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Programmable Logic Control

Ethernet/IP I/F Module

XGT Series **User Manual**

XGL-EIPT

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

⚠ Warning

- **Please install a protection circuit on the exterior of PLC so that the whole system may operate safely regardless of failures from external power or PLC.** Any abnormal output or operation from PLC may cause serious problems to safety in whole system.
  - Install protection units on the exterior of PLC like an interlock circuit that deals with opposite operations such as emergency stop, protection circuit, and forward/reverse rotation or install an interlock circuit that deals with high/low limit under its position controls.
  - If any system error (watch-dog timer error, module installation error, etc.) is detected during CPU operation in PLC, all output signals are designed to be turned off and stopped for safety. However, there are cases when output signals remain active due to device failures in Relay and TR which can't be detected. Thus, you are recommended to install an addition circuit to monitor the output status for those critical outputs which may cause significant problems.
- **Never overload more than rated current of output module nor allow to have a short circuit**. Over current for a long period time maycause a fire .
- **Never let the external power of the output circuit to be on earlier than PLC power**, which may cause accidents from abnormal output oroperation.
- **Please install interlock circuits in the sequence program for safe operations in the system when exchange data with PLC or modify operation modes using a computer or other external equipments** Read specific instructions thoroughly when conducting control operations with PLC.

Safety Instructions for design process

⚠ Caution

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

Safety Instructions on installation process

⚠ Caution

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

Safety Instructions for wiring process

⚠ Warning

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

⚠ Caution

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

Safety Instructions for test-operation and maintenance

⚠ Warning

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

⚠ Caution

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

Safety Instructions for waste disposal

⚠ Caution

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

Revision History

Version	Date	Contents	Revised position
V 1.0	’09.12	First edition	-
V 1.1	’11.05	How to enable link through flag added	CH 6.3.1
V 2.0	’12.06	Add service setting by tag	CH5, 6
V 2.1	’14.09	XG5000 V4.0 UI Updated	Entire
V2.2	’20.05	Format and contents modification according to the change of company name(LSIS -> LS ELECTRIC)	

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

Current XGL-EIPT manual is written based on the following version.

Related OS version list

Product name	OS version
XGK-CPUU, CPUH, CPUA, CPUS, CPUE	V4.2
XGI-CPUU/D, CPUU, CPUH, CPUS, CPUE	V4.0
XGR-CPUH/F, CPUH/T, CPUH/S	V2.6
XG5000	V4.0

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Chapter 4 System Configuration

Chapter 5 Installation of Software and Communication Parameters

Chapter 6 EIP Service

Chapter 7 Diagnosis

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Chapter 1 Overview

1.1 Overview

This user guide is made out to describe EtherNet/IP I/F module (Referred to as “EPI Module”) among XGT PLC system networks. EtherNet/IP is the protocols where Common Industrial Protocol (CIP: industrial protocols used in common, such as Device Net, ControlNet, CompoNet, etc) has been laid on an upper layer of open protocol Ethernet. Thus, EtherNet/IP allows DeviceNet, ControlNet, and CompoNet developers to secure the interoperability between multi-band and lower network devices by applying the same objects and profiles. EIP module provides two Ethernet Ports (Ethernet Port) and the switch function required for the existing STAR system is built in and it is the module for transmitting data between PCCs or between PLC and EtherNet/IP I/F IO module.

Make a program in reference with these following user guides

- XG5000 User Guide
- XGK Instructions
- XGK User Guide
- XGI Instructions
- XGI User Guide
- XGR Instructions
- XGR User Guide

Be careful of these configuration items when you constitute XGT EIP module system.

- XGT PLC XG5000 Programming Tool: Over V4.0
- XGK CPU: Over V4.2
- XGI CPU: Over V4.0
- XGR CPU: Over V2.6

1.2 Features

XGT EtherNet/IP I/F Module have the following features.

(1) Communication Methods: Extensive Client Messaging Support
- ▶ Encapsulated Messages, UCMM Explicit Messaging
- ▶ Class 3 Connected Explicit Messaging(Server Only)
- ▶ Class 1 Connected Implicit(IO) Messaging(Cyclic I/O Service Only)

(2) Compatibility: XGT EtherNet/IP I/F meet EtherNet/IP Conformance Test Suite Version 2.10

(3) 100BASE-TX media is provided and 100Mbps/ (Full Duplex) are supported.

(4) It is possible to be equipped with 24 units per CPU and installation to basic base and extension base is available. However, only installation to base is possible in XGR system. .

(5) With the built - in switch, there is no need to install a separate switch and hub and wiring is saved and flexibility in installation is provided.

(6) As Auto Cross Over- function is provided, cabling job is convenient.

(7) A variety of diagnose functions, the states information of modules and networks are provided.
- ▶ The state of a communication module
- ▶ The state of a communication service(EIP, Non-circular server)
- ▶ Auto Scan-function providing an information of own corporation's and other corporations' modules connected into network
- ▶ The kinds of packets and the quantity of data received by communication module (Network load – prediction is available)
- ▶The diagnosis function through network is available

1.3 Product Components

1.3.1 Indication of Type Names

Components of XGT EtherNet/IP I/F module product are described.

Type Name	Components	Remarks
XGL-EIPT	Electric 2 –port EtherNet/IP Module	More than category 5

1.3.2 The Number of Installation available – units by CPUs

Up to 24 units of XGT EtherNet/IP I/F module are possible to be installed regardless of basic base and extension base. However, when XGR CPU is applied, it is possible to be installed into the basic base. To achieve the maximum performance, if possible, install this module to the basic module. The following table shows the kinds of services which are possible to be used by CPUs. When you configure the system, consider the number of communication modules.

Segment	XGK					XGI					XGR		
	CPUH	CPUU	CPUA	CPUS	CPUE	CPUU	CPUH	CPUS	CPUE	CPUU/D	CPUH/T	CPUH/F	CPUH/S
Number of P2P use modules(maximum)	8 units										6 units		
Maximum number of modules(server use modules included)	24 units										6 units		

1.4 Software for Using Products

The following explains main programming tools and other production software for using EIP module. For more exact application of programs and communication, refer to the contents below and apply it to systems.

1.4.1 Confirms for Software

Segment	Component Products	Communication Set-up Tool
XGL-EIPT	Communication Module for XGT	XG5000

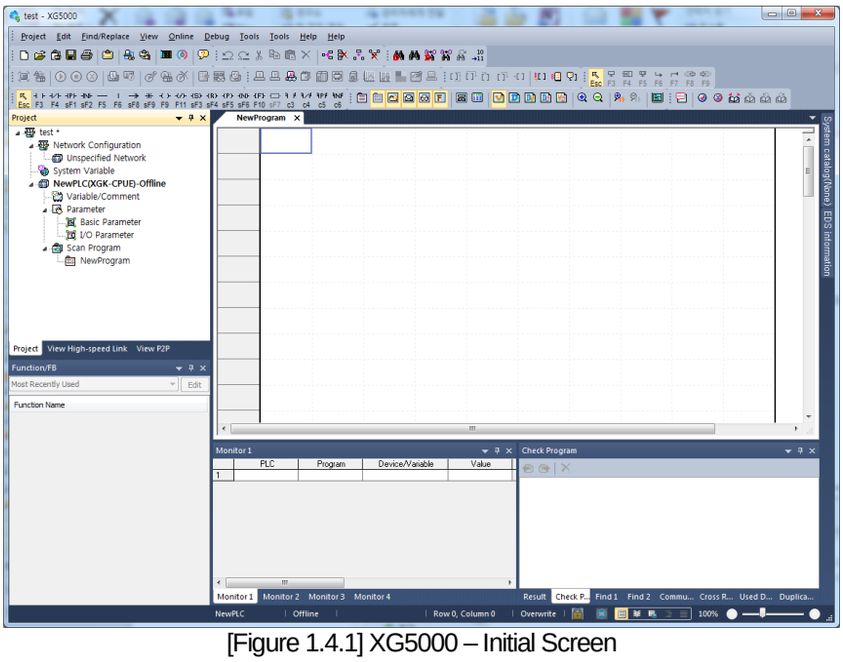
Notice

1) To use the above program, download from the current website you are visiting. In case you can not use the internet, visit near agencies and ask for CD-ROM for installation.
   Internet Web - address : http://www.lselectric.co.kr/
2) To program XG5000, use RS-232C port and USB of CUP module. For cable, refer to the XGT catalogue. (USB-301A, K1C-050A)

1.4.2 XG5000

XG5000 is the software for dedicatedly using all communication modules including Ethernet/IP I/F module for basic parameter set-up, frame make-up, module and network diagnosis.

The following illustration shows the initial screen of XG5000.



[Figure 1.4.1] XG5000 – Initial Screen

1.4.3 Confirmation of Versions

Check out the version of the module before using XGT EtherNet/IP I/F.

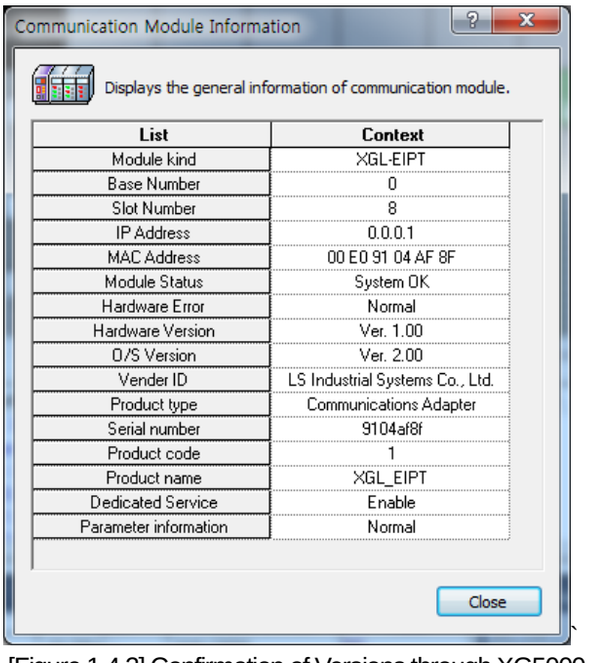
1) Confirmation through XG5000

To read the information of a communication module, access to the communication module.

.

If interface is normally maintained with CPU, the information like the following illustration can be got.

(1) Execute XG5000.
(2) Connect with CPU via access through [Online]-[Connect] on menu.
(3) When connected with CPU, execute the diagnosis of XG5000.
(4) Locate the mouse to the communication module in system diagnosis screen of online menu.
(5) Double-click the communication module or click right button of mouse and select Detailed Module Information.



[Figure 1.4.2] Confirmation of Versions through XG5000

2) Confirmation of Versions through Case Label of Products

In each module, the information of the module product is attached to the exterior case.

In case there is no connector with PC and it is impossible to check out online, confirmation is available after you remove the module in case. The label attached to the backside of a product and the type name and the version information is marked.

Chapter 2 Specification

2.1 General Specification

The general specification of XGT series is as follows.

<table>
<tr><th>No.</th><th>Items</th><th colspan="6">Specifications</th><th>Related standards</th></tr>
<tr><td>1</td><td>Ambient temperature</td><td colspan="6">0 ~ 55 ℃</td><td></td></tr>
<tr><td>2</td><td>Storage temperature</td><td colspan="6">–25 ~ +70 ℃</td><td></td></tr>
<tr><td>3</td><td>Ambient humidity</td><td colspan="6">5 ~ 95%RH (Non-condensing)</td><td></td></tr>
<tr><td>4</td><td>Storage humidity</td><td colspan="6">5 ~ 95%RH (Non-condensing)</td><td></td></tr>
<tr><td rowspan="9">5</td><td rowspan="9">Vibration resistance</td><td colspan="4">Occasional vibration</td><td>-</td><td></td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td><td>How many times</td><td rowspan="9">IEC61131-2</td></tr>
<tr><td>5 ≤ f < 8.4Hz</td><td colspan="2">–</td><td>3.5mm</td><td rowspan="5">10 times each directions (X, Y and Z)</td></tr>
<tr><td>8.4 ≤ f ≤ 150Hz</td><td colspan="2">9.8m/s^2(1G)</td><td>–</td></tr>
<tr><td colspan="4">Continuous vibration</td></tr>
<tr><td>Frequency</td><td colspan="2">Acceleration</td><td>Amplitude</td></tr>
<tr><td>5 ≤ f < 8.4Hz</td><td colspan="2">–</td><td>1.75mm</td></tr>
<tr><td>8.4 ≤ f ≤ 150Hz</td><td colspan="2">4.9m/s^2(0.5G)</td><td>–</td></tr>
<tr><td>6</td><td>Shock resistance</td><td colspan="6">• Peak acceleration: 147 m/s^2(15G)
• Duration: 11ms
• Half-sine, 3 times each direction per each axis</td><td>IEC61131-2</td></tr>
<tr><td rowspan="4">7</td><td rowspan="4">Noise resistance</td><td>Square wave Impulse noise</td><td colspan="5">AC: ±1,500 V
DC : ±900V</td><td>LS ELECTRIC standard</td></tr>
<tr><td>Electrostatic discharge</td><td colspan="5">Voltage: 4kV (Contact discharge)</td><td>IEC61131-2
IEC61000-1-2</td></tr>
<tr><td>Radiated electromagnetic field noise</td><td colspan="5">80 ~ 1000 MHz, 10V/m</td><td>IEC61131-2,
IEC61000-1-3</td></tr>
<tr><td rowspan="2">Fast transient/bust noise</td><td>Segment</td><td colspan="2">Power supply module</td><td colspan="2">Digital/analog input/output communication interface</td><td rowspan="2">IEC61131-2
IEC61000-1-4</td></tr>
<tr><td>Voltage</td><td colspan="2">2kV</td><td colspan="2">1kV</td></tr>
<tr><td>8</td><td>Operation ambience</td><td colspan="6">Free from corrosive gases and excessive dust</td><td></td></tr>
<tr><td>9</td><td>Altitude</td><td colspan="6">Less than 2,000m</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="6">Less than 2</td><td></td></tr>
<tr><td>11</td><td>Cooling method</td><td colspan="6">Air-cooling</td><td></td></tr>
</table>

N0ote

1) IEC (International Electrotechnical Commission):
An international nongovernmental organization which promotes internationally cooperated standardization in electric/electronic field, publishes international standards and manages applicable estimation system related with.

2) Pollution degree:
An index indicating pollution degree of the operating environment which decides insulation performance of the devices. For instance, Pollution degree 2 indicates the state generally that only non-conductive pollution occurs. However, this state contains temporary conduction due to dew produced.

2.2 Performance Specification

The following table describes the specification of system configuration in accordance with Ethernet/IP I/F module's media. When you configure systems, refer to the below table.

Item		Standard
Transmission Standard	Transmission Speed	100Mbps
	Transmission Method	Base Band
	Maximum Extension Distance between Nodes	100m
	Communication Zone Excess Method	CSMA/CD
	Frame Error – Checking Method	CRC 32 = $X^{32} + X^{26} + X^{23} + ,,,,, + X^2 + X + 1$
	The Number of Maximum Installments (When server is included)	24 units*주commet1)
Topology		Line , Star
Diagnosis Function		Module Information , Service State , Media Information , Auto Scan, Ping Test
Service	Periodic Cline t	Implicit IO Client
	Aperiodic Client	UCMM Client
	Periodic Server	Implicit IO Server
The Number of Connections (Client/Server)	TCP	64/128
	CIP(IO Communication)	64/128
The Number of Maximum Services		8
The Number of Maximum Installments		24
Media		UTP/STP Category 5
Basic Standards	Dimension (mm)	98(H) X 27(W) X 90(D)
	Consumption Current (mA)	400
	Weight (g)	102

Notice

1) As XGR CPU can be installed into basic base, the number of maximum installments is limited to 6 units .

2) 정상 통신 보장의 경우 EIP블록 64개에 대해 각 블록 당 최대/최소 데이터로 설정 시 정상 동작이 가능한 송신주기를 의미합니다

▶ 정상통신 보장 기준은 시스템에서 하나의 XGT EtherNet/IP I/F 모듈만 주기 클라이언트로 동작하고 나머지 모듈은 주기 서버로 동작할 경우를 조건으로 합니다.

▶ 비주기 서버 또는 네트워크의 부하에 따라서 차이가 있을 수 있습니다.

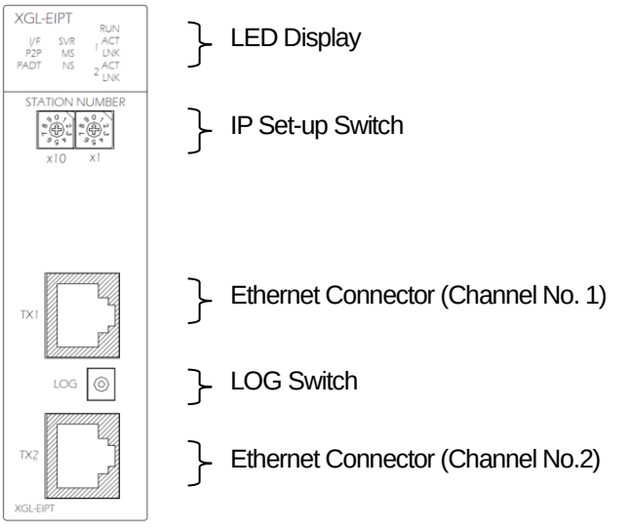
▶ 데이터 수신 시 주기, 비주기를 포함한 모든 통신서비스(서버 포함)는 CPU의 한 스캔당 7000바이트를 넘을 수 없습니다.

▶ 스캔 당 수신 데이터(바이트) 초과 여부는 (30×총 수신 블록 수) + 총 수신 블록의 설정 데이터 크기로 판단할 수 있습니다.

▶ 이때 시스템은 하나의 EtherNet/IP I/F 모듈이 주기 클라이언트로 동작하고 나머지 국은 서버로 동작할 때를 조건으로 합니다.

2.3 Name in Each Part

The name in each module is as follows.



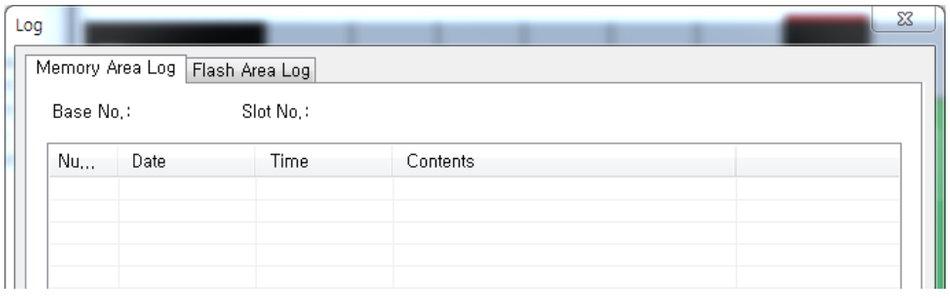
[Figure 2.3.1] The Front View for Module PLC

▶ LED Names and Contents

Silk Mark	LED State	Contents
RUN	ON	Power -on and Process normally operating
	OFF	Power –off and Process abnormally operating
I/F	OFF	I/F operating normally with CPU
	Flicker/OFF	I/F operating abnormally with CPU
P2P	ON	In case of stetting up P2P Service
	OFF	In case of canceling P2P Service
PADT	ON	XG5000 being connected via remote control
	OFF	XG5000 remote connection has been released
SVR	ON	When exterior client has been connected, Light ON
	OFF	When there is no exterior client connection, Light OFF
MS	Green Light ON	When normal operating
	Green Light flickers	When configuration for device is not over
	Red Light flickers	In case of wrong set-up or restorable errors happened
	Red Light ON	When errors which are impossible to restore have been made
	Red Green Light flickers	When self-diagnosis is proceeding
NS	Green Light flickers	When there is no connection of a device
	Green Light ON	When there is connection more than 1 with a device at least
	Red Light flickers	When Timeout with a device more than 1 unit happened
	Red Light ON	When repeated IP address has been detected
	Red / Green Light flickers	When self-diagnosis is preceding
n ACT	Flicker	In case of frame – transmitted and received (n=1,2)
n LNK	ON	When network link has been formed (n=1,2)
	OFF	When network link has not been formed (n=1,2)

▶ Log Switch

In case of reading Log in communication module and needing to store the Log, if you push it for more than 1 second, it is stored into Flash area from Memory area. The Log in the memory area is the one erased when power is supplied again and the Log in Flash area is the one which is maintained when power is supplied again.



▶ IP Set-up Switch (1~89)

(1) IP Set-up Switch (1~89)
When IP address has not been inserted via XG5000 within 10 seconds after power was supplied, switch value '192.168.250' is set up.

(2) IP Set-up Switch (90~98)
This switch is designed for setting up the inside of communication. If you change it arbitrary, it may cause problems.

(3) IP Set-up Switch (90~98)
This switch functions to configure the system into a ring form and when set-up is not finished, normal operation is impossible. It is possible to form a ring system in terms of appearance by supporting 2 connectors but actual ring system is not supported.

2.4 Cable Standards

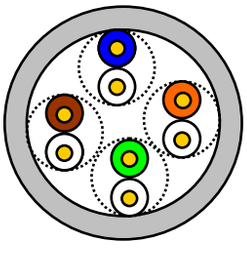
2.4.1 UTP Cable

UTP cable is classified into the 3 types according to the following standards.

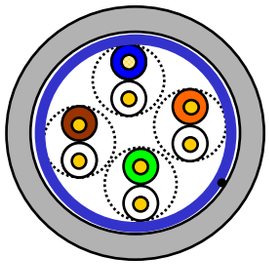
- ▶ With or without Shield: 3 Types (UTP, FTP, STP)
- ▶ Used - frequency Band: 7 Categories (Category 1 ~ Category 7)
- ▶ Inflammable Grade: 4 Grades (CMX, CM, CMR, CMP)

1) Kinds of Cables with or without Shield

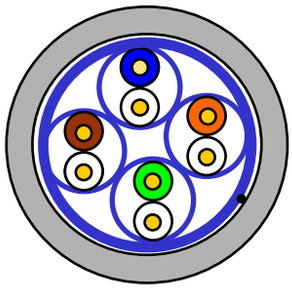
Classification	Details	Use
UTP(or U.UTP)	Unshielded Cables for High Speed – Signals	Maximum 200MHz Voice +Information (Data)+ Low grade Video Signal
FTP(or S.UTP)	1 Layer Shield, Cable Core only shielded * Shield Materials: AL/Plastic Complex Foil Or Copper Braid	Maximum 100MHz Electro Magnetic Interference (EMI) and Electric Stability is considered Voice + Information (Data) + Low grade Video Signal
STP(or S.STP)	Dual - shielded Construction, Pair Shielded Cables or Core Shielded Cables * Pair - shielded Materials : AL/Plastic Complex Foil * Core - shielded Materials : AL/Plastic Complex Foil or Copper Braid	Maximum 500MHz Voice + Information (Data)+ Video Signal An Alternative to 75Ω – Coaxial Cable



UTP



FTP



STP

Notice

1) UTP : Unshielded Twisted Paired Copper Cable
FTP : (Overall) Foiled Twisted Paired Copper Cable
STP : (Overall) Shielded(and Shielded Individually Pair)Twisted Paired Copper Cable

2) Patch Cable(or Patch Cord)
Instead of Solid Conductors, Stranded Conductors may be used for the purpose of improving the Flexibility of a UTP 4Pair Cable. The materials and sizes of strands used are regulated in accordance with UL444, and representative sizes and materials are Un-coated AWG 24 (7/0203A).
In other words, diameter of unshielded wire is 0.203mm and wires are stranded in 1+6 structure. The materials are annealed coopers.

2) Classification by Frequencies used

Classification	Frequency used (MHz)	Transmission Speed(Mbps)	Uses
Category 1	Voice Frequency	1	Telephone Network (2 Pair)
Category 2	4	4	Multi- Pair Communication Cable
Category 3	16	16	Telephone Network + Computation Network
Category 4	20	20	1) Computation Network – Transmission Speed Up 2)Low-loss Communication Cable
Category 5 and Enhanced Category 5	100	100	1)Digital Telephone Network + Computation Network 2)Low Loss, Wideband Cable

Notice

1) The classification currently applied at home and abroad is Category 3, 5, Enhanced Category 5, and Category 6. Category 4 is not now used as Category 5 appears. Category 7 is in STP structure and it is at a development stage over the world.

3) Classification by Inflammable Grades(Base on UL Certification)

Segment	Induced Calorie	Induced Time	Combustion Length	Smoke Regulation	Remarks
CMP	88(kW)	20 minutes	Less than 73m/min	Regulated	• For Installing ceilings without duct • Plenum Cable • UL 910 (Plenum Test)
CMR	150(kW)	30 minutes	Less than 3.6m	Not Regulated	• Vertical Installation Type • Non-Plenum Cable • UL 1666(Riser Test)
CM	21(kW)	20 minutes	Less than 2.4m	Not regulated	• General Type • Non-Plenum Cable • UL 1581(VTFT Test)
CMX	1(kW)	1 minute	Less than 0.5m	Not regulated	• Restrictive Use • Non-Plenum Cable • UL 1581 (VW-1 Test)

Notice

1) CMG is located in the middle grade between CM and CMR, but generally it is not applied to LAN Cable such as UTP Cable.
Example) CMG: CAS FT4 (VTFT Test), similar to CM of UL 1581.
→Burner Angle (Horizontality → 45 degree – Upward) and Sample Conditions (1/2 interval arrangement → A Bundle of 6 ones x 6 units) are different.

4) An Example (CTP-LAN5) of Category - 5 Twisted Pair Cable(UTP)

Items	Units		Values
Conductor Resistance (Maximum)	Ω/km		93.5
Insulation Resistance (Minimum)	MΩ/km		2500
Anti- voltage	V/minute		AC 500
Characteristic Impedance	Ω(1~100MHz)		100 ± 15
Attenuation	Less than dB/100m	10MHz	6.5
		16MHz	8.2
		20MHz	9.3
Near End Cross-talk Attenuation	Less than dB/100m	10MHz	47
		16MHz	44
		20MHz	42

Chapter 3 Installation and Test operation

3.1 Installation Environment

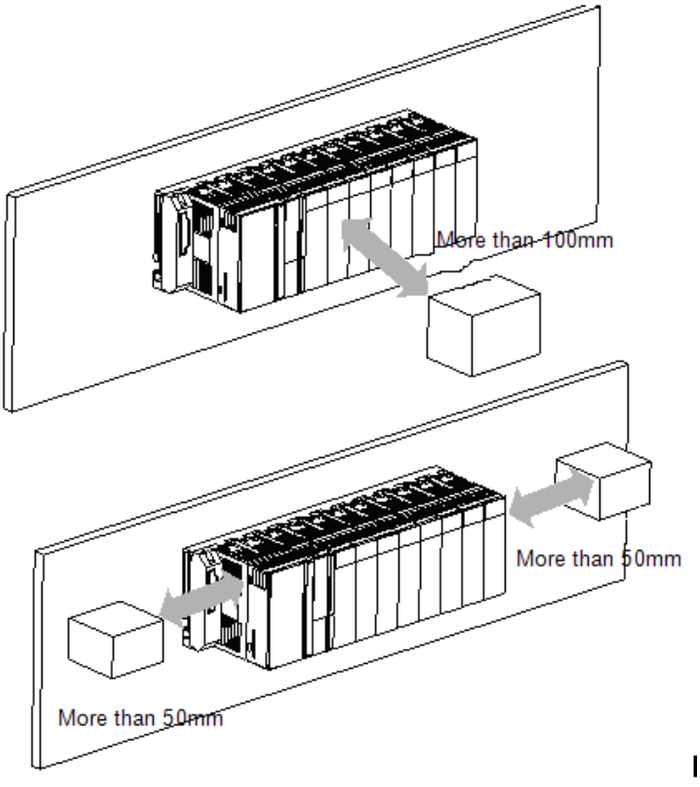
This product is very reliable regardless of installation environments, but to guaranty the reliability and stability of the system, pay attention to the following items.

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

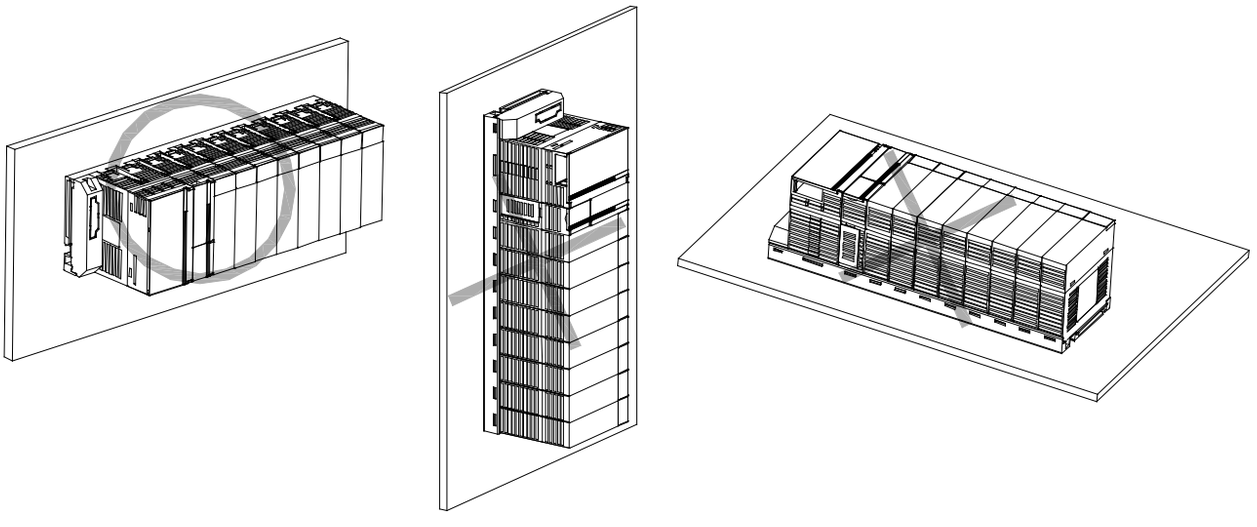
(1) Make sure wiring leavings are not inserted inside the PLC when you process screw holes or do wiring jobs.
(2) Install the places where it is easy to control.
(3) Do not install into the same panel as high press machine.
(4) Make sure the distance to the duct and the surrounding module is maintained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



3.2 Cautions when Handling

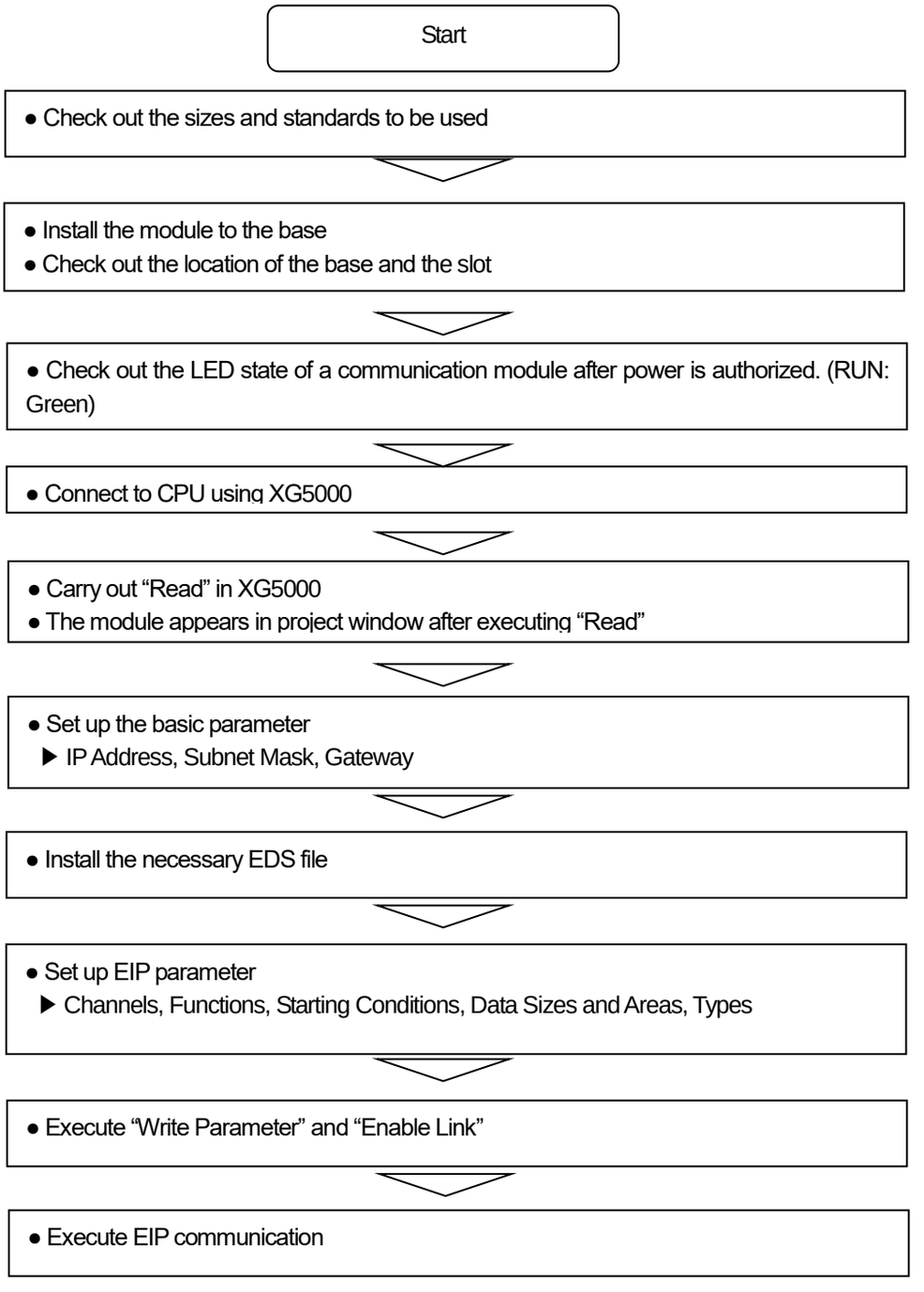
Observe the following directions when you configure the system using EtherNet/IP I/F module.

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 The Order for Setting up Products till Running

The following describes the order of installing or setting up products. Install the system and setting up the parameter so that they can operate in order.



3.4 I/O Allotment and Device Information

3.4.1 I/O Allotment

1) Using XGK CPU

(1) How to Configure the Basic System

The features of the basic system, which is configured after the basic base and the extension base are connected through cables, are as follows. The step number of bases is restricted in accordance with kinds of CPUs and the allotment method of In/Output number. Thus, it is possible to select a fixed type and a variable type.

