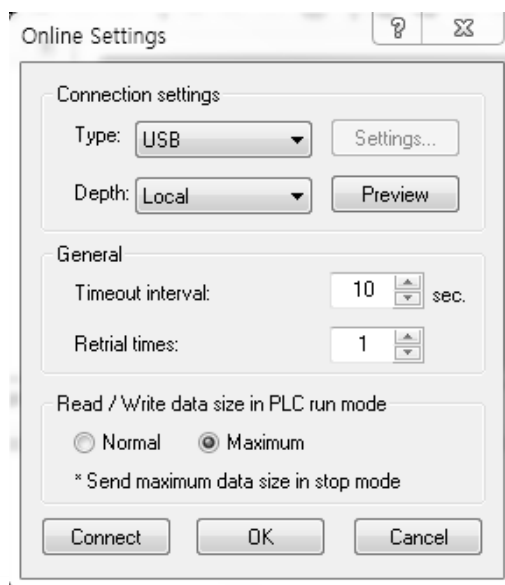
If you register the module at Slot 3, it becomes as follows



[Figure 6.2.5] Standard setting registration screen

2) Registration in the online status

To connect Main unit, need to set how to connect. Select [Online] → [Connection Settings]

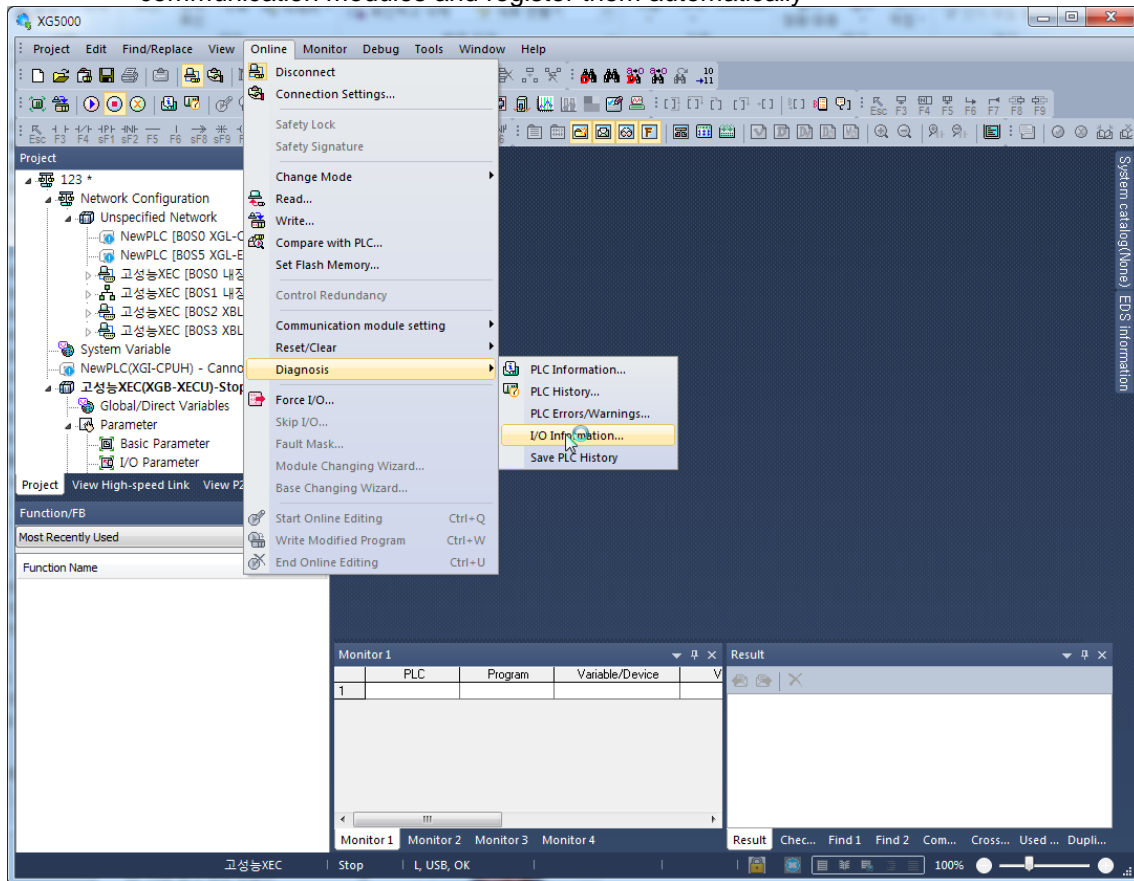


[Figure 6.2.6] Connection setting screen

Item	Content	
Connection option setting	Connection method	RS-232C, USB
	Step of connection	Local/Remote Connection setting Local: Direct connection between PC and Main unit Remote: Indirect connection between PC and Main unit through other communication module.
General	Time out	1~90 second
	Retry	1~9 times

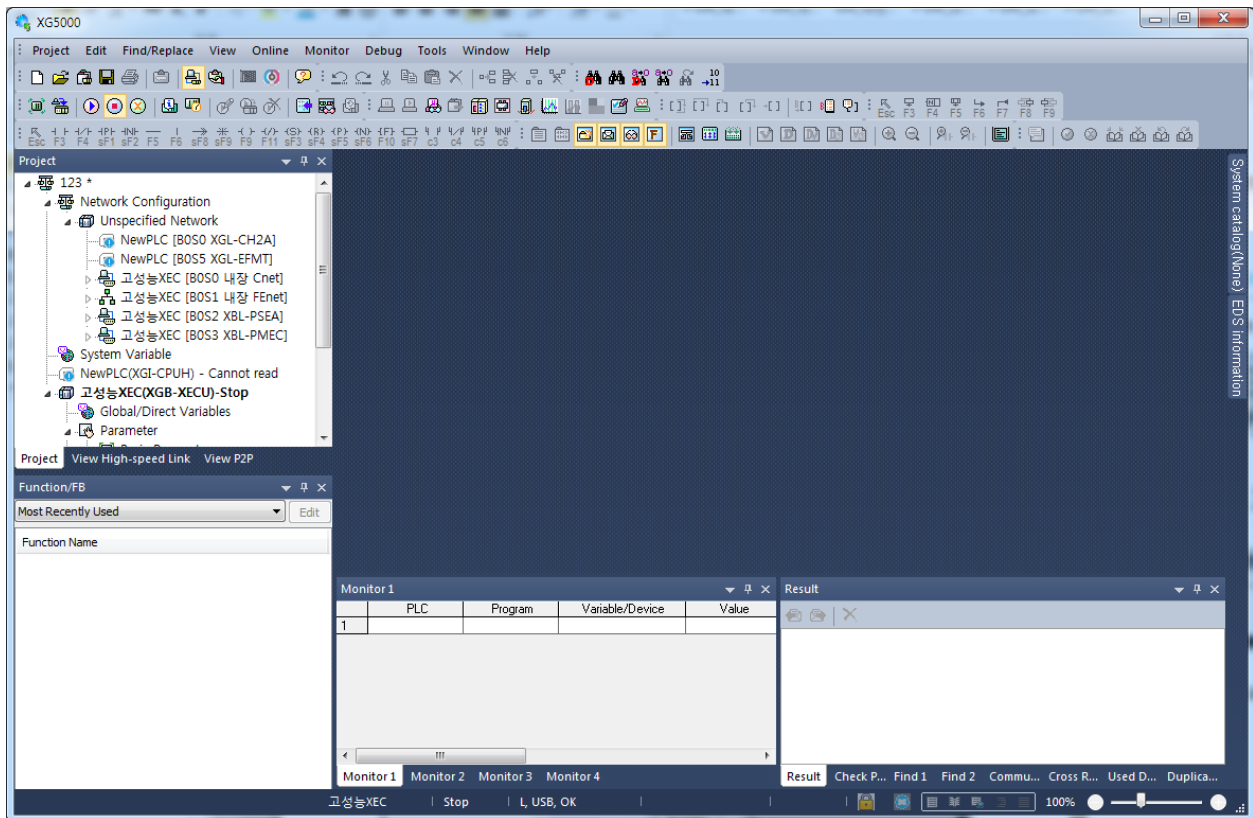
[Table 6.2.3] Contents of Connection setting window

After connection, if you select [Online] → [Diagnosis] → [I/O information], it searches all communication modules and register them automatically



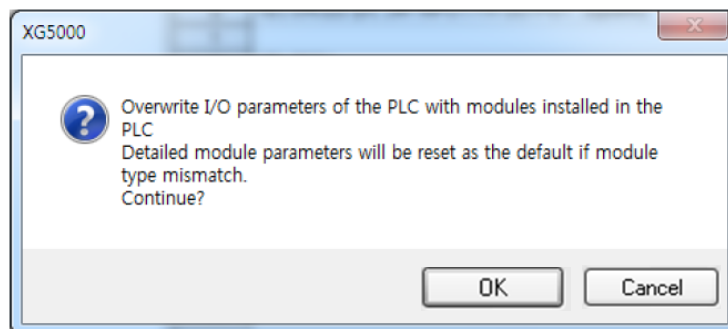
[Figure 6.2.7] Read IO Information

In case that Pnet is installed in slot 3, it is automatically registered as below.



[Figure 6.2.8] Standard setting screen

At this time, if current information is different with already registered information, the following message appears.



[Figure 6.2.9] IO change message window

6.3 High-speed Link parameter setting

6.3.1 Introduction of High-speed Link

XGT series provide 2 kinds of communication ways. Those are P2P, HS link.

HS link is used for a lot of data processing at once cyclically. Pnet module provide HS link.

It can update output data or input data by using cycle set between main unit and Pnet master.

The parameter setting method is as shown below.

- 1) Download configuration data to Pnet module by using PROFICON.
- 2) Upload configuration data in XG5000
- 3) Set Read/Write device area in HS link block.
- 4) Download parameter to main unit in XG5000.
- 5) Enable HS link.

Data size can be set 1~ 244 bytes per station and communication cycle can be set from 20ms to 10s.

Remark

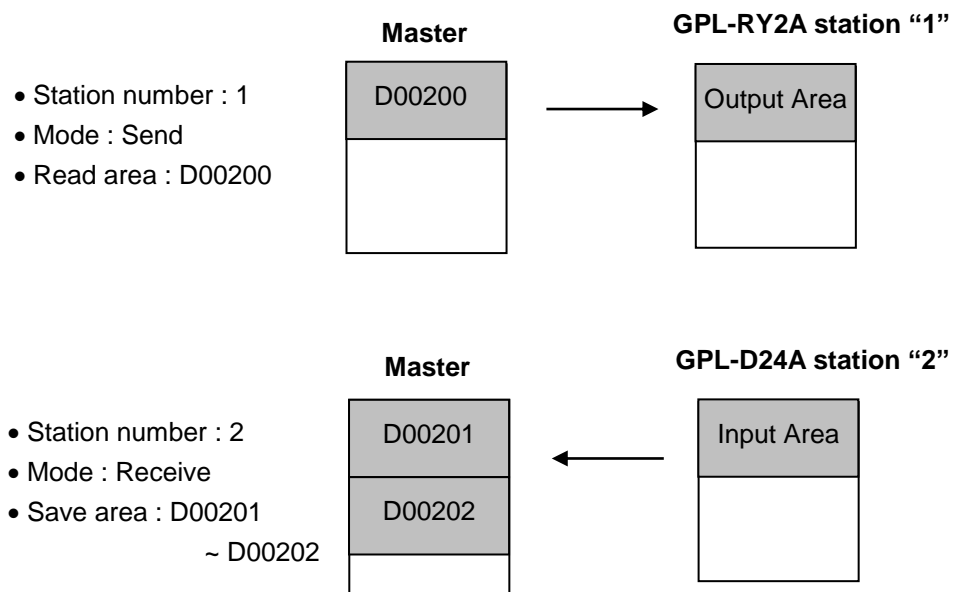
- 1) In case of Pnet HS link, 1 block means 1 slave. The blocks can be set by Max. 64 and each block can use Max. 244 bytes.
- 2) HS link communication cycle means receiving and sending cycle between main unit and Pnet master module. Communication cycle between master and slave module is set by bus parameter of PROFICON.

6.3.2 High-speed Link Send/Receive Data Processing

For the application example of High-speed link, the master station “0” and slave stations “1” and “2” (GPL-RY2A, GPL-D24A) are to share data with each other.

Setting is as follows;

- 1) The master station “0” transmits 2 bytes of D00200 data to the slave station “1”.
- 2) 4 bytes of the data received from the station “2” are saved on D00201, D00202.



[Figure 6.3.1] Block diagram of High-speed link process

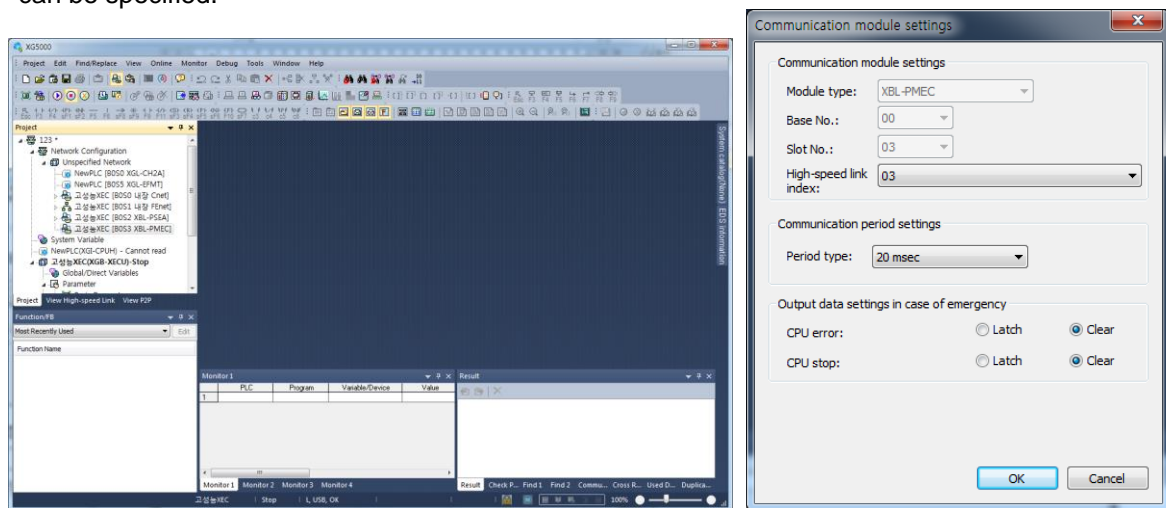
6.3.3 High Speed Link Parameter Setting

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

Communication module can be equipped with maximum 2 modules per a main unit in XGB.