Segment	XGK-CPUE	XGK-CPUS	XGK-CPUA	XGK-CPUH	XGK-CPUU
The Step Number s of Maximum Extension	1step	3 steps	3 steps	7steps	7steps
The Installation Number of Maximum In/Output Module s	24 modules	48modules	48modules	96 modules	96 modules
Maximum In/Output Point	1,536 point	3,072 point	3,072 point	6,144point	6,144point
Maximum Extension Distance	15m				

(2) Allotment of In/Output Numbers(Fixed Type)

a) For each slot of a base, 64 points are allotted regardless of a module installed or not and kinds of modules.

b) In one base, in/output numbers for 16 slots are allotted. In other words, the starting number of base 1 will be P00640.(Refer to 2.3.2)

c) The example of allotment of in/output numbers in the slot base 12 is as follows.

Slot No.		0	1	2	3	4	5	6	7	8	9	10	11
PWR	CPU	I16	I16	I32	I64	O16	O32	O32	O64	I32	O16	O32	O32
		P3F	P7F	P11F	P15F	P19F	P23F	P27F	P31F	P35F	P39F	P43F	P47F

(3) Allotment of Output Numbers (Variable Type)

a) Points are allotted in accordance with the installation modules by slots.

b) Installation modules are designated by parameters, designated points are allotted.

c) The slots not designated by I/O parameter are automatically allotted according to installation modules (8 points - module is allotted to be 16 points).

d) The empty slot not designated by I/O parameter is processed to be 16 points.

e) Using I/O parameter, you can designate points only without designating a module.

f) For the slots which special modules and communication modules have been installed, 16 points are allotted.

g) The example of allotment of in/output numbers in the slot base 12 is as follows.

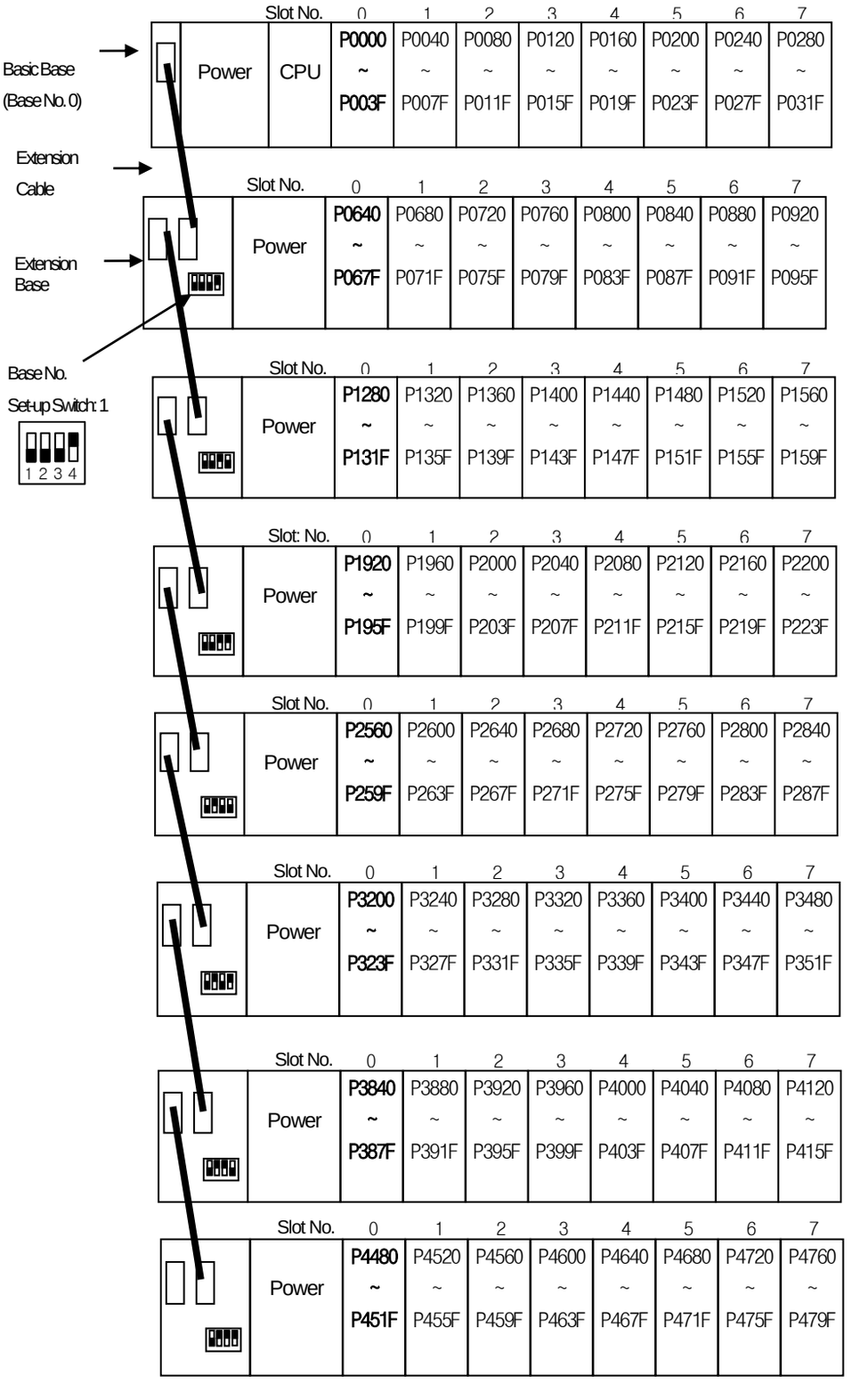
Slot No.		0	1	2	3	4	5	6	7	8	9	10	11
PWR	CPU	I16	I16	I32	I64	O16	O32	O32	O64	I32	O16	O32	O32
		P0F	P1F	P3F	P7F	P8F	P10F	P12F	P16F	P18F	P19F	P21F	P23F

(4) When Configuring the Maximum System

a) The Maximum Configure of the Basic System (Point- fixed Type)

System Configuration Example.1

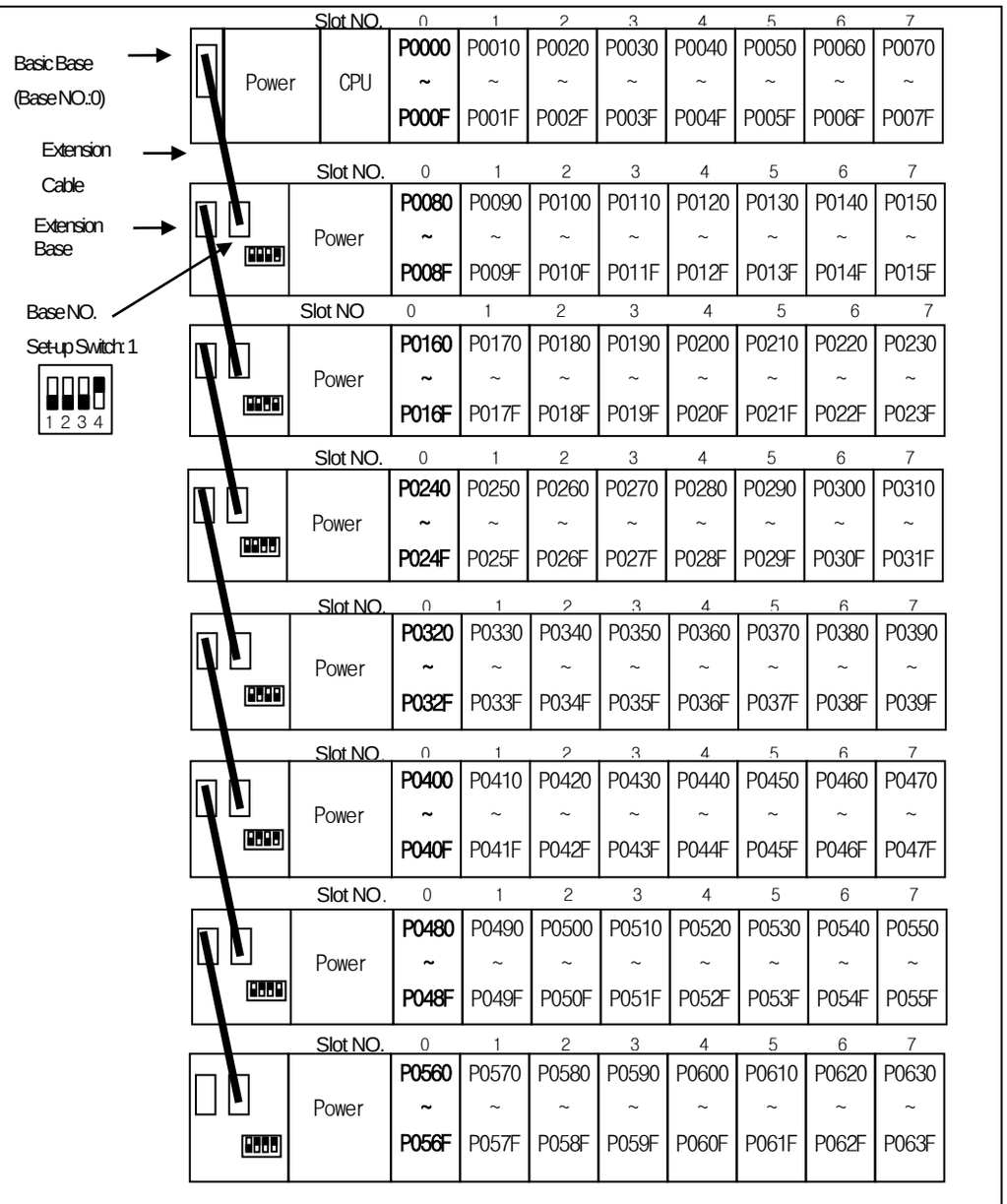
- I/O Point – fixed Type
- XGK-CPUH
- 8 Slot Base



b)The Maximum Configuration of the Basic System (Points - Variable Type)

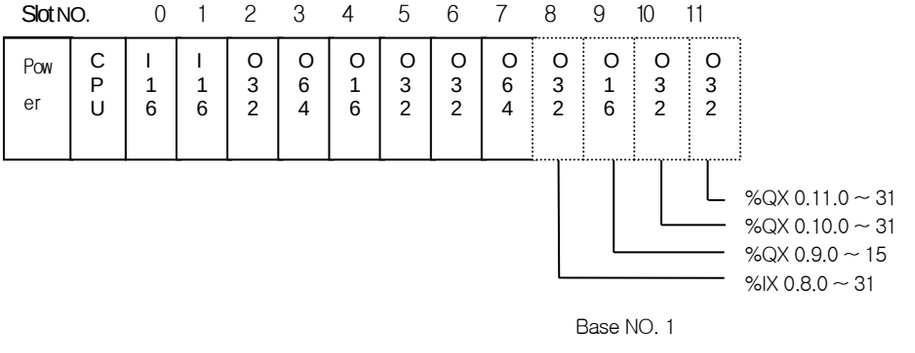
System Configuration Example 2

- I/O Points Variable Type
- XGK-CPUH
- 8 Slot Base
- When 16 points module installed



2) When using XGI CPU

(1) The Configuration Method of the Basic System

Segment	XGI-CPUE	XGI-CPUS	XGI-CPUH	XGI-CPUU	XGI-XPUU/D
The Number of Maximum Extension Steps	1 stage	3 stages	7 stages	7 stages	7 stages
The Number of Maximum In/Output Modules	24 modules	48 modules	96 modules	96 modules	96 modules
Maximum In/Output Points	1,536 points	3,072 points	6,144 points	6,144 points	6,144 points
Maximum Extension Distance	15m				
	• In/Output numbers are allotted to be 64 points fixed per the slot of a base. •To each slot of a base is allotted, 64 points are allotted regardless of with or without the installation and kinds. • The installation location of special modules and the number of uses are not restrictive. • In case of special modules, fixed in/output numbers are not allotted, unlike digital in/output modules. • Special modules are controlled by exclusive function blocks and memories are automatically allotted. • The example of allotment of in/output numbers in12 Slot Base is as follows.  					

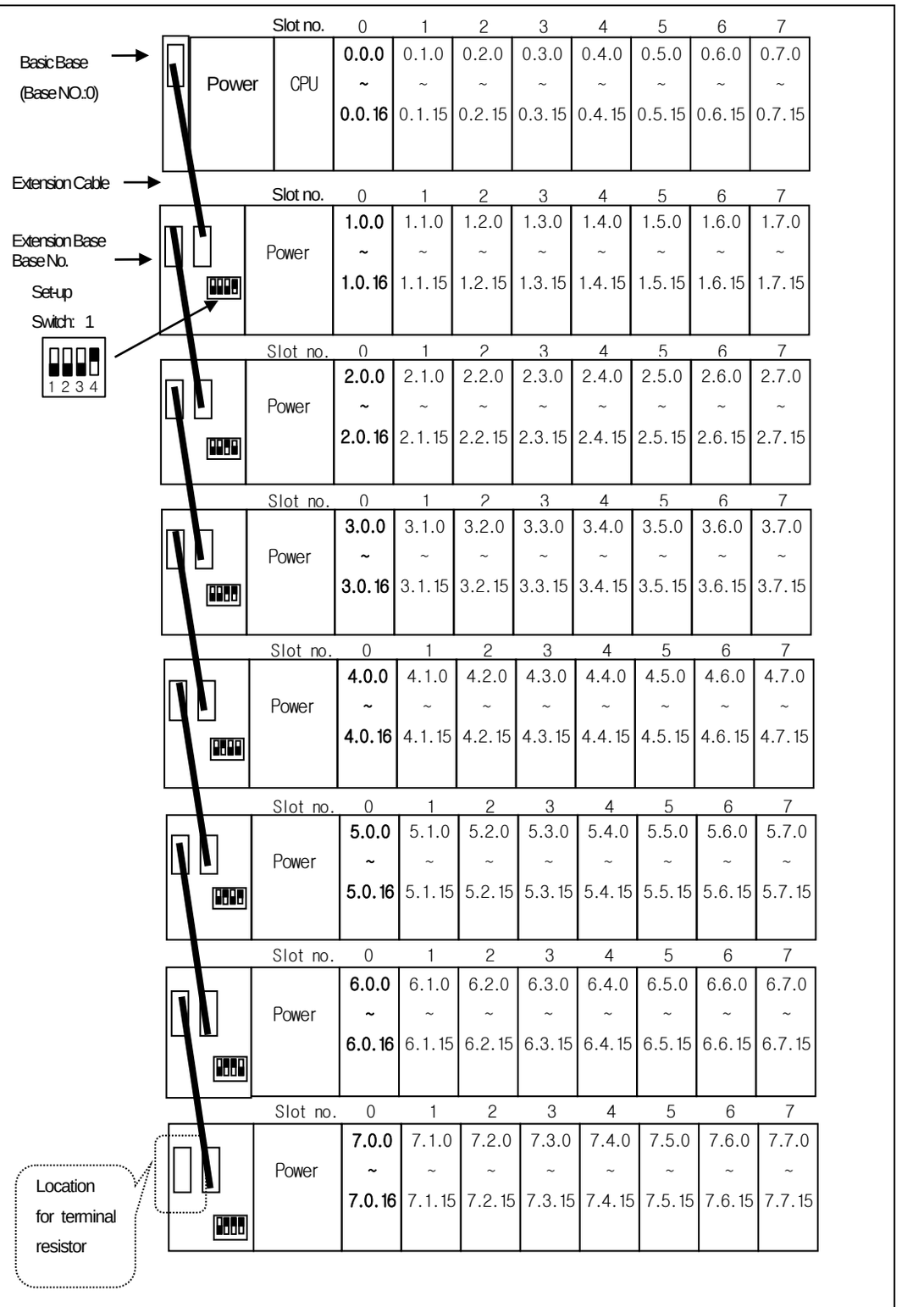
Notice

1) The basic base is fixed at 0 in base NO, and the extension base has a switch extending base numbers.
2) Only if the module type set up through I/O parameter corresponds to the type of the module actually installed running starts.

(2) When Configuring the Big System

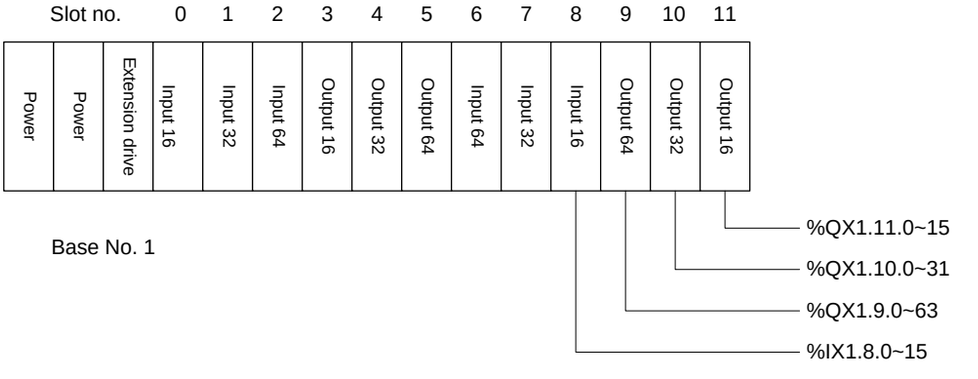
System Configuration Example 2

- XGI-CPUU
- 8 Slot Base
- When installing 16 modules



3) When using the XGR CPU

(1) How to configure the basic system

Classification	XGR-CPUU
Configuration of basic base	• Install basic base of same configuration double
Max. extension base	• Available to install 1~31 extension bases
Max. equip-able IO module no.	• Available to install up to 372 at extension base
Max. IO points	• In case of 16 points module: 5,952 point • In case of 32 points module: 11,904 point • In case of 64 points module: 23,808 point
Max. extension distance	• Between base - Optical: 2 ㎞ - Electricity: 100 m • Total max. distance - Optical: 64 ㎞(When configuring 31 extension bases) - Electricity: 3.2 ㎞ (When configuring 31 extension bases)
IO number allocation of extension base	• IO number start value of each base is determined by base number set in extension drive module. (1~31) • IO number in base is fixed as 64 per slot. Each slot is allocated 64 points regardless of module equipment and type • Special module doesn't use IO number to control unlike digital IO module. It uses U device and dedicated function block • IO number allocation of 12 slot base is as follows. 
IO number of basic base	• IO number doesn't have meaning in basic base because only communication module can be equipped. • Thought basic base doesn't use IO number, it is allocated same with 12 slot extension base. • Base number of basic base is 0 and it is positioned at the first of IO number.

Note

(1) Redundant basic base is fixed as '0'. In the extension base, there is switch to set base number.
(2) Redundant CPU can be installed at basic base.
(3) Redundant CPU is CPU module occupying two slots.
(4) In order to start, module type set by IO parameter should be same with real equipped module type.
(5) When remote connection by using Cnet I/F module, station number of extension drive available to connection is limited 1~15.

3.4.2 Available device area per CPU series

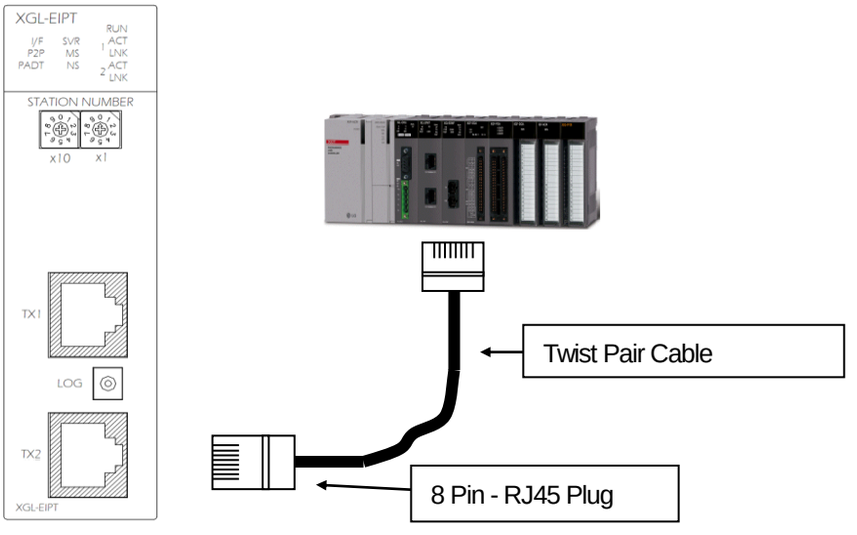
CPU type	Area	Range	Size (word)	Reference
XGK	P	P0~P2047	2048	Read/Write/Monitor available
	M	M0~M2047	2048	Read/Write/Monitor available
	K	K0~K2047	2048	Read/Write/Monitor available
	F	F0~F2047	2048	Read/Monitor available (Write: available from 1025 word)
	T	T0~T2047	2048	Read/Write/Monitor available
	C	C0~2047	2048	Read/Write/Monitor available
	L	L0~L11263	11264	Read/Write/Monitor available
	N	N0~N21503	21504	Read/Write/Monitor available
	D	D0~D32767	32768	Read/Write/Monitor available, XGK–CPUH
		D0~D19999	20000	Read/Write/Monitor available, XGK–CPUS
	R	R0~R32767	32768	Read/Write/Monitor available
	ZR	ZR0~ZR65535	65536	Read/Write/Monitor available
XGI	I	IW0.0.0~IW127.15.3	8192	Read/Write/Monitor available
	Q	QW0.0.0~QW127.15.3	8192	Read/Write/Monitor available
	M	MW0~MW131071	131072	Read/Write/Monitor available
	R	RW0~RW32767	32768	Read/Write/Monitor available
	W	WW0~WW65535	65536	Read/Write/Monitor available
XGR	I	IW0.0.0~IW127.15.3	8192	Read/Write/Monitor available
	Q	QW0.0.0~QW127.15.3	8192	Read/Write/Monitor available
	M	MW0~MW131071	131072	Read/Write/Monitor available
	R	RW0~RW32767	32768	Read/Write/Monitor available
	W	WW0~WW65535	65536	Read/Write/Monitor available
Common	U	U0~U4095	4096	Monitor available

Note

(1) ZR device is available only at XGK-CPUH.
(2) ZR device should request by using “W”.
Ex) When requesting word size from ZR0, you should request as “%WW000”.
(3) At U device, address of bit monitoring is hexadecimal and monitoring address of word area is decimal.

3.5 Installation of Products

3.5.1 Installation of XGL-EIPT



[Illustration 3.6.1] How to Install 100BASE-TX

The maximum segment distance of 100BASE-TX reaches 100m. (The distance between modules)
Straight cables and cross cables are used.
If a cross cable is used when connected between these communications modules, the time for connecting links can be shortened.
This module doesn't support a ring system.
When configuring a ring form, IP address switch of a module – front view must be set up at '99.'
Then, a ring system is formed in external aspect, but the service for a ring system will not be supported.
If IP address switch is not set up at 99'after formed in a ring, data burst may happen and modules can not execute normal actions.

Pin NO.	Signal	Straight Cable between Cables	1:1 Cross Cable
1	TD+	1-1	1-3
2	TD-	2-2	2-6
3	RD+	3-3	3-1
6	RD-	6-6	6-2
4,5,7,8	Not used	-	-

Notice

1) 100BASE-TX cable is designed to be weak in cable structure, so only if cables are twisted (Two wires are stranded) after No.1 (TD+) and No. 2 (TD-) wires are twisted and No. 3 and No. 6 are twisted with each other. wiring will be strong in strength.
2) For cable terminal treatment and manufacture, consult with professional providers to install

1) How to Install UTP

(1) For reliable transmission of 100Mbps signal using UTP cables, Patch Cord, Line Cord, Patch Panel, DVO(Data Voice Outlet), etc must meet 5 spec (Category 5 Spec.- EIA/TIA-568A).
(2) Make sure the length of patch code will be over 7m in cross-connect, If the length exceeds 7m, the length corresponding to 90m, as much as the allowable value in Horizontal Distribution System, must be deducted.
(3) Make sure the length of line cord does not exceed 3m in line cord length. If the length exceeds 3m, as much as the length corresponding to 90m, the allowable value in Horizontal Distribution System, must be deducted.
(4) Make sure the loose of paired pitch of UIP cable in case of disconnection to patch panel and DVD does not exceed the following dimension.
(5) Maximum Paired Pitch – Loose : Category 5 : 13mm, Category 3 : 26mm
(6) Use jumper wires in DC cross-connect system. Then, also the loose of paired pitch must not exceed the above standards. Especially, in case of seriously bending cables, pay attention so that damage or separation between pairs does not happen.
(7) Maximum Curvature Diameter : 4 Pair Cable : 4 times the Diameter
Cable more than 25 Pair: 10 times the Diameter
(8) Make sure the maximum tensile force while using does not exceed 110N (11.3Kgf) based on 4 Pair
(9) Make sure jumper cables and patch codes are loosely disconnected. When tightly connected, the features of category 5 may lower. When using Tie-wrap, make sure cables are not stressed.
(10) Make sure proper distance is maintained between EMI source and UTP cable when installing cables.

The proper distance in each case is as follows.

Conditions	Minimum Separation Distance		
	Less than 2.0KVA	2.5 KVA	More than 5.0KVA
In case unshielded power lines or electric facilities are open and are in the state of being closely located nearby non-metal pipes	127mm	305mm	610mm
In case unshielded power lines or electric facilities are in the state of being located nearby buried metal pipes	64mm	152mm	305mm
In case buried metal pipes the power line (or the same shields)are in the state of being located nearby buried metal pipes	-	76mm	152mm

Notice

1) In case voltage reaches 480V and electric power source reaches more than 5KVA, separated calculation is required.

3.6 Test Operation

3.6.1 Directions when Configuring Systems

1) To use P2P service including this module, make sure IP Addresses of all channels are different from IP addresses of all other channels.
2) To use communication cables, select the ones in designated sizes. Using cables that have not been designated may cause serious communication obstacles.
3) Check out whether cables are disconnected or short-circuited before installing communication cables.
4) Completely tighten the connectors of communication cables so that cable connections can be fixed.
5) Incomplete cable connections may cause serious obstacles to communication.
6) In case of connecting communication cables to a long distance, make sure cables are not separated from power lines or inductive noises.
7) Coaxial cables are low in flexibility, so they must be re-branched lowering down at least more than 30 cm from the connector in communication module, and if cables are bent on the square and forcibly transformed, it may cause the destruction of the connector located in the communication module.
8) In case LED does not normally operate, refer to 'Chapter 10 Troubleshooting' and check out causes. If something is wrong even if actions have been taken, contact Warranty Service Center.

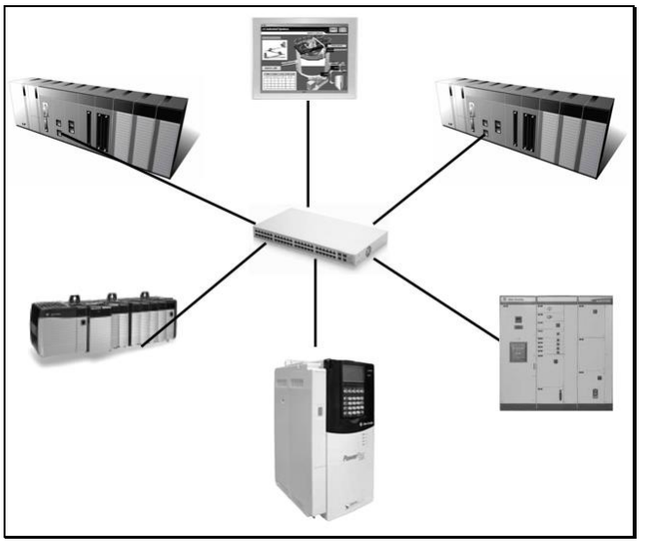
Chapter 4 System Configuration

EtherNet/IP I/F modules can be installed regardless of XGT CPU modules. The number of maximum installments reaches 24 units including basic bases and extension bases. For EIP service, 8 units can be used as EIP service to the maximum. If used as an aperiodic server, 24 units can be used to the maximum.

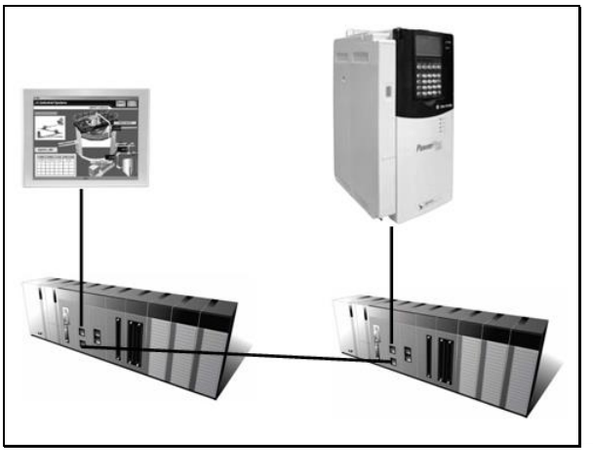
It is possible for the communication system using this module to be applied to a variety of configurations. This chapter describes the examples of the cases when system configuration is available and unavailable by applications.

4.1 Configuration of a Usable System

4.1.1 System Configuration using a Switch



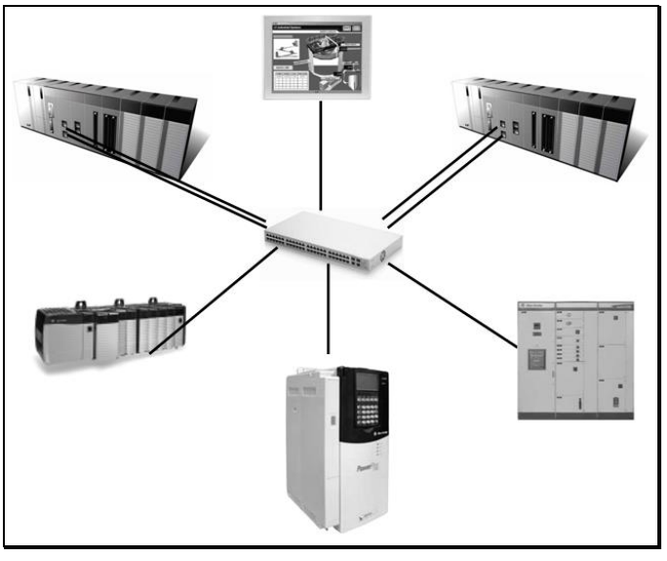
4.1.2 System Configuration not using a Switch



4.2 Configuration of an unusable System

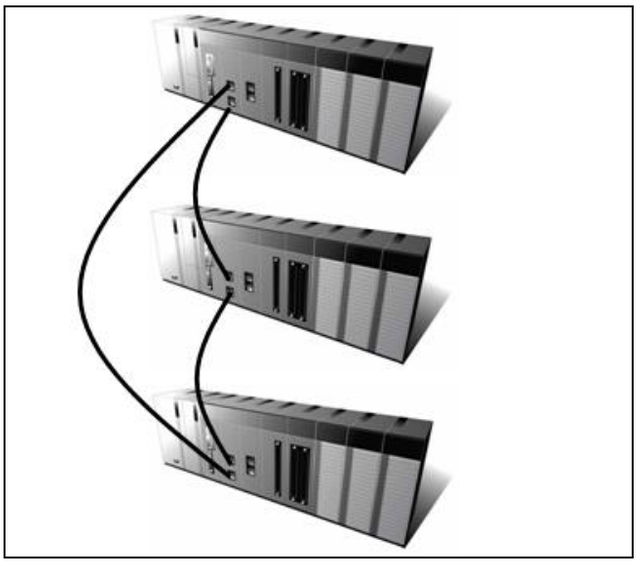
4.2.1 System Configuration using a Switch

It is impossible for EtherNet/IP I/F module to normally operate as data burst happens when each module is connected to each switch of 2 communication ports.



4.2.2 Configuration of a Ring System (Configuration of a XGL-EIPT Ring)

EtherNet/IP I/F does not support a ring system. When you configure a ring form, it is necessary to set up the IP address switch of the module – front view at '99.' Then, it is configured into a ring system in external aspect, but the service on an actual ring system is not supported. In case IP address switch is not set up at NO. '99' after configured into a ring, data burst happens and the module does not normally execute operations.



Chapter 5 Installation of Software and Communication Parameters

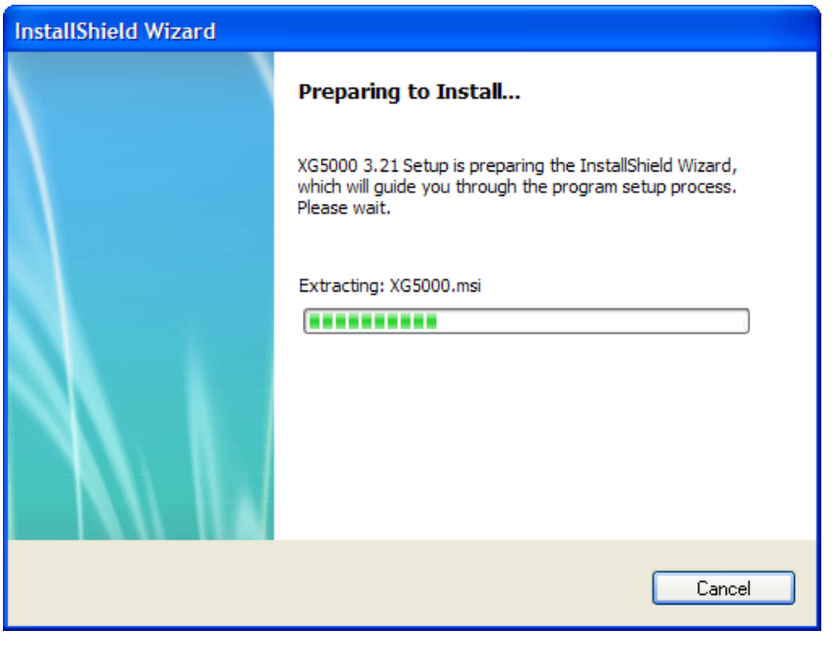
5.1 Installation and Execution of Software

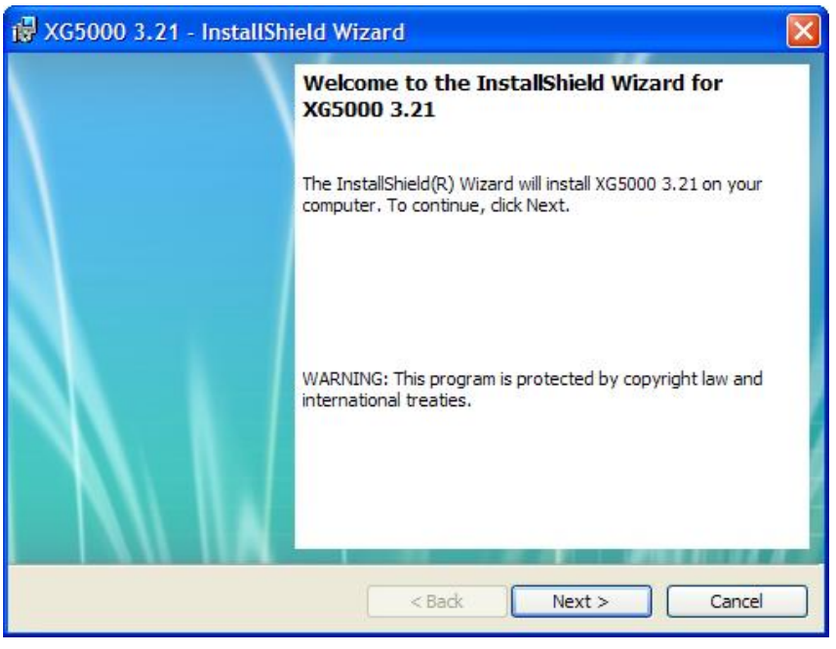
To use software XG5000, it is necessary to install XG5000. Then, only if the version of XG5000 is over V4.0, it is possible to use XGT EtherNet/IP I/F module. The requirements for system needed to execute are as follows.

1) PC and Memory: It is necessary to need a computer with more than 128MB memory and the memory with more than 512MB is recommended.
2) Communication Port: RS-232C serial port or USB port are required.
3) Hard Disk: The area where more than 200MB is possible to use is required.
4) Mouse: A mouse that can be connected with a computer is required.
5) Monitor: The resolution must reach more than 1024 X 768.
6) Window: It is possible to execute in Window 2000/XP/VISTA. However, if several applications including other products are executed, XG5000 can be on the blitz due to the restriction to using memories.

5.1.1 Installation of XG5000

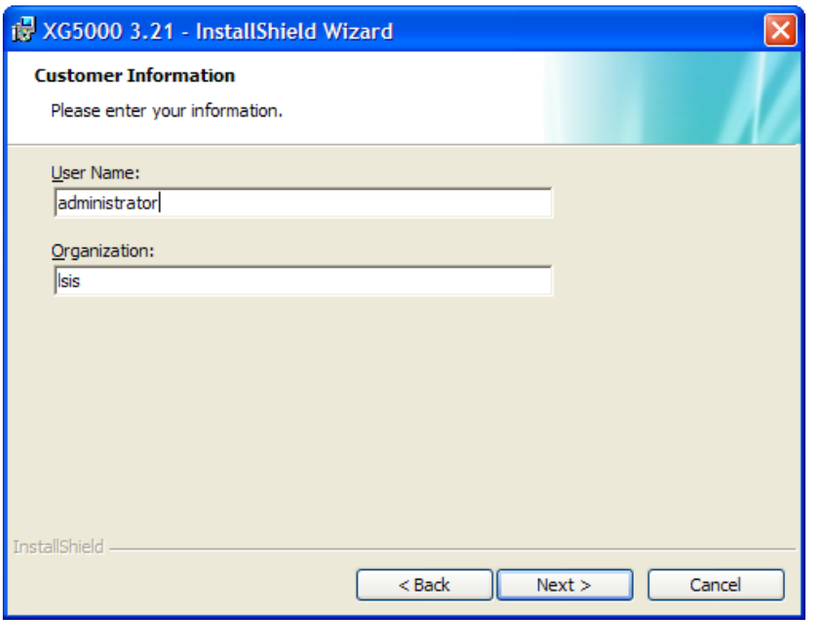
1) Execute the installation file.
2) InstallShield Wizard prepares for installation as follows.





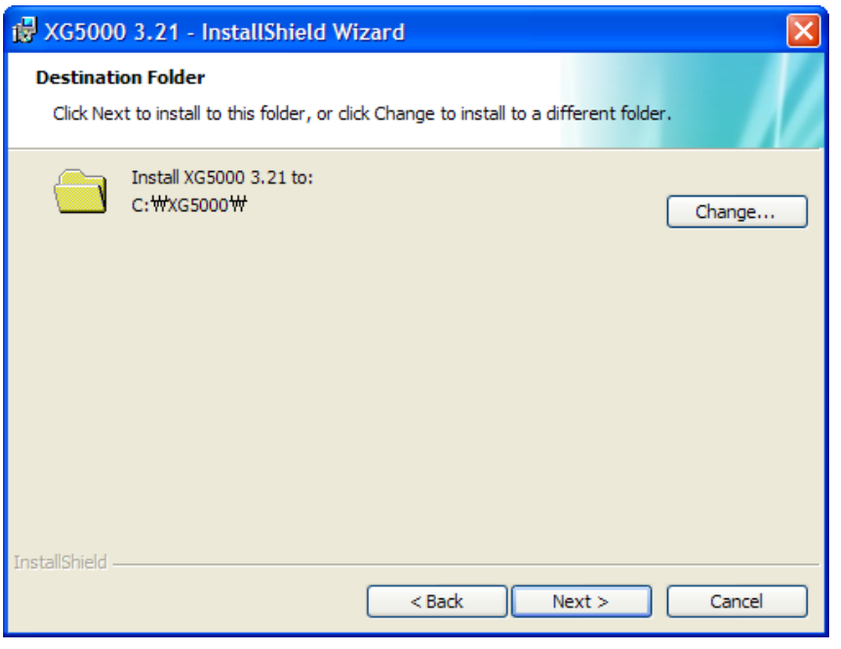
3) Click next button.

4) Insert a company's name and press next button.

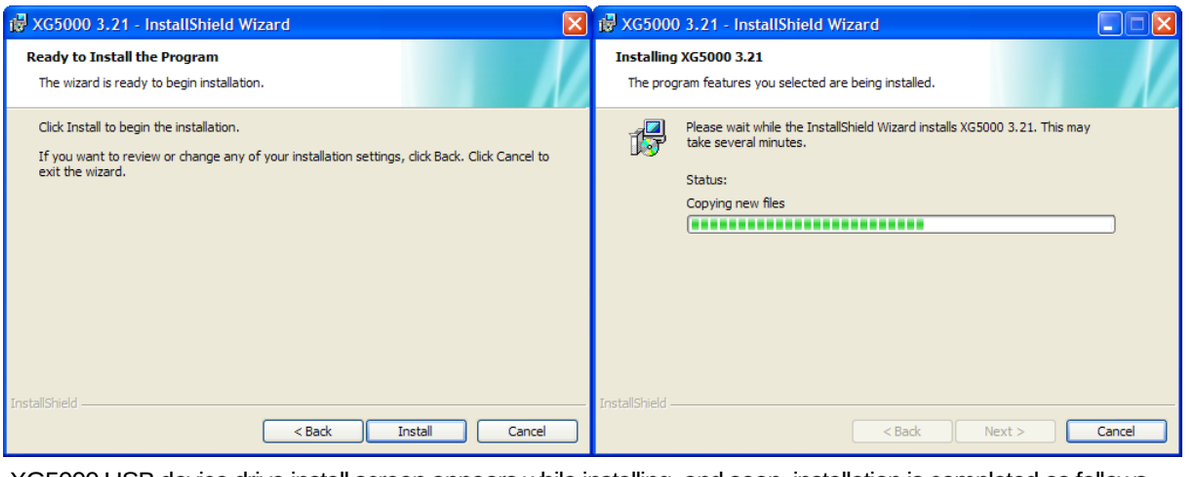


5) Designate the folder that XG5000 will be installed. If you want to change the folder, click" Index" and enter or select new folder. As XG5000 needs installation space of 200MByte, select the disk with enough room. If the installation room is not enough, warning message is on and thus, it is impossible to proceed to next step.

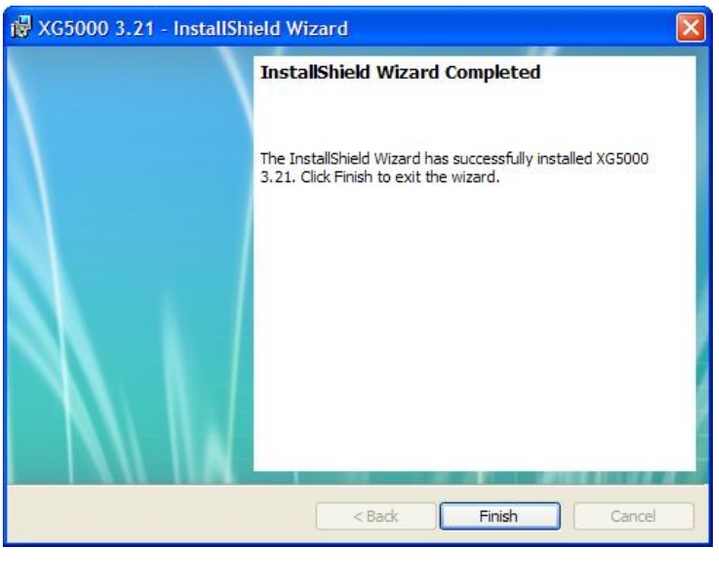
6) If you have selected a folder, press next button.



7) Check out the installation path and press next button. Install as follows.



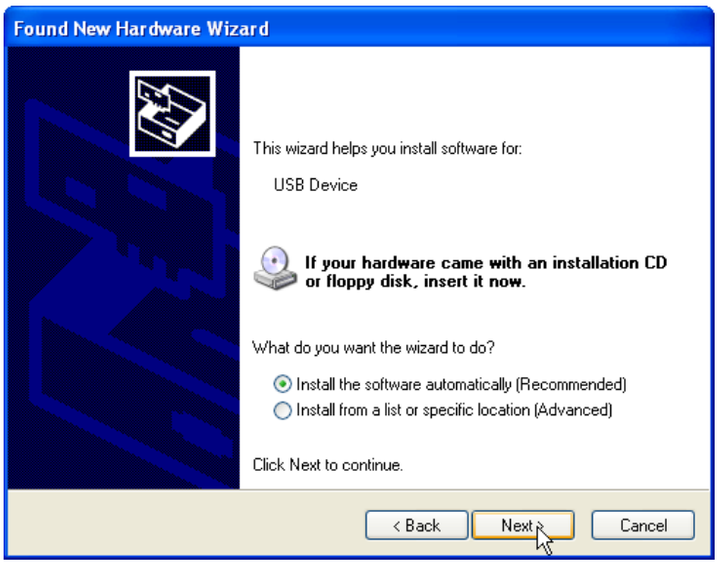
XG5000 USB device drive install screen appears while installing, and soon, installation is completed as follows.



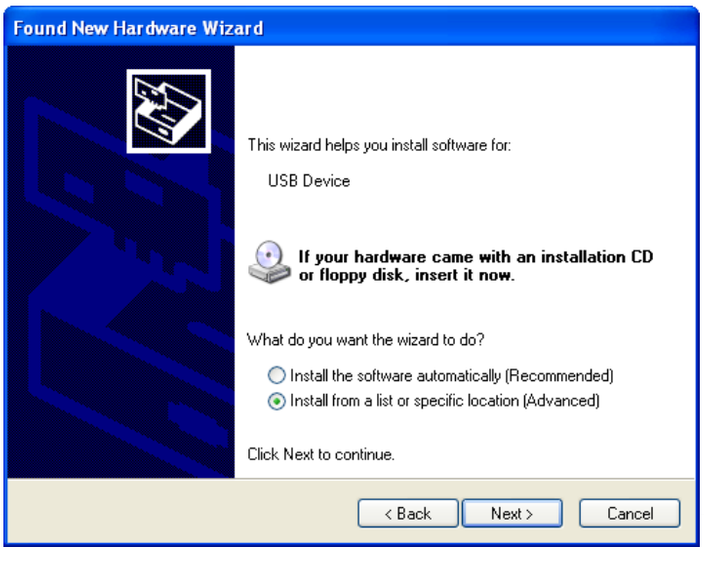
5.1.2 Installation of USB Device Drive

When you install XG5000 into Window XP for the first time, install USB Device Drive additionally. Even if USB is not connected, install USB device drive as follows.
However, in Window 2000, USB device drive is automatically installed when XG5000 is installed, and in Window XP, install it additionally.

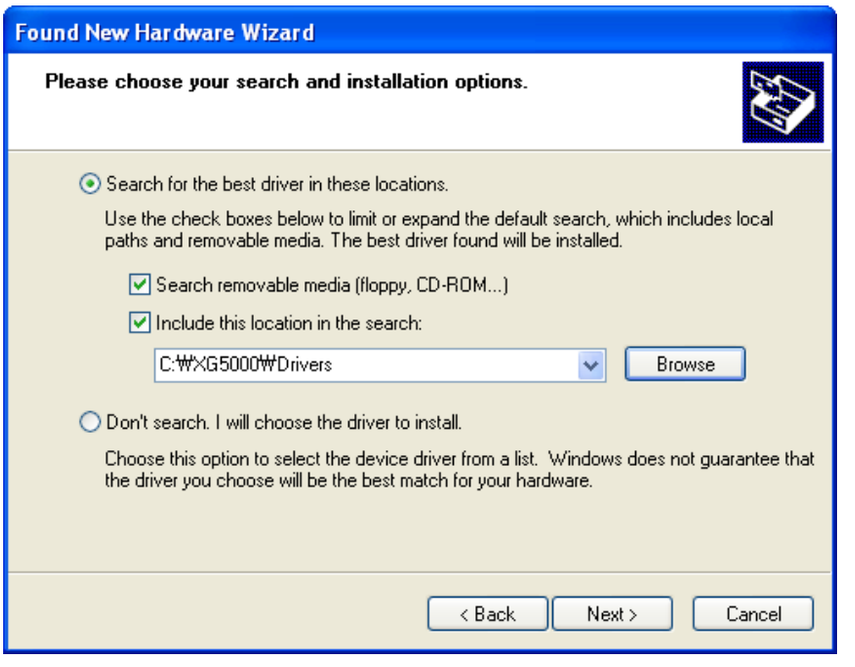
1) Check out whether there are driver folders in the folder XG5000 has been installed into. In Drivers folder, there are two drive files - GmUSBD.sys, GmUSBD.inf. If there is no folder or drive file, install XG again.
2) Turn off PLC power and connect USB connector to PC. When connected, new hardware search Wizard Dialogue Box appears
3) Order a user to install the device drive.



4) Select “Installation in List or Particular Location (High Grade)” of the options in new hardware search wizard dialogue box” and press next button.

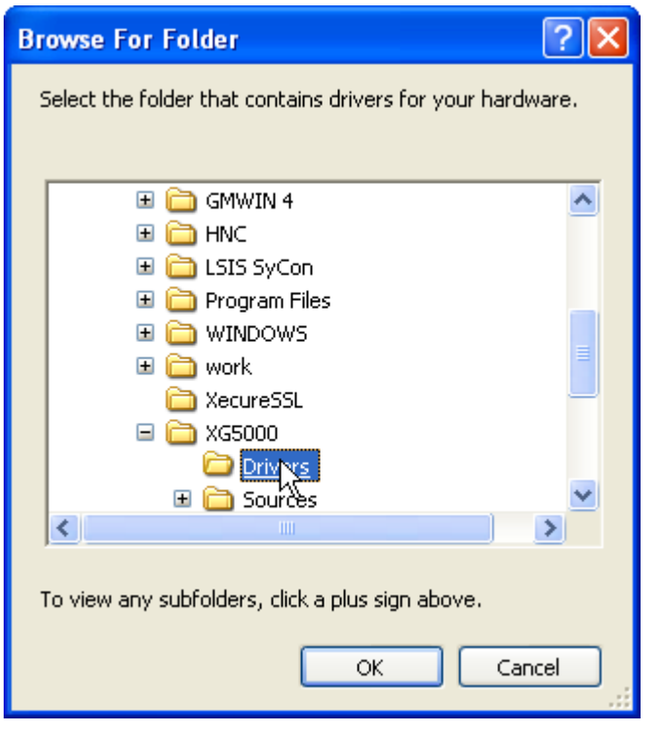


5) Select “Search the Most Suitable Drive in this Location” of drive search options and check out “Include Next Location when Searching”



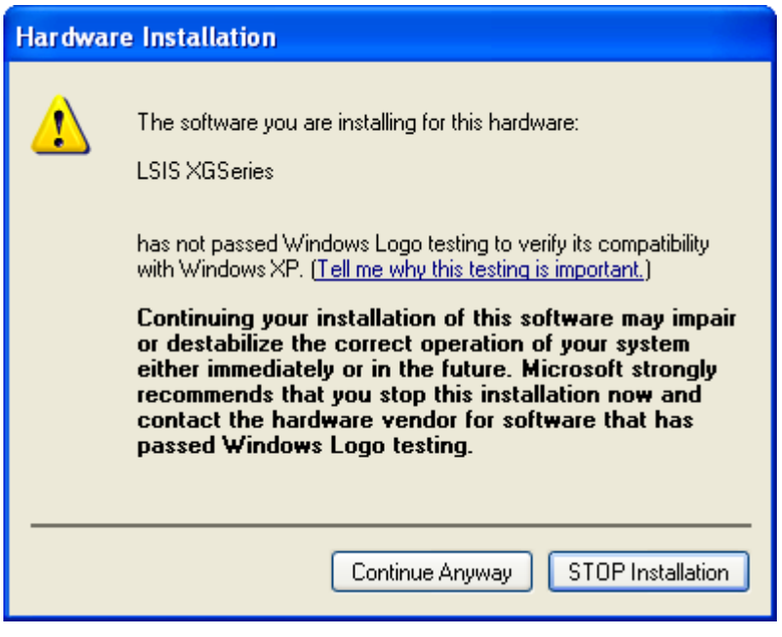
6) Press “Search” button

Select Drivers Folder where XG5000 has been installed in “Index Dialogue Box”

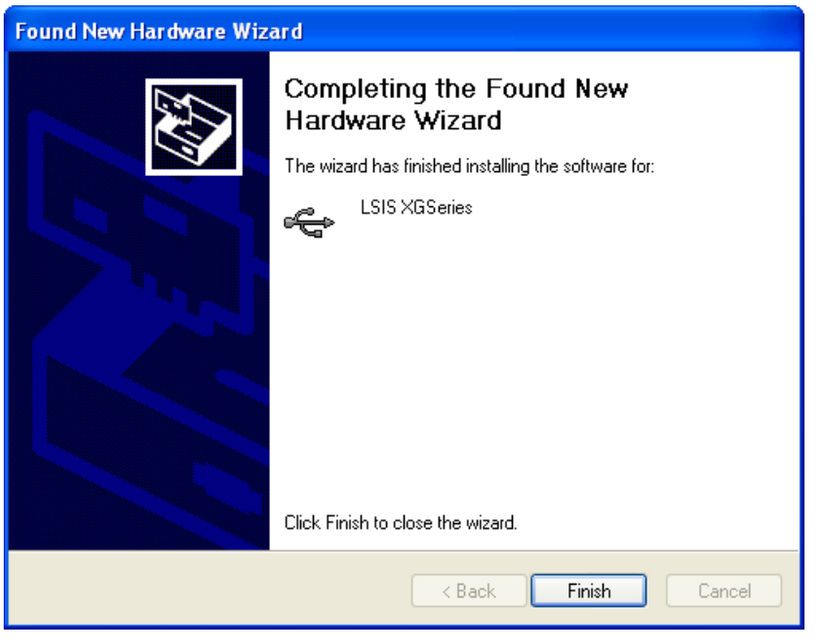


7) Press “Ok” button. The computer searches for the folder you selected.

8) If the computer selects the most suitable device drive, it will ask to install the device driver selected. As USB device driver stably operates in Window operating system, press the button “Continue”.



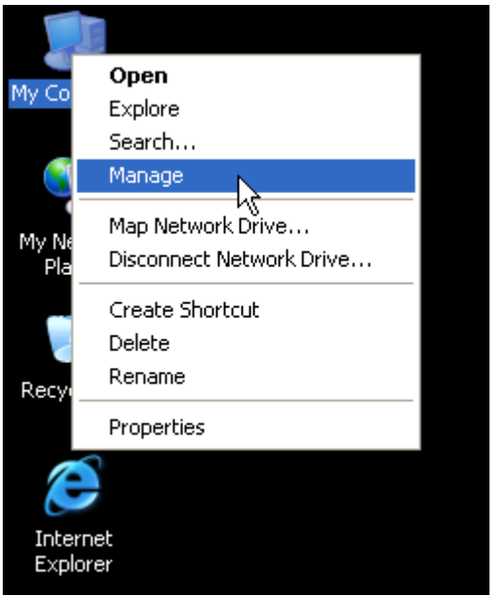
9) The completion of a device driver is completed; the dialogue box for installation like this appears. If you press “Finish” button, driver installation is terminated.



5.1.3 Confirmation on the Installation of USB Device Driver

If USB is not connected, confirm the installation of device driver as follows.

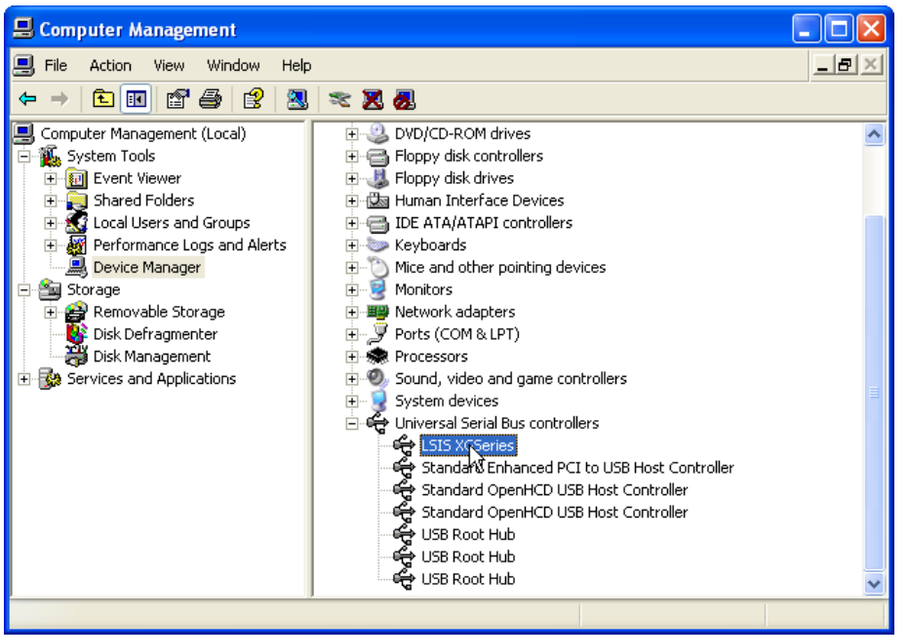
(1) Click the right button in “My Computer” on the desktop and select menu [Management].



1) The computer management dialogue box appears like this. In the left tree list of the dialogue box, extension proceeds in this order - [Computer Management (Local)] - [System Tool] - [Device Manager].
2) The items appearing in the list can differently come out with each other according to the devices installed in the computer.

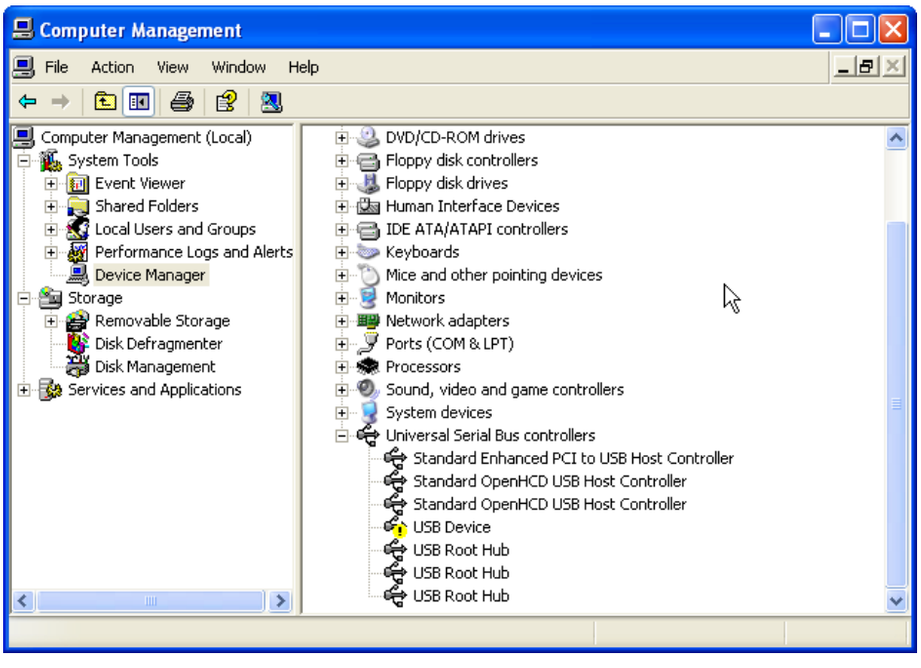
(1) In case of normal state

If the list [LGIS XG Series] located in the lower of [Universal Serial Bus] appears, the device driver has been normally installed.



(2) In case of abnormal state

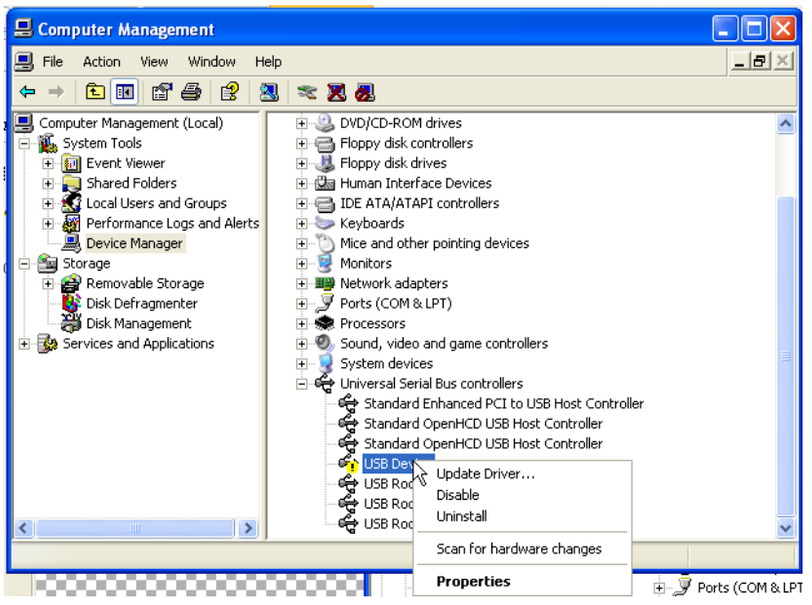
The following illustration appears, it is the case the device drive has not normally been installed.



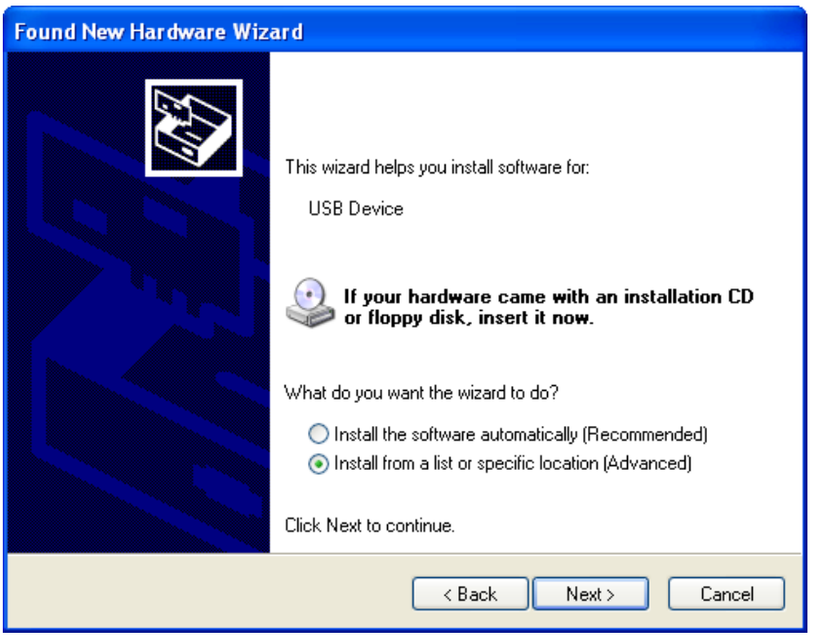
In case of not normally installed, reinstall according to the following order.

(3) Click the right button in the device driver where “Exclamation Mark” appears.

(4) Select Menu [Driver Update]

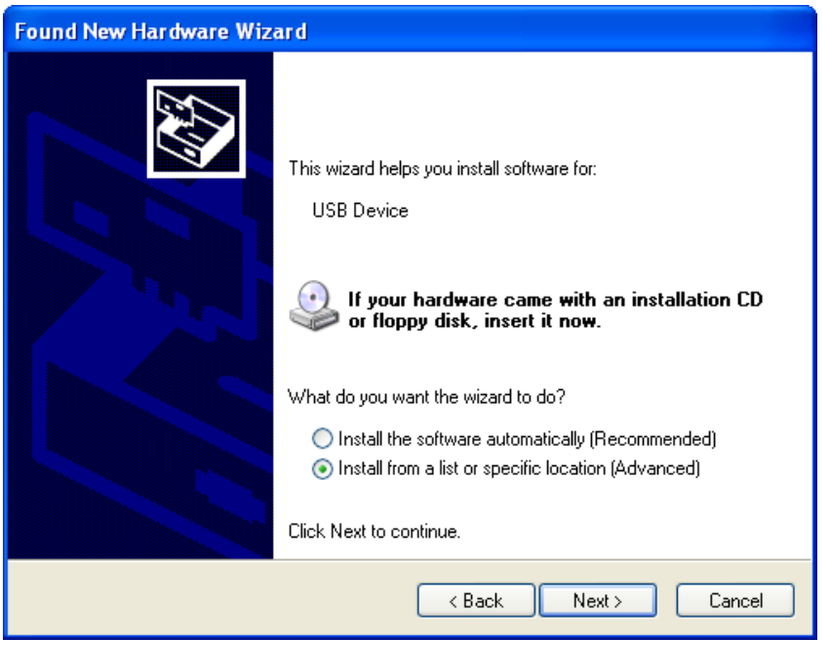


(5) Hardware Update Wizard Dialogue Box appears. Select Option “Installation in List or Particular Location (High Grade)”List and press next button. The following procedures are manual and are the same to the installation of the device driver.

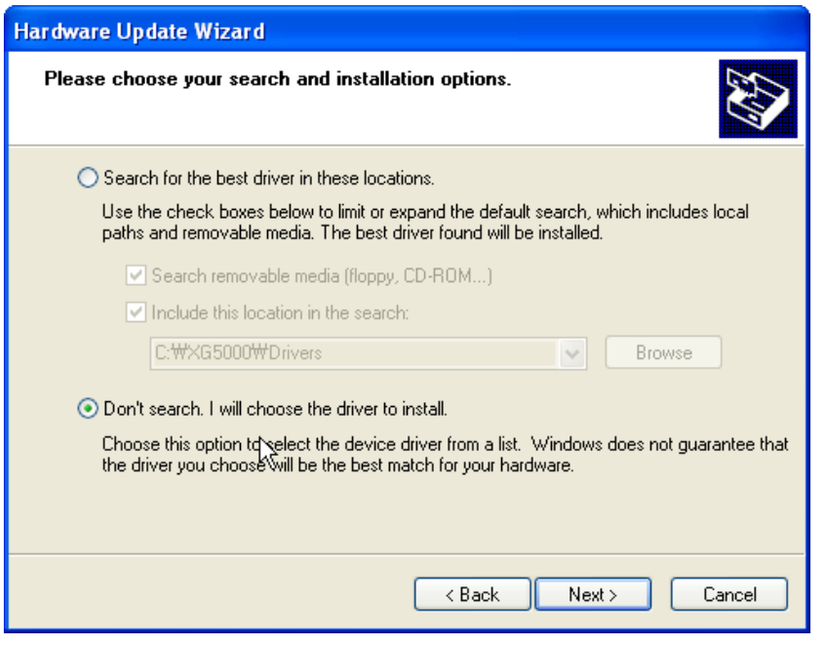


If not installed, reinstall according to the following order.

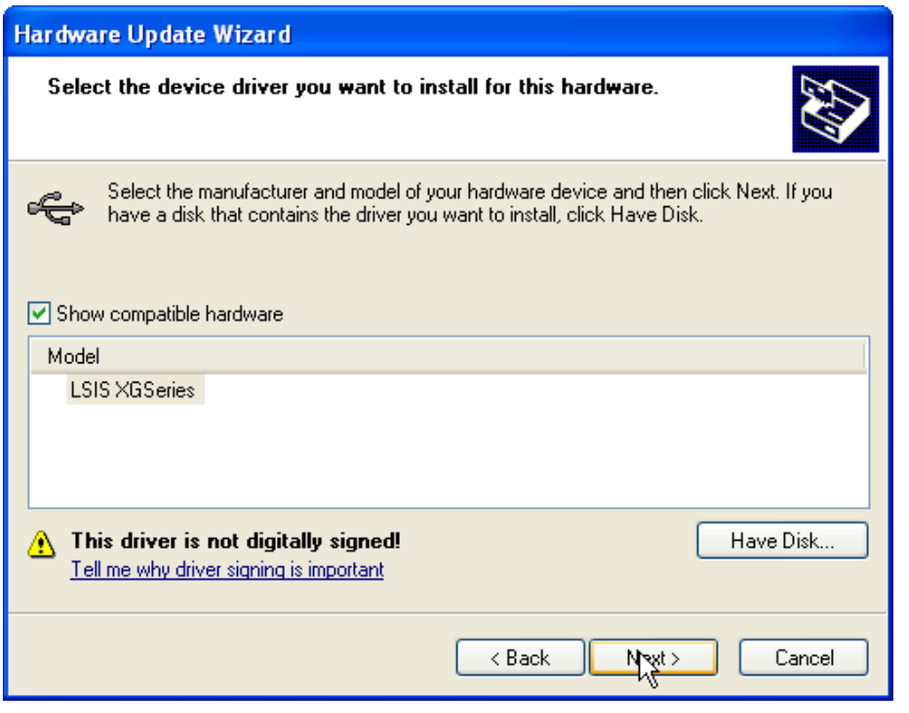
(1) In case a device driver has been wrongly installed or is problematic, execute Hardware Update Wizard Start.
(2) Select Option “Installation from a List or a specific location (Advanced)” List and press next button.