1) Communication module and Communication period setting

If add the High-speed link in the screen of project, Communication module settings is opened. In this screen, communication module, communication period and output data in case of emergency can be specified.

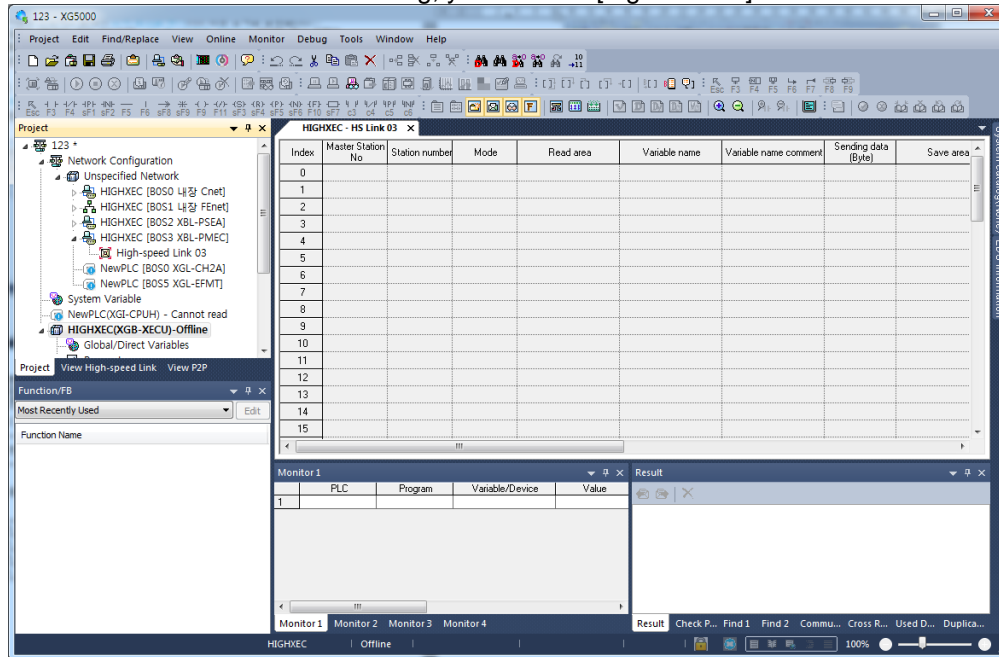


[Figure 6.3.1] Communication module setting

Items		Description	
Communication module settings	Module type	Select Pnet I/f module	
	Base No.	Setting of base position installed Range of Setting: 0 ~ 7 (varying depending on the CPU module)	
	Slot No.	Setting of slot position installed Range of Setting: 0 ~ 11	
Communication period settings		Period type	<ul style="list-style-type: none"> - Range of setting: 10ms, 20 ms, 50 ms, 100 ms, 200 ms, 500 ms, 1s, 5s, 10s, (default is 20 ms) - This applied to Send data - But Receive data will be processed in every scan end regardless of communication period.
Output data setup in case of emergency settings	CPU error	Latch	Keeps its output status
		Clear	Clears all outputs
	CPU stop	Latch	Keeps its output status
		Clear	Clears all outputs

[Table 6.3.1] Communication module setting

After communication module setting, you can see [Figure 6.3.2]

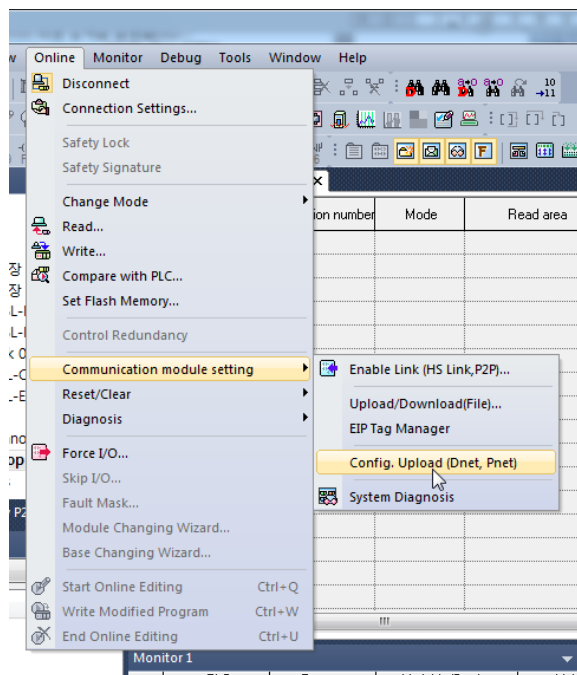


[Figure 6.3.2] Communication module setting

2) Config, Upload (Dnet, Pnet)

After communication module setting, you can use the menu of [Online] [Communication module setting] [Config. Upload (Dnet, Pnet)].

In order to upload configuration data of master, select [Online] → [Config. Upload (Dnet, Pnet)]



[Figure 6.3.2] Config. Upload (Dnet, Pnet)

The screen as below is after“Config. Upload (Dnet, Pnet)”. You can use Read / save area which are blank.

HIGHXEC - HS Link 03 x											
Index	Master Station No.	Station number	Mode	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)
0	0	1	Send				2				
1	0	2	Receive								4
2											
3											
4											
5											
6											
7											
8											
9											
10											

[Figure 6.3.4] High-speed link block Setting

3) High-speed link block Setting

After uploading configuration data, input device information in the blank area.

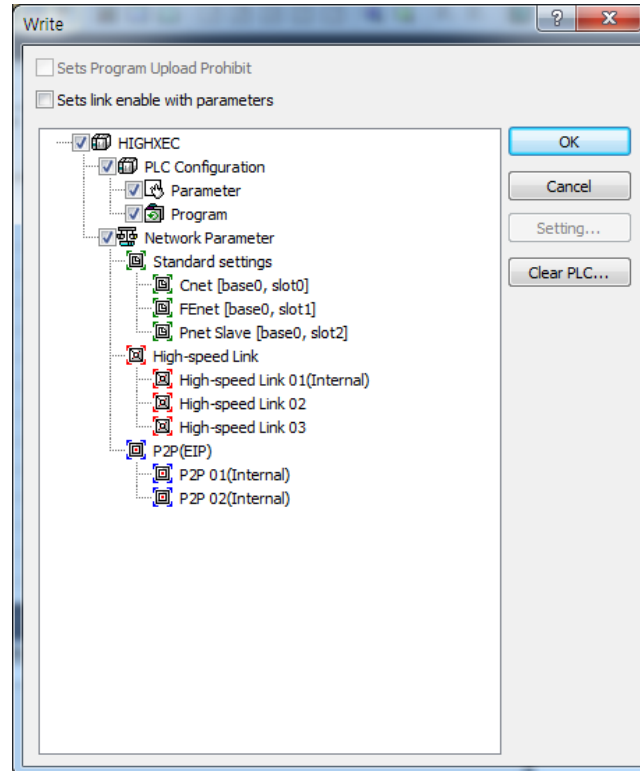
Classification	Details	
Master Station No.	Display the Master station no. (0 ~ 123)	
Station No. *1	Setting range for the slave : 1 ~ 123	
Mode *1	Sending : Transmit the data from master module to slave module. Receiving : Transmit the data from slave module to master module.	
Read area (Master module → Slave module)	XBM, XBC	Area to set the start address of device used for Sending. Setting device : P, M, K, F, T, C, U, L, D, R, ZR
	XEC	Area to set the start address of device used for Sending. Setting device : A, M, I, Q, R, W, F, K, L, U
Save area (Slave module → Master module)	XBM, XBC	Area to set the start address of device used for Receiving. Setting device : P, M, K, F, T, C, U, L, D, R, ZR
	XEC	Area to set the start address of device used for Receiving. Setting device : A, M, I, Q, R, W, F, K, L, U
Send data Receive data (Byte)	Display input/output points of slave module by the bytes. - In case of I/O module of 8 bits or less, please set 1 byte.	

*1 : Area is not able to set

[Table 6.3.2] High-speed link block Setting

4) Write the High-speed link parameter

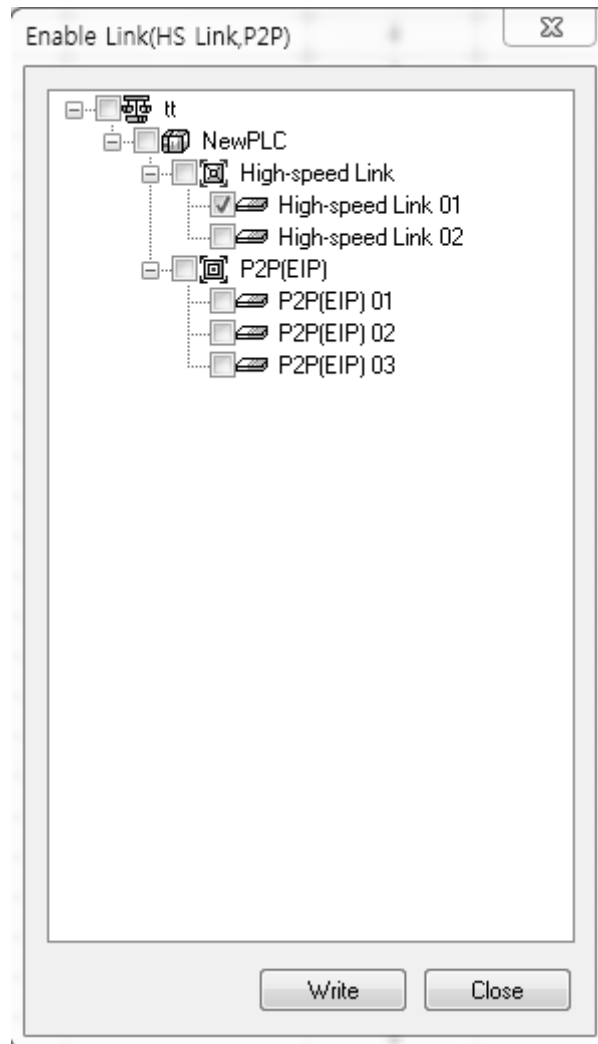
Click “Online” → “Write Parameters” in XG5000, check the applicable High-speed link and then click [OK].



[Figure 6.3.5] Screen of Write the parameter

5) Enable of High-speed link

Click “Online” → “Communication module setting “ → “Enable Link” 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.



[Figure 6.3.5] Screen of Link Enable

6.4 High-speed Link Information

With High-speed link service used to exchange data between communication modules of two or more stations, it provides a checking method of High-speed link service status for the user through High-speed link information so to confirm reliability of the data read from the destination station via the High-speed link.

In other words, the communication module synthesizes the data received up to that time at intervals of a specific time and lets the user know if High-speed link operates as in parameters specified by the user through High-speed link information where the whole information of Run-link(_HSxRLINK) and Link-trouble(_HSxLTRBL) to provide the whole information of the communication network, and the individual information of _HSxSTATE, _HSxTRX, _HSxMOD and _HSxERR to provide communication status for 64 register items in the parameters are contained.

Classification	Run-link	Link-trouble	Send/Receive status	Operation Mode	Error	High-speed link status
Information type	Whole information	Whole information	Individual information	Individual information	Individual information	Individual information
Keyword name (x=High-speed link No. n= High-speed link station No.)	_HSxRLINK	_HSxLTRBL	_HSxTRX[n] (n=0.63)	_HSxMOD[n] (n=0.63)	_HSxERR[n] (n=0.63)	_HSxSTATE[n] (n=0.63)
Data type	Bit	Bit	Bit-Array	Bit-Array	Bit-Array	Bit-Array
Monitor	Available	Available	Available	Available	Available	Available
Program	Available	Available	Available	Available	Available	Available

[Table 6.4.1] High-speed link information function

The user can use the information in keyword format when programming, and also monitor the High-speed link status using the monitor function of the High-speed link information. Prior to its application, the user is requested to check the reliability of the Send/Receive data through High-speed link information of Run-link and Link-trouble when operating several PLCs with High-speed link used.

[Table 6.4.1] below shows functions and definition of the High-speed link information.

PLC	Type	Device	Value	Variable	Comment
1 NewPLC	BIT	L000000	On	_HS1_RLINK	All stations are OK in HS link 1
2 NewPLC	BIT	L000001	Off	_HS1_LTRBL	Trouble after _HS 1 RLINK on
3 NewPLC	BIT	L000020	On	_HS1_STATE000	Total states of HS link 1-block 000
4 NewPLC	BIT	L000021	On	_HS1_STATE001	Total states of HS link 1-block 001
5 NewPLC	BIT	L000101	On	_HS1_MOD001	Operation mode of HS link 1-block 001
6 NewPLC	BIT	L000102	Off	_HS1_MOD002	Operation mode of HS link 1-block 002
7 NewPLC	BIT	L000180	On	_HS1_TRX000	Normal communication with HS link 1-block 000
8 NewPLC	BIT	L000181	On	_HS1_TRX001	Normal communication with HS link 1-block 001
9 NewPLC	BIT	L000260	Off	_HS1_ERR000	Error mode of HS link 1-block 000
10 NewPLC	BIT	L000261	Off	_HS1_ERR001	Error mode of HS link 1-block 001
11					

[Figure 6.4.1] Monitor window of variables

1) Run-link (_HSxRLINK)

As the whole information it shows whether High-speed link is normally executed through the user defined parameters, whose contact will be kept 'On' if once 'On' until Link Enable is 'Off', and also will be 'On' under the conditions specified below.

- ① If Link Enable is 'On'.
- ② If all the register list settings of parameters are specified normally.
- ③ If all the data applicable to the parameters register list is transmitted and received as specified in the period or

If the status of all the destination stations specified in the parameters is Run and with no error at the same time.