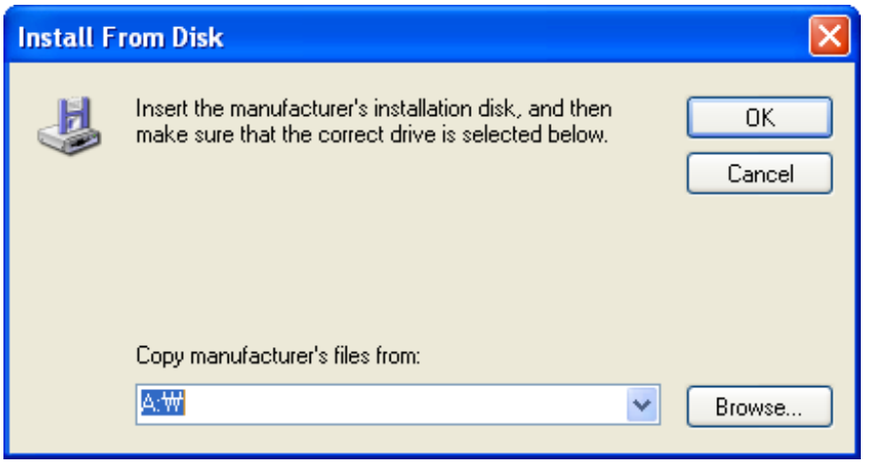
(3) Search and Installation Option “Do not research”. Select “Directly Select the Driver You Will install” and press next button.



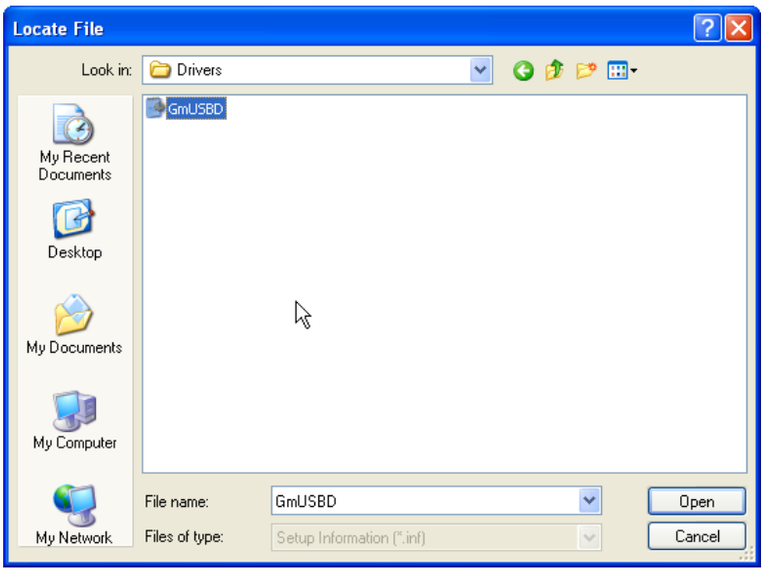
(4) Press button “Disc Loaded”.



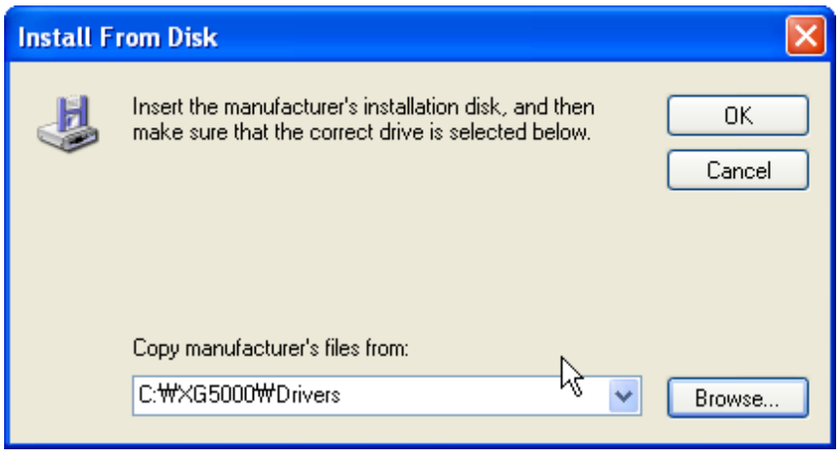
(5) If Installation Dialogue Box appears from the disc appears, press button “Search.”



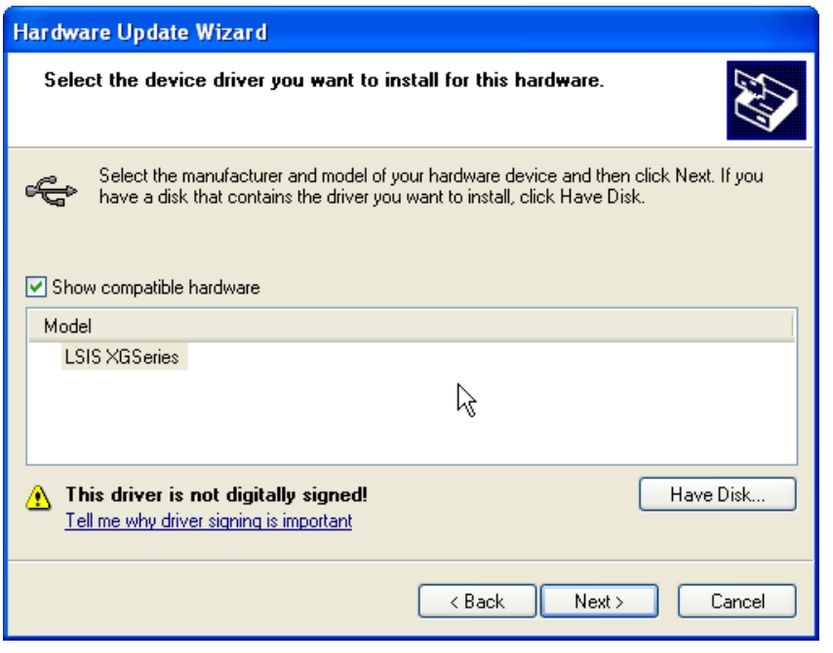
(6) Move to the folder File XG5000 has been installed from File Search Dialogue Box. If drivers fold selected, GmUSBD.inf file appears. Select this file and press button “Open.”



(7)The directory with device driver files appears on the location of the manufacture’s file. Press button “Ok.”

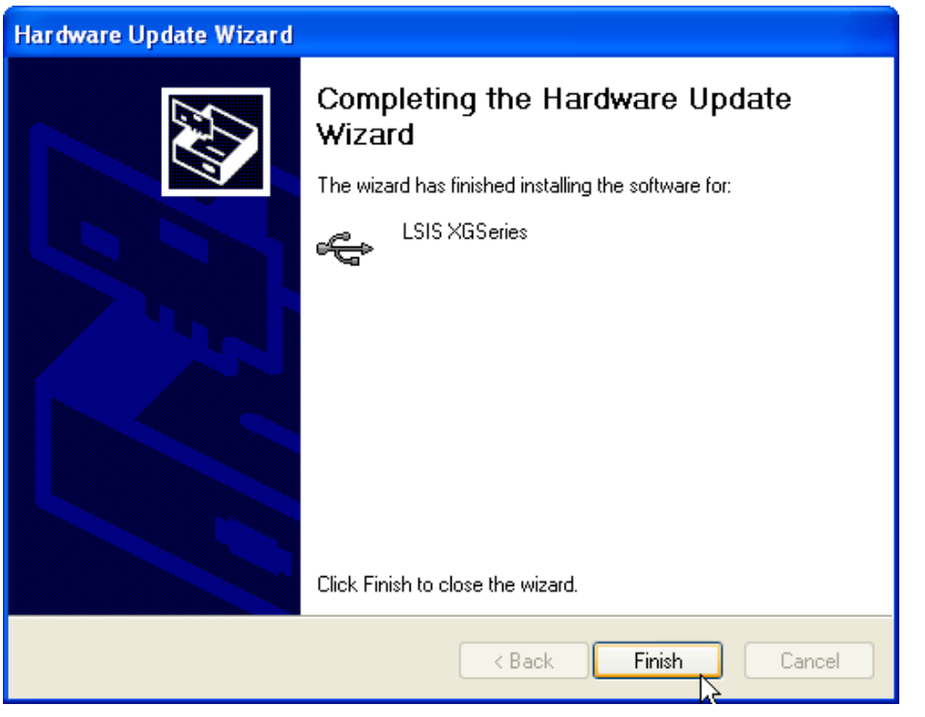


(8) Select “Select LGIS XG Series”drive in hardware indication list in select dialogue box for selecting drive which is compatible and press button “Next.”



(9)The Dialogue Box for Hardware Installation appears. Press button “Continue” and proceed with installation.

(10)Dialogue Box for Hardware Update Wizard Completed appears. Press button “Finish” and complete the installation of device drive.



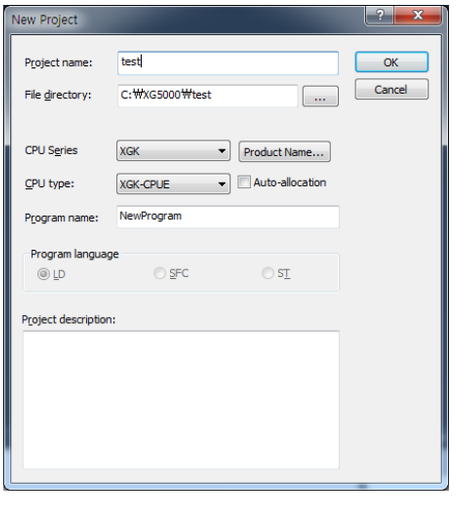
5.2 How to Register Communication Modules

To use Ethernet/IP I/F module, communication parameter must be made up in XG5000 and to set up the system on Ethernet/IP I/F module, the module must be registered to XG5000.
How to register Ethernet/IP I/F module located at discretion is as follows in accordance with the state of on/off line.

5.2.1 In case of Offline

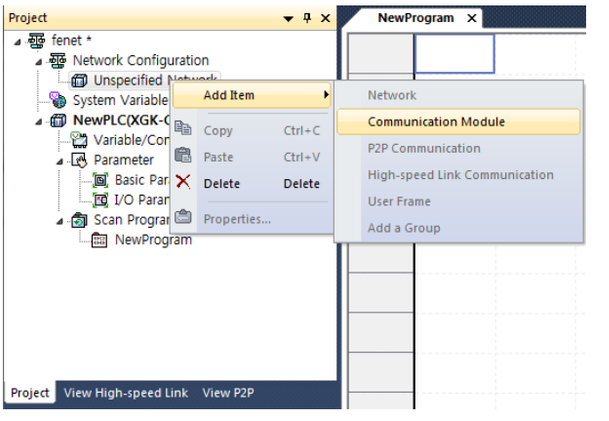
This is the way used in setting up communication modules and making up communication related parameters in the state of not connected with PLC. The execution method is as follows.

1) After execute XG5000, select 'File-> 'New File 'or click ( ).
2) Create the projects that you will store in the project name, and select the names of the projects to be stored and the CPU types of PLC that you selected.



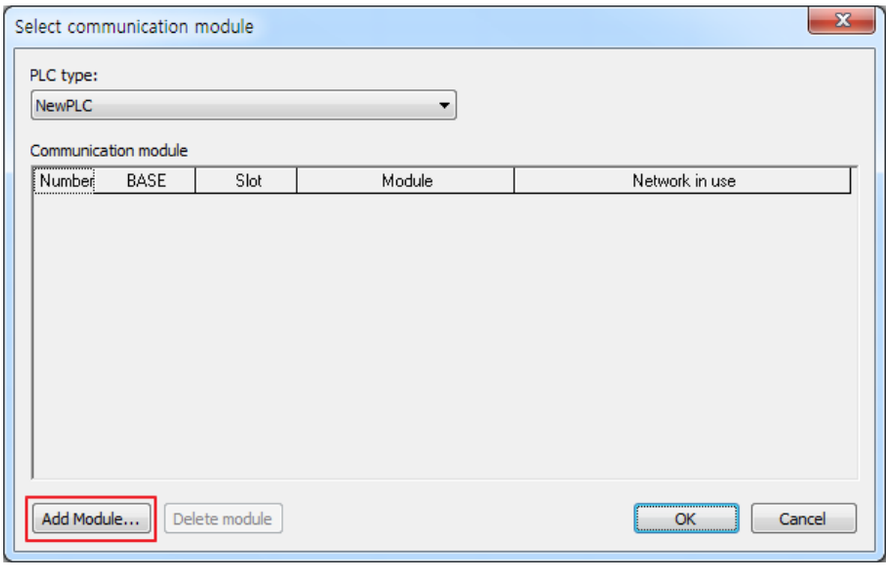
3) If you register a communication module without connected to XGT, Use a "Communication module setting" window. If Ethernet/IP is to be registered on base 0 and slot 3, Set it in the following procedure at a project Window.

a) Right click [unspecified Network] -> [add item] -> [Communication module]



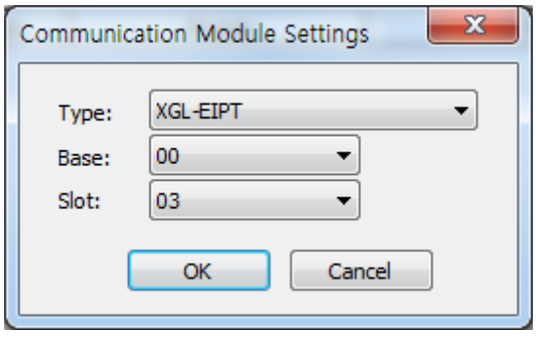
[Fig 5.2.4] Select communication module menu

b) Click [Select communication module] -> [Add module]



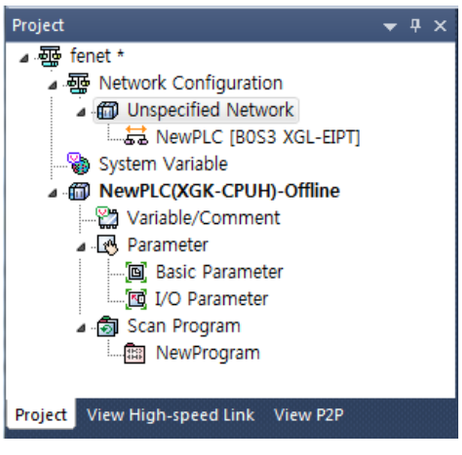
[Fig 5.2.5] Add module

c) [Communication module settings] -> select module type, base, slot



[Fig. 5.2.6] Communication module setting

Ethernet/IP module is registered on Slot 3 of Base 0 is as shown below;

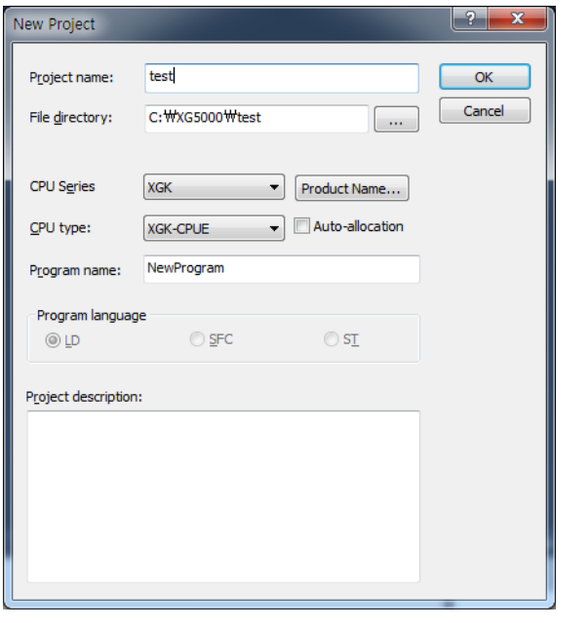


[Fig. 5.2.7] Manually register communication module

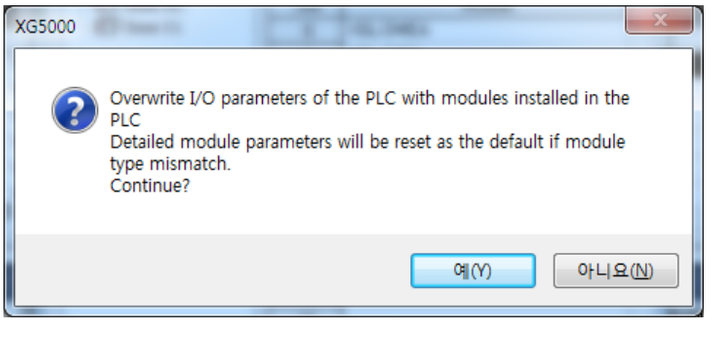
5.2.2 In case of Online

To register the communication module in online state, using XG5000, the methods in NO. 1 and NO. 2 are the same as the one in registering modules of EtherNet/IP in offline state. The execution order afterwards is as follows.

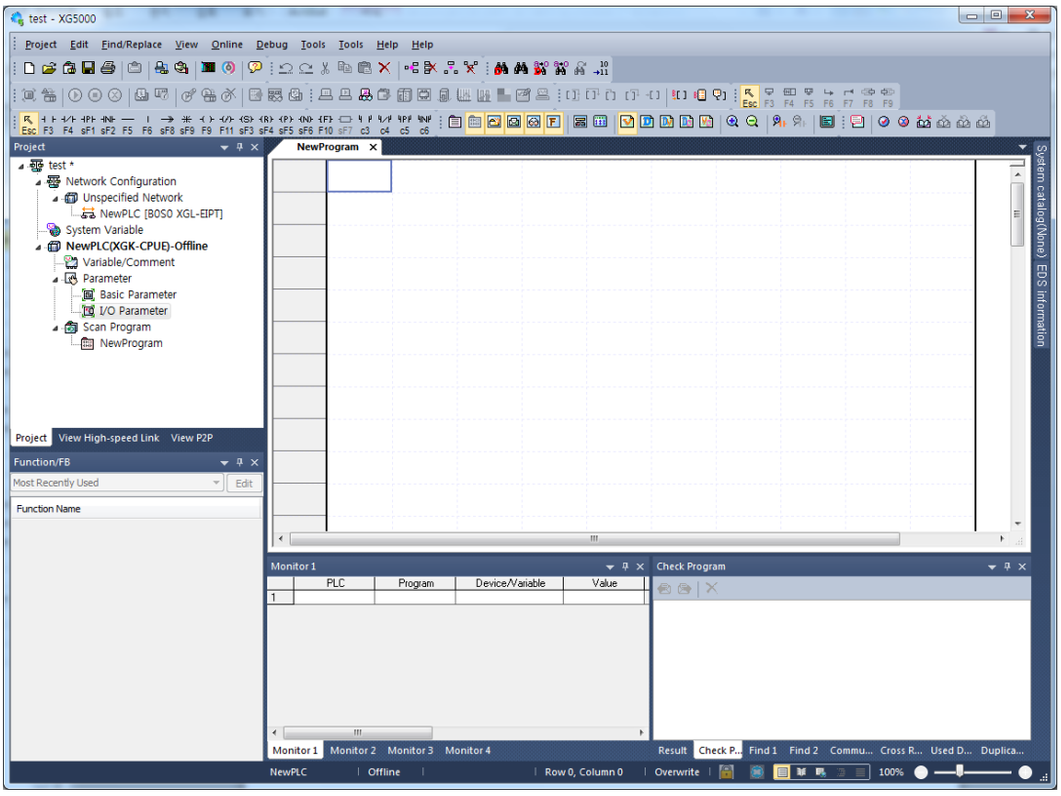
1) Create Project Name you will store and select 'PLC Series" type applied to PLC series and PLC CPU type for CPU.
2) If not connected, check out the state of connection with PLC or select 'Online '-> 'Connection Set-up,' or select the connection method by clicking icon  . As a connection method, there is a method using RS-232C, a method using cables, and a method using Ethernet module and EtherNet/IP module. As a connection method, select Local in case of directly connecting with PLC. The remote connection steps will be described in 7.4 remote connection.



3) When normally connected, the lower menus of online menus are activated.
4) To check out the modules installed to the current base, select 'Online' → 'Read' or click icon  , communication modules existing in the main base and the extension base are automatically searched for and the information of installation modules appears on the project window. In case the module registered in offline state are different from the information of PLC currently connected or kinds of communication modules, check out whether they have changed or not with the above message.



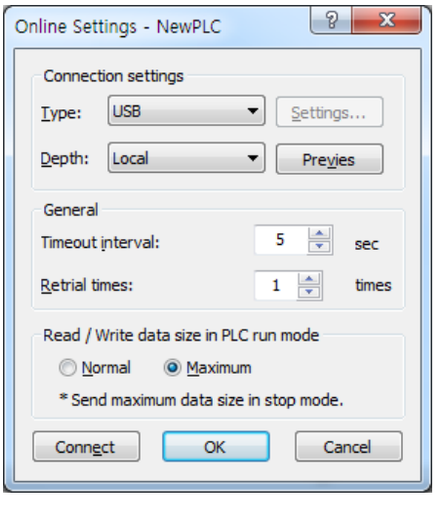
5) The list of the communication module installed to a product is created on “Project Window.”



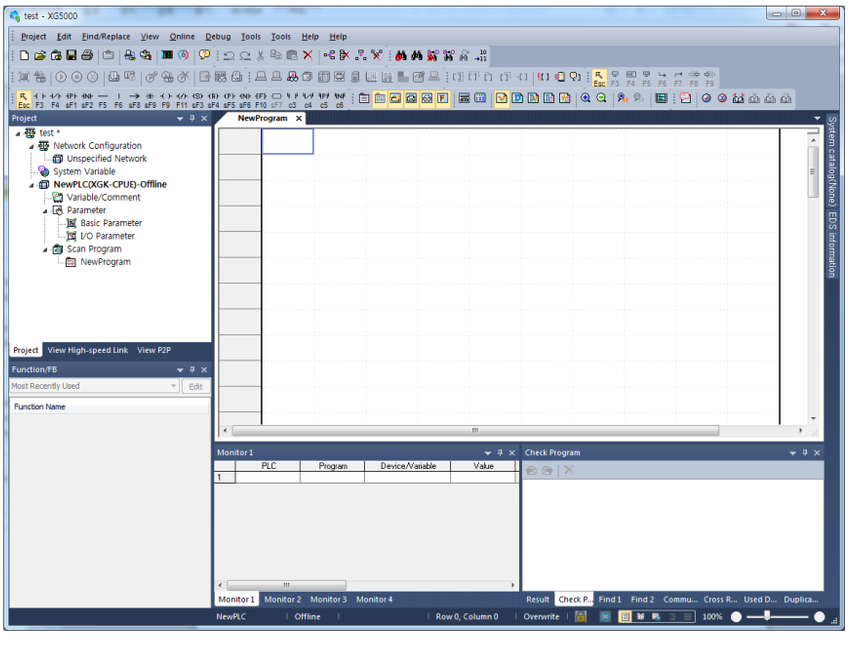
5.2.3 In case of Reading Parameter stored in PLC

The method for reading the basic set-up values for the communication module stored in PLC and for reading P2P set-up values are in the below order.

1) Select “Read” from PLC in the File.



2) It is possible to check out the basic set-up values and P2P set-up values stored in PLC.



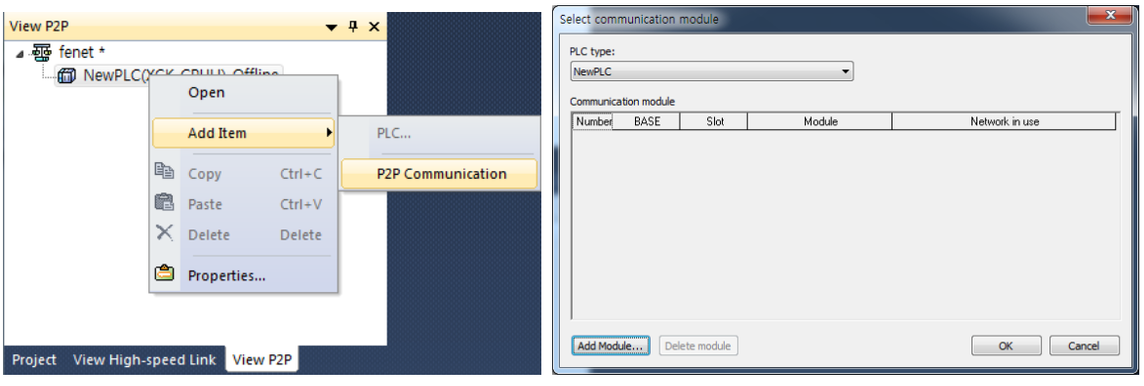
5.2.4 How to Set-up Modules

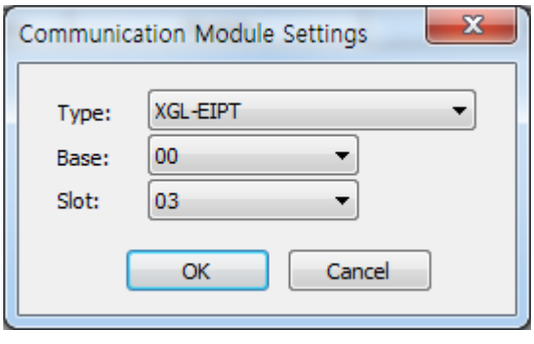
To operate EtherNet/IP I/F modules, set up in the following order.

1) Execution Order

(1) Enter in the Project Window

In the base where online → project window → module will be installed, the communication module set- up window appears as follows.





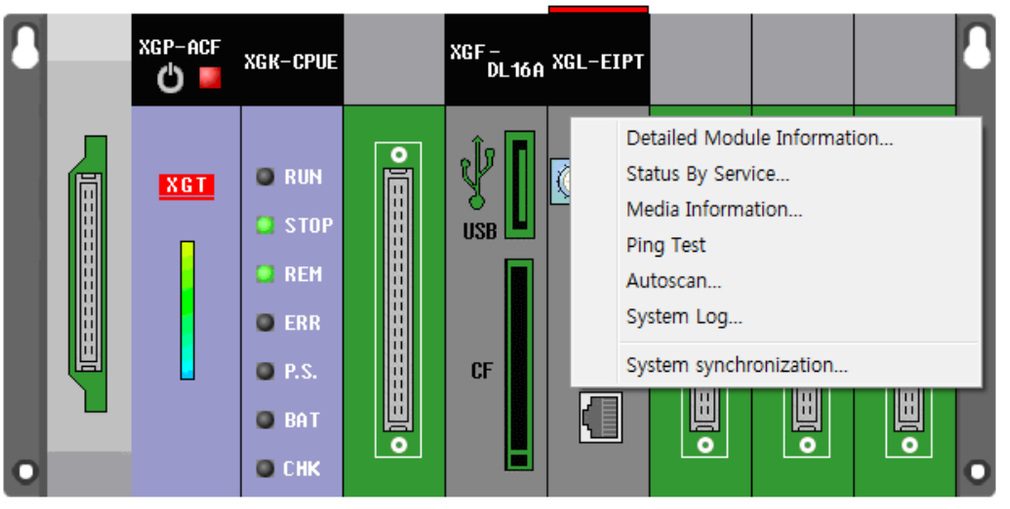
(2) I/O Information - Read

Select Online → Online after Connection → Diagnosis → I/O information – Read and read the module installed to the current base.

2) Operation Check –out

(1) Select Online → Communication module setting → System Diagnosis or click icon ( ).

(2) Click the right button of the mouse in the module of the'System Diagnosis' Window and check out whether communication has been in normal state or not after clicking Communication Module Information 'or State by Services.



Chapter 6 EIP Service

6.1 EtherNet/IP Communication Method

The communicant method of EtherNet/IP is divided into Implicit Communication Method and Explicit Communication Method and each method is again divided into client and server function. In XGT EtherNet/IP IF module, Implicit communication method is provided by periodic client /periodic server and explicit communication method is provided by aperiodic client/aperiodic server.
The periodic client/server is similar to the high speed link of the existing XGT communication service, which is the service used when data is transmitted and received periodically. The aperiodic /server method is the communication method used when particular events happen. In XGT EtherNet/IP I/F module these two services are incorporated into EIP service and provided.

6.1.1 EtherNet/IP Terms

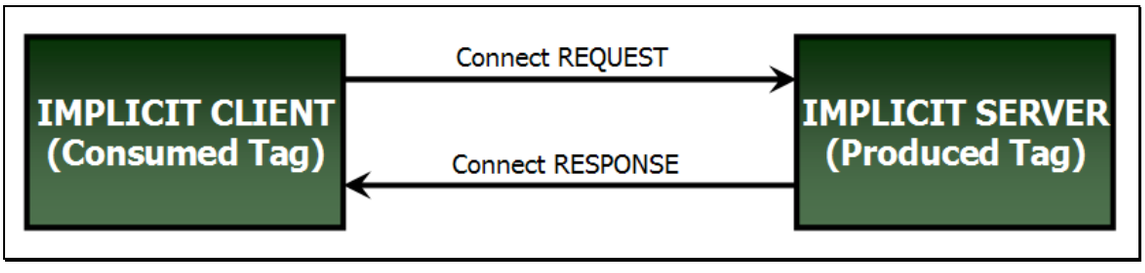
1) Implicit Messaging: Suggestive message, the message where the information has been implicated to the minimum other than data (In XGT EtherNet/IP I/F module the message is provided via client /periodic server communication)
2) Explicit Messaging: Clear message, including all information that can translate frames other than data (In XGT EtherNet/IP I/F module the message is provided via aperiodic client communication)
3) Client: The subject requiring information
4) Server: The subject that provides information at request
5) Producer: The entity that create producers, information
6) Consumer: The entity that receives consumer information and consumes it
7) Tag: Nameplate , Named Variable
8) EDS File: The abbreviation for Electric Data Sheets. The file where the information on the device and on the communication set –up is recorded
9) RPI: The abbreviation for Requested Packet Interval, meaning the period when Packet will be sent (In XGT EtherNet/IP I/F module, packet is provided at transmission period)

6.1.2 EDS File

Electrical Description Script (EDS) File is a description on devices and it includes the information about a product type and connection, as well as Vendor ID. In EtherNet/IP I/F module it is the basic principle to set up using EDS File. To install RDS Fie, EDS register menu of XG-PD should be set up.

6.1.3 Periodic Communication (Implicit) System

Implicit Message provided in periodic communication in XGT EtherNet/IP I/F module means a suggestive and implied message. As this message contains header information to the minimum except for the data in frame, it also refers to the message which is impossible to see what data means. In addition, if we translate it in different way, this message means that header information is small in quantity, so the process of translating the frame has been simplified and it is possible to process data quickly. In EtherNet/IP, connection between client and server is set up with the parameter for sending this data.
Client requires connection and it becomes the object that receives and consumes data, and sever comes to transmit the said data in transmission period (Requested Packet Interval: RPI) like the way client wants. Thus, client comes to set up consumed tag and server will set up produced tag (XGT EtherNet/IP IF: Input Only Type).



[Illustration 5.1] Client and Server in XGT EtherNet/IP I/F - Module Periodic Communication

Notice

Implicit Server is created also in Implicit Client. Server can set up timeout in the period that client grants according to types. Using data that client provides, it is possible to output to his own module .

6.1.4 Aperiodic Communication (Explicit) System

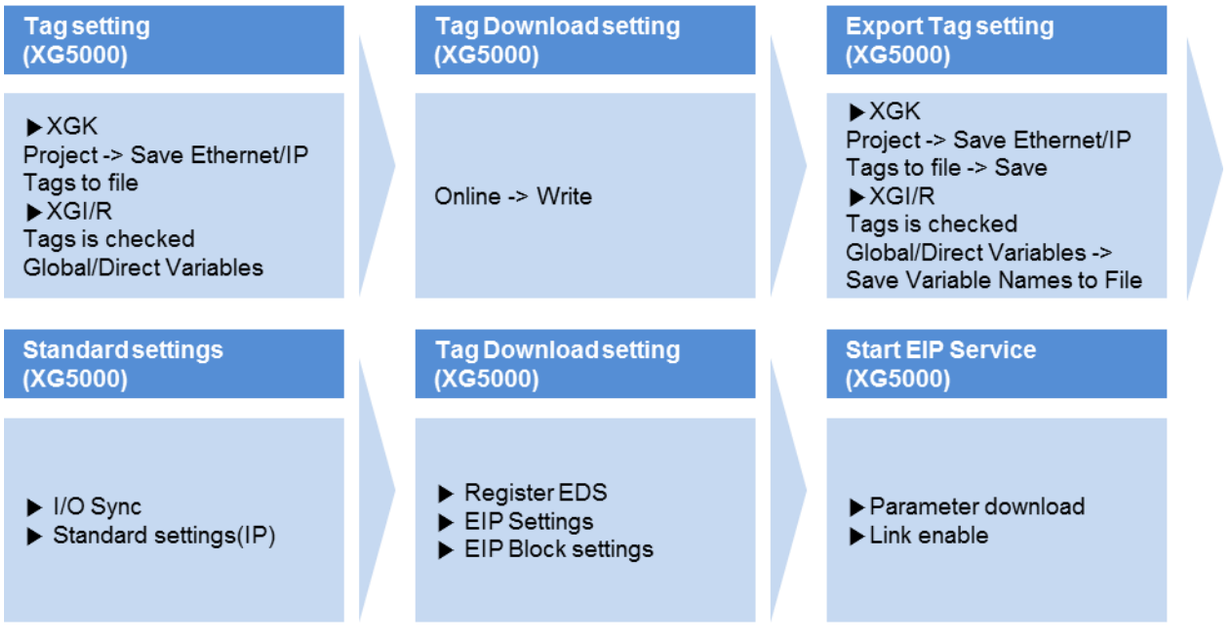
Explicit Message provided in aperiodic communication from XGT EtherNet/IP I/F module means clear and explicit message. This message also means that all information which is possible to translate data to date frame. Thus, even though it takes some time to translate frame, if the message we want is sent without the process of setting parameter, frame is translated from server and the response is made.
In general it is utilized as monitoring data to aperiodic data rather than control data.
The following table shows the parameter items set up when XGT EtherNet/IP I/f module is used.

Parameter	Inferior Configuration	Set-up Items	Set-up Scope	Set-up or Not			Remarks
				Periodic Client	Periodic Server	Aperiodic Client	
EIP	EIP Configuration			o	x	x	Drag & drop from EDS File
	EIP Channel		0-63	x	o	o	Set up other's IP
	EIP Block	Channel	0-63	o	o	o	Enter the channel you will use of set up channels in EIP channel
		Operation Mode	Pursuant to EIP Channel	o	o	o	Automatically displayed in accordance with set up channels
		I/O Type	Defined in EDS	o	x	x	Select I/O type defined in EDS
		Connection Type	Multicast, Point to Point	o	x	x	Select one among connection types defined in EDS
		Function	Write, Read, Tag Read, Tag Write	x	x	o	Select one among aperiodic clients
		Parameter	Defined in EDS	o	x	o	Set up the parameter defined in EDS - In case of aperiodic client, only read/write can be set up for read /write
		Parameter Contents	Defined in EDS	x	x		Display the contents set up in the Parameter
		Mobile Conditions	Special Flag, Contact Point	x	x	o	Set up mobile conditions
		Transmitting Period	20-10000	o	x	X	Period transmitting data
		Timeout	0-7	o	x	X	Transmission Period – Timeout(0-7)
		Data Type	BIT,1/2/4/8 BYTE	o	o	o	Set up a data type
		Tag Set- up/ Local Tag	XGT PLC Device	o	o	O	The device area of the local axis where "Write" or "Read" is executed you will
		Tag Set- up/ Remote Tag	TAG	o	x	o	Designate Other's TAG(Maximum 40 letters) In case remote station is XGT PLC, it is set up as "% + Device Name" (Ex.% MW200)
		Tag Set-up/Size		o	o	O	Periodic Client/Server : Maximum 500 Byte Aperiodic Client : Maximum 1400 Byte

6.2 EIP Service

EtherNet/IP is divided into a periodic message service (Implicit Service), and an aperiodic message service (Explicit Service). In XGL-EIPT module these two services are incorporated to be provided as periodic/client server and aperiodic client.
In Periodic Client / Server Service the tag for communication must be set up in parameter system. Thus, client and server tag must be shared with information for communication when parameter is exchanged. In XGT EhterNet/IP I/F module, client and server must be set up with XG5000. Make sure client is set up in periodic client and sever is set up with periodic server. For the detail contents, see 6.3.
Aperiodic client service must be communicated after you put the tag to be communicated and communication set-up. Thus, when required from client, server receives al information in frame and translates, and responds. In other words, it is the service without setting up from server side.

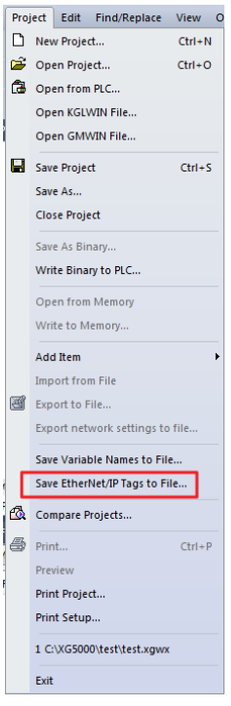
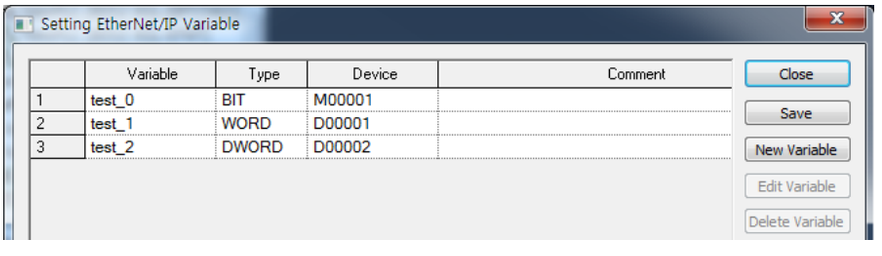
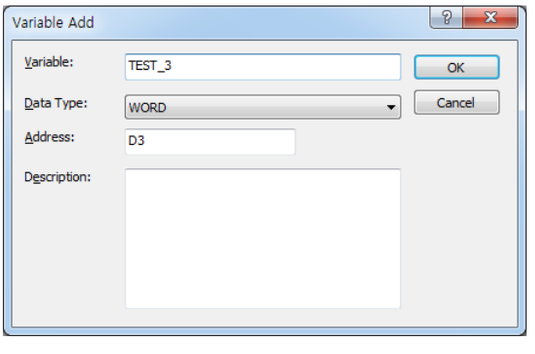
In this part, EIP types and use methods provided to a user are described.
The flowing refers to the order for making up the program using EIP.



6.3 Tag setup

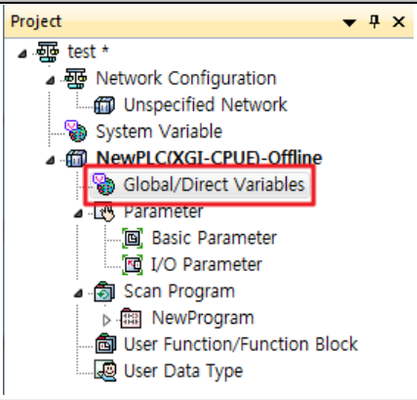
1. XGK

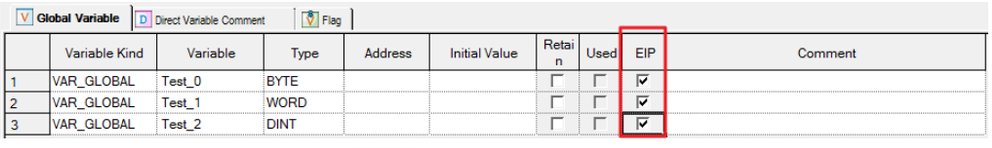
For XGK CPU, you can set up the tag in “EtherNet/Export IP tag” of the project menu. After setting, it is saved as file(.csv) and imports the set file in XG-PD for edition. For more details, refer to the below setup procedures.

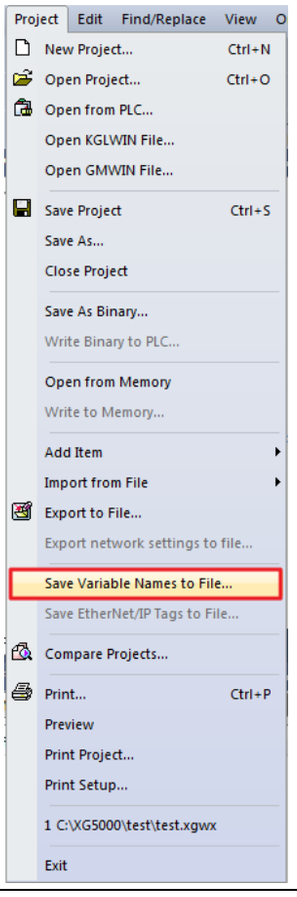
Order	Set-up Procedure	How to Set up
1	Set up XG-5000 EtherNet/IP variable	  
	1) Select Project -> EtherNet/Export IP tag. 2) Set up the EtherNet/IP variable by adding variables. 3) Saved the set variables.	

2. XGI/R

When you apply XGI/R CPU, you can set up tags in the “global/direct variable” of XG5000 project and tick the checkbox of EIP for setup. For more details, refer to the below setup procedures.

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Declare XG-5000 global variable</td><td>






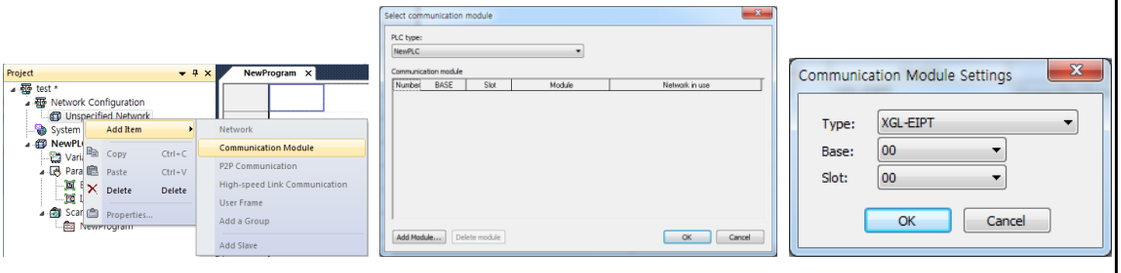
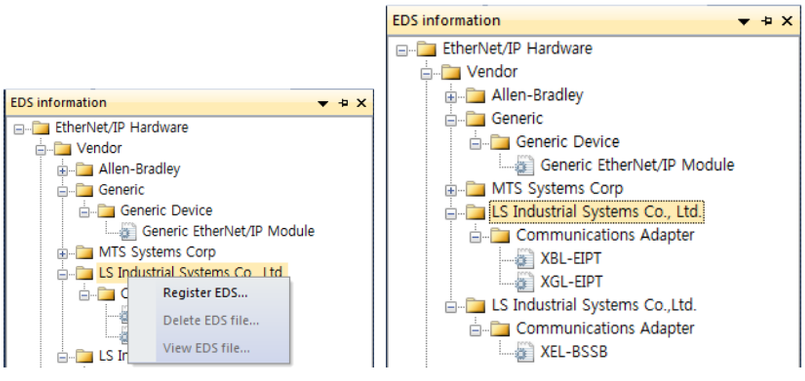
</td></tr>
<tr><td colspan="2">1) Declare the variable to be used as tag in XG5000.
2) Tick the EIP Check Box to be used in EtherNet/IP.
3) Save it as the ‘Project -> variable/ descriptive file’.</td></tr>
</table>

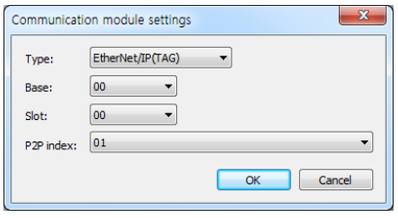
6.4 Setup of Periodic/Non-periodic Communication Service

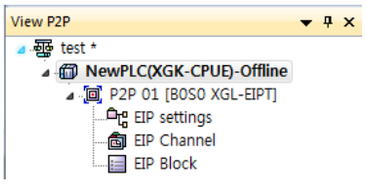
6.4.1 Periodic client communication service

After setting the communication modules and basic parameters with XG5000, use the mouse to drag the EDS file of the opposing station to be communicated and start setup.

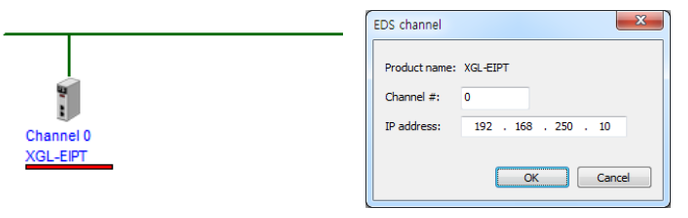
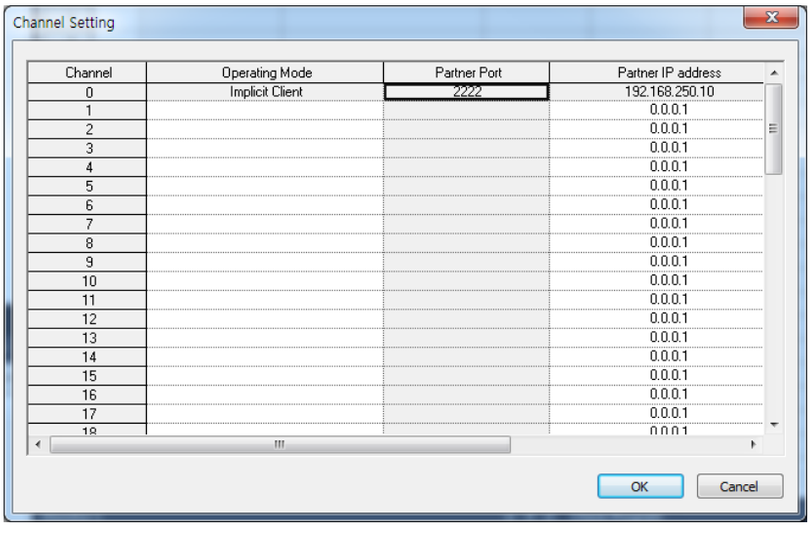
1) Basic parameters setup and EDS registration

<table>
<tr><th>Order</th><th>Set – up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Setup of communication module</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the desired base with the right mouse button to select the EtherNet/IP I/F module.
2) Double-click the communication module to set up the basic parameters.</td></tr>
<tr><td rowspan="2">2</td><td>Registration of EDS file</td><td> 
</td></tr>
<tr><td colspan="2">1) Register the EDS file of the targeted communication module.
2) Click ‘XG5000 -> EDS information window’
3) After completing the above procedures, you can see the registered EDS file in the EDS file information window.</td></tr>
</table>

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">3</td><td>EIP service registration</td><td> 


</td></tr>
<tr><td colspan="2">Double-click the P2P(EIP)in the window for setting up P2P(EIP) and enter the module and slot number.</td></tr>
</table>

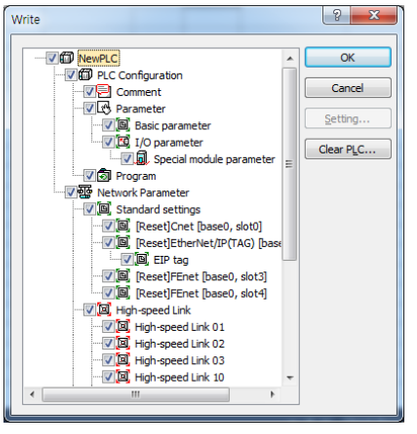
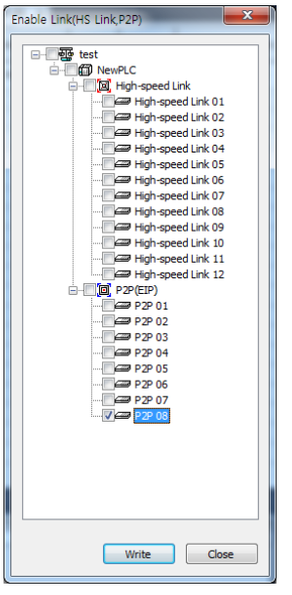
2) EIP Configuration and parameters setting

Order	Set-up Procedure	How to Set up
1	EIP Configuration	
	1) Drag the registered EDS file from the EDS information window and paste it to the EIP configuration window. 2) The channel setup window will be displayed at the same time as pasting. 3) Set up the channel number and ID address in the setup window.	
2	Confirm EIP channel information	
	1) Drag the registered EDS file from the EDS information window and paste it to the EIP configuration window. 2) The channel setup window will be displayed at the same time as pasting. 3) Set up the channel number and ID address in the setup window.	

Order	Set-up Procedure	How to Set up
3	EIP Block Set-up	

Index	Ch	Operating Mode	I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Time out	Data type	tag settings		
												Local tag	Remote tag	Size
0	0	Implicit Client	2.Read Only(TAG)	Multicast		Parameter	T2O Tag Size:2		300	2. RPI x16	ARRAY[0..1] OF WORD	test_3/D00004	test_4	2

1) Channel: Drag the EDS file to display the set channel. If several channels are set, a user can select the desired channel number to configure the block.
2) Operation mode: It is displayed depending on the set channel; displayed as periodic client, non-periodic client and periodic server.
3) I/O type: Indicates the name of the connection defined in the EDS file of the relevant device. The communication with the server side will be opened based on the connection method set here.
4) Access mode: Sets up how to communicate with the server. The information supported depending on the module is recorded in EDS and MULTICAST, Point To Point(UNICAST) may be available.
5) Parameters: Means the parameters of the server side that should be set by a user. For more details on parameters, refer to the server manual.
▶When selecting Read Only(ID):
(1) T2O Tag Size : Data size to be read from the server side
(2) Input Assembly Instance(8bit) : Block number of the server to be read
▶When selecting Read Only(Tag):
(1) T2O Tag Size : Data size to be read from the server side
6) Details of parameters: Displays the details of the set parameters.
7) Transmission cycle (ms): Means the transmission cycle of the data and the setting range is 20~10000 ms.
8) Time-out: Set the value of the integer multiple of the time set as the transmission cycle(ms) and set the time to report error when the frame does not exist within the set time. The setting range is transmission cycle ×0~7.
9) Data type : Indicates the data type.
10) local tag : Set the area to read or write local data.
Select the variable imported from XG-PD by double-clicking or input the variable that you know for setting.
11) Remote tag : Input the set Producer Tag to the opposing station for the period communication.

Order	Set-up Procedure	How to Set up
4	Write parameters and Link Enable	 
	1) After clicking 'Online → Write', check the set P2P(EIP) and click 'OK'. 2) After clicking 'Online → Communication module setting → Link Enable', check the P2P(EIP) and click 'Write'. 3) If you do not check Link Enable, the set EIP will not be operated.	

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

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

Flag list related with “Enable Link”

-XGR

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

-XGI

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

-XGK

Flag	Data type	Device	Description
_HS1_ENABLE_STATE	BIT	F09600	HS link 1 enable/disable current state
_HS2_ENABLE_STATE	BIT	F09601	HS link 2 enable/disable current state
_HS3_ENABLE_STATE	BIT	F09602	HS link 3 enable/disable current state
_HS4_ENABLE_STATE	BIT	F09603	HS link 4 enable/disable current state
_HS5_ENABLE_STATE	BIT	F09604	HS link 5 enable/disable current state
_HS6_ENABLE_STATE	BIT	F09605	HS link 6 enable/disable current state
_HS7_ENABLE_STATE	BIT	F09606	HS link 7 enable/disable current state
_HS8_ENABLE_STATE	BIT	F09607	HS link 8 enable/disable current state
_HS9_ENABLE_STATE	BIT	F09608	HS link 9 enable/disable current state
_HS10_ENABLE_STATE	BIT	F09609	HS link 10 enable/disable current state
_HS11_ENABLE_STATE	BIT	F0960A	HS link 11 enable/disable current state
_HS12_ENABLE_STATE	BIT	F0960B	HS link 12 enable/disable current state
_HS1_REQ	BIT	F10300	HS link 1 enable/disable request
_HS2_REQ	BIT	F10301	HS link 2 enable/disable request
_HS3_REQ	BIT	F10302	HS link 3 enable/disable request
_HS4_REQ	BIT	F10303	HS link 4 enable/disable request
_HS5_REQ	BIT	F10304	HS link 5 enable/disable request
_HS6_REQ	BIT	F10305	HS link 6 enable/disable request
_HS7_REQ	BIT	F10306	HS link 7 enable/disable request
_HS8_REQ	BIT	F10307	HS link 8 enable/disable request
_HS9_REQ	BIT	F10308	HS link 9 enable/disable request

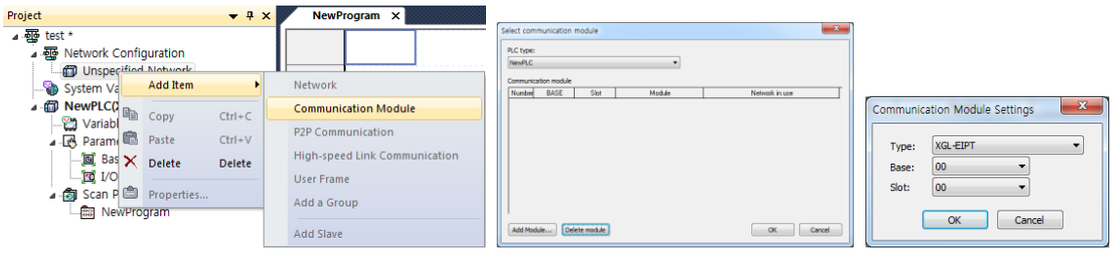
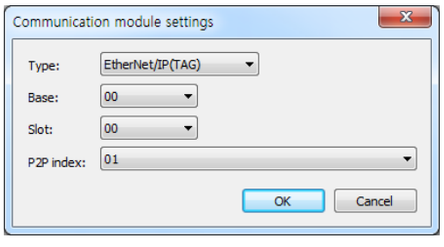
Flag	Data type	Device	Description
_HS10_REQ	BIT	F10309	HS link 10 enable/disable request
_HS11_REQ	BIT	F1030A	HS link 11 enable/disable request
_HS12_REQ	BIT	F1030B	HS link 12 enable/disable request
_HS1_REQ_NUM	BIT	F10310	HS link 1 enable/disable setting
_HS2_REQ_NUM	BIT	F10311	HS link 2 enable/disable setting
_HS3_REQ_NUM	BIT	F10312	HS link 3 enable/disable setting
_HS4_REQ_NUM	BIT	F10313	HS link 4 enable/disable setting
_HS5_REQ_NUM	BIT	F10314	HS link 5 enable/disable setting
_HS6_REQ_NUM	BIT	F10315	HS link 6 enable/disable setting
_HS7_REQ_NUM	BIT	F10316	HS link 7 enable/disable setting
_HS8_REQ_NUM	BIT	F10317	HS link 8 enable/disable setting
_HS9_REQ_NUM	BIT	F10318	HS link 9 enable/disable setting
_HS10_REQ_NUM	BIT	F10319	HS link 10 enable/disable setting
_HS11_REQ_NUM	BIT	F1031A	HS link 11 enable/disable setting
_HS12_REQ_NUM	BIT	F1031B	HS link 12 enable/disable setting
_P2P1_ENABLE_STATE	BIT	F09620	P2P1 enable/disable current state
_P2P2_ENABLE_STATE	BIT	F09621	P2P2 enable/disable current state
_P2P3_ENABLE_STATE	BIT	F09622	P2P3 enable/disable current state
_P2P4_ENABLE_STATE	BIT	F09623	P2P4 enable/disable current state
_P2P5_ENABLE_STATE	BIT	F09624	P2P5 enable/disable current state
_P2P6_ENABLE_STATE	BIT	F09625	P2P6 enable/disable current state
_P2P7_ENABLE_STATE	BIT	F09626	P2P7 enable/disable current state
_P2P8_ENABLE_STATE	BIT	F09627	P2P8 enable/disable current state
_P2P1_REQ	BIT	F10320	P2P1 enable/disable request
_P2P2_REQ	BIT	F10321	P2P2 enable/disable request
_P2P3_REQ	BIT	F10322	P2P3 enable/disable request
_P2P4_REQ	BIT	F10323	P2P4 enable/disable request
_P2P5_REQ	BIT	F10324	P2P5 enable/disable request
_P2P6_REQ	BIT	F10325	P2P6 enable/disable request
_P2P7_REQ	BIT	F10326	P2P7 enable/disable request
_P2P8_REQ	BIT	F10327	P2P8 enable/disable request
_P2P1_REQ_NUM	BIT	F10330	P2P1 enable/disable setting
_P2P2_REQ_NUM	BIT	F10331	P2P2 enable/disable setting
_P2P3_REQ_NUM	BIT	F10332	P2P3 enable/disable setting
_P2P4_REQ_NUM	BIT	F10333	P2P4 enable/disable setting
_P2P5_REQ_NUM	BIT	F10334	P2P5 enable/disable setting
_P2P6_REQ_NUM	BIT	F10335	P2P6 enable/disable setting
_P2P7_REQ_NUM	BIT	F10336	P2P7 enable/disable setting
_P2P8_REQ_NUM	BIT	F10337	P2P8 enable/disable setting

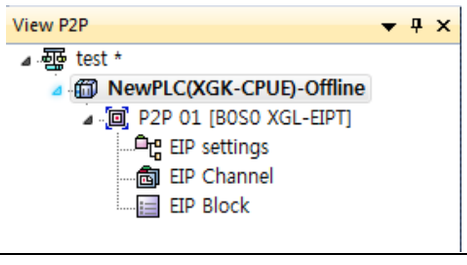
▶ How to enable link
-HS link/P2P enable/disable setting flag ON → HS link/P2P enable/disable request flag ON
▶ How to disable link
-HS link/P2P enable/disable setting flag OFF → HS link/P2P enable/disable request flag ON
▶ You can monitor the Enable/Disable state of the each link through “enable/disable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

6.4.2 Setup of Non-periodic Client Communication Service

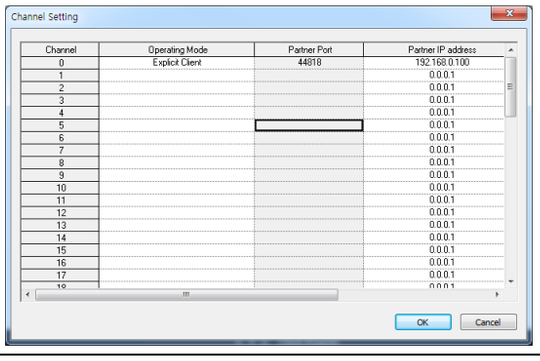
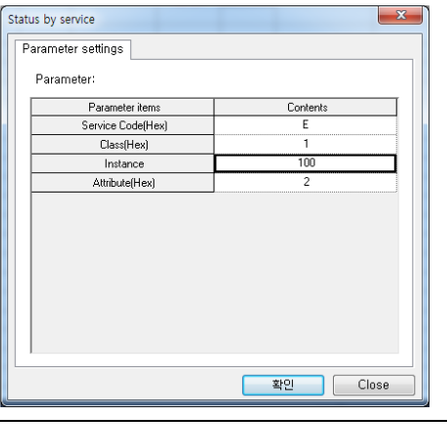
The non-periodic communication is the service to read or write the opposing tag data. It can be used similarly to XGT's P2P service and you can use it by setting the opposing tag data without setting EDS.

1) Basic Parameter Setup and EIP Service Registration

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Communication module setup</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the desired base with the right mouse button to select EtherNet/IP I/F module.
2) Double-click the communication module to set up the basic parameters.</td></tr>
<tr><td rowspan="2">2</td><td>EIP service registration</td><td> 


</td></tr>
<tr><td colspan="2">Double click the P2P(EIP) of the P2P(EIP) setup window and then, enter the module and slot number.</td></tr>
</table>

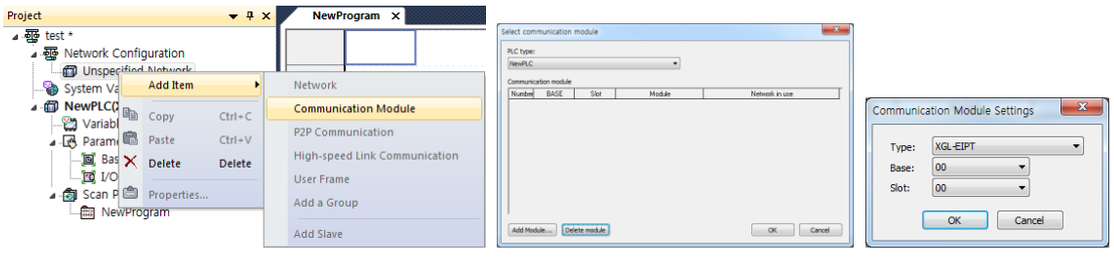
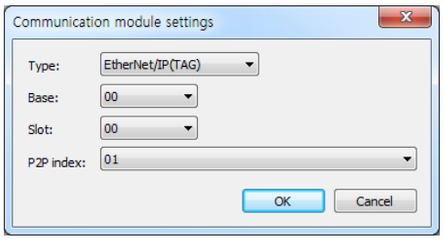
2) EIP Configuration and parameters setting

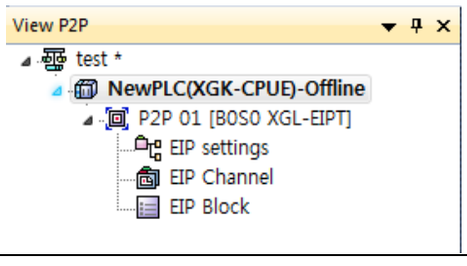
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>Hot to Set up</th></tr>
<tr><td rowspan="2">1</td><td>EIP Channel Information Check-out</td><td> 
</td></tr>
<tr><td colspan="2">1) After double-clicking the EIP channel, set the operation mode as the non-periodic client.
2) Input the IP address of the opposing station.</td></tr>
<tr><td rowspan="2">2</td><td>Block Set-up</td><td>▶ Example of Tag Read
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Explicit Client</td><td></td><td></td><td>TAG READ</td><td></td><td></td><td>F00093</td><td></td><td></td><td>DWORD</td><td>test_2/D00002</td><td>test_4</td><td>1</td></tr>
</table>
▶ Example of Read
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Explicit Client</td><td></td><td></td><td>Generic READ</td><td>Parameter</td><td>Service Code(Hex):E
Class(Hex):1
Instance:100
Attribute(Hex):2</td><td>F00093</td><td></td><td></td><td>DWORD</td><td>test_2/D00002</td><td></td><td>1</td></tr>
</table>
▶ Example of Parameter Set-up
 
</td></tr>
<tr><td colspan="2">1) Channel: Selects and uses one among the channels set as non-periodic client.
2) Operation mode: Displays the operation mode depending on the set channel.
3) Functions: There are ‘Read Tag’command that reads and saves the tag data from the server; ‘Write Tag’ command that saves the data to the server; ‘Read/Write’ that inputs directly the parameters not tag.
4) Parameters : Can be set only when setting ‘Read/Write’ in Functions.
▶ Service Code(Hex) : Input the service code to be used. (Ex.: 0E : Get ,10 : Set)
▶ Class(Hex) : Input the Class to set parameters.
▶ Instance(Hex) : Input the instance to set parameters.
▶ Attribute(Hex) : Input the Attribute to set parameters.
5) Operation conditions : Sets the operation conditions to send messages.
6) Data type : If you select the local tag, the data type of the selected tag will be displayed.
7) Tag setup: Set up the client’s (own) tag in the local tag, server’s tag in the remote tag and then, fix the size.
8) Size: Sets up the size depending on the data type.</td></tr>
</table>

6.4.3 Periodic Server Communication Service

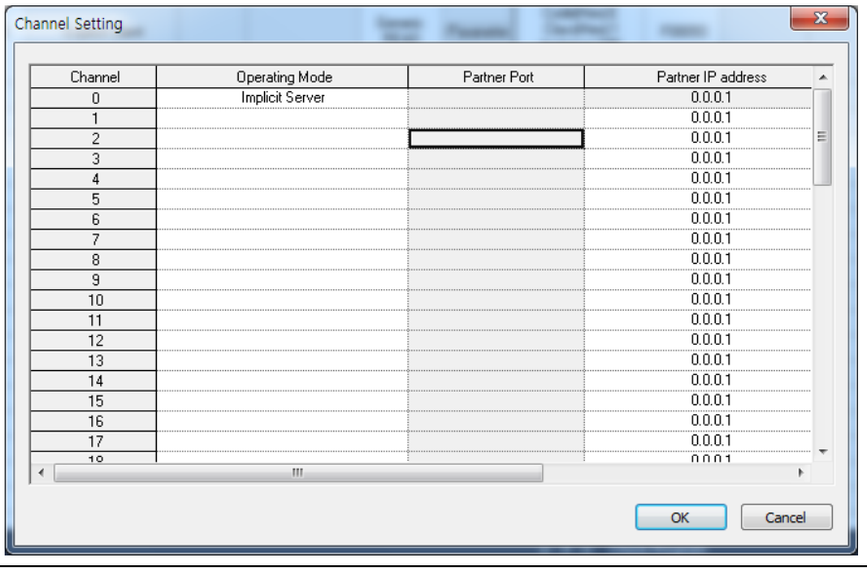
For the periodic communication using EtherNet/IP I/F module, even in case of the module operated by the server, you need to set up the tag size, address.

1) Basic Parameter Set-up and EIP Service Registry

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Communication module setup</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the desired base with the right mouse button to select EtherNet/IP I/F module.
2) Double-click the communication module to set up the basic parameters.</td></tr>
<tr><td rowspan="2">2</td><td>EIP service registration</td><td> 


</td></tr>
<tr><td colspan="2">Double click the P2P(EIP) of the P2P(EIP) setup window and then, enter the module and slot number.</td></tr>
</table>

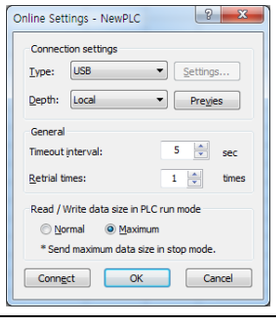
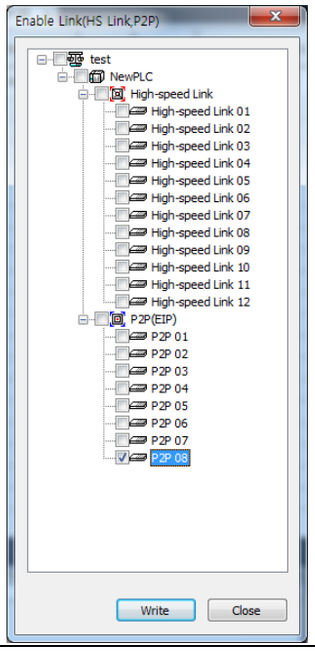
2) EIP Channel and Parameter Set-up

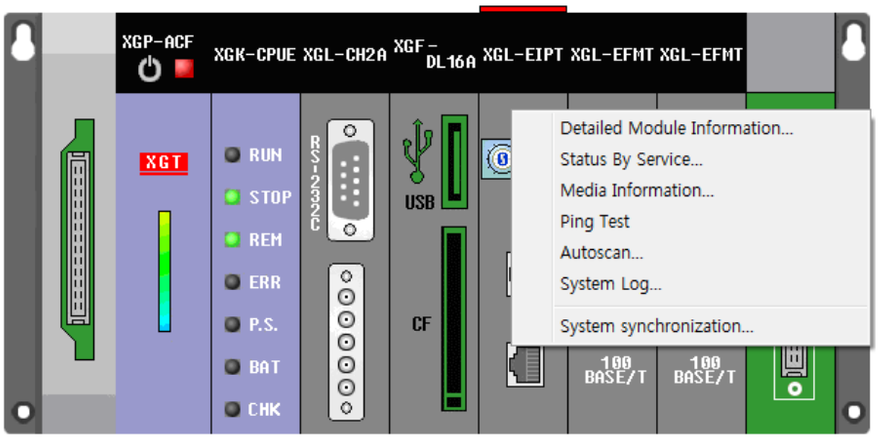
<table>
<tr><th>Order</th><th>Set - up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>EIP channel Information check</td><td> 
</td></tr>
<tr><td colspan="2">1) After double-clicking EIP channel, set the operation mode as the periodic server.
2) The module for which the basic parameters are set is operated as the periodic server so you do not need to input the IP address of the opposing station.</td></tr>
<tr><td rowspan="2">2</td><td>Block Set-up</td><td><table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Implicit Server</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>WORD</td><td>test_1/D00001</td><td></td><td>1</td></tr>
</table></td></tr>
<tr><td colspan="2">1) Channel : Select and use the one among the channels where periodic servers have been set up
2) Operating Mode: The operation mode of the channel set up according to the channel set-up is displayed.
3) Date Type: Enter the data type of the tag that you will set up.
4) Local Tag: This tag is the device area of the module operating via server.
5) Size: The data size of the module operating via server.</td></tr>
</table>

6.5 Start of Operation

The operation of the XGT EtherNet/IP I/F module is largely divided into periodic communication service and aperiodic communication service.
For set - up contents, refer to 5.3 and 5.4.