2) Link-trouble (_HSxLTRBL x=HS link No.(1~2))

As the whole information it shows whether High-speed link is normally executed through the user defined parameters, which will be 'On' if Run-link 'On' condition is violated when Run-link is On, and will be off if the condition is recovered.

3) Send/Receive (Tx/Rx) status (_HSxTRX[0..63] x=HS link No.(1~2))

As individual information it shows the operation status of High-speed link parameters on the register list up to 64 registered items' Send/Receive information. If the Send/Receive operation of the registered items is agreeable to the Send/Receive period, the applicable bit will be On, and if not, it will be Off.

4) Operation mode (_HSxMODE[0..63] x=HS link No.(1~2))

As individual information it shows the operation status of High-speed link parameters on the register list up to 64 registered items' operation mode information just like the max. register number. If the station specified in the register item is in Run mode, the applicable bit will be On, and if in Stop/Pause/Debug mode, it will be Off.

5) Error (_HSxERR[0..63] x=HS link No.(1~2))

As individual information it shows the operation status of High-speed link parameters on the register list up to 64 registered items' error information just like the max. register number. The error displays the general status of the PLC which fails to execute the user program. If the destination station PLC is normal, it will be Off, and if abnormal, it will be On.

6) High-speed link status (_HSxSTATE[0..63] x=HS link No.(1~2))

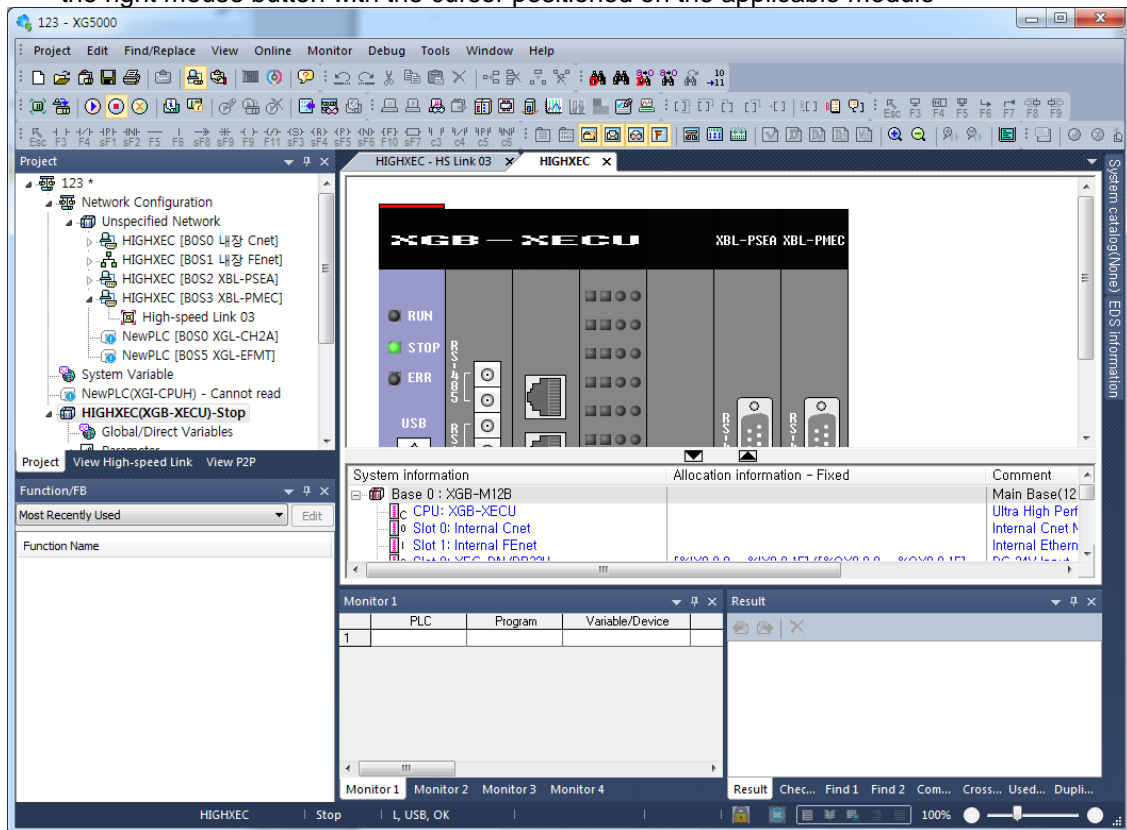
As individual information it shows the operation status of High-speed link parameters on the register list up to 64 registered items' High-speed link status just like the max. register number, which synthesizes the information of the individual items to display the general information of the registered items. In other words, if the applicable list's Send/Receive status is normal with the operation mode of Run and with no error, it will be On, and if the conditions above are violated, it will be Off.

6.5 Monitor of High-speed link information

High-speed link information can be checked through the variable monitor on the monitor menu after XG5000 is Online connected, or through the XG5000 diagnosis service.

1) High-speed link monitor from the XG5000 diagnosis services

- (1) Select XG5000's "Online" → "Communication module setting" → "System Diagnosis." → Click the right mouse button with the cursor positioned on the applicable module

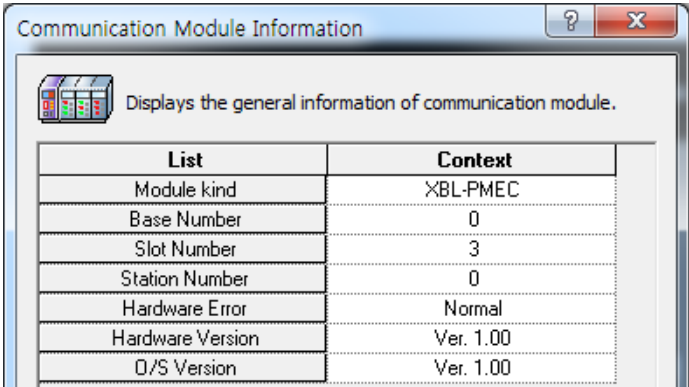


[Figure 6.5.1] System Diagnosis

Item	Details
Communication module information	Displays the information of communication module
High Speed Link	Displays the information of high speed link
Auto scan	Displays the information of the slave configuration

[Table 6.5.1] System diagnosis

(2) Module Information

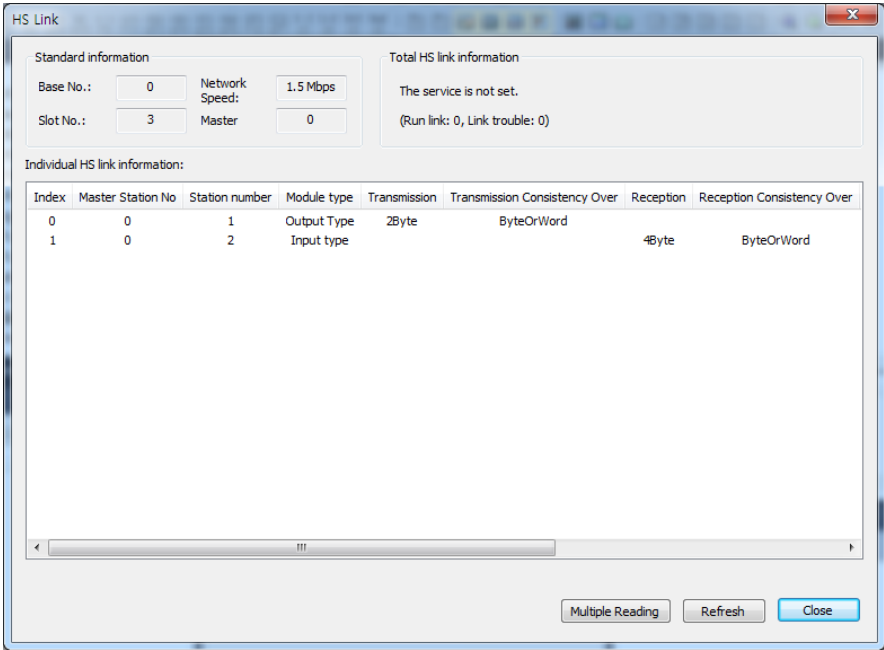


[Figure 6.5.2] Communication module information

Classification	Details
Module type.	XBL-PMEA
Base Number.	Displays the base number (0)
Slot Number	Displays the slot no.(1~10), depending on main unit type
Master Station no.	Displays the master station number
Hardware status	Displays the hardware status
Hardware version	Displays the hardware version
Software version	Displays the software version

[Table 6.5.4] Communication module information

(3) High Speed Link

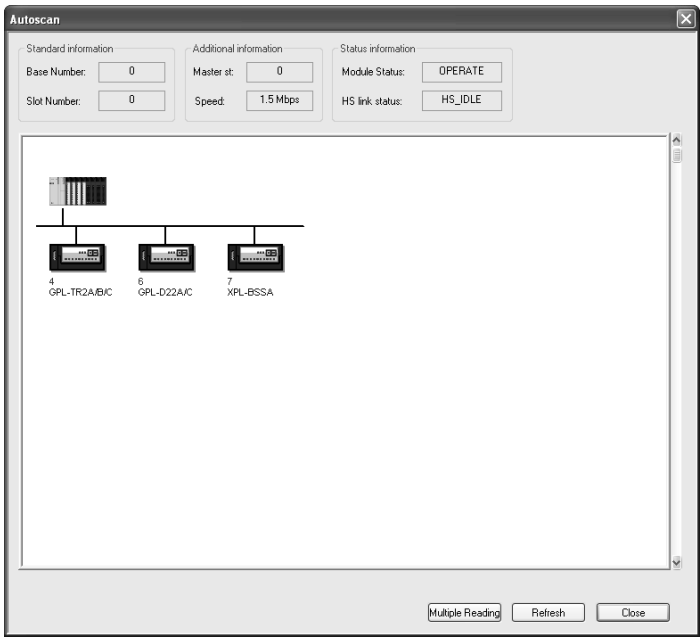


[Figure 6.5.3] High Speed Link

Item		Details
Basic information	Base no.	Displays the base no.(0)
	Slot no.	Displays the slot no.(1~10)
	Communication speed	Displays the communication speed by bps unit (9,600 bps ~ 12Mbps)
	Master station no.	Displays the master station no.(0~123)
Total information of high speed link	Run Link	Displays the flag of Run Link
	Link trouble	Displays the flag of Link Trouble
Separate information of high speed link	Master station no.	Displays the master station no.(0~123)
	Station no.	Displays the slave station no.(0~123)
	Module type	Displays the Transmission or Reception type
	Transmission	Master module → Slave module
	Transmission Consistency Over	ByteOrWord: Consistency supports for a node Whole Length: Consistency supports for whole blocks.
	Reception	Slave module → Master module
	Reception Consistency Over	ByteOrWord: Consistency supports for a node Whole Length: Consistency supports for whole blocks.
	Total size	Displays the size of Transmission/Reception byte
	Mode	Displays the mode of Profibus-DP communication mode (Run, Stop)
	Status of Transmission or Reception	Displays the information of Transmission/Reception between master and slave (Normal, Error)
	Status of high speed link	Displays the information of high speed link between master and slave (Normal, Error)
	Error	Displays the error information between master and slave (Normal, Error) There are 2cases of errors as below a) In case that slaves doesn't exist on the network, after slaves is configured in PROFICON. b) In case that slaves exist on the network, after slaves is not configured in PROFICON.

[Table 6.5.3] High Speed Link

(4) Autoscan



[Figure 6.5.4] Autoscan

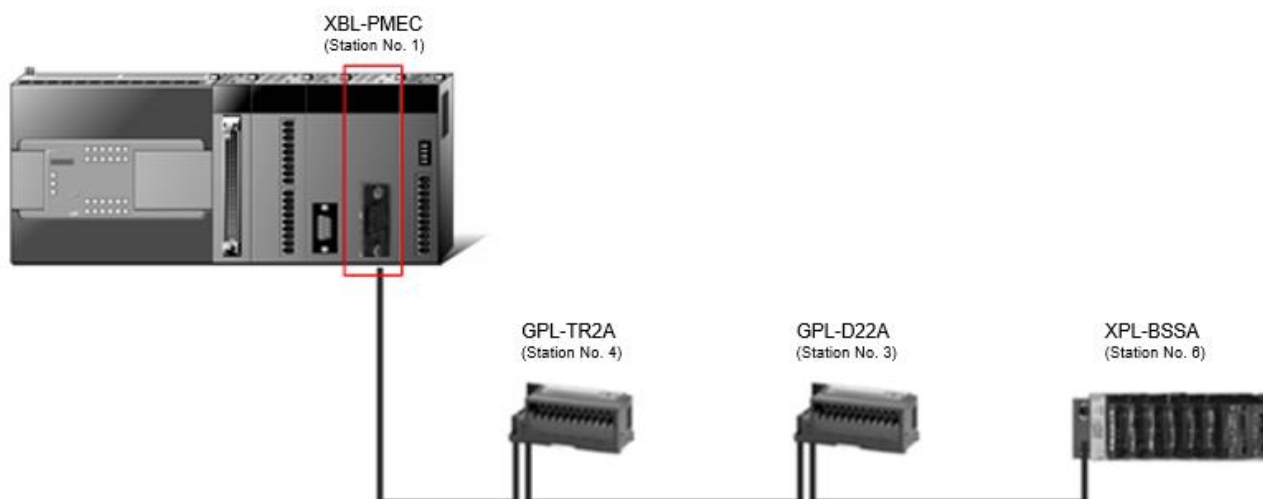
Item		Details
Basic information	Base no.	Displays the base no.(0)
	Slot no.	Displays the slot no.(1~10), depending on main unit
Added information	Master station no.	Displays the master station no.(0~123)
	Communication speed	Displays the communication speed by bps unit (9,600 bps ~ 12Mbps)
Status information	Status of communication module	Displays the status of communication module
	Status of high speed link	Displays the status of high speed link

[Table 6.5.4] Autoscan

Chapter 7 Program Example

7.1 Example of communication with XBL-PMEC

This example shows a program that is installed on No. 0 slot of XGT No. 0 base, sending and receiving data to Smart I/O module(Station Number 3 and 4) and Extended Smart I/O Pnet(Station 6).