6.5.1 XG5000 Set-up

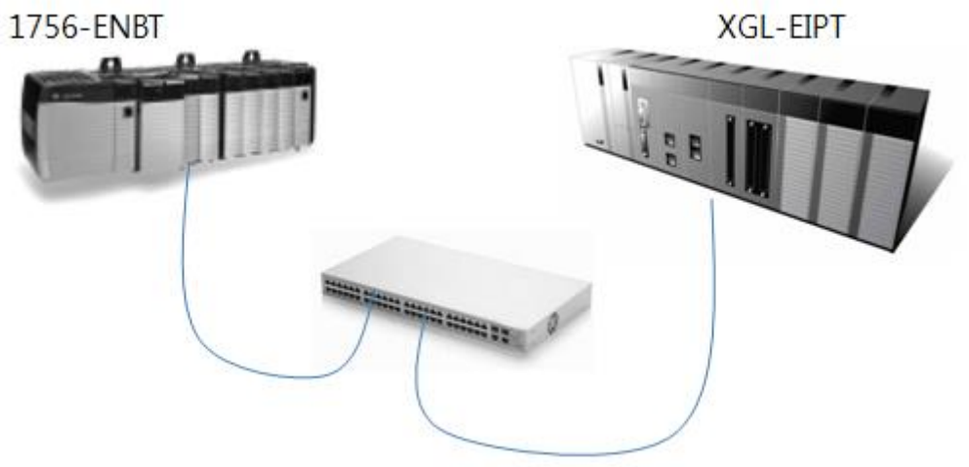
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Connection Set-up</td><td> 
</td></tr>
<tr><td colspan="2">1) Online → Select Connection setting or Click Icon ( ).
2) After setting up the connection option suitable for a use's environment, click "Connection."</td></tr>
<tr><td>2</td><td>Read I/O Information</td><td>Select Online → Read or click icon ( ), and read the information loaded in the module</td></tr>
<tr><td rowspan="2">3</td><td>Enable Link</td><td> 
</td></tr>
<tr><td colspan="2">1) Online → Communication module setting → Link Enable or click icon ( ).
2) Check out EIP where set-up has been completed and click "Write"</td></tr>
</table>

Order	Set-up Procedure	How to Set up
3	Operation Check-out	
	1) Select Online → Communication module setting → System Diagnosis or click icon ( ). 2) After clicking the module, press the right side of the mouse, then it is possible to check out whether communication has been successfully done by clicking frame monitoring or the state by services. * For the details on system diagnosis, refer to Diagnosis Function Chapter 7.	

6.6 Examples

6.6.1 Communication with Rockwell 1756-ENBT Communication Module

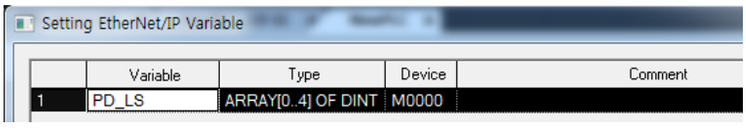
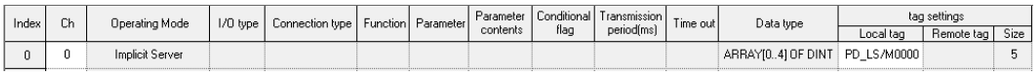
1) System Configuration



Segment	1756-ENBT	XGL-EIPT
IP Address	192.168.250.41	192.168.250.52

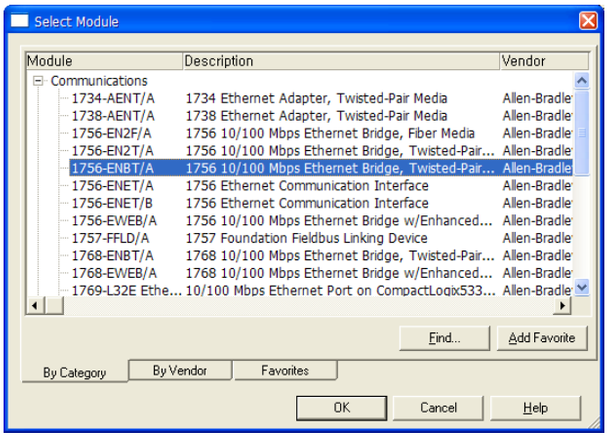
2) Setup of 1756-ENBT Consumer, XGL-EIPT Producer
- setup of XGT Ethernet/IP I/F module parameter

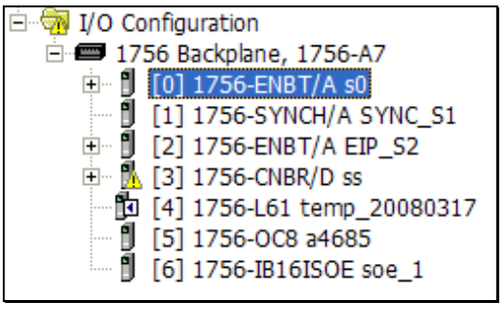
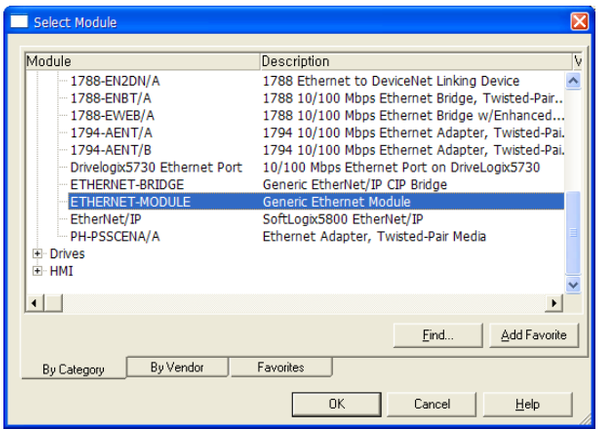
XGT is used as producer so refer to the details of the above 6.3.3 to set it as periodic server.

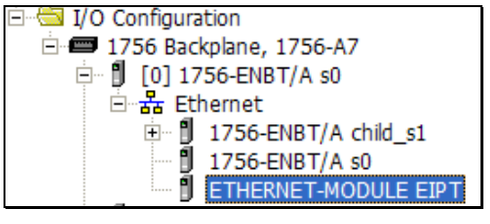
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td>1</td><td>Tag setup</td><td> 
</td></tr>
<tr><td rowspan="2">2</td><td>Block setup</td><td> 
</td></tr>
<tr><td colspan="2">1) Channel: Selects one among the channels set as periodic server.
2) Operation mode: Displays the operation mode depending on the set channel.
3) Data type: Shows the data type of the set tag.
4) Local tag: Selects the tag operated by tag.
5) Size: Shows the size of the selected tag.</td></tr>
</table>

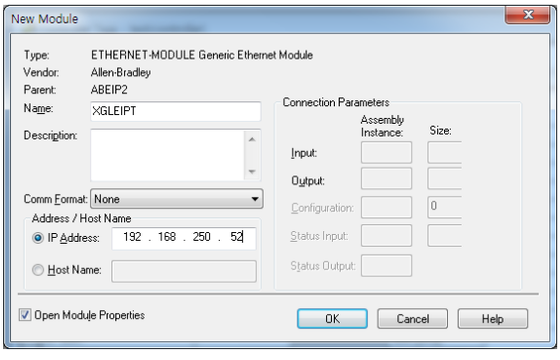
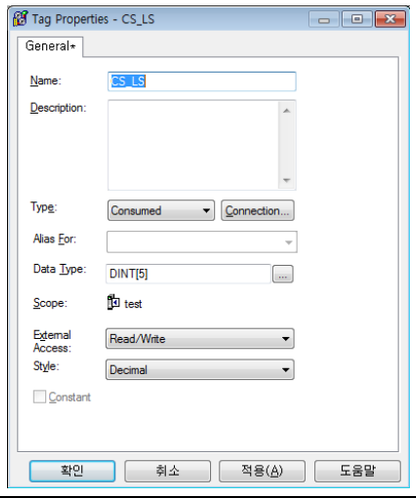
3) Rockwell 1756-ENBT Communication Module and Communication Set-up

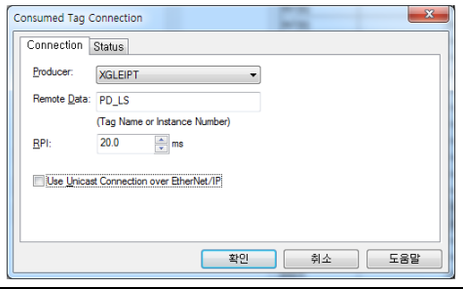
Set up Rockwell's Client using Rockwell's S/W(RSLogix 5000).

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Module Set - up</td><td> 


</td></tr>
<tr><td colspan="2">Search for the module in I/O Configuration and install it</td></tr>
<tr><td rowspan="2">2</td><td>Network Module Installation</td><td> 

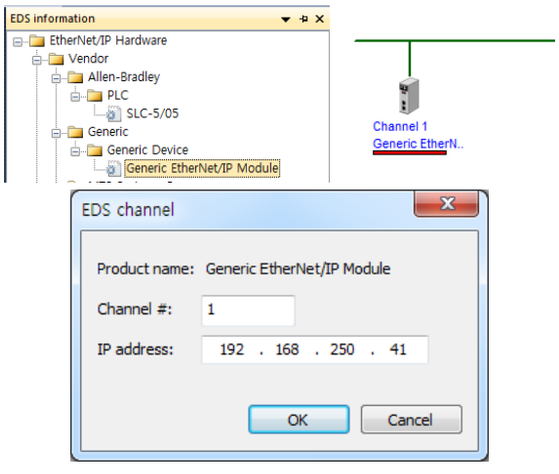

</td></tr>
<tr><td colspan="2">1) If ENBT Module has been installed, extend it into network and install the module of the network connected.
2) Herein, the installation of Rockwell's module only is available, and modules, not Rockwell's one, are possible to set up, using Generic Device.
3) For the connection of XGT EtherNet/IP I/F Module, set up Generic Device.</td></tr>
</table>

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">3</td><td>Network Address and Connection Information Input</td><td> 
</td></tr>
<tr><td colspan="2">1) Name: Input the name to be used for the module.
2) IP Address: Input XGL-EIPT module’s IP.
3) Comm Format: Input None.</td></tr>
<tr><td rowspan="2">4</td><td>Consumer tag setup</td><td> 


</td></tr>
<tr><td colspan="2">1) Name: Input the name of the consumer tag.
2) Data Type: Input the data type to be communicated.
3) Connection: Input the producer tag to be connected with the consumed tag.
4) RPI: Input the transmission cycle that the producer will receive.</td></tr>
</table>

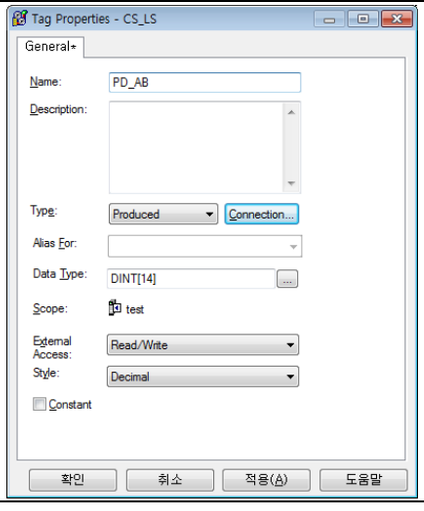
4) Setup of 1756-ENBT Producer, XGL-EIPT Consumer

XGT is used as the producer so refer to the details of the above 6.3.1. Periodic Client Setup.

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Set up channel with Generic EDS</td><td> 
</td></tr>
<tr><td colspan="2">1) Select the Generic EtherNet/IP Module in the EDS information window and drag it to the EIP configuration window.
2) IP Address: Input the IP of 1756-ENBT module.</td></tr>
<tr><td rowspan="2">2</td><td>Block setup</td><td><table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Implicit Client</td><td>6.Input Only(Tag type)</td><td>Multicast</td><td></td><td>Parameter</td><td>T2O Data Size:14</td><td></td><td>200</td><td>0. RPI x4</td><td>ARRAY[0..13] OF DINT</td><td>CS_AB/P2000</td><td>PD_AB</td><td>14</td></tr>
</table></td></tr>
<tr><td colspan="2">1) I/O type: Select 6. Input Only(Tag Type).
2) Parameter: Input the size of the consumer tag. The size is the number of data types.
3) Local tag: Select the consumer tag to be communicated with the producer.</td></tr>
</table>

5) Rockwell 1756-ENBT Communication setup

You can set up the producer of Rockwell by using Rockwell's S/W(RSLogix 5000).
If the procedures 1) ~ 3) of the above consumer setup have already established, you only need to set up the producer tag.

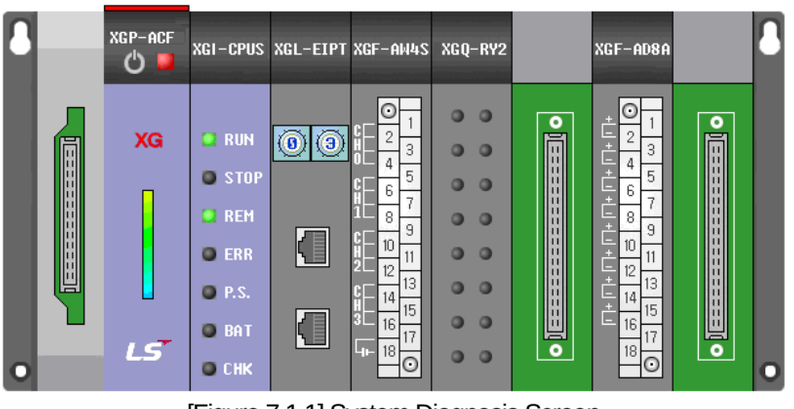
Order	Set-up Procedure	How to Set up
1	Producer tag setup	
	1) Name: You can input the name of the producer tag. 2) Data Type: You can input the data type to be communicated.	

Chapter 7 Diagnosis

This chapter describes how to check out systems and modules, how to check out network state, and how to download 0/S. When checking out states of system configuration and EtherNet/IP I/F Module, a user should review the following procedure.

7.1 System Diagnosis

This diagnosis is the method to check out the state of EtherNet/IP I/F Module and systems. If click 'Online' → 'Communication module setting' → 'System Diagnosis' after clicking 'Online' → 'Connection' on XG5000, the system diagnosis screen is open as seen in [Figure 7.1.1] and Module Information Window is open in system diagnosis below as seen in [Figure 7.1.2].

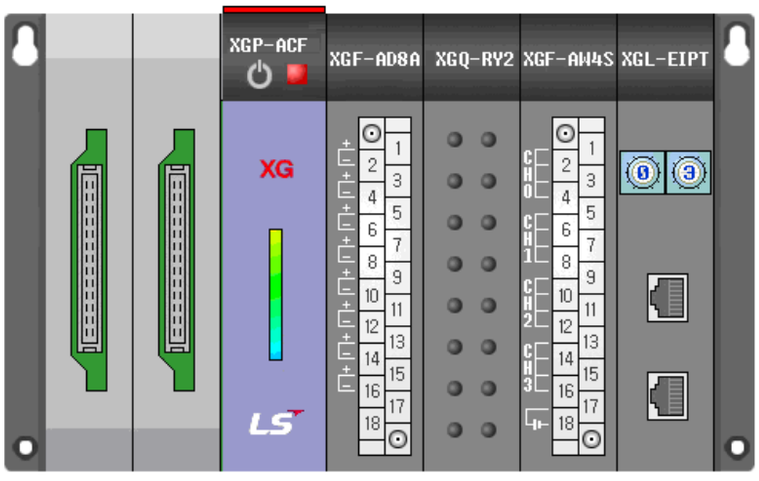


[Figure 7.1.1] System Diagnosis Screen

System information	Allocation information - Fixed	Comment
Base 0 : XGB-M06A		Main Base(6 Slots)
Power : XGP-ACF		AC100~240V Input
CPU : XGI-CPUS		High-Speed CPU Module(I/O: Maximum 3,072 Points)
Slot 0 : XGL-EIPT		EtherNet/IP Module
Slot 1 : XGF-AW4S		Isolated-type 2-Wire analog Input Type(4 Channels)
Slot 2 : XGQ-RY2A/B	[%QX0.2.0 ~ %QX0.2.63]	Relay Output, 16 Contacts (2A, No Varistor/Varistor)
Slot 3 : Empty slot		
Slot 4 : XGF-AD8A		A/D Voltage/Current Input Type(8 Channels)
Slot 5 : Empty slot		

[Figure 7.1.2] Module Information Window

When Extension Base has been connected, if a user clicks the extension base on module information window to open System Diagnosis Screen, the system diagnosis screen of the extension base appears. The above [Figure 7.1.1] and [Figure 7.1.2] show the main base system diagnosis screen of the system composed of the main base and the extension base. If a user clicks the base 1 in [Figure 7.1.2] to see the system diagnosis screen of the extension base in the above Figure, he can see the extension base diagnosis screen in Figure [7.1.3].



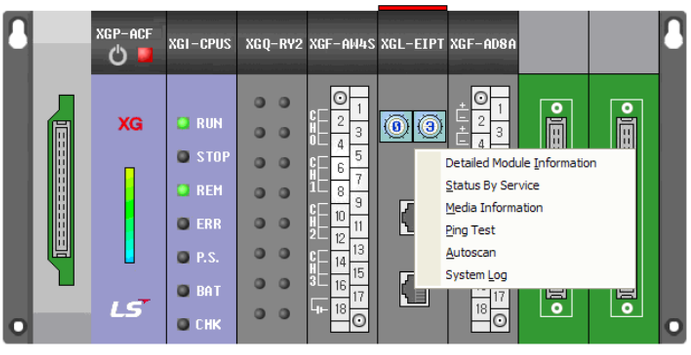
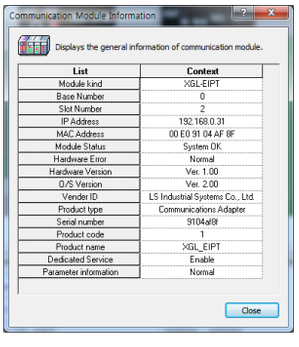
[Figure 7.1.3] Extension Base System Diagnosis Screen

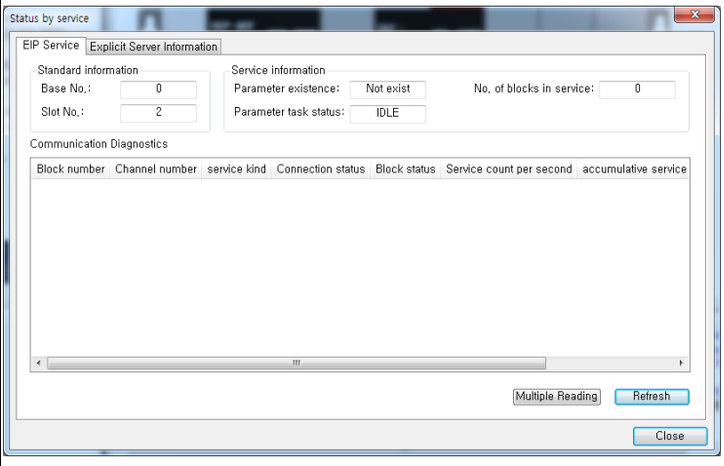
System information	Allocation information - Fixed	Comment
Base 0 : XGB-M06A		Main Base(6 Slots)
Base 1 : XGB-E04A		Extended Base(4 Slots)
Power : XGP-ACF		AC100~240V Input
Slot 0 : XGF-AD8A		A/D Voltage/Current Input Type(8 Channels)
Slot 1 : XGQ-RY2A/B	[%QX1.1.0 ~ %QX1.1.63]	Relay Output, 16 Contacts (2A, No Varistor/Varistor)
Slot 2 : XGF-AW4S		Isolated-type 2-Wire analog Input Type(4 Channels)
Slot 3 : XGL-EIPT		EtherNet/IP Module

[Figure 7.1.4] Extension Base Module - Information Window

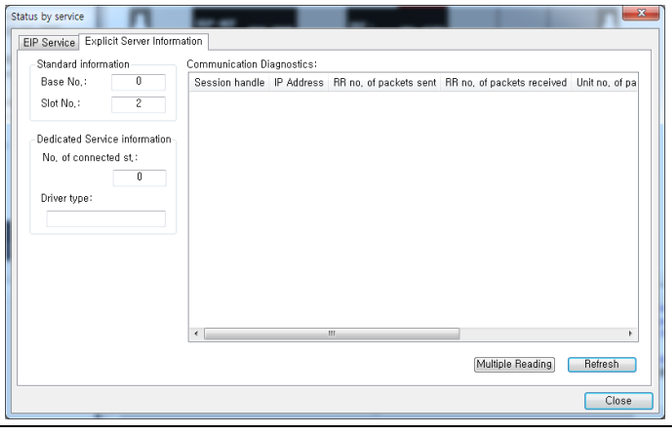
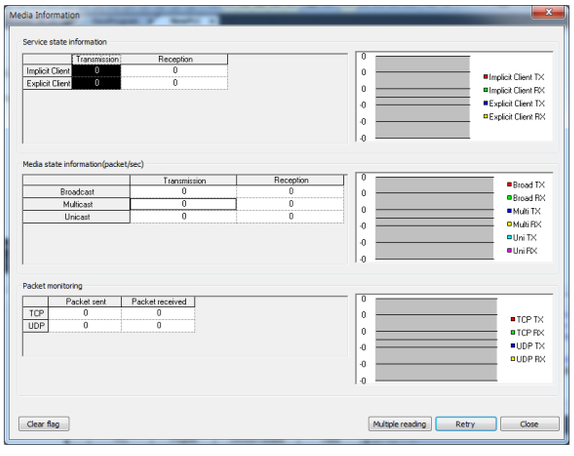
7.2 System Diagnosis Items and Contents

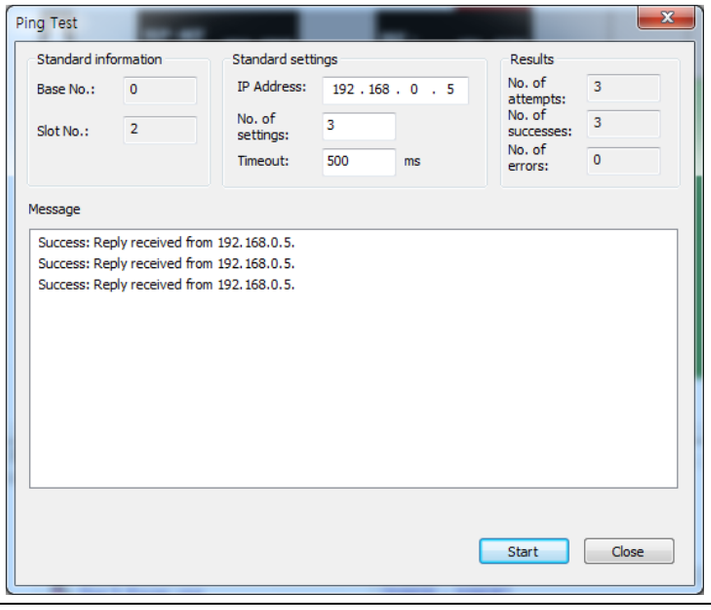
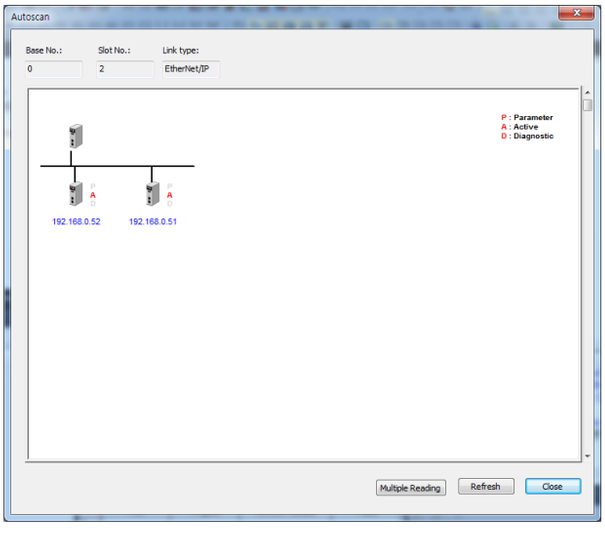
This part describes the diagnosis items and contents of EtherNet/IP I/F Module provided from XG5000.

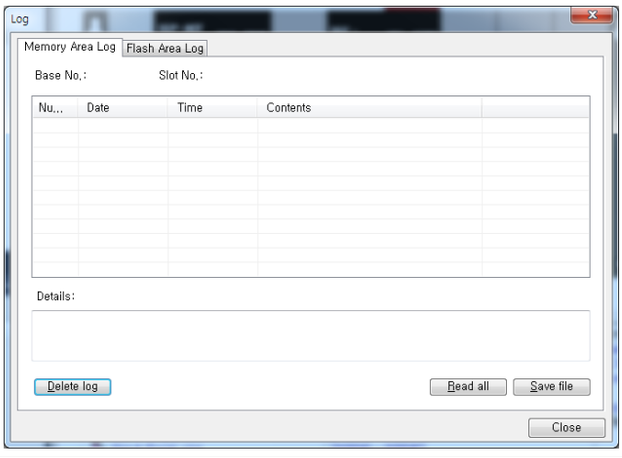
<table>
<tr><th>Order</th><th>Diagnosis Items</th><th>How to Set up and Contents</th></tr>
<tr><td rowspan="2">1</td><td>System Diagnosis</td><td> 
</td></tr>
<tr><td colspan="2">1) Select ‘Connection’ → ‘Online’ → ‘Communication module setting’ → ‘System Diagnosis’
2) Put the mouse on XGL-EIPT and click it with the right side of the mouse to check out the diagnosis information of EtnerNet/IP I/F Module a user wants.</td></tr>
<tr><td rowspan="2">2</td><td>Communication Module Information</td><td> 
</td></tr>
<tr><td colspan="2">The general information of EtherNet/IP I/F Module is displayed.
1) Module Kind: Displays kinds of modules (XGL-EIPT).
2) Base No. : Displays the base location of the module installed.
3) Slot No.: Displays the slot location of the module located.
4) IP Address: Displays IP address set up in module.
5) MAC Address: Displays MAC address set up in the modules.
6) Module Status: Displays the state of the module.
7) Hardware Error: Displays whether the error of the hardware has been made or not.
8) Hardware Version: Displays the version of the hardware.
9) OS Version: Displays the version of module OS.
10) Vender ID: Vendor ID of Displays EtherNet/IP Module
11) Product Type: Displays the Product Type of Ethernet/IP
12) Serial No.: Displays the serial no. of the module.
13) Product Code: Displays the code No. of the module
14) Product Name : Displays the name of the module
15) Dedicated service: Displays when operation channel exists as aperiodic server
16) System parameter information: Displays basic parameter setting status</td></tr>
</table>

<table>
<tr><th>Order</th><th>Diagnosis Items</th><th>How to Set up and Contents</th></tr>
<tr><td></td><td>State by Services
EIP Service</td><td> 
</td></tr>
<tr><td>3</td><td colspan="2">1) Specific Flag Information Window
(1) Block No. : Displays the index of the parameter that a user set up with EIP Service.
(2) Channel No.: Displays the number of the channel that a user set up in each block.
(3) Service Kind: Displays the type of the service that a user set up : Implicit Client / Implicit Server / Explicit Client
(4) Connection Status: Displays whether EIP Block has been connected or not.
▶CONNECT: State that connection has been completed
▶IDLE: State that connection has not been completed
(5) Block Status: Displays the block state of EIP Block
▶NONEXIST: State that the set-up of connection has not been done
▶REGSESSION: State that TCP Connection has been completed and EtherNet/IP Connection is in the process of being set up
▶READY: State that communication is available
▶BUSY: State that response on required frame has not been received yet
(6) Service Count per Second: Displays how many times the service has been carried out per 1 second.
(7) Accumulative Service Count : Displays the number of services till now
(8) Accumulative Error Count : Displays the number of errors till now</td></tr>
</table>

<table>
<tr><th>Order</th><th>Diagnosis Items</th><th>How to Set up and Contents</th></tr>
<tr><td rowspan="2">4</td><td>State by Services

Explicit Server Information</td><td> 
</td></tr>
<tr><td colspan="2">1) Session Handle : The original number granted to connected client
2) IP Address : IP Address of connected client
3) The Number of RR packets sent: The Number of Transmission Packets of the Message in the form of Request/Reply
4) The Number of RR Packets received: The Number of Reception Packets of the Message in the form of Request/Reply
5) The Number of Unit Packets sent: The Number of Transmission Packets of the Message used after connection set-up
6) The Number of Unit Packets received: The Number of Reception Packets of the Message used after connection set-up
7) The Number of Error Packets : The Number of Error Packets coming into Server</td></tr>
<tr><td rowspan="2">5</td><td>Media Information</td><td> 
</td></tr>
<tr><td colspan="2">1) Service State Information: Displays the number of service completed in EtherNet/IP I/F Module.
2) Media State Information: Displays the packet quantity per second in service type of EtherNet/IP I/F Module.
3) Packet Monitoring</td></tr>
</table>

Order	Diagnosis Items	How to Set up and Contents
6	Ping Test	
	It is possible to check out the operation state of an opponent country by entering an opponent country's IP Address In case of not receiving the signal from an opponent country, it is necessary to check out the basic set-up information	
7	Auto Scan	
	A user can check out the system configuration state of the whole system. ▶ Parameter: In case EIP Parameter is set up, it is marked as P.' ▶ Active: The module operating normally (Online State) is marked as'A.' ▶ Diagnostic: The module that diagnosis needs to be marked as 'D.'	

Order	Diagnosis Items	How to Set up and Contents
8	System Log	
		In case a user cannot check out the performance of errors and services or stores the contents of the current memory area into flash, when pressing the Log switch, memory area log is automatically stored to flash. 1) Memory Area Log: Displays the history when errors and the problems in service performance are made. In case of Memory Area Log, when the power is turned off, it automatically extinct. 2) Flash Area Log: When a user presses the log switch on the module's front side, the log of the memory area is stored into memory, and even if the power is turned off, the history can be maintained.

7.3 Troubleshooting

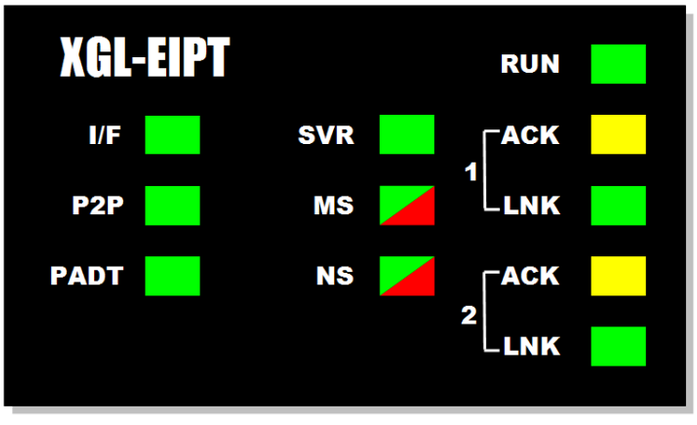
This part describes causes and actions on failures and errors that may happen in operating systems. When a user wants to check out errors and problems in EtherNet/IP I/F Module, the following procedure will help you check out those malfunctions. When judging whether the module is in abnormal state or not, make sure to take actions in order, using Troubleshooting. Do not repair and disassemble at your discretion.

7.3.1 Check-out through LED in Communication Module

This check-out is the way of checking out the state of the module to see whether it is defective or not.

1) Abnormal Operation Display

LED located on the front side of EtherNet/IP I/F Module enables a user to check out.



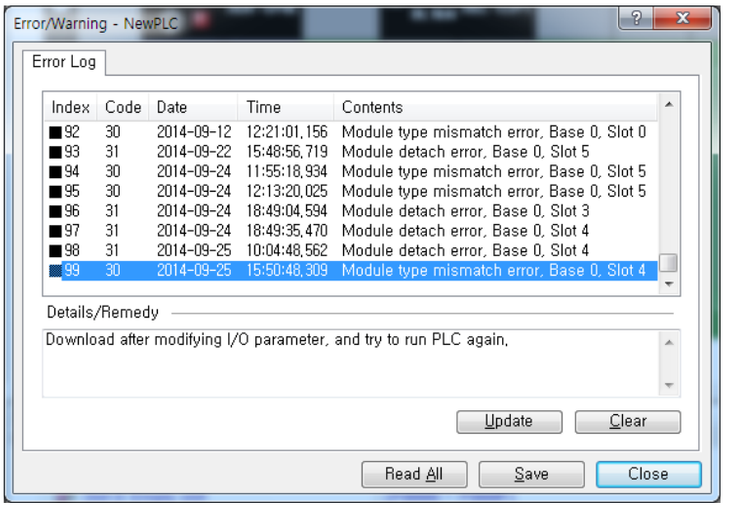
[Figure 7.3.1] LED of EtherNet/IP I/F Module

LED Contents	Error Contents	Actions
RUN	Light out after supplying the module power	1) Check out whether EtherNet/IP Communication Modules has been properly installed or not - Check out whether the DC 5V – supply power for power module has been normal or not. - Check out whether the communication module has been properly installed to the base 2) Consult with Warranty Service Center
I/F	Operation stops when light is on and off	1) Check out whether CPU and Communication Modules have been properly installed 2) Consult with Warranty Service Center
P2P	Light is off during service for command languages	1) Check out whether command language has been properly entered or not 2) Check out connection has been properly done or not 3) Check out whether Link Enable in Menu is on or not
PADT	Light is off during remote connection service	1) Check out whether telephone office numbers for remote connection(PADT) have been properly set up or not 2) Check out whether PADT Program – Remote Connection has been canceled
SVR	Light is off during server operation	1) Check out whether the connection with client has been properly done
MS	Red light is on and off	1) Check out the basic set-up and supply power again
	Red light is on	1) Supply power again 2) Consult with Warranty Service Center

LED Contents	Error Contents	Actions
NS	Red light is on and off	1)Check out the device where Timeout happened
	Red light is off	1) Set up IP Address again (Find the same IP Address)
ACT	Light is off during normal communication	1) Check out the transmission or reception parameter 2) Check out whether connection has been properly done
LNK	Light is off during normal communication	1) Check out whether cables have been properly connected ports 2) Check out whether an opponent's port is normally operating ha been

7.3.2 Check out of Module Errors through XG5000

It is possible to simply monitor errors of the module through XG5000 Program. After connecting RS-232C or USB Connector to CPU, check out online' → 'PLC History', 'PLC Error /Warning'in XG5000.