[Figure 7.1.1] I/O Structure and Sending/Receiving Data

Slave		Master			
Station No.	Module name	Mode	Read Area	Save Area	Size (byte)
4	GPL-TR2A	Sending	M0000(2byte)	-	2
3	GPL-D22A	Receiving	-	M0200(2byte)	2
6	XPL-BSSA	XBE-TN32A	Sending	M0000(4byte)	Sending(22byte)/ Receiving(20byte)
		XBE-DC32A	Receiving	-	
		XBF-AD04A	Receiving	-	
		XBF-DV04A	Sending	M0302(8byte)	
		XBF-DC04A	Sending	M0306(8byte)	
		XBF-RD04A	Receiving	-	
		XBE-RY16A	Sending	M0310(2byte)	

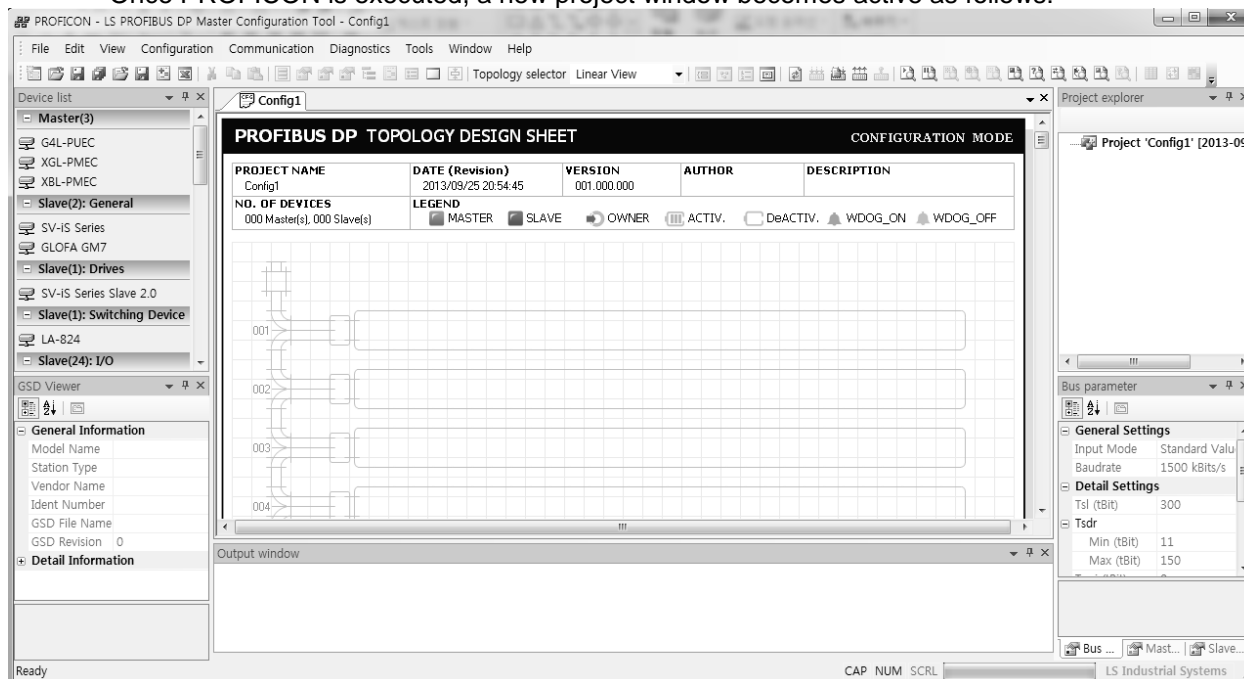
[Table 7.1.1] High-Speed Link Sending/Receiving Map

In the table above, XBC-H type main unit sends 2 byte data in M0000 area to GPL-TR2A and 22 byte data in M0300~0310 area to XPL-BSSA and saves 2 byte (16 points) input data of GPL-D22A in M0200 area of XBC-H type main unit and 20 byte input data of XPL-BSSA in M0311~3020 area of XBC-H type main unit.

7.2 PROFICON settings

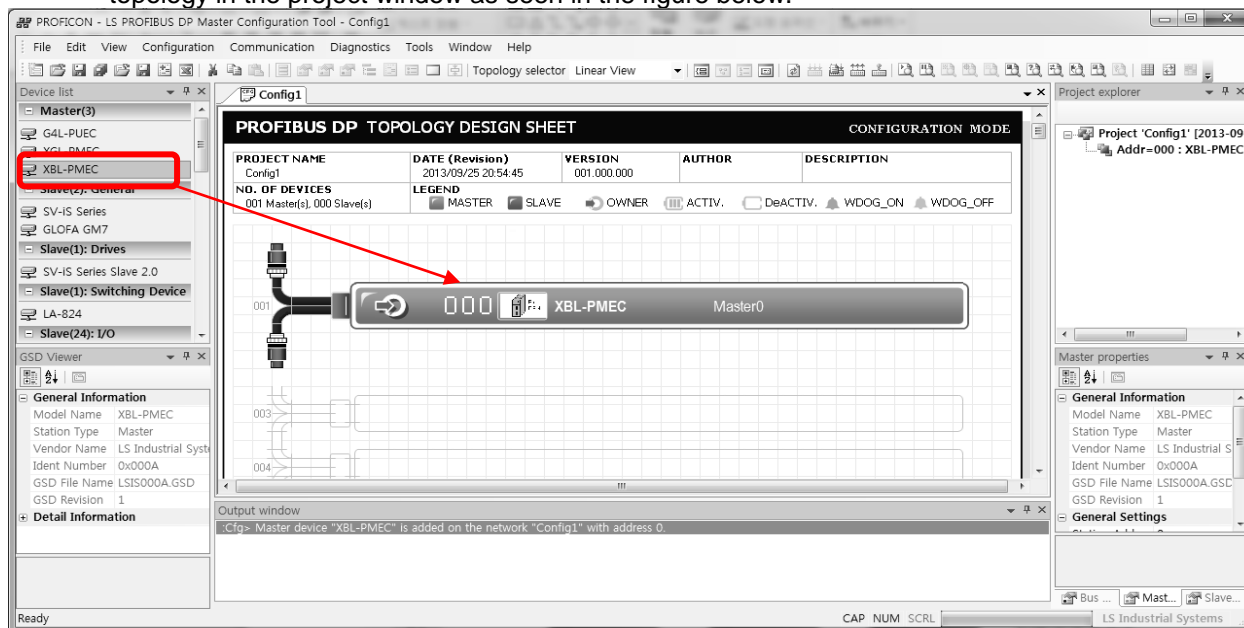
To exchange data between the systems as in [Figure 7.1.1], it is convenient for the user to write high-speed link sending/receiving map. In addition, it is necessary to write high-speed link parameters after setting Network Configuration through PROFICON and download to PLC in order to send/receive data as in [Table 7.1.1].

Once PROFICON is executed, a new project window becomes active as follows:



[Figure 7.2.1] Initial Execution Screen: New Project Window

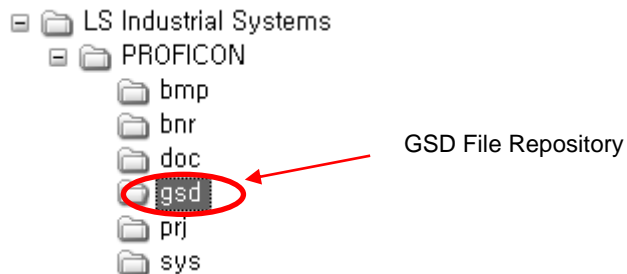
For network configuration, the master module (XBL-PMEC) should be composed first. Select XBL-PMEC from the device list window on the left and drag and drop on the topology in the project window as seen in the figure below.



[Figure 7.2.2] Insert Master module

Chapter 7 Program Example

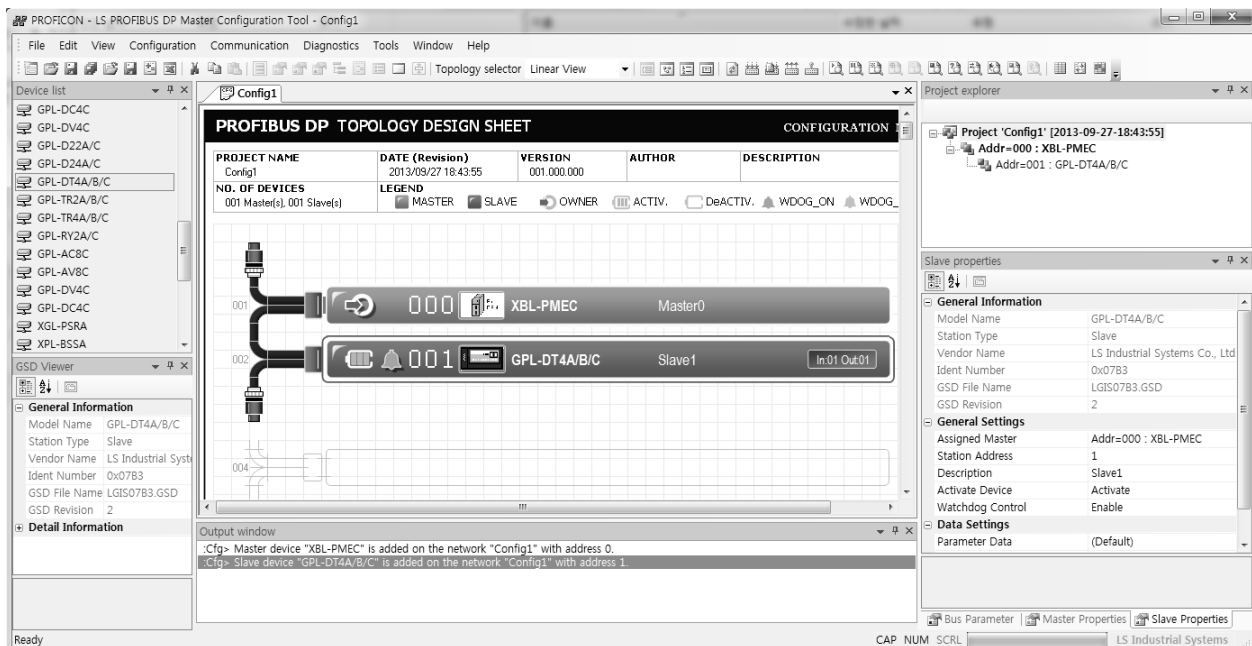
Now the user should compose slave module. It can be either to set it up manually, or search slave module existing in current network automatically and set it up. However, at this time, the GSD file of slave module to be composed should be in the GSD directory (See [Figure 7.2.3]) of PROFICON installation directory. The GSD file is provided by the company manufacturing such slave module.



[Figure 7.2.3] Directory of PROFICON Installation

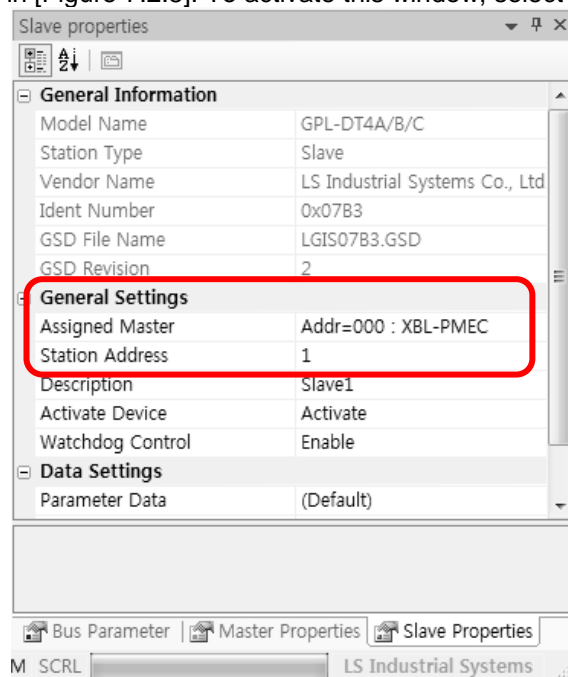
(1) Setting manually

As in setting the Master module, drag a selected slave from the device list on the left and drop it on the topology.



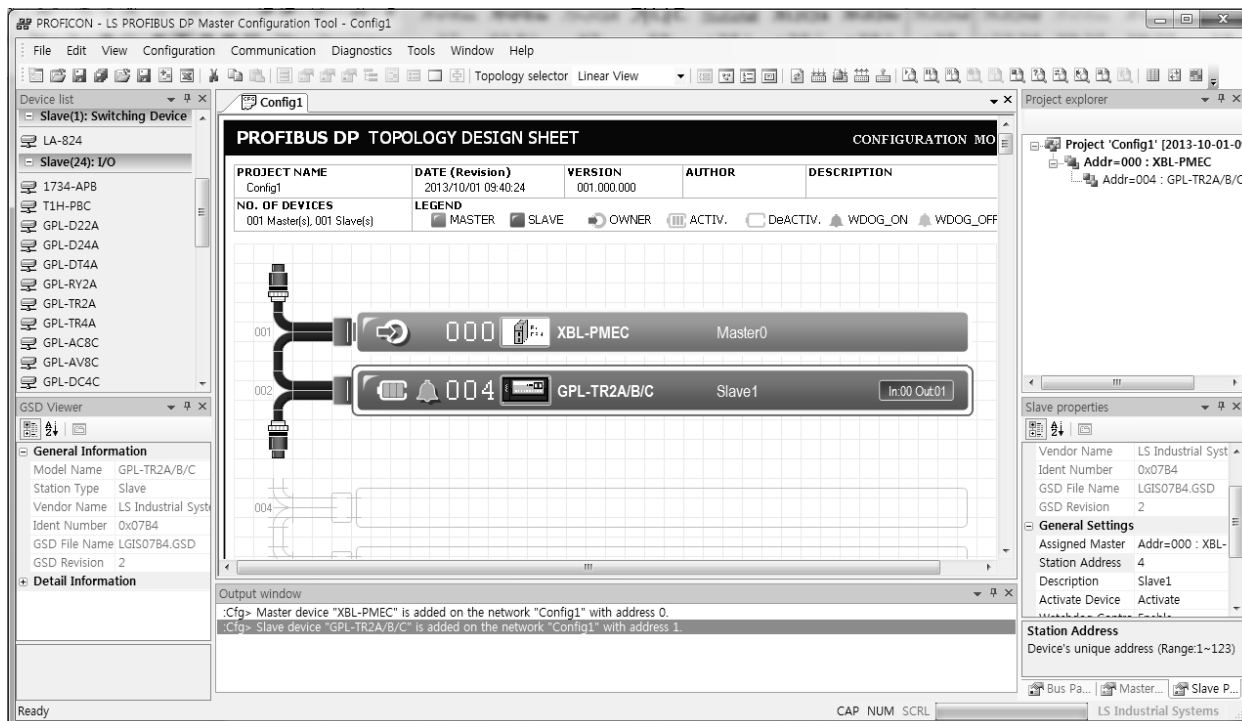
[Figure 7.2.4] Add Slave Module (Manual Setting)

Change the station number of the slave module in the Slave Properties window on the left bottom as seen in [Figure 7.2.5]. To activate this window, select a Slave from the topology.



[Figure 7.2.5] Change Slave Properties

If station number and description properties are changed, the changed number and properties are immediately reflected on the project window as seen in the figure below.

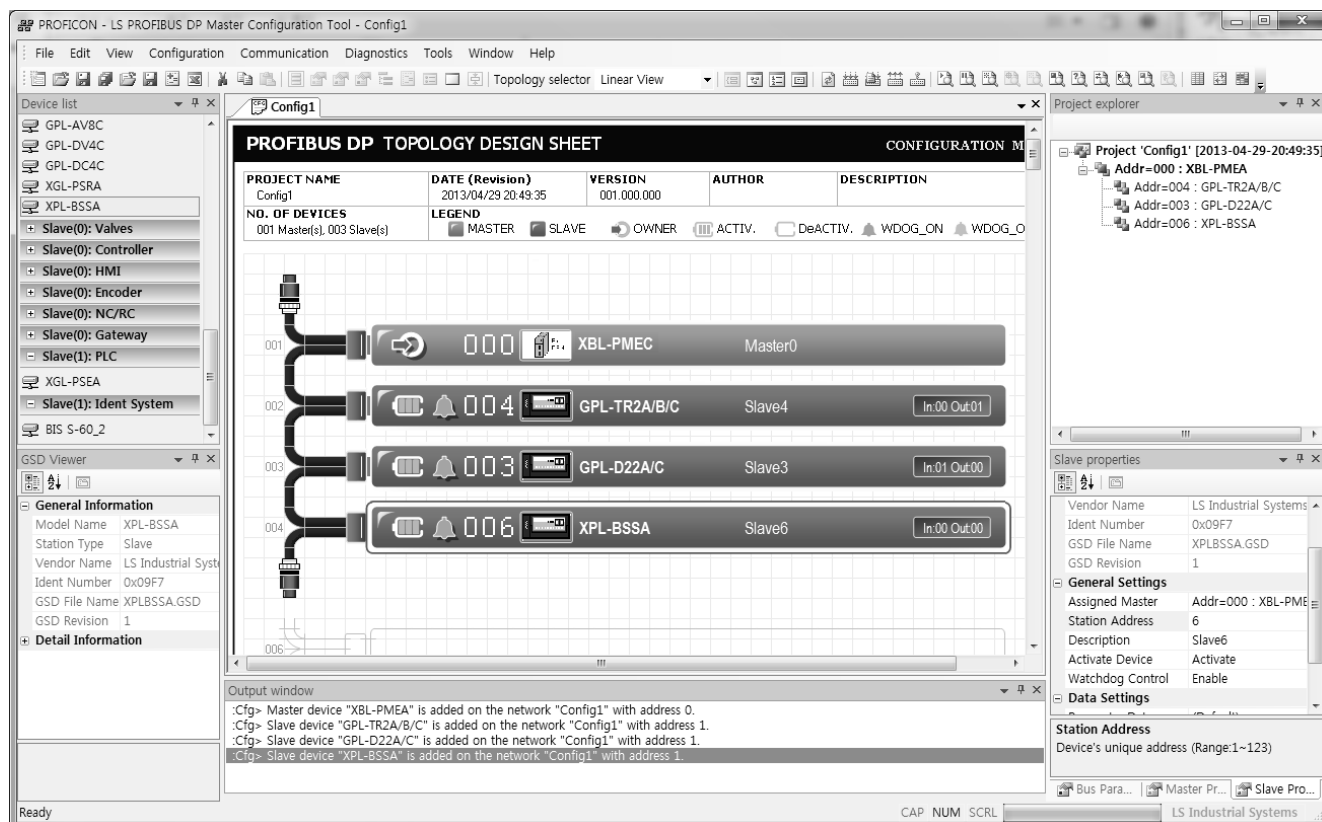


[Figure 7.2.6] Topology after properties are changed

Chapter 7 Program Example

Set remaining GPL-D22A through the process described above.

However, for XPL-BSSA as extended slaves, it is necessary to add module data. Set XPL-BSSA on the topology first through the process above as in the following figure



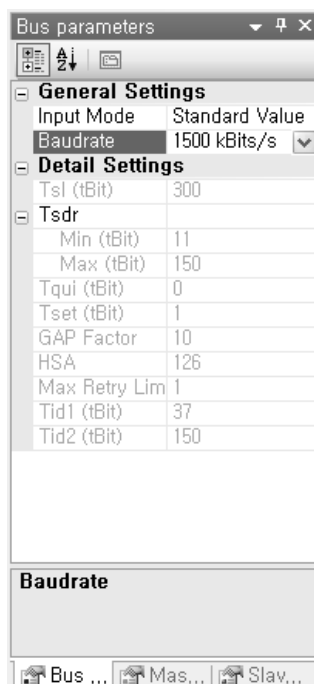
[Figure 7.2.7] Add Extended XPL-BSSA

Press module data in the Slave Properties window to make the slave module setting window appear. Set modules in sequence through this setting window (See [Figure 7.2.8])

Slot	Module	Type	I Len.	O Len.	Content
1	Digital Output	QB	-	4	Digital output 4byte(XBE-TN32A)
2	Digital Input	IB	4	-	Digital input 4byte(XBE-DC32A)
3	Analog Input	IB	8	-	Analogue input 8byte(XBF-AD04A)
4	Analog Output	QB	-	8	Analogue output 8byte(XBF-DV04A)
5	Analog Output	QB	-	8	Analogue output 8byte(XBF-DC04A)
6	Analog Input	IB	8	-	Analogue input 8byte(XBF-RD04A)
7	Digital Output	QB	-	2	Digital output 2byte(XBE-RY16A)

Bus parameters are to communicate with the Master and represent communication speed and communication timing parameters. To set, select the Master from the topology and then, select “Bus Parameters” item from the “Configuration” menu to activate the “Bus Parameter” tap on the left bottom.

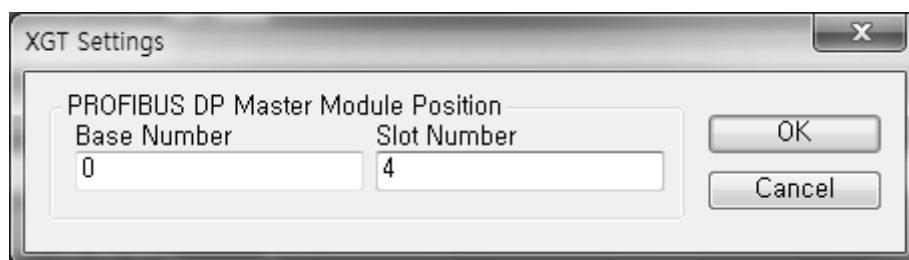
At this time, it is possible to set communication speed (Baudrate) of the Master module. Our Slave module Smart I/O series have a function to adjust the speed of slave to be equal with that of the Master module automatically (For other companies’ Slave modules, refer to their user’s manuals).



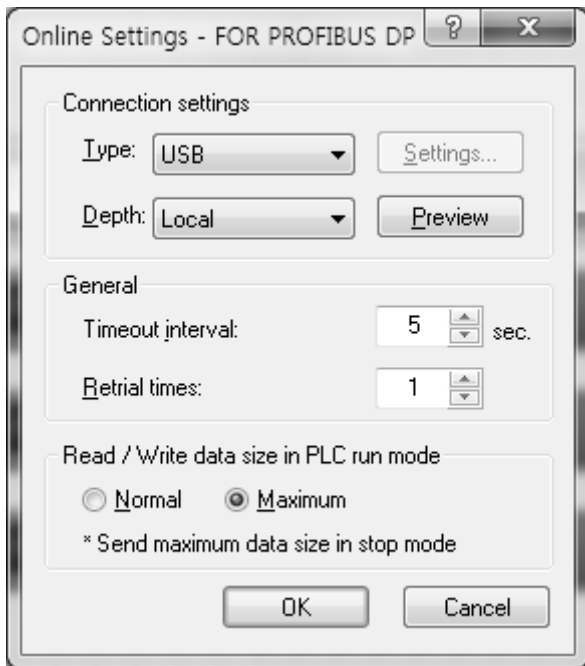
[Figure 7.2.10] Select a communication speed of the Master module

If the process above is completed, it can be declared that setting all of the networks is completed.

To download the Network Configuration to Pnet I/F module, select “Settings...” from the “Communication” menu and set access. After assigning a number to the slot in which the current Pnet I/F module is installed, set access as in [Figure 7.2.12].



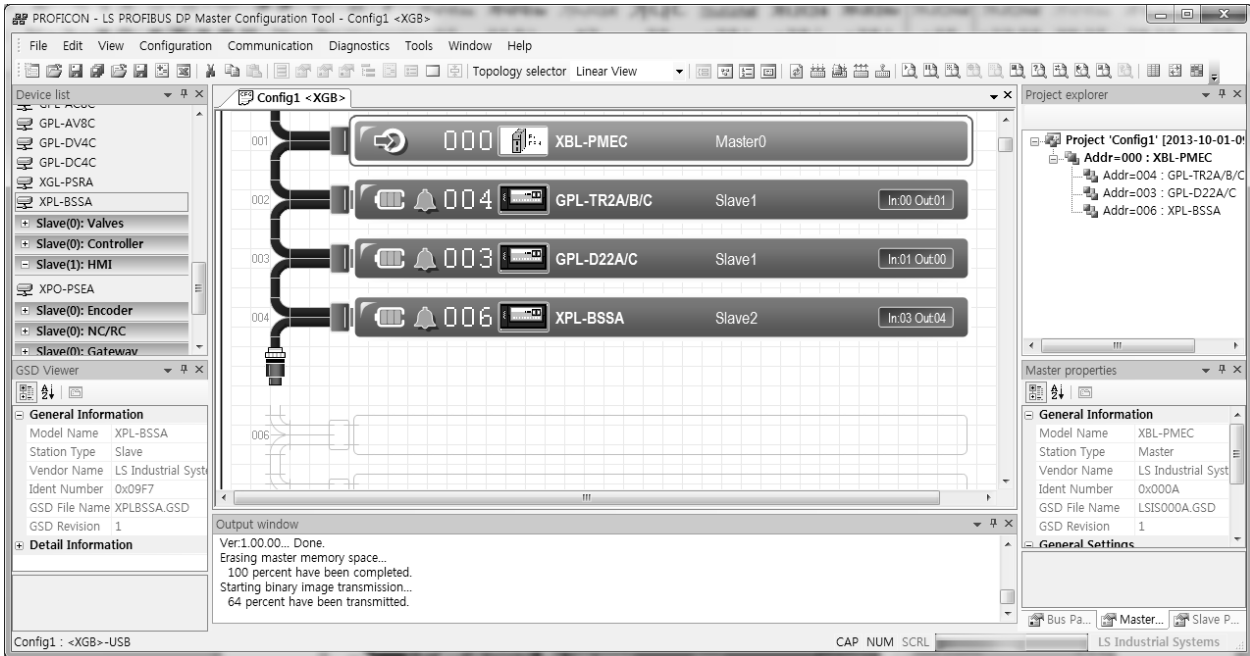
[Figure7.2.11] Communication Settings Window for XGT: Set to install Pnet I/F module



[Figure 7.2.12] Setting Window to access to XGT CPU module

Once communication is connected, select 'Download Image' from the 'Communication' menu to download.

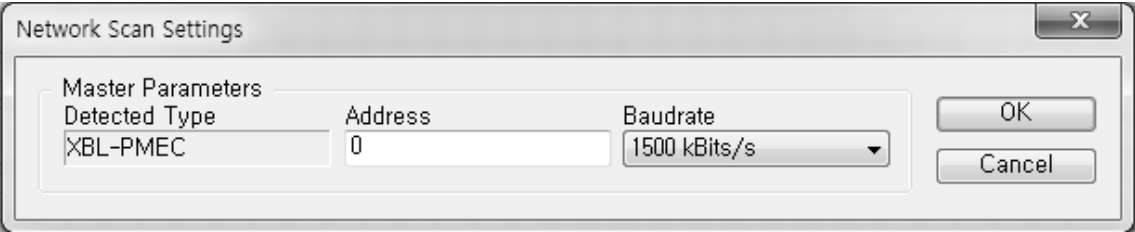
As seen in [Figure 7.2.13], the Progress Bar shows download progress and setting Pnet I/F module network are completed once download ends. Before closing this tool, save the current network project to recover the project later.