[Figure 7.3.2] PLC History - Specific Information Monitor

In case hard errors or CPU interface errors are made to the module, naturally LED abnormally operates, but it is possible to figure out this state, using exclusive programs.
[Figure 7.7.2] will help a user check out error/warning information through PLC history from [Online] of XG5000 and it is possible to solve problems by referring to "Details and Actions" contents.

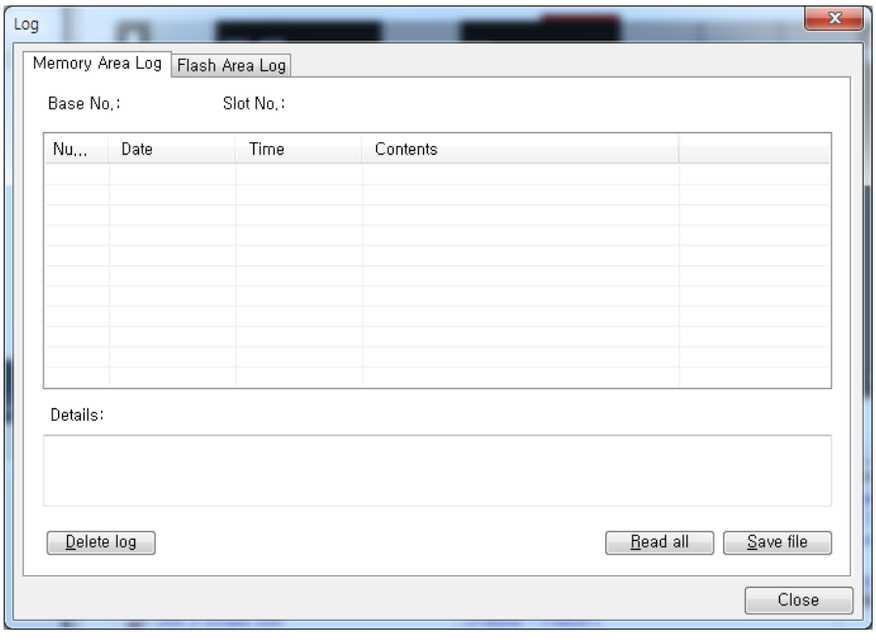
7.3.3 Check-out on Module Errors through System Log

It is possible to monitor whether communication module has been malfunctioned through XG5000 Program. After connecting RS-232C or USB Connector to CPU Module, click EtherNet/IP I/F Module with the right side of the mouse on “Diagnosis Screen” in XG5000 and select “System Log,”and then Log Screen is open.

1) Memory Area Log

It is possible to check out whether errors have been made or services have been performed.

[Figure 7.3.3] shows the memory area log screen of ‘System Log.’



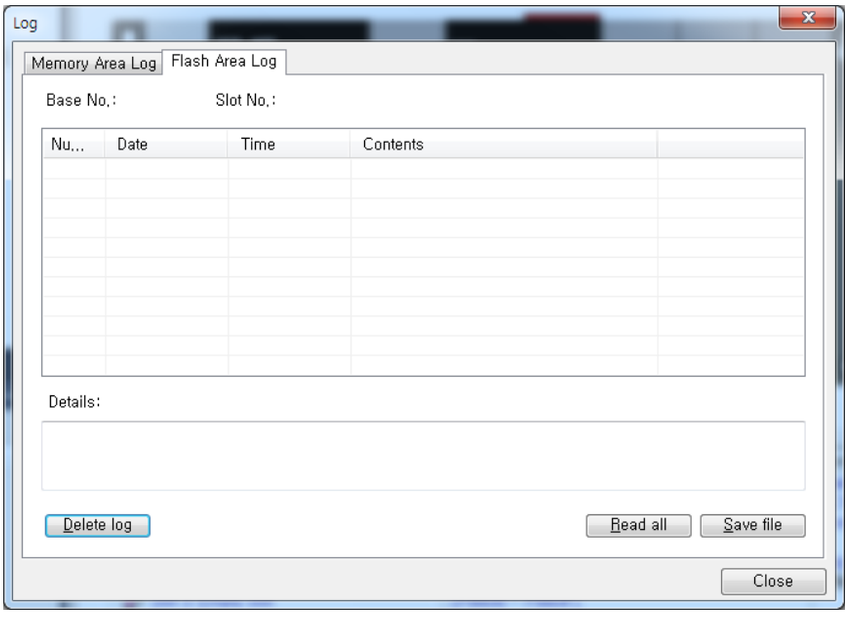
[Figure 7.3.3] Memory Log Area Screen of ‘System Log’

It is possible to check out the date, time, contents when events, such as error occurring or service performing, happened.

1) Flash Area Log

If it is impossible to check out errors or service performances through XG5000 or if a user wants to store the contents in current memory area into flash, when pressing Log Switch on the front side on EtherNet/IP I/F Module, memory area log is automatically stored to Flash.

[Figure 7.3.4] shows the flash area – log screen of 'System Log.'

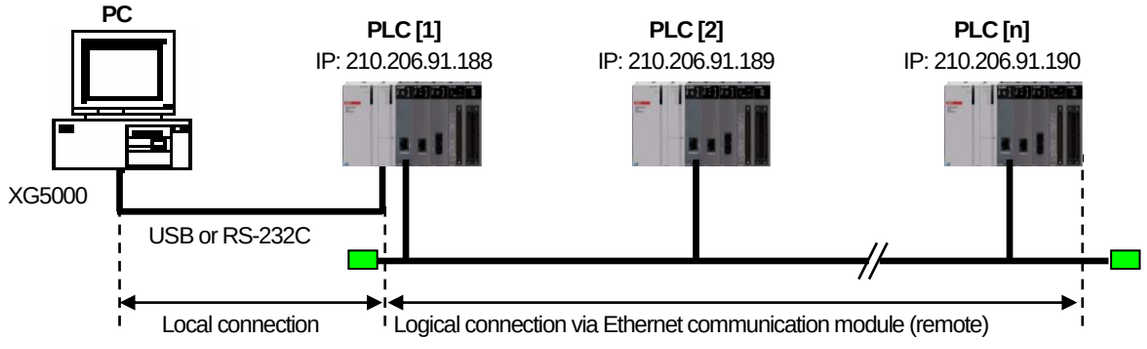


[Figure 7.3.4] Flash Area Log Screen of 'System Log'

7.4 Remote Communication control

7.4.1 Introduction

This function is used for programming, downloading of user program, program debugging, monitoring, etc in network system where PLCs are connected with each other via Ethernet by remote control without moving the physical connection status of XG5000. It is especially convenient for easy access to each device from a place without repositioning when network-connected devices are separated far. XG5000 remote connection service is available under the following Logical Path to attain its purpose.



[Fig. 7.4.1] Ethernet network

A network is supposed where RS-232C cable is connected between PC in which XG5000 is installed and PLC #1 station, and PLC #1, PLC #2 and PLC #n are connected with each other via Ethernet in XG5000 of [Fig.7.4.1]. To access the contents of PLC #1 station in the figure above, Local connection is needed in XG5000's on-line menu. After finishing accessing the contents of PLC #1, disconnect the Local connection with 'Disconnect' menu. To access the PLC #n station, select PLC #n by setting the IP address of PLC #n and Base and Slot No. where FEnet module is installed in the PLC #1 station in the remote connection dialog box and connect. Then logical connection between XG5000 and PLC #n will be established via RS-232C and Ethernet. This status is identical to the status that RS-232C cable is connected between PC and PLC #n station and it is available to execute all functions of programming, downloading, debugging and monitoring as in PLC #1.

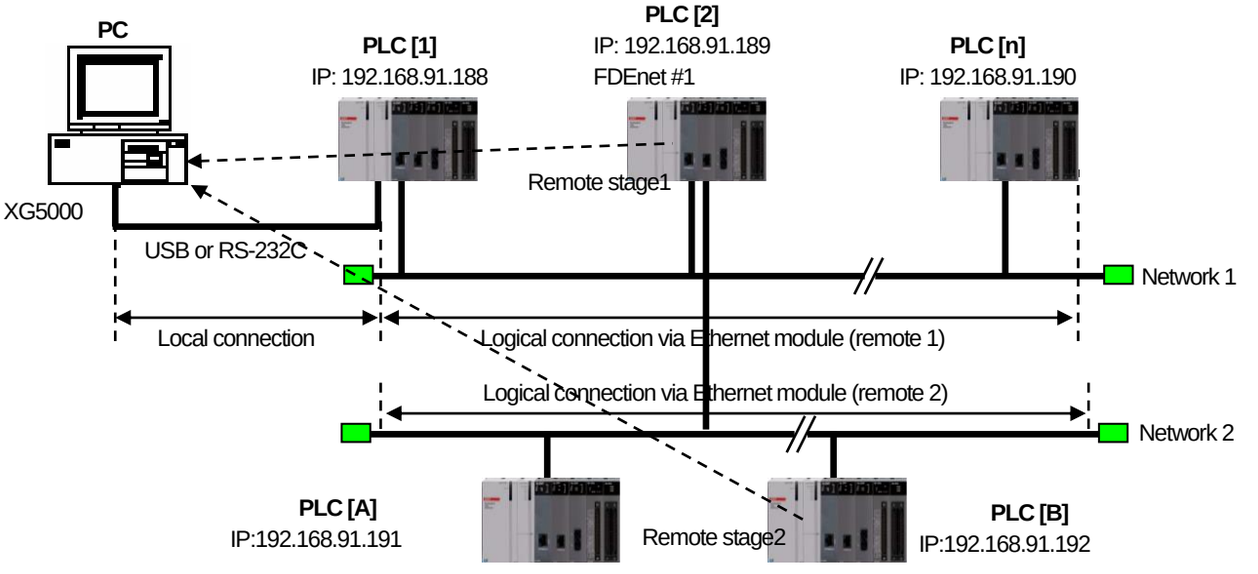
Also, if Ethernet module (LAN Card) is installed on PC where XG5000 is installed and connected to the identical network to PLC, remote stage 1 connection with PLC is available via Ethernet without local connection via RS-232C.

With the remote connection service of XG5000, easy access to PLC is possible even if the PLC is located at a far place. And re-programming without repositioning the PLC is possible when PLC is located at a place hard to reach.

7.4.2 Setting and Connection

All PLCs connected via XGT network are available to connect with each other by remote connection service. XG5000 remote connection is composed of stage 1 and stage 2 connections as described below.

The followings explains remote 1 and remote 2 connections.

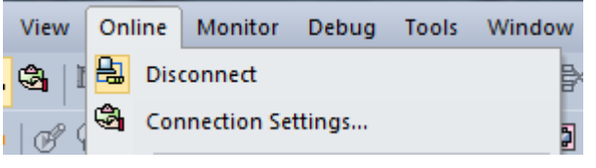


[Fig. 7.4.2] Remote connection

[Fig. 7.4. 2] shows an example of network system composed of two networks.

(1) Remote stage 1 connection (If RS-232C cable used)

For remote stage 1 connection, XG5000 shall be in off-line state.
Click [Online] -> [Connection settings]



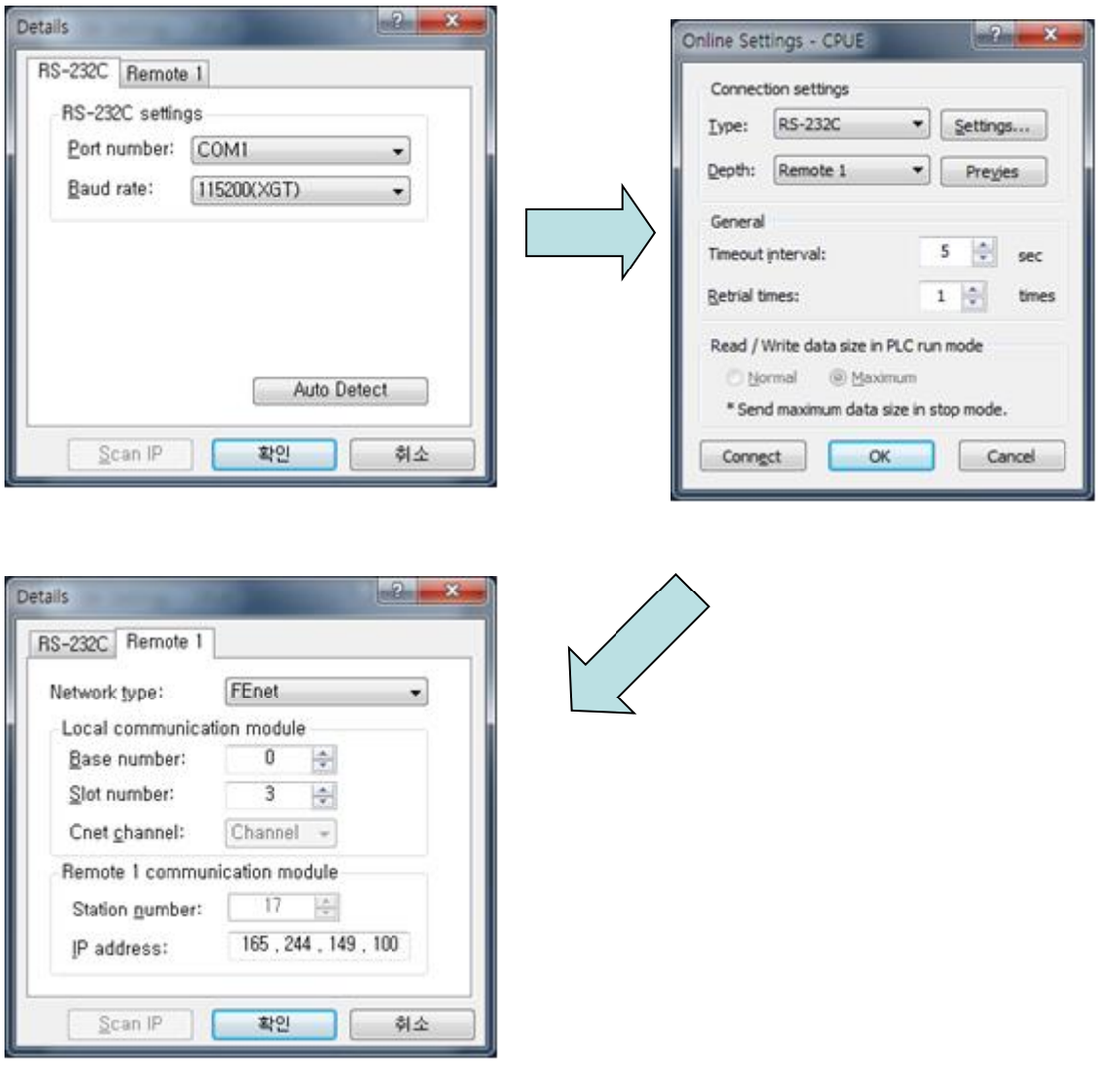
[Fig. 7.4.3] XG5000 remote connection option to select

(a) Connection type

It designates the connecting method for local connection. Local connection is applied with RS-232C used as in [Fig. 7.4.3]. Select the port used in PC for a communication port. The case that Ethernet is used for local connection will be described in the next section. Refer to user's manual of each communication module for the case with other connection types.

(b) Connection depth

Decide a PLC Connection stage of local, remote stage 1 or 2. Select remote stage 1 here.



[Fig. 7.4.4] XG5000 remote stage 1 connection

(c) Network type

Select a network type for stage 1 connection among Rnet, Fdnet, Cnet, FEnet and FDEnet. XGL-FEnet is to be selected because stage 1 connection is applied through FEnet in [Fig. 7.4.4].

(d) Base No.

Specify the base No. where FEnet I/F module of PLC #1 for remote connection is installed.

(e) IP address

Specify the IP address of FEnet I/F module installed in the PLC which will be connected with XG5000 in the network 1. Use the IP address of FEnet module installed in PLC #2 station, 192.168.91.189 in [Fig. 7.4.4].

(f) Slot

It indicates the slot number where FEnet module is installed in locally connected PLC via RS-232C. Select No.0 in [Fig. 7.4.4] since FEnet installed on PLC #1 is on slot No.0.

Now click [OK] and then select [Connect] on the Online menu.

Since stage 1 connection-completed status is the logical connection status identical to the local connection with RS-232C cable is connected to the PLC, where all of the on-line menus are available. (Except that CPU type between PLC and presently open project is disagreeable)

1) Precautions for remote connection

Prepare a program suitable for the correspondent CPU type to connect with remotely. If the CPU type is disagreeable between the two, limited functions only will be allowed, where program uploading/downloading and monitoring are not available.

(2) Remote stage 2 connection (RS-232C cable is used for local connection)

For remote stage 2 connection, XG5000 shall be in off-line state.

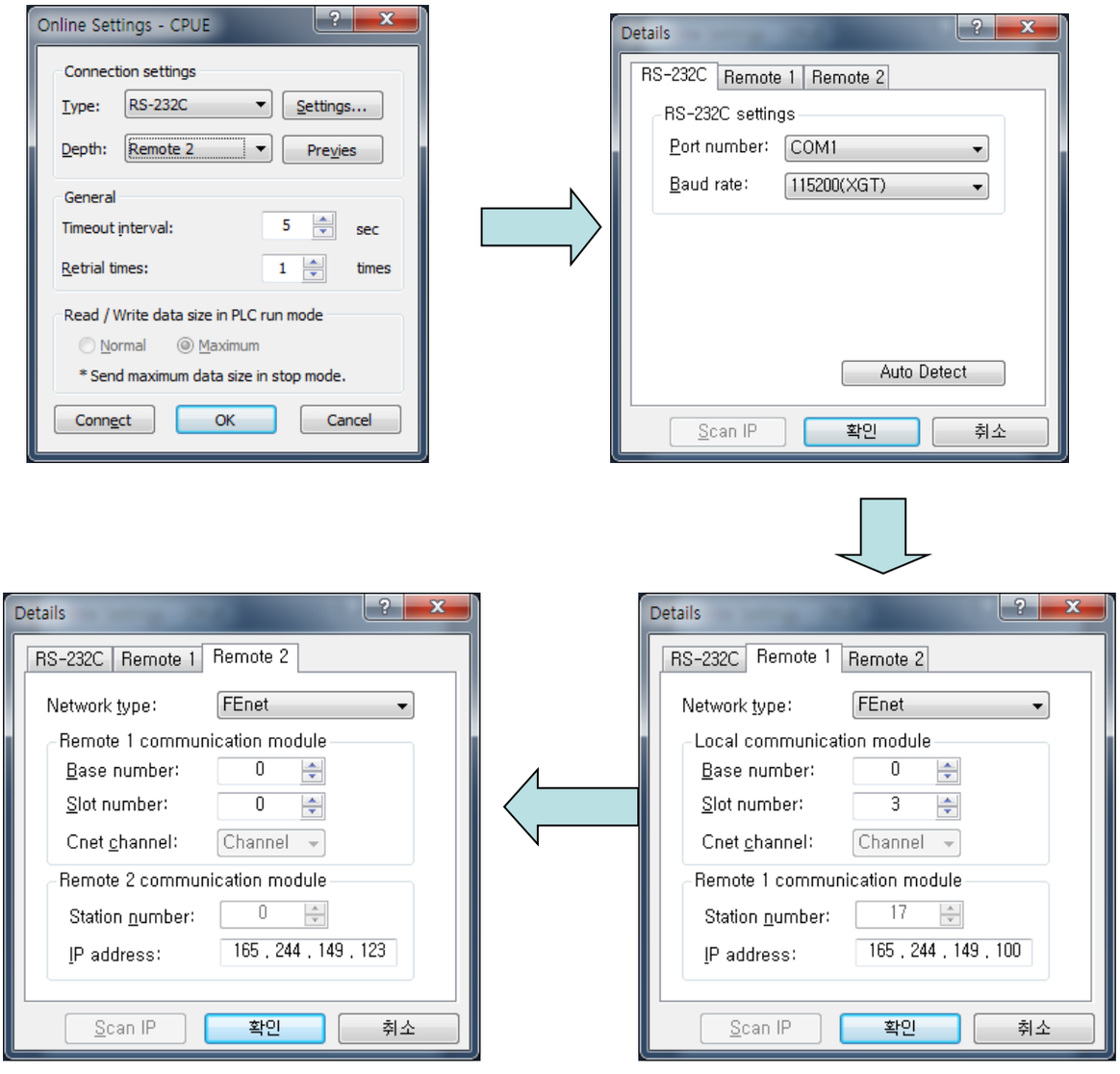
Click [Online] -> [Connection settings] like [fig.7.4.3]

(1) Connection type

Select Local connection. [Fig. 7.4.5] shows that select RS-232C for Type and Remote 2 for Depth. The communication port choose using PC port. If use Ethernet, explain it in the next chapter. If use other communication module, Please refer to manual each communication modules.

(2) Connection depth

Select Reome 2



[Fig. 7.4.5] XG5000 remote stage 2 connection

Remote 2 only will be described below since the others are the same in the dialog box above.

(1) Setting of network type

Select a network type for remote stage 2 connection among XGT Rnet, Fdnet, Cnet, FEnet and FDEnet. Network types of stage 1 and stage 2 connections bear no relation to each other. XGL-FEnet is to be selected since stage 2 connection is with FEnet in [Fig. 7.4.5].

(2) IP address

Specify the IP address of FEnet I/F module installed in the PLC [B] which will be connected with XG5000 in the network 2. Use the IP address of FEnet module installed in PLC [B] station, 192.168.91.192 in [Fig. 7.4.5].

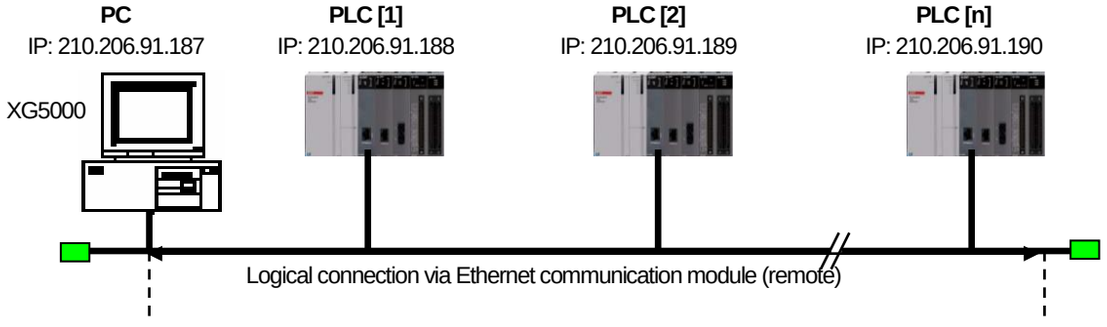
(3) Base and slot No.

Set the Base and Slot No. where FEnet module is installed in the PLC [2] which will be connected with stage 2 in the network 2.

Stage 2 connection-completed status as above is the logical connection status identical to the connection with RS-232C cable is connected to PLC [B], where all of the on-line menus are available.

(3) Remote 1 connection directly from PC connected with Ethernet

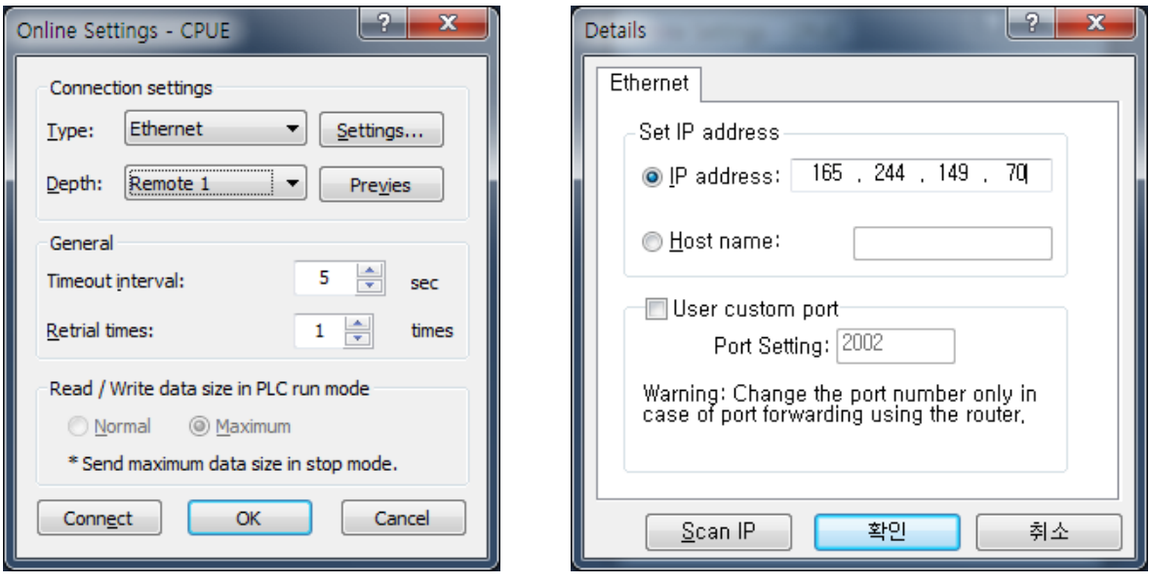
Remote stage 1 connection via Ethernet without connecting RS-232C is available if a PC where XG5000 is operating is included in PLC Ethernet network.



[Fig. 7.4.6] Remote stage 1 connection system through PC

[Fig. 7.4.6] shows the connection between PC and PLC via Ethernet, where connection to all PLCs on the network is available without RS-232C used in XG5000. In this case local connection is omissible and remote 1 connection is available with all PLCs.

Select 'Connection settings' on the Online menu and change the setting in the dialog box as specified below to establish remote stage 1 connection directly via Ethernet.



[Fig. 7.4.7] Remote 1 connection directly via Ethernet

(a) Connection type

Select an applicable type for connection. In the case of [Fig. 7.4.7], select Ethernet because the connection is established directly via Ethernet without application of RS-232C.

(b) Connection depth

Decide a PLC connection stage of remote stage 1 or 2. Select remote 1 here.

(c) IP address

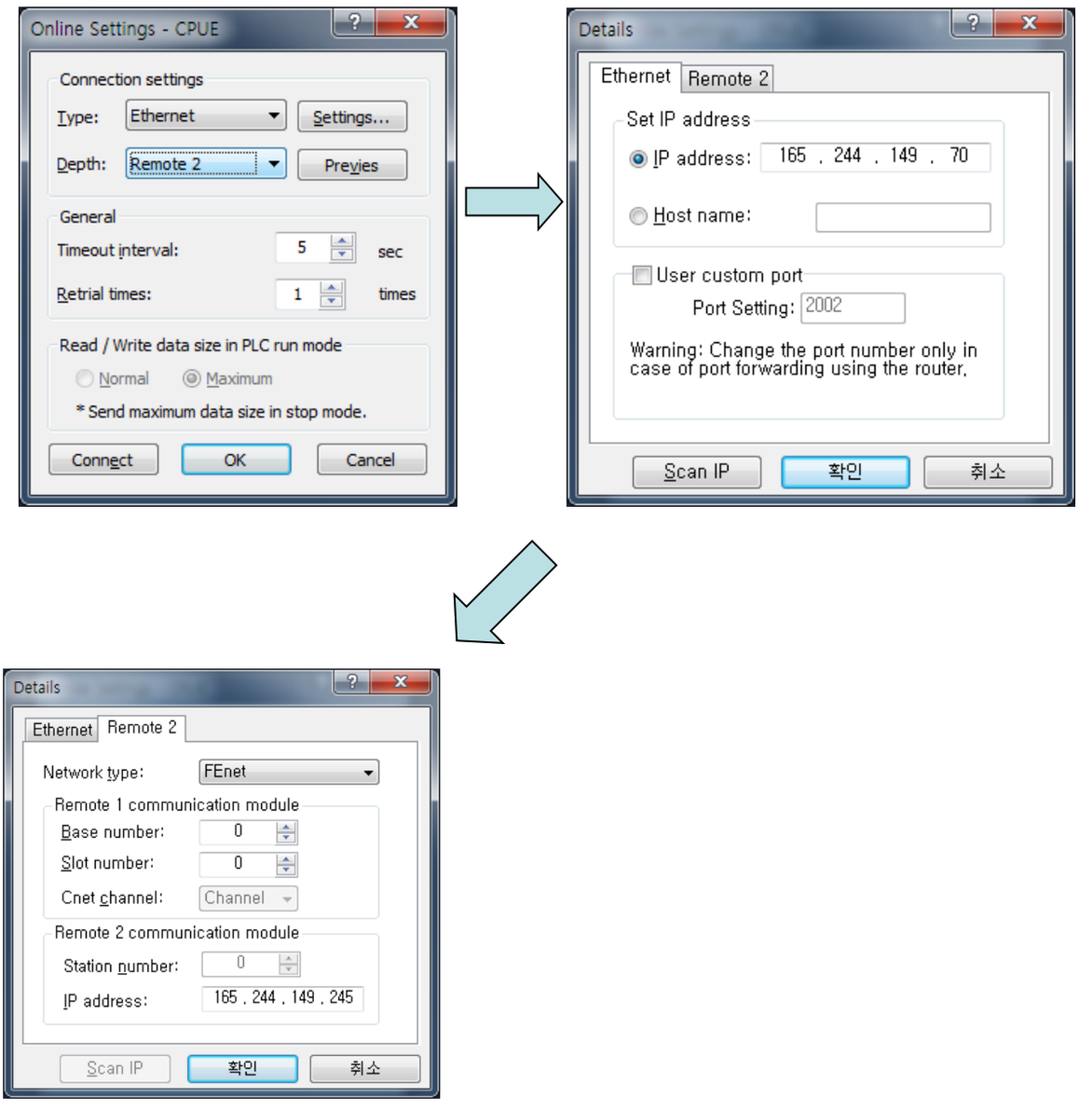
Set the IP address of FEnet I/F module to connect to. Use IP address, 210.206.91.190 to connect to PLC [n] in [Fig. 7.4.7].

The rest procedures are the same as with RS-232C used. Now click [OK] and then select [Connect] on the Online menu.

It is accessible through Ethernet which the CPU module direct connection without Ethernet I/F module. CPU direct connection support high performance XGT-series.(High performance XGT: Ethernet port internal CPU)

(4) Remote 2 connection directly from PC connected with Ethernet

Remote stage 2 connection is available via Ethernet if a PC where XG5000 is operating is included in one PLC Ethernet network and one Ethernet is connected with other Ethernet network. The procedures are the same as in remote 1 connection and a setting example of 'Connection Setting' is as [Fig. 7.4.6].



[Fig. 7.4.6] Remote 2 connection directly via Ethernet

(1) Precautions for operation with remote stage 1 & 2 connection

1) The following menus are not available if the types between the project presently open in XG5000 and the CPU connected with stage 1 or 2 are not identical.
   A) Write program and each parameter
   B) Read program and each parameter
   C) Monitor
   D) Flash memory
   E) Set Link Enable
   F) I/O information
   G) Compulsory I/O information
   H) I/O SKIP

2) Execute the remote connection with applicable project open of the station to connect to for XG5000 programming through remote stage 1 & 2 connections.

3) Up to 2 stages only are available for the remote connection. More than that is not available for the remote connection.

(2) In case of remote connection via XGR redundancy

1) In case of remote connection via XGR redundancy, service is executed. Though you connect to Standby, connection route is Master CPU

Appendix

A.1 Terms

1. IEEE 802.3

IEEE 802.3 regulates standards on Ethernet based on CSMA/CD. In other words it is a short distance net(LAN) based on CSMA/CD (Carrier Sense Multiple Access with Collision Detection)Ethernet devised by IEEE 802.3 Group, divided into the following specific projects.

(1) IEEE P802.3 - 10G Base T Study Group

(2) IEEE P802.3ah - Ethernet in the First Mile Task Force

(3) IEEE P802.3ak - 10G Base-CX4 Task Force

※ Ethernet and IEEE 802.3 must be standardized in RFC894 and RFC1042, and mutual frame processing must be possible.

2. ARP (Address Resolution Protocol)

This Protocol is created to find MAC Address, using an opponent's IP address in Ethernet LAN.

3. Bridge

This is the device used to connect two networks so that they can operate as if those two were one. Bridge is used to connect two networks an also applied to divide one big network into two small networks for improving performance ability.

(1) Related Standards: IEEE 802.1D

(2) Bridge (Layer2 Switch) is the devise connected in Layer 2, which extends transmission limit distance of Ethernet and operates in Filtering and Forwarding as well.

4. Client

This refers to a user of network service, or a computer or a program using the resources of other computer (In general, the part who asks for services).

5. CSMA/CD (Carrier Sense Multiple Access with Collision Detection)

Each Client transmits its own data in case network is empty by checking out (Carrier Sense) whether there is a signal or not before sending off data to network. Then, all Clients are same in authority for transmission (Multiple Access), and if Clients more than two ones transmit, collision conflict occurs and the Client that detected these transits again in fixed hours.

6. DNS (Domain Name System)

This system is the method used to convert Domain Name on the internet in alphabet into Internet Number (Namely, IP Address) corresponding to it.

7. Dot Address

This refers to IP Address expressed into '100.100.100.100' and each number is represented in decimal number, and it takes up 1 BYTE among 4 BYTES in total.

8. E-mail Address

This is the address of a user having his login account in the special device connected through the internet, and in general, it is expressed in a user's ID@ domain name (Device Name). In other words, it is expressed like hjee@microsoft.com, where @ is called "at" and it is the key board appearing if a user press shift+2 on keyboard. The letters in the back of "@" refer to special institutions (school, research center, corporation …) and the letters in front of "@" becomes a user's ID.

The end letters in domain name are top-ranked ones, and in case of USA, the following abbreviation is mostly used and in case of Korea, Korea is expressed in .kr for displaying nationality:
.com: usually corporations (company) / .edu: usually educational institutions like university (education). / .ac (academy) used in Korea, / .gov: governmental institutions, for example, NASA - nasa.gov (government) / .mil: sites related to the military. For example, USA air force is “to af.mil, (military)”/ .org means private organizations. Nations are expressed as follows: (/ .au: Australia / .uk: England / .ca: Canade / .kr: Korea / .jp: Japan / .fr: France / .tw: Taiwan, etc.).

9. Ethernet

This net is LAN Connection System (IEEE 802.3) that USA (Xerox), Intel, and DEC jointly developed. Ethernet, a network connection with 10Mbps transmission ability and 1500 BYTE packet used, can collect a variety of computers in network. Thus, it is called “pronoun of LAN” and the diverse products in generality in size, not for special providers, have been launched.

10. FTP (File Transfer Protocol)

This program is used to transmit files between computers among application programs that TCP/IP Protocol provides. Only f a user has Account on the computer he will log in, it is possible to copy files by logging in anywhere wherever the computer is located.