[Figure 7.2.13] Download Process

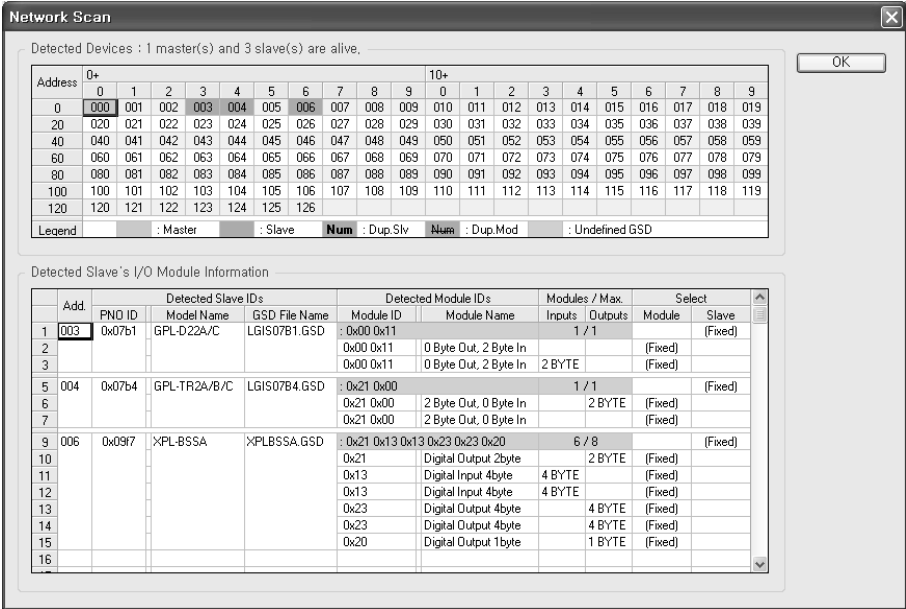
(2) Setting automatically

After setting and saving the Master module, set access according to the methods. After that, execute “Auto. Network Scan...” in the “Diagnostics” menu to make the following screen appeared. Input the Master’s address and its communication speed and press the ‘OK’ button. Then, the module begins to scan networks.



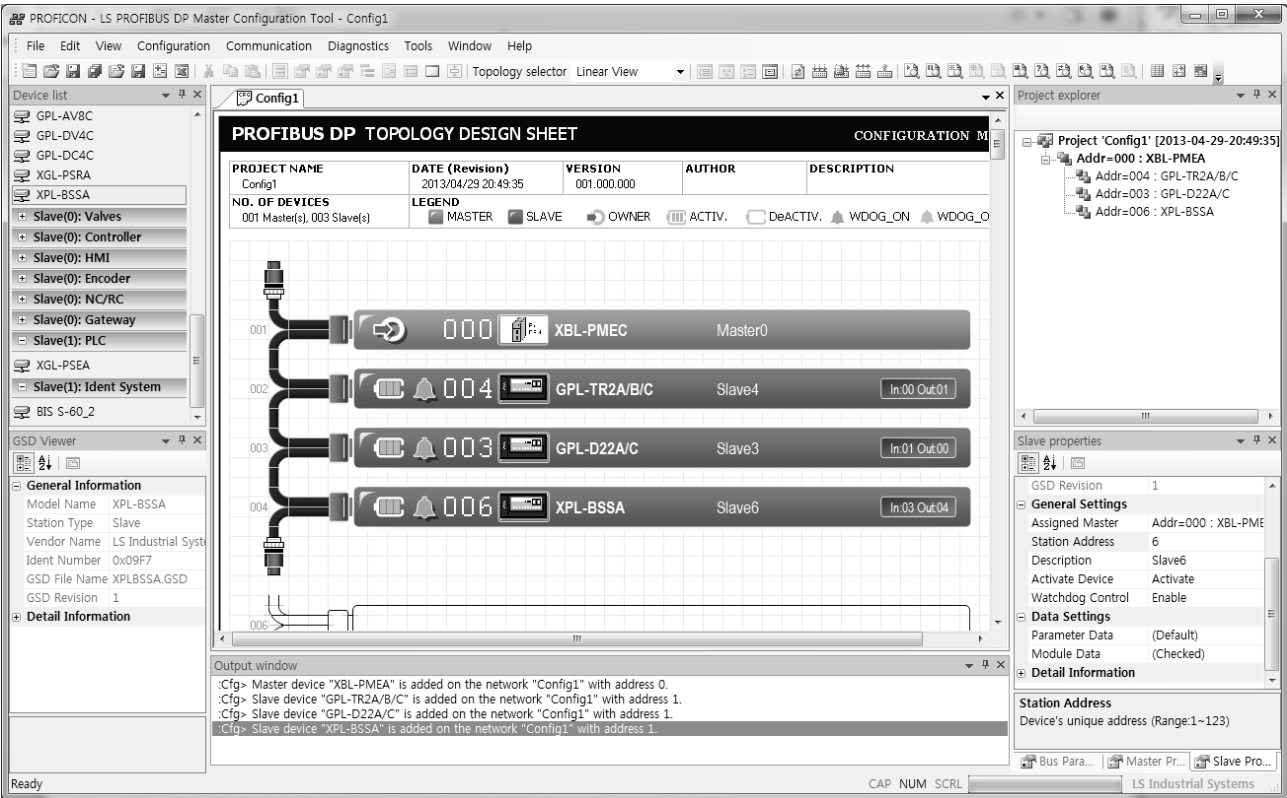
[Figure 7.2.14] Setting of Automatic Network Scan

Through the process above, PROFICON refers to GSD file of the Slave module on the current network and the data size of the relevant module and the address of the sending/receiving data supported by the module are automatically set. Then, the scanned results are shown as in [Figure 7.1.16].



[Figure 7.2.15] Results of Automatic Network Scan

At this time, pressing the “OK’ button will prompt setting network topology automatically as seen in [Figure 7.2.16].



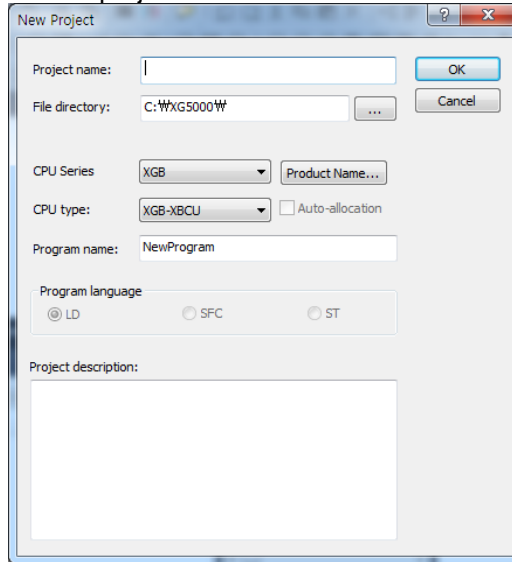
[Figure 7.2.16] Screen that has been set through Automatic Network Scan

To change Slave Properties, click a module from the topology and change them through the Slave Properties Window on the left bottom.

7.3 XG5000 settings

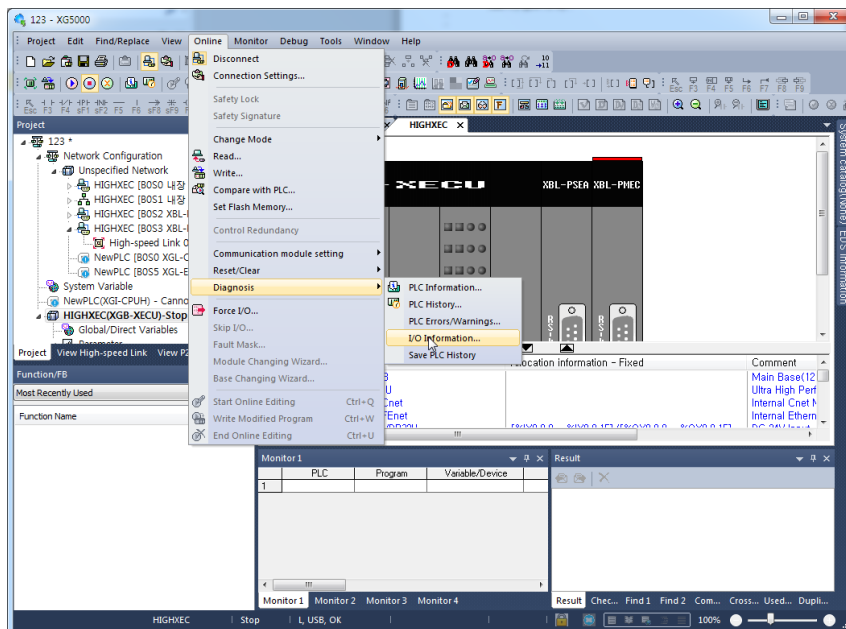
This part describes how to assign the internal memory by XG5000..

Click 'File' ->'New File' and select project name and PLC series in the New Project window.



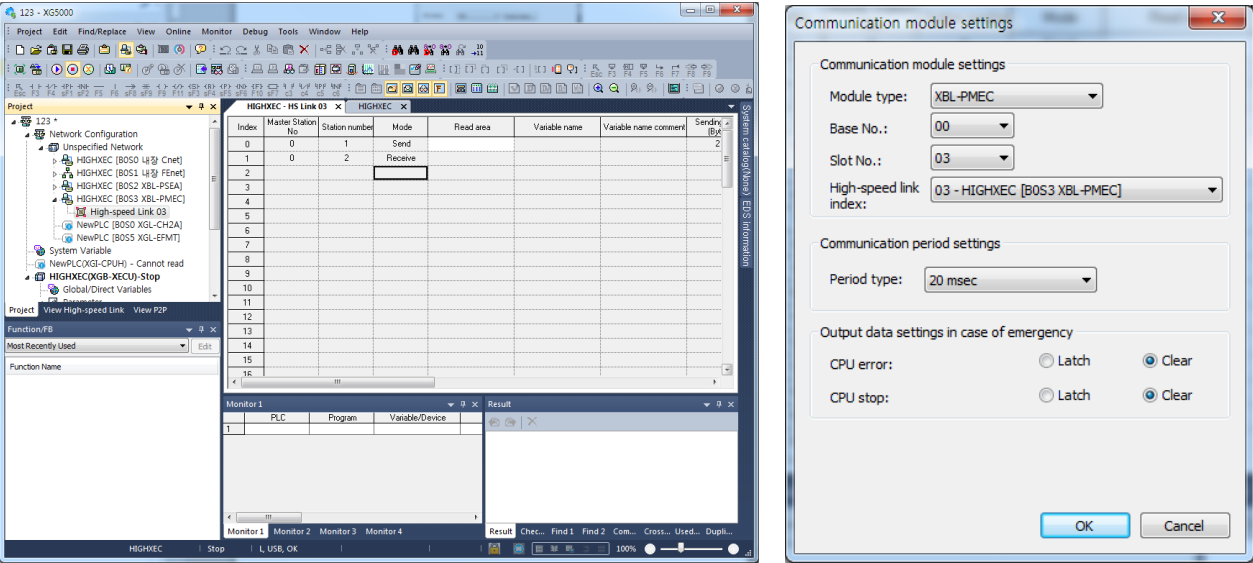
[Figure 7.3.1] New project

Select the 'Online' to connect with CPU and Online menu 'Read I/O information' is brought I/O information of each slot installed.



[Figure 7.3.2] After reading I/O information, add Pnet module

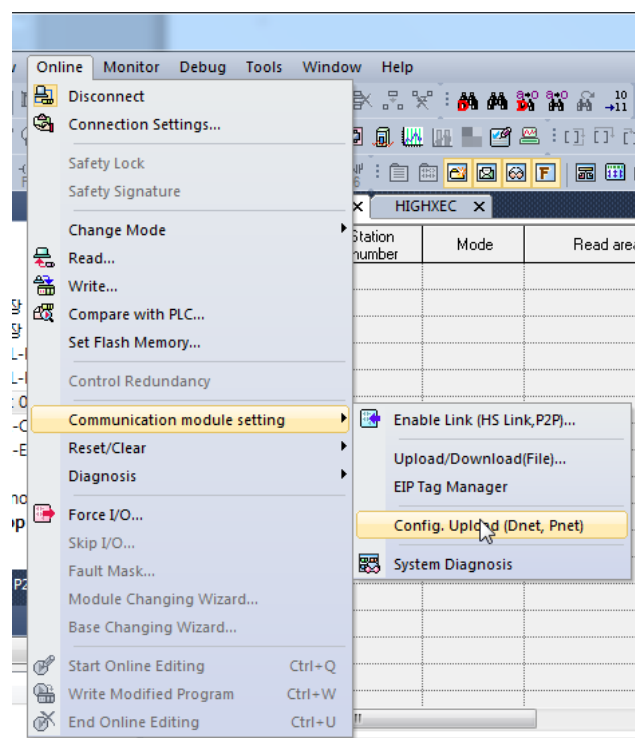
Select High-speed link tab in lower end tab of left frame, Double click High-speed link 1. It can available to set the module type, base (no.) number, slot (no.) number and communication cycle.



[Figure 7.3.3] Screen of communication module setting

Select the Pnet for module type, position of current master communication module is set the base number and slot number. Communication cycle is set free from 10ms to 10s, It will be a data transmission cycle between CPU module of PLC and Master communication module. In emergency, output setting is set suitable to user's environment. Click 'OK' and then 'Block' is created below 'High-speed link 1', Double click it.

After block is created, click the index of block information frame (right frame). Click [Online] – [Config. Upload (Dnet, Pnet)] and it brought the setting information in PROFICON.



[Figure 7.3.4] Config.Upload(Dnet, Pnet) menu

After PROFICON setting file is uploaded, setting information is displayed in block window as shown below.

HIGHXEC - HS Link 03 x HIGHXEC x											
Index	Master Station No	Station number	Mode	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)
0	0	3	Receive								2
1	0	4	Send				2				
2	0	6	Send/Receive				22				20
3											
4											
5											
6											
7											

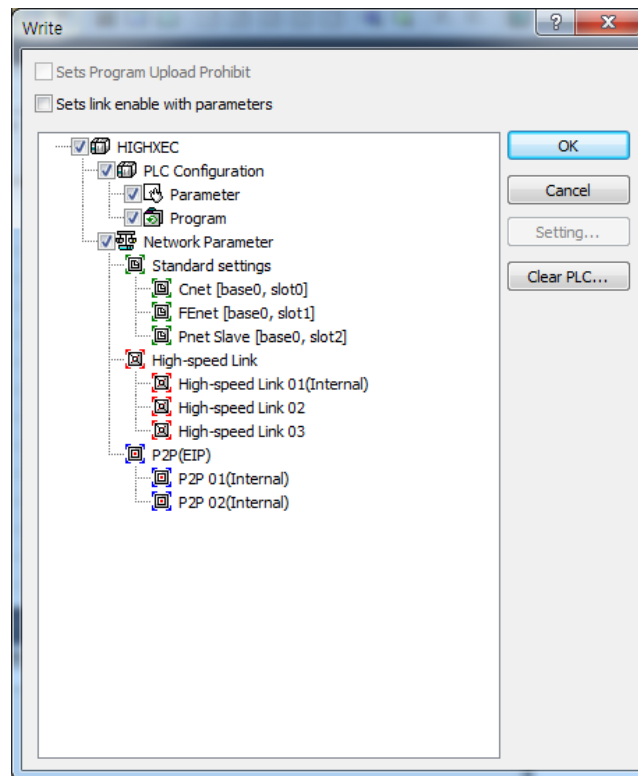
Double click the applicable index to set the address. Set M0200 for station3, M0000 for station 4 and M0300 for area to read, M0311 for area to save of station 6.

[Figure 7.3.5] High-speed link block setting

HIGHXEC - HS Link 03 x HIGHXEC x											
Index	Master Station No	Station number	Mode	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)
0	0	3	Receive					%Mw200			2
1	0	4	Send	%Mw0			2				
2	0	6	Send/Receive	%Mw300			22	%Mw311			20
3											
4											
5											
6											
7											

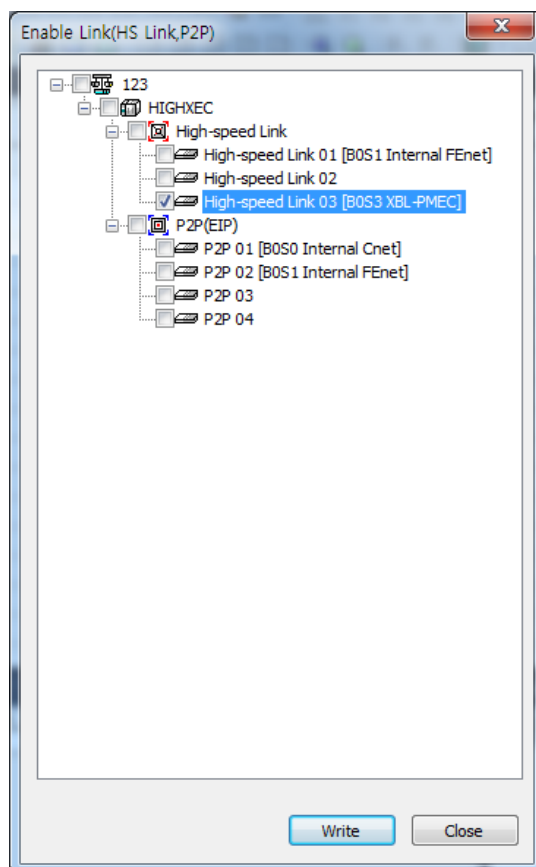
[Figure 7.3.5] Finished screen

After finish the setting, setting information is downloaded in PLC. Select [Online] – [Write parameter] (standard settings, High-speed link, P2P). Here, Check High-speed link to download and click 'OK'.



[Table 7.3.6] Write parameter (Standard settings, High-speed link, P2P)

After Write is finished, the operation is by applicable high-speed link enabled. Select the [Online] – [Enable Link] (High-speed, P2P). And Link Enable window is displayed as shown below. Select the applicable High-speed link number and then select 'Write' to set.



[Figure 7.3.7] Link Enable (High-speed link, P2P)

If you use others products to slave module, Setting of using that product's GSD file is same as above in order.

Chapter 8 Troubleshooting

This chapter is to describe various errors that may occur in system operation, their causes and actions to take against. If any error occurs on Pnet I/F module, its related details can be checked through the procedures below. Surely follow the troubleshooting procedures in the sequence as specified to check for abnormal module state. And any discretionary repair or disassembly is not allowed.

8.1 Symptoms and Management by LED Status

It can know the simple symptoms by LED status and it can manage.
(When High-speed link is enabled).

(1) XBL-PMEC

RUN	I/F	HS	P-RUN	STAT	ERR	CFG	Symptoms	Management
On	Flicker	Off	On	Off	Off	Off	High-speed link disabled	-
On	Flicker	On	On	Off	Flicker	Off	Abnormal connection status of a slave	Check the connection of slave Check the setting of slave
On	Flicker	On	On	Off	On	Off	Bus error	Check the cable short Check the module with different speed Check the operation device value bigger than HAS*1
On	Flicker	Flicker	-	-	Off	Flicker	SyCon (PROFICON) setting changes during High Speed Link operation	Check the connection of slave Check the setting of slave
-	-	-	-	On	-	-	Error in OS	Request A/S
Off	Off	Off	-	-	-	-	Error	Request A/S

*1) HAS: Highest Station Address

[Table8.1.1] Symptoms related communication module (When High-speed link is enabled)

8.2 System Diagnosis of PROFICON

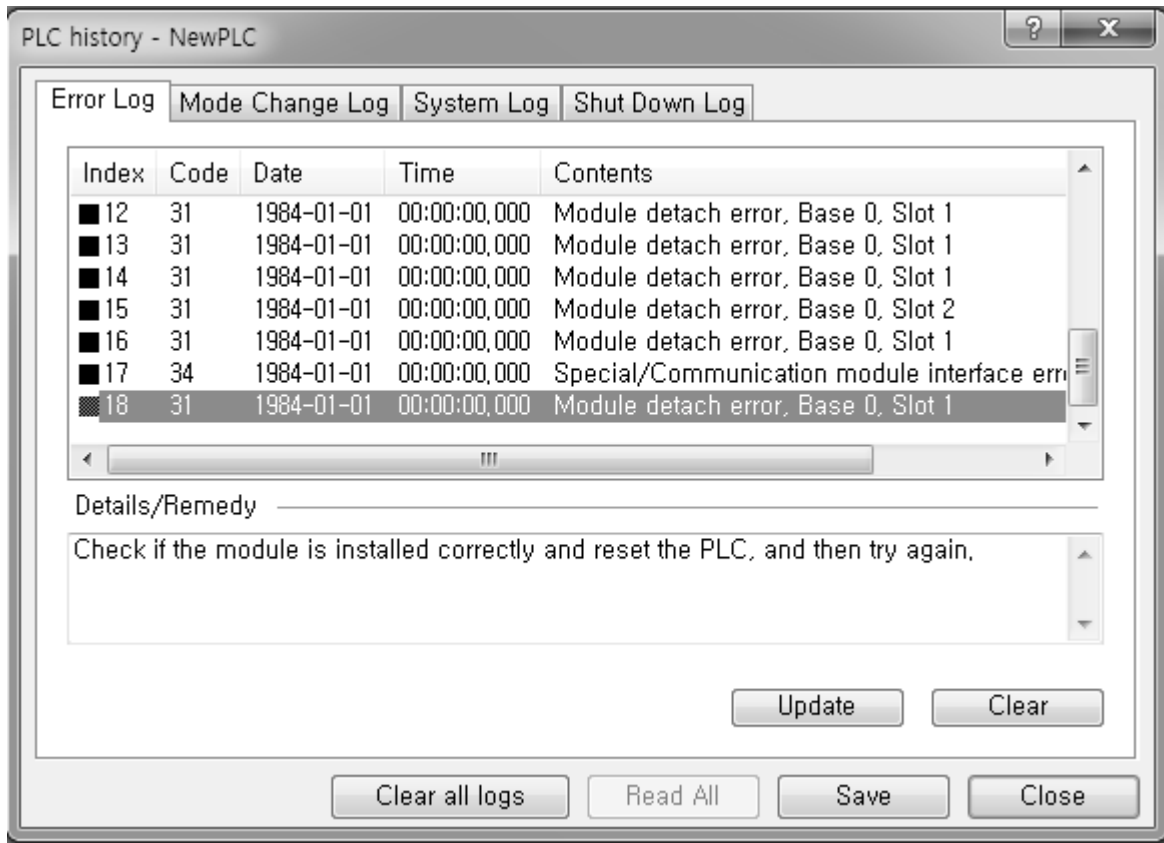
System Diagnosis of PROFICON refers to 5.4 Diagnosis function

8.3 System Diagnosis of XG5000

System Diagnosis of XG5000 refers to 6.5 Monitor of High-speed link information

8.4 Diagnosis of Communication Module by using XG5000

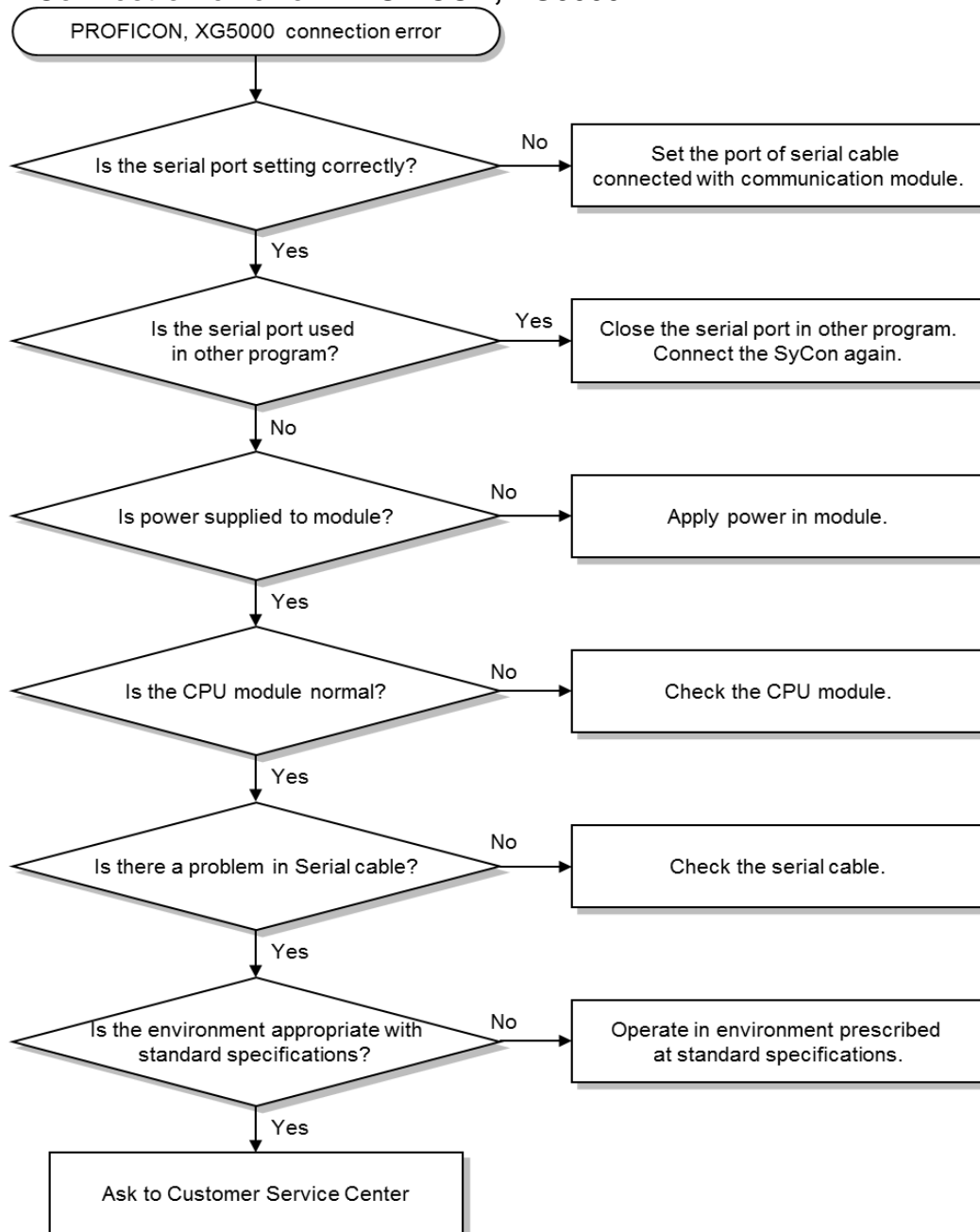
XG5000 connection program can be used to monitor the communication module simply. Connect with CPU port and then select [On-Line] -> [PLC History] -> [PLC Error/Warning] in XG5000.



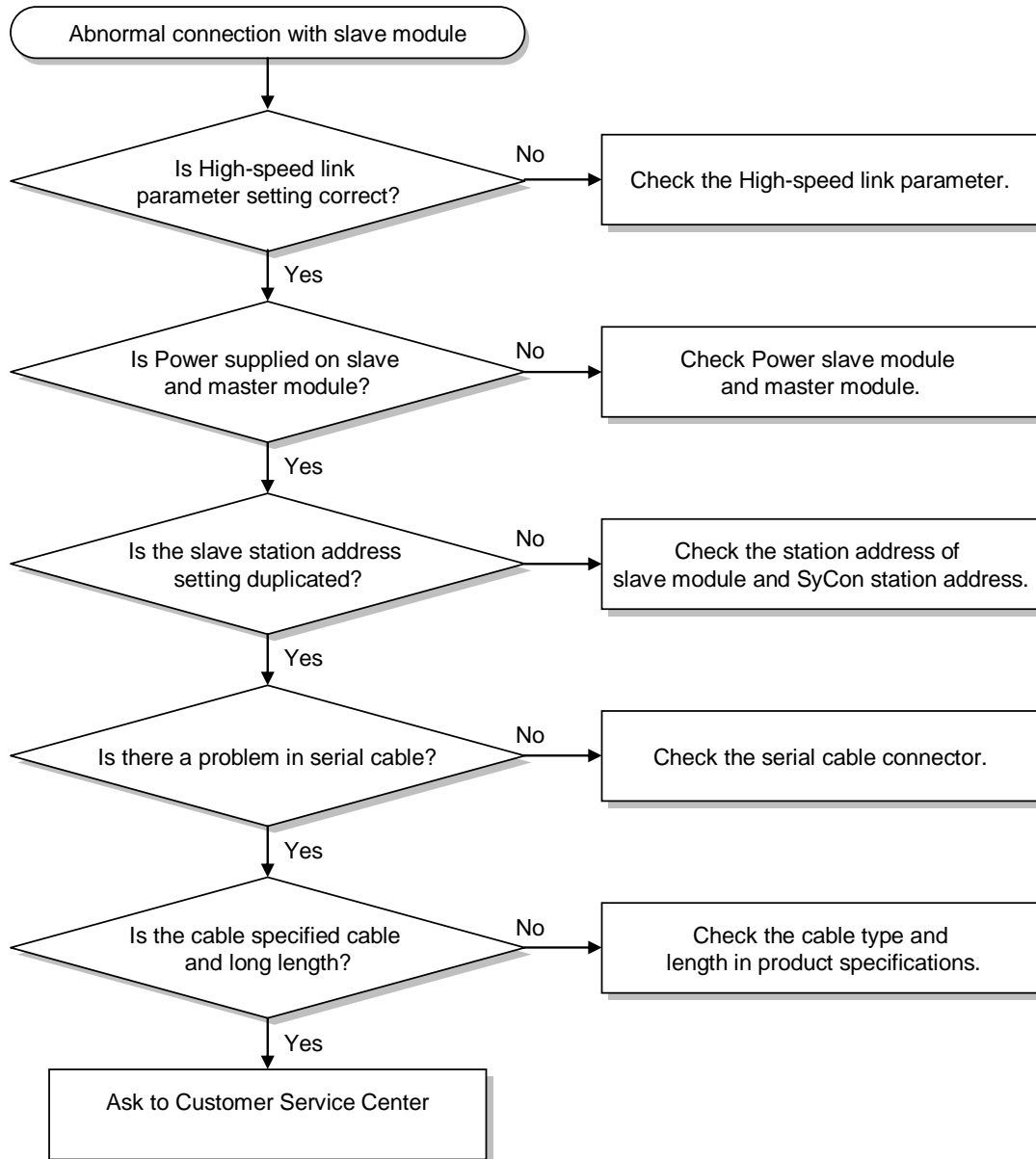
[Fig 8.4.1] PLC history details monitor

8.5 Troubleshooting

8.5.1 Connection error on PROFICON, XG5000



8.5.2 Network error with slave module



Appendix

A.1 Terminology

1) Profibus-FMS (Fieldbus Message Specification)

Solution generally used to provide communication functions in the cell level, with services available to transmit the program file to operate the field device and its related data file, to operate the program by remote control through the network and to manage various events which may occur during operation of the controlled and automatized system.

2) Profibus-DP (Decentralized Peripherals)

Used to send real-time data fast between field devices. It is an example of the communication system applied as of HS digital communication type substituted for existing 24V and 4~20Ma of analog sign like the communication between field devices such as various sensors and actuators installed on PLC and the field.

3) Profibus-PA (Process Automation)

Specially made for process automation with safety device built-in, which can connect sensor and actuator with a single bus line common-used. And it provides power and data communication function on the bus by means of 2-wire technology in compliance with the international standard of IEC 1158-2.

4) SyCon

Application program of Profibus Network Configuration Tool used to specify the configuration though SyCon and download the information onto the applicable module if LSIS master module (XGL-PMEA) is applied.

5) PROFICON

Application program of Profibus Network Configuration Tool used to specify the configuration though PROFICON and download the information onto the applicable module if LSIS master module (XGL-PMEC) is applied.

6) GSD file

As the data sheet of electronic devices, it contains such information as maker, device name, status of released hardware and software, Send rate available, master related standards (max. slaves which can be connected with, upload/download option, etc.) and slave related standards (number and type of I/O channels, diagnosis test specification and available module information modular equipment is provided for).

7) Broadcast communication

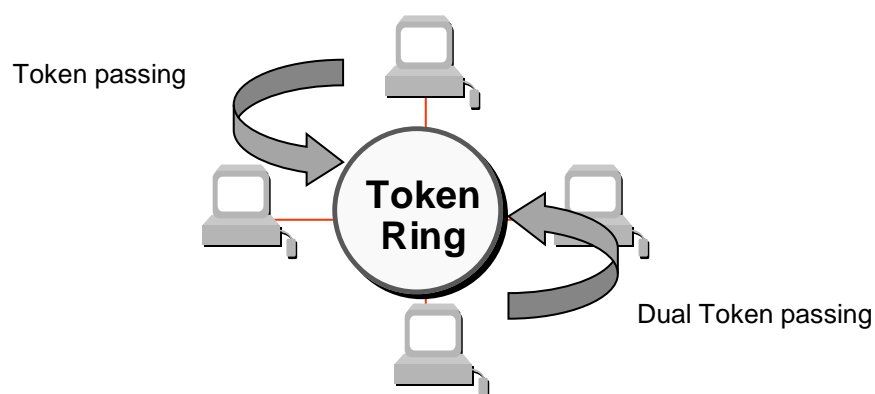
Used to send the message whose operation station is not recognized to all the stations (Master, Slaves).

8) Multicast communication

Used to send the message whose operation station is not recognized to the station group whose operation station is previously specified.

9) Token Ring

As one of the node connection methods on the network, it is a local communication network using a token to access to communication network with physical ring structure. If the transmission node obtains a token and its control, it transfers the message packet. Actually realized examples are IEEE 802.5, ProNet-1080 and FDDI. The term of Token Ring is occasionally used in substitute for IEEE 802.5.



A.2 List of Flags

A.2.1 High-speed link flags

Device		Variables	Type	Function	Description
K type.	IEC tpe				
L00000	%LX0	_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.
L00001	%LX1	_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.
L00020 ~ L0005F	%LX32~ %LX95	_HS1_STATE[k] (k=000~063)	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])
L00060 ~ L0009F	%LX96~ %LX159	_HS1_MOD[k] (k=000~063)	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.
L00100 ~ L0013F	%LX160~ %LX223	_HS1_TRX[k] (k=000~063)	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.
L00140 ~ L0017F	%LX224~ %LX287	_HS1_ERR[k] (k=000~063)	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.
L00180 ~ L0021F	%LX288~ %LX351	_HS1_SETBLO CK[k] (k=000~063)	Bit Array	HS link parameter No.1, Block No.k setting displayed	Displays the setting status of parameter's data block k.

Notes			
HS link No.	Device		Remarks
	K type	IEC type	
1	L00000~ L0021F	%LX0~%L X351	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: K type = L00000 + 260 x (HS link No. – 1) IEC type = %LX0 + 416 x (HS link No. – 1)
2	L00260~ L0045F	%LX416~ %LX767	

A.3 PROFICON Error code

When the error codes exist in the output window After “Check your communication data” message was shown. The meaning of this error code is as below.

Function	Error type	Code	Description
Common	ERROR_UNKNOWN_AREA	52	If you don't have command types.
Image download	ERROR_INVALID_COMMAND	19	If it is different between command area code and Image download.
	ERROR_NOTALLOWEDACCESS	4	If it is different between command type and Image download.
	ERROR_INVALID_BLOCKNO	8	If block ID which want to download is different from block ID+1.
	ERROR_INVALID_LENGTH	9	The frame length is smaller than 4bytes or bigger than 244bytes.
Image upload	ERROR_NOMATCH_COMMAND_TYPE	59	If the number of block ID of upload is bigger than the number of block ID of downloaded image when the command of quitting image upload is arrived.
	ERROR_NOTCONFIGURED	2	If there is no downloaded valid image.
	ERROR_INVALID_READCODE	19	If it is different between area code of command and image upload.
	ERROR_NOTALLOWEDACCESS	4	If it is different between command type and image upload.
	ERROR_INVALID_BLOCKNO	8	If block ID which want to upload is different from block ID+1
	ERROR_INVALID_SEQNO	44	The the number of block ID which want to upload is bigger than the number of block ID of downloaded image.
Communication Start/Stop	MISC_NOTSUPPORTED_COMMAND	3	If you try to ask area code which is not supported.
Debug mode	ERROR_SLAVE_ADDR	161	If the slave station number is bigger than 123.
	CON_NA	17	If there is no slave or diagnostics information which is available.
Live list	LIVELIST_PARAMETER_ERROR	2	If the master station number is bigger than 123.
	LIVELIST_COLLISION_ERROR	4	If the master station number is same with slave station number.

Function	Error type	Code	Description
Request execution of auto network scan	MISC_NOTSUPPORTED_COMMAND	3	If you try to ask area code which is not supported.
	MISC_INVALID_MASTER_ADDR	1	If you try to ask area code which is not supported.
	MISC_NOTSUPPORTED_BAUDRATE	2	If the communication speed is not supported - XBL-PMEC provides communication speed as below. (9.6 k, 19.2 k, 93.75 k, 187.5 k, 500 k, 1.5 M, 3 M, 6 M, 12 M)
Request execution result of auto network scan	LIVELIST_NOTREADY	1	If reading slave list is asked in PROFICON before being finished of autoscan.
	LIVELIST_PARAM_ERROR	2	If the master station is bigger than 123 or the error of Initialization of parameter is happened when reading the result of autoscan,
	LIVELIST_COLLISION_ERROR	4	If the master station number is same with slave station number.
	ERROR_SLAVE_ADDR	161	If the slave station number is bigger than 123.
	CON_NA	17	If reading information is asked before completing autoscan data.

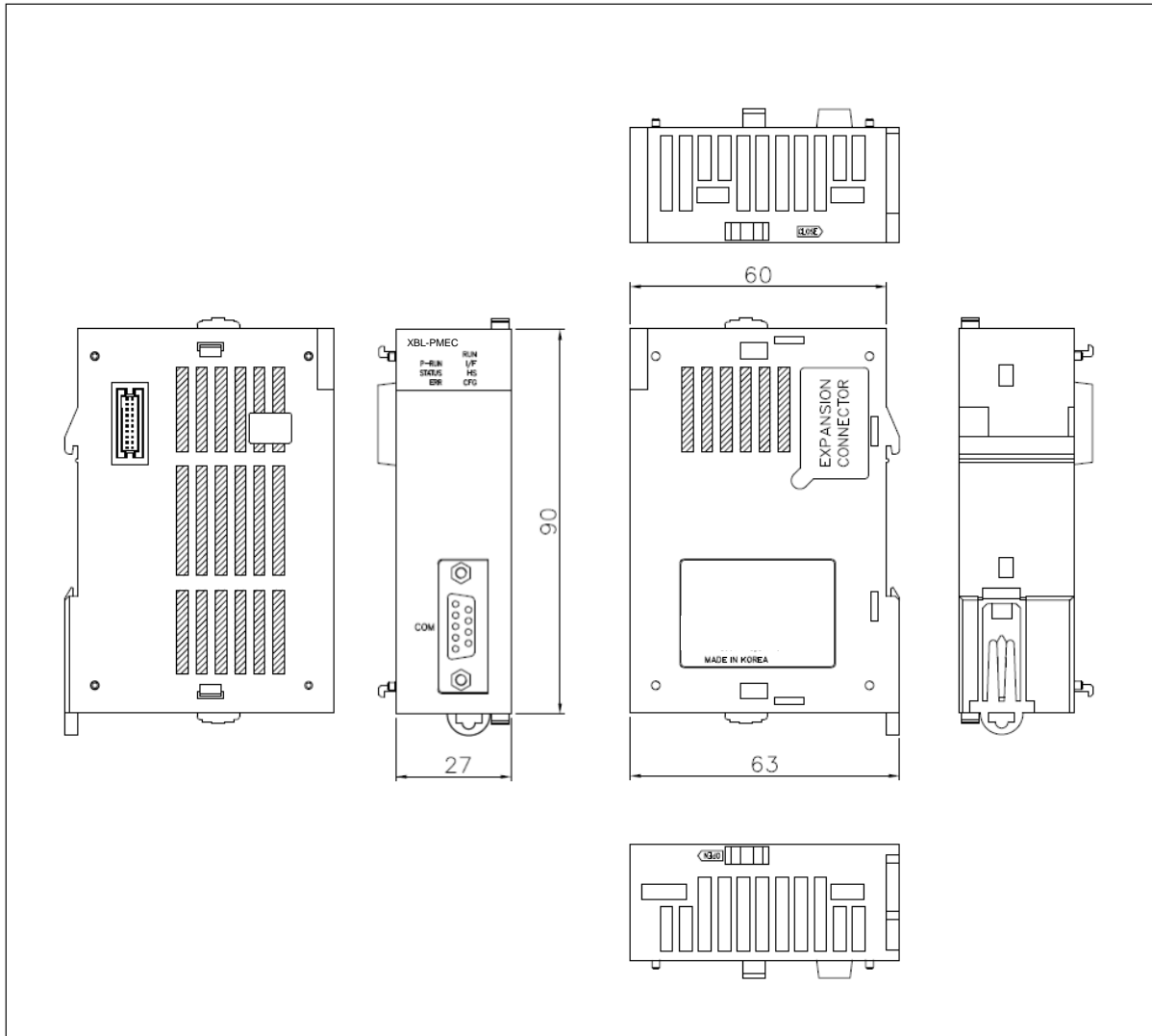
Remark

It is demanded to wait for certain time to get the result of auto network scan after auto network scan is asked.
Waiting time refer to 5.4.4 auto network scan.

A.4 External Dimensions

Unit : mm

• XBL-PMEC



Warranty

1. Warranty Period
- The product you purchased will be guaranteed for 18 months from the date of manufacturing.
2. Scope of Warranty
- Any trouble or defect occurring for the above-mentioned period will be partially replaced or repaired. However, please note the following cases will be excluded from the scope of warranty.
- (1) Any trouble attributable to unreasonable condition, environment or handling otherwise specified in the manual,

(2) Any trouble attributable to others' products,

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

(4) Due to unintended purposes

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

(6) Not attributable to the company; for instance, natural disasters or fire
3. Since the above warranty is limited to PLC unit only, make sure to use the product considering the safety for system configuration or applications.

Environmental Policy

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

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



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Specifications in this instruction manual are subject to change without notice due to continuous products development and improvement.