11. Gateway

This part is software/hardware translating two different protocols and is the device corresponding to the exit enabling a user to exchange information with other systems.

12. Header

This device is the part of the packet including own country’s and an opponent country’s addresses, and the part for checking out errors.

13. HTML (Hypertext Markup Language, Standard Language of WWW)

This is the language system for making hypertext texts and the documents made up in HTML are seen via web browser.

14. HTTP (Hypertext Transfer Protocol, Standard Protocol of WWW)

This is the protocol used to provide and receive a variety of files and data existing in World Wide Web (WWW).

15. ICMP (Internet Control Message Protocol)

This protocol creates error messages and test packets for managing internet via extension protocol of IP address and is designed to report errors and take control.

16. IP (Internet Protocol)

This protocol is deigned for network layers for internet. This is the protocol in non-connective datagram which transmits and receives data as data like TCP, UDP, ICMP, IGMP uses IP (32BYTE).

17. IP Address

This term means the address on internet in each computer composed of numbers and this address consists of binary numbers in 32BYTE (4BYTE) size to classify each device on internet. IP address is divided into 2 parts in total and is composed of address for classifying network and host address for dividing hosts. IP address is classified into 3 classes -

(Class) A/ B/ C – according to how many BYTES are allotted to network address and host address. IP address is unique one over the world, so it is not decided at discretion but NIC (Network Information Center), the regional information net center allots when subscribing to internet, and In case of Korea, KRNIC (Korea Network Center) is in charge of allotment.
Example) 165,244.149.190

18. ISO (International Organization for Standardization)

This organization is a subsidiary under UN established to enact international standards and to carry out management.

19. LAN (Local Area Network)

This network is a short distance network or an information communication network in region which enables a user to connect a variety of computers in limited scope and to exchange data with each other.

20. MAC (Medium Access Control)

This term refers to the way of deciding which device will use network within given time In Broadcast Network.

21. Node

Each computer connected to network net is called “node,” respectively.

22. Packet

This is a bundle of data which becomes the basic unit for transmitting data via network. In general packet creates a bundle in size from tens to hundreds BYTE. On the front side of each bundle Header is posted and the information on which way this bundle to be sent and more information required are added.

23. PORT number

This number is an identifier used to classify applications on TCP/UDP. On TCP, this PORT number is used to decide to which PORT data should be sent and the program used in general operation system has each own PORT.
Example) 21/tcp: Telnet

24. PPP (Point-to-Point Protocol)

This protocol is an agreement on telephone communication that allows packets to be transmitted. In other words, it is the commonest protocol on internet that enables a computer to be connected to TCP/IP through general telephone lines and modems.
This protocol is similar to SLIP, but it is equipped with modern – communication protocol factors such as error detection, data compression, etc., so it displays excellent performances compared to SLIP.

25. Protocol

Protocol is the regulations on how computers connected to network transmit and receive information with each other. Protocol means the regulation for exchanging messages on high level as the interface between one device and the

other device is specifically described on low level(For example, which BIT/BYTE should go through lines) or files are transmitted through internet.

26. Router

This device is used to transmit data packets between networks. It also judges whether to send data packets to the final destination or not and whether to wait or not if network is busy, and which LAN to be connected to from a plural LAN diverging point. In other words, this device is a special computer /software that manage the connection for more than two networks.

27. Server

This term means the part which passively responds to Client's request and shares its own resources.

28. TCP (Transmission Control Protocol)

(1) Transport Layer Protocol for the Internet

- Supports Transmission/Reception, using Connection
- Supports Multiplexing Function
- Performs reliable transmission of data in connecting - oriented aspect
- Supports transmission of emergency data

29. TCP/IP (Transmission Control Protocol/Internet Protocol)

This term means the agreement on transmission for communication between computers in different model. This protocol plays a role that enables the communication between general PC and medium host, IBM PC and MAC, and among medium or large scaled computers produced by other manufactures. This term is used as a general term of the protocol for transmitting the information between computer networks and included FTP, Telnet, SMTP, etc. TCP is divided into data packets and transmitted by IP, and the packet transmitted is configured by TCP again.

30. Near-end crosstalk

Near-end crosstalk is a kind of disturbance generated by the electricity from a communication signal or a magnetic field that affect other signals in neighboring lines. In telephone line, near-end crosstalk may cause some dialogue contents on other lines to be heard. The phenomenon generated by near-end crosstalk is called "Electro Magnetic Interference." This may happen on small circuits in computer or audio equipments as well as network lines. This term may be applied to optic signals that disturb each other. For example, as seen in an insulated conductor of a telephone cable, if electrostatic coupling or electromagnetic coupling between one insulated conductor and the other insulated conductor occurs and the phone current on one insulated conductor is derelict to other insulated conductor, crosswalk-talk happens. Of these crosswalk-talks, the crosswalk-talk that happened to a transmitting part called "Near-end crosstalk" and the one that happened to a receiving part is called Far-end crosstalk.

A.2 Flag List

A.2.1 Special Relay (F) List

Device1	Device2	Type	Variable	Function	Description
F0000	-	DWORD	_SYS_STATE	Mode and State	Displays the Mode and Run State of PLC
	F00000	BIT	_RUN	RUN	Run State
	F00001	BIT	_STOP	STOP	Stop state
	F00002	BIT	_ERROR	ERROR	Error state.
	F00003	BIT	_DEBUG	DEBUG	Debug State
	F00004	BIT	_LOCAL_CON	LOCAL CONTROL	Local Control Mode
	F00005	BIT	_MODBUS_CON	MODE BUS MODE	Mode Bus Control Mode
	F00006	BIT	_REMOTE_CON	REMOTE MODE	Remote Control Mode
	F00008	BIT	_RUN_EDIT_ST	CORRECTING WHILE RUN	Downloading Correction Program while Run.
	F00009	BIT	_RUN_EDIT_CHK	CORRECTING WHILE RUN	Internal Processing for Correction while Run
	F0000A	BIT	_RUN_EDIT_DONE	CORRECTION COMPLETED WHILE RUN	Correction Completed while Run
	F0000B	BIT	_RUN_EDIT_END	CORRECTION END WHILE RUN	Correction Ended while Run
	F0000C	BIT	_CMOD_KEY	OPERATION MODE	Operation Mode Transformed by the Key
	F0000D	BIT	_CMOD_LPADT	OPERATION MODE	Operation Mode Transformed by the Local PADT
	F0000E	BIT	_CMOD_RPADT	OPERATION MODE	Operation Mode Transformed by Remote PADT
	F0000F	BIT	_CMOD_RLINK	OPERATION MODE	Operation Mode Transformed by Remote Communication Mode
	F00010	BIT	_FORCE_IN	FORCIBLE ENTRY	Forcible Entry State
	F00011	BIT	_FORCE_OUT	FORCIBLE OUTPUT	Forcible Output State
	F00012	BIT	_SKIP_ON	IN/OUTPUT SKIP	Executing In/Output Skip
	F00013	BIT	_EMASK_ON	FAILED MASK	Executing Failed Mask
	F00014	BIT	_MON_ON	MONITOR	Executing Monitor
	F00015	BIT	_USTOP_ON	STOP	Stopped by Stop Function
	F00016	BIT	_ESTOP_ON	ESTOP	Stopped by EStop Function
	F00017	BIT	_CONPILE_모드	COMPILING	Performing Compiling
	F00018	BIT	_INIT_RUN	INITIALIZING	Performing Initializing Task
	F0001C	BIT	_PB1	PROGRAM CODE 1	Program Code 1 Selected
	F0001D	BIT	_PB2	PROGRAM CODE 2	Program Code 2 Selected
	F0001E	BIT	_CB1	COMPILE CODE1	Compile Code 1 Selected
	F0001F	BIT	_CB2	COMPILE CODE 2	Compile Code 2 Selected

Device 1	Device 2	Type	Variable	Function	Description
F0002	-	DWORD	_CNF_ER	SYTEM ERROR	Reports Serious Failure State of the System
	F00020	BIT	_CPU_ER	CPU ERROR	Errors in CPU Configuration
	F00021	BIT	_IO_TYER	MODULE TYPE ERROR	Module Type does not corresponds.
	F00022	BIT	_IO_DEER	MODULE REMOVAL ERROR	Module Removed
	F00023	BIT	_FUSE_ER	FUSE ERROR	Fuse Disconnected
	F00024	BIT	_IO_RWER	MODULE IN/OUTPUT ERROR	Problems occurred in to Module In/Output
	F00025	BIT	_IP_IFER	MODULE INTERFACE ERROR	Problems occurred in Special / Communication Module Interface
	F00026	BIT	_ANNUM_ER	EXTERNAL DEVICE ERROR	Serious Errors detected from External Devices
	F00028	BIT	_BPRM_ER	BASIC PARAMETER	Errors in Basic Parameter
	F00029	BIT	_IOPRM_ER	IO PARAMETER	Errors with IO Configuration Parameter
	F0002A	BIT	_SPPRM_ER	SPECIAL MODULE PARAMETER	Special Module Parameter is in Abnormal State
	F0002B	BIT	_CPPRM_ER	COMMUNICATION MODULE PARAMETR	Communication Module Parameter is in Abnormal State
	F0002C	BIT	_PGM_ER	PROGRAM ERROR	Errors in Program
	F0002D	BIT	_CODE_ER	CODE ERROR	Errors in Program Code
	F0002E	BIT	_SWDT_ER	SYSTEM WATCH DOG	Scan Watchdog Operated
	F0002F	BIT	_BASE_POWER_ER	POWER ERROR	Errors in Base Power
	F00030	BIT	_WDT_ER	SCAN WATCHDOG	Scan Watchdog Operated
F0004	-	DWORD	_CNF_WAR	SYSTEM WARNIGN	Reports on the Light Errors of the System
	F00040	BIT	_RTC_ER	RTC ERROR	Errors in RTC Data
	F00041	BIT	_DBCK_ER	BACKUP ERROR	Problem Occurred in Data Back Up
	F00042	BIT	_HBCK_ER	RESTART ERROR	Hot Restart Impossible
	F00043	BIT	_ABSD_ER	OPERATION ERROR STOP	Stops due to Abnormal Operation
	F00044	BIT	_TASK_ER	TASK COLLIDE	Task Colliding
	F00045	BIT	_BAT_ER	BATTERY ERROR	Errors in Battery
	F00046	BIT	_ANNUM_WAR	EXTERIAL DEVCIE ERROR	The Light Error of the External Device Detected
	F00047	BIT	_LOG_FULL	MEMORY FULL	Log Memory Fully Filled
	F00048	BIT	_HS_WAR1	HIGH SPEED LINK1	High Speed Link – More Than Parameter 1
	F00049	BIT	_HS_WAR2	HIGH SPEED LINK2	High Speed Link – More Than Parameter 2
	F0004A	BIT	_HS_WAR3	HIGH SPEED LINK3	High Speed Link – More Than Parameter 3
	F0004B	BIT	_HS_WAR4	HIGH SPEED LINK4	High Speed Link – More Than Parameter 4
	F0004C	BIT	_HS_WAR5	HIGH SPEED LINK5	High Speed Link – More Than Parameter 5
	F0004D	BIT	_HS_WAR6	HIGH SPEED LINK6	High Speed Link – More Than Parameter 6
	F0004E	BIT	_HS_WAR7	HIGH SPEED LINK7	High Speed Link – More Than Parameter 7

Device 1	Device 2	Type	Variable	Function	Description
F0004	F0004F	BIT	_HS_WAR8	HIGH SPEED LINK 8	High Speed Link – More Than Parameter 8
	F00050	BIT	_HS_WAR9	HIGH SPEED LINK 9	High Speed Link – More Than Parameter 9
	F00051	BIT	_HS_WAR10	HIGH SPEED LINK 10	High Speed Link – More Than Parameter 10
	F00052	BIT	_HS_WAR11	HIGH SPEED LINK 11	High Speed Link – More Than Parameter 11
	F00053	BIT	_HS_WAR12	HIGH SPEED LINK12	High Speed Link – More Than Parameter 12
	F00054	BIT	_P2P_WAR1	P2P PARAMETER 1	P2P – More Than Parameter 1
	F00055	BIT	_P2P_WAR2	P2P PARAMETER 2	P2P – More Than Parameter 2
	F00056	BIT	_P2P_WAR3	P2P PARAMETER 3	P2P – More Than Parameter 3
	F00057	BIT	_P2P_WAR4	P2P PARAMETER 4	P2P – More Than Parameter 4
	F00058	BIT	_P2P_WAR5	P2P PARAMETER 5	P2P – More Than Parameter 5
	F00059	BIT	_P2P_WAR6	P2P PARAMETER 6	P2P – More Than Parameter 6
	F0005A	BIT	_P2P_WAR7	P2P PARAMETER 7	P2P – More Than Parameter 7
	F0005B	BIT	_P2P_WAR8	P2P PARAMETER 8	P2P – More Than Parameter 8
	F0005C	BIT	_CONSTANT_ER	FIXED PERIOD ERROR F	Fixed Period Errors
F0009	-	WORD	_USER_F	USER CONTACING POINT	User Usable Timer
	F00090	BIT	_T20MS	20ms	20ms Periodic Clock
	F00091	BIT	_T100MS	100ms	100ms Periodic Clock
	F00092	BIT	_T200MS	200ms	200ms Periodic Clock
	F00093	BIT	_T1S	1s	1s Periodic Clock
	F00094	BIT	_T2S	2s	2s Periodic Clock
	F00095	BIT	_T10S	10s	10s Periodic Clock
	F00096	BIT	_T20S	20s	20s Periodic Clock
	F00097	BIT	_T60S	60s	60s Periodic Clock
	F00099	BIT	_ON	ALWAYS - ON	Always On – State Bit
	F0009A	BIT	_OFF	ALWAYS - ON	Always Off – State Bit
	F0009B	BIT	_1ON	1 SCAN - ON	1st Scan Only On –State
	F0009C	BIT	_1OFF	1 SCAN -OFF	1st Scan Only Off –State
	F0009D	BIT	_STOG	ANTi - CLOCK	Every Scan Anti –Clocked
F0010	-	WORD	_USER_CLK	USER-CLOCK	User Set-up Available Clock
	F00100	BIT	_USR_CLK0	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 0
	F00101	BIT	_USR_CLK1	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 1
	F00102	BIT	_USR_CLK2	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 2

Device 1	Device 2	Type	Variable	Function	Description
	F00103	BIT	_USR_CLK3	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 3
	F00104	BIT	_USR_CLK4	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 4
	F00105	BIT	_USR_CLK5	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 5
	F00106	BIT	_USR_CLK6	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 6
	F00107	BIT	_USR_CLK7	DEGIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 7
F0011	-	WORD	_LOGIC_RESULT	LOGIC RESULTS	Displays Logic Results
	F00110	BIT	_LER	CALCULATION ERROR	On during 1 Scan when Errors made to Calculation
	F00111	BIT	_ZERO	ZERO FLAG	On if Calculation Result is 0
	F00112	BIT	_CARRY	CARRY FLAG	On if Carry occurred during Calculation
	F00113	BIT	_ALL_OFF	ALL OUTPUT OFF	On if All Outputs are OFF
	F00115	BIT	_LER_LATCH	CALCULATION ERROR LATCH	On Maintained when Errors made to Calculation
F0012	-	WORD	_CMP_RESULT	COMPARISION RESULTS	Display Comparison Results
	F00120	BIT	_LT	LT FLAG	On if " Less Than "
	F00121	BIT	_LTE	LTE FLAG	On if "The Same or Less Than"
	F00122	BIT	_EQU	EQU FLAG	On if "The Same "
	F00123	BIT	_GT	GT FLAG	On if "Larger Than "
	F00124	BIT	_GTE	GTE FLAG	On "Larger Than or The Same "
	F00125	BIT	_NEQ	NEQ FLAG	On if "Not The Same "
F0013	-	WORD	_AC_F_CNT	FREQUENT BLACKOUT	Displays Blackout Frequency
F0014	-	WORD	_FALS_NUM	FALS NUMBER	Displays the Number of FALS
F0015	-	WORD	_PUTGET_ERR0	PUT/GET ERROR 0	Main Base PUT / GET ERROR
F0016	-	WORD	_PUTGET_ERR1	PUT/GET ERROR 1	Extension Base Step 1 - PUT / GET ERROR
F0017	-	WORD	_PUTGET_ERR2	PUT/GET ERROR 2	Extension Base Step 2 - PUT / GET ERROR
F0018	-	WORD	_PUTGET_ERR3	PUT/GET ERROR 3	Extension Base Step 3 - PUT / GET ERROR
F0019	-	WORD	_PUTGET_ERR4	PUT/GET ERRO 4	Extension Base Step 4 - PUT / GET ERROR
F0020	-	WORD	_PUTGET_ERR5	PUT/GET ERROR 5	Extension Base Step 5 - PUT / GET ERROR
F0021	-	WORD	_PUTGET_ERR6	PUT/GET ERROR 6	Extension Base Step 6 - PUT / GET ERROR
F0022	-	WORD	_PUTGET_ERR7	PUT/GET ERROR 7	Extension Base Step 7 - PUT / GET ERROR
F0023	-	WORD	_PUTGET_NDR0	PUT/GET COMPLETED 0	Main Base PUT / GET COMPLETED
F0024	-	WORD	_PUTGET_NDR1	PUT/GET COMPLETED 1	Extension Base Step 1 PUT / GET COMPLETED
F0025	-	WORD	_PUTGET_NDR2	PUT/GET COMPLETED 2	Extension Base Step 2 PUT / GET COMPLETED
F0026	-	WORD	_PUTGET_NDR3	PUT/GET COMPLETED 3	Extension Base Step 3 PUT / GET COMPLETED
F0027	-	WORD	_PUTGET_NDR4	PUT/GET COMPLETED 4	Extension Base Step 4 PUT / GET COMPLETED

Device 1	Device 2	Type	Variable	Function	Description
F0028	-	WORD	_PUTGET_NDR5	PUT/GET COMPLETED 5	Extension Base Step 5 PUT / GET COMPLETED
F0029	-	WORD	_PUTGET_NDR6	PUT/GET COMPLETED 6	Extension Base Step 6 PUT / GET COMPLETED
F0030	-	WORD	_PUTGET_NDR7	PUT/GET COMPLETED 7	Extension Base Step 7 PUT / GET COMPLETED
F0044	-	WORD	_CPU_TYPE	CPU TYPE	Displays the Information on CPU Type
F0045	-	WORD	_CPU_VER	CPU VERSION	Displays CPU Version
F0046	-	DWORD	_OS_VER	O/S VERSION	Displays O/S Version
F0048	-	DWORD	_OS_DATE	O/S DATE	Displays O/S Distribution Date
F0050	-	WORD	_SCAN_MAX	MAXIMUM SCAN TIME	Displays Maximum Scan Time
F0051	-	WORD	_SCAN_MIN	MINIMUM SCAN TIME	Displays Minimum Scan Time
F0052	-	WORD	_SCAN_CUR	CURRENT SCAN TIME	Displays Current Scan Time.
F0053	-	WORD	_MON_YEAR	MONTH /YEAR	Month, Year Data of PLC
F0054	-	WORD	_TIME_DAY	HOUR / DATE	Hour, Date Data of PLC
F0055	-	WORD	_SEC_MIN	SECOND / MINUTE	Second, Minute Data of PLC
F0056	-	WORD	_HUND_WK	100 YEARS / DAY	100 Years , Minute Data of PLC
F0057	-	WORD	_FPU_INFO	FPU CALCULATION RESULT	Displays Calculation Results in Immovable Decimal Point
	F00570	BIT	_FPU_LFLAG_I	INACCURATE ERROR LATCH	Latches if Inexact Errors
	F00571	BIT	_FPU_LFLAG_U	UNDERFLOW LATCH	Latches if Underflow Occurs
	F00572	BIT	_FPU_LFLAG_O	OVERFLOW LATCH	Latches if Overflow Occurs.
	F00573	BIT	_FPU_LFLAG_Z	0 DIVISION LATCH	Latches 0 Division
	F00574	BIT	_FPU_LFLAG_V	NULL CALCULATION LATCH	Latches if Null Calculation
	F0057A	BIT	_FPU_FLAG_I	INACCURATE ERROR	Reports on Inexact Error Occurrence.
	F0057B	BIT	_FPU_FLAG_U	UNDEFLOW	Reports if Underflow Occurs.
	F0057C	BIT	_FPU_FLAG_O	OVERFLOW	Reports if Overflow Occurs
	F0057D	BIT	_FPU_FLAG_Z	O DIVISION	Reports if O Division
	F0057E	BIT	_FPU_FLAG_V	NULL CALCUATION	Reports if Null Calculation
	F0057F	BIT	_FPU_FLAG_E	IRREGULAR VALUE ENTRY	Reports when Entering Irregular Value
F0058	-	DWORD	_ERR_STEP	ERROR STTEP	Stores Error Step.
F0060	-	DWORD	_REF_COUNT	REFRESH	Increases if Module Refresh Performed
F0062	-	DWORD	_REF_OK_CNT	REFRESH OK	Increases if Module Refresh is in Normal State
F0064	-	DWORD	_REF_NG_CNT	REFRESH NG	Increases if Module Refresh in Abnormal State
F0066	-	DWORD	_REF_LIM_CNT	REFRESH LIMIT	Increases if Module Refresh in Abnormal State (Timeout)
F0068	-	DWORD	_REF_ERR_CNT	REFRESH ERROR	Increases if Module Refresh in Abnormal State
F0070	-	DWORD	_MOD_RD_ERR_CNT	MODULE READ ERROR	Increases if Reading Module 1 Word Abnormally
F0072	-	DWORD	_MOD_WR_ERR_CNT	MODULE WRITE ERROR	Increases if Writing Module 1 Word Abnormally
F0074	-	DWORD	_CA_CNT	BLOCK SERVICE	Increases if Block Data Service of Module Performed

Device 1	Device 2	Type	Variable	Function	Description
F0076	-	DWORD	_CA_LIM_CNT	BLOCK SERVICE LIMIT	Increases if Block Data Service in Abnormal State
F0078	-	DWORD	_CA_ERR_CNT	BLOCK SERVICE ERROR	Increases if Block Data Service in Abnormal State
F0080	-	DWORD	_BUF_FULL_CNT	BUFFUR FULL	Increases if CPU Internal Buffer FULL
F0082	-	DWORD	_PUT_CNT	PUT COUNT	Increases if Performing PUT.
F0084	-	DWORD	_GET_CNT	GET COUNT	Increases if Performing GET.
F0086	-	DWORD	_KEY	CURRENT KEY	Displays the Current State of Local Key.
F0088	-	DWORD	_KEY_PREV	PREVIOUS KEY	Displays the Previous State of Local Key
F0090	-	WORD	_IO_TYER_N	INCONSISTENT SLOT	Displays Module Type – Inconsistent Slot No.
F0091	-	WORD	_IO_DEER_N	REMOVAL SLOT	Displays Slot No. where Module Removal Occurred
F0092	-	WORD	_FUSE_ER_N	FUSE DISCONNECTION SLOT	Displays Slot No. where Fuse Disconnection Occurred
F0093	-	WORD	_IO_RWER_N	RW ERROR SLOT	Displays Module Read/Write –Error Slot No.
F0094	-	WORD	_IP_IFER_N	I/F ERROR SLOT	Displays Interface Error Slot No.
F0096	-	WORD	_IO_TYER0	MODULE TYPE 0 ERROR	Main Base - Module Type Error
F0097	-	WORD	_IO_TYER1	MODULE TYPE 1 ERROR	Extension Base Step 1 – Module Type Error
F0098	-	WORD	_IO_TYER2	MODULE TYPE 2 ERROR	Extension Base Step 2 – Module Type Error
F0099	-	WORD	_IO_TYER3	MODULE TYPE 3 ERROR	Extension Base Step 3 – Module Type Error
F0100	-	WORD	_IO_TYER4	MODULE TYPE 4 ERROR	Extension Base Step 4 – Module Type Error
F0101	-	WORD	_IO_TYER5	MODULE TYPE 5 ERROR	Extension Base Step 5 – Module Type Error
F0102	-	WORD	_IO_TYER6	MODULE TYPE 6 ERROR	Extension Base Step 6 – Module Type Error
F0103	-	WORD	_IO_TYER7	MODULE TYPE 7 ERROR	Extension Base Step 7 – Module Type Error
F0104	-	WORD	_IO_DEER0	MODULE REMOVAL 0 ERROR	Main Base Module Removal Error
F0105	-	WORD	_IO_DEER1	MODULE REMOVAL 1 ERROR	Extension Base Step 1 – Module Removal Error
F0106	-	WORD	_IO_DEER2	MODULE REMOVAL 2 ERROR	Extension Base Step 2 – Module Removal Error
F0107	-	WORD	_IO_DEER3	MODULE REMOVAL 3 ERROR	Extension Base Step 3 – Module Removal Error
F0108	-	WORD	_IO_DEER4	MODULE REMOVAL 4 ERROR	Extension Base Step 4 – Module Removal Error
F0109	-	WORD	_IO_DEER5	MODULE REMOVAL 5 ERROR	Extension Base Step 5 – Module Removal Error
F0110	-	WORD	_IO_DEER6	MODULE REMOVAL 6 ERROR	Extension Base Step 6 – Module Removal Error
F0111	-	WORD	_IO_DEER7	MODULE REMOVAL 7 ERROR	Extension Base Step 7 – Module Removal Error

Device 1	Device 2	Type	Variable	Function	Description
F0112	-	WORD	_FUSE_ER0	FUSE DISCONNECTION 0 ERROR	Main Base Fuse Disconnection Error
F0113	-	WORD	_FUSE_ER1	FUSE DISCONNECTION 1 ERROR	Extension Base Step 1 – Fuse Disconnection Read/Write Error
F0114	-	WORD	_FUSE_ER2	FUSE DISCONNECTION 2 ERROR	Extension Base Step 2 – Fuse Disconnection Read/Write Error
F0115	-	WORD	_FUSE_ER3	FUSE DISCONNECTION 3 ERROR	Extension Base Step 3 – Fuse Disconnection Read/Write Error
F0116	-	WORD	_FUSE_ER4	FUSE DISCONNECTION 4 ERROR	Extension Base Step 4 – Fuse Disconnection Read/Write Error
F0117	-	WORD	_FUSE_ER5	FUSE DISCONNECTION 5 ERROR	Extension Base Step 5 – Fuse Disconnection Read/Write Error
F0118	-	WORD	_FUSE_ER6	FUSE DISCONNECTION 6 ERROR	Extension Base Step 6 – Fuse Disconnection Read/Write Error
F0119	-	WORD	_FUSE_ER7	FUSE DISCONNECTION 7 ERROR	Extension Base Step 7 – Fuse Disconnection Read/Write Error
F0120	-	WORD	_IO_RWER0	MODULE RW 0 ERROR	Main Base - Module Read/Write Error
F0121	-	WORD	_IO_RWER1	MODULE RW 1 ERROR	Extension Base Step 1 – Module Read/Write Error
F0122	-	WORD	_IO_RWER2	MODULE RW 2 ERROR	Extension Base Step 2 – Module Read/Write Error
F0123	-	WORD	_IO_RWER3	MODULE RW 3 ERROR	Extension Base Step 3 – Module Read/Write Error
F0124	-	WORD	_IO_RWER4	MODULE RW 4 ERROR	Extension Base Step 4 – Module Read/Write Error
F0125	-	WORD	_IO_RWER5	MODULE RW 5 ERROR	Extension Base Step 5 – Module Read/Write Error
F0126	-	WORD	_IO_RWER6	MODULE RW 6 ERROR	Extension Base Step 6 – Module Read/Write Error
F0127	-	WORD	_IO_RWER7	MODULE RW 7 ERROR	Extension Base Step 7 – Module Read/Write Error
F0128	-	WORD	_IO_IFER_0	MODULE I/F 0 ERROR	Main Base Module - Interface Error
F0129	-	WORD	_IO_IFER_1	MODULE I/F1 ERROR	Extension Base Step 1 – Module Interface Error
F0130	-	WORD	_IO_IFER_2	MODULE I/F 2 ERROR	Extension Base Step 2 – Module Interface Error
F0131	-	WORD	_IO_IFER_3	MODULE I/F 3 ERROR	Extension Base Step 3 – Module Interface Error
F0132	-	WORD	_IO_IFER_4	MODULE I/F 4 ERROR I	Extension Base Step 4 – Module Interface Error
F0133	-	WORD	_IO_IFER_5	MODULE I/F 5 ERROR	Extension Base Step 5 – Module Interface Error
F0134	-	WORD	_IO_IFER_6	MODULE I/F 6 ERROR	Extension Base Step 6 – Module Interface Error
F0135	-	WORD	_IO_IFER_7	MODULE I/F 7 ERROR	Extension Base Step 7– Module Interface Error
F0136	-	WORD	_RTC_DATE	RTC DATE	Current Date of RTC
F0137	-	WORD	_RTC_WEEK	RTC DAY	Current Day of RTC
F0138	-	DWORD	_RTC_TOD	RTC HOUR	Current Time of RTC (ms unit)
F0140	-	DWORD	_AC_FAIL_CNT	POWER SHUT-OUT FREQUENCY	Stores the Frequency that Power has been Shut out.
F0142	-	DWORD	_ERR_HIS_CNT	ERROR OCCURRENCE	Stores the Frequency that Error s were Made

Device 1	Device 2	Type	Variable	Function	Description
				FREQUENCY	
F0144	-	DWORD	_MOD_HIS_CNT	MODE CONVERSIO N FREQUENCY	Stores the Frequency that the Mode has been Converted
F0146	-	DWORD	_SYS_HIS_CNT	HISTORY OCCURRENCE FREQUENCY	Stores the Frequency that the System History Occurred.
F0148	-	DWORD	_LOG_ROTATE	LOG ROTATE	Stores Log Rotate Information
F0150	-	WORD	_BASE_INFO0	SLOT INFORMATION 0	Main Base Slot Information
F0151	-	WORD	_BASE_INFO1	SLOT INFORMATION 1	Extension Base Step 1 – Slot Information
F0152	-	WORD	_BASE_INFO2	SLOT INFORMATION 2	Extension Base Step 2 – Slot Information
F0153	-	WORD	_BASE_INFO3	SLOT INFORMATION 3	Extension Base Step 3 – Slot Information
F0154	-	WORD	_BASE_INFO4	SLOT INFORMATION 4	Extension Base Step 4 – Slot Information
F0155	-	WORD	_BASE_INFO5	SLOT INFORMATION 5	Extension Base Step 5 – Slot Information
F0156	-	WORD	_BASE_INFO6	SLOT INFORMATION 6	Extension Base Step 6 – Slot Information
F0157	-	WORD	_BASE_INFO7	SLOT INFORMATION 7	Extension Base Step 7 – Slot Information
F0158	-	WORD	_RBANK_NUM	USED BLOCK NO.	Block No. used Currently
F0159	-	WORD	_RBLOCK_STATE	FLASH STATE	Flash Block State
F0160	-	DWORD	_RBLOCK_RD_FLA G	FLASH READ	ON when Reading Data of Flash N Block
F0162	-	DWORD	_RBLOCK_WR_FLA G	WRITE ON FLASH	ON when Writing Data of Flash N Block
F0164	-	DWORD	_RBLOCK_ER_FLA G	FLASH ERROR	Errors occurs during Flash N Block Service
F1024	-	WORD	_USER_WRITE_F	USABLE CONTACTING POINT	Contacting Point Usable in Program
	F10240	BIT	_RTC_WR	RTC RW	Writes and Read Data to RTC
	F10241	BIT	_SCAN_WR	SCAN WR	Scan Value Initialization
	F10242	BIT	_CHK_ANC_ERR	EXTERNA L SERIOUS FAILURE REQUEST	Requires Serious Failures from External Devices
	F10243	BIT	_CHK_ANC_WAR	EXTERNAL WARNING REQUEST	Requests to Detect Light Failures from External Devices
F1025	-	WORD	_USER_STAUS_F	USER CONTACTING POINT	User Contacting Point
	F10250	BIT	_INIT_DONE	INTIALIZATION COMPLETED	Displays Initialization Task Performance Completed
F1026	-	WORD	_ANC_ERR	EXTERNAL SERIOUS FAILURE INFORMATION	Displays Serious Failures Information of External Devices
F1027	-	WORD	_ANC_WAR	EXTERNAL LIGHT FAILURE WARNING	Displays the Light Failures Information of External Devices
F1034	-	WORD	_MON_YEAR_DT	MONTH / YEAR	Clock Information Data (Month / Year)
F1035	-	WORD	_TIME_DAY_DT	HOUR / DAY	Clock Information Data (Hour / Day)
F1036	-	WORD	_SEC_MIN_DT	SECOND / MINUTE	Clock Information Data (Second / Minute)
F1037	-	WORD	_HUND_WK_DT	100 YEARS / DAY	Clock Information Data(100 Years / Day)

A.2.2 Communication Relay (L) List

-Special Register for Data Link

*P2P Parameter: 1~8, P2P Block: 0~63

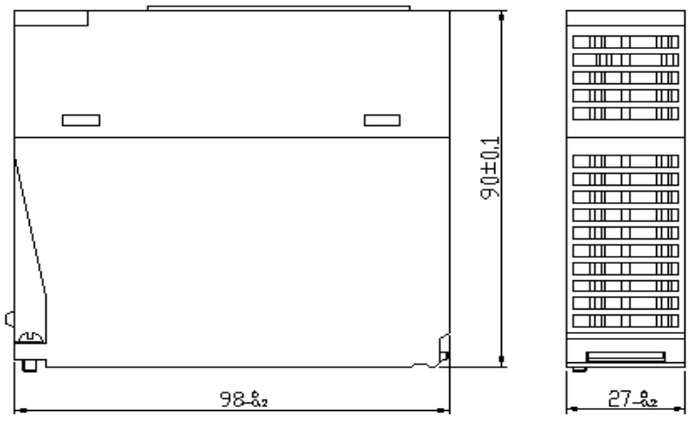
No.	Key Word	Type	Contents	Contents Description
L006250	_P2P1_NDR00	BIT	P2P PARAMETER No. 1 – BLOCK SERVICE IN NORMAL STATE COMPLETED	Displays P2P PARAMETER No. 1 – BLOCK SERVICE IN NORMAL STATE COMPLETED
L006251	_P2P1_ERR00	BIT	P2P PARAMETER No.00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED	Displays P2P PARAMETER No.00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED
L00626	_P2P1_STATUS00	WORD	IF P2P PARAMETER No.00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED, ERROR CODE	Displays IF P2P PARAMETER No.00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED, ERROR CODE
L00627	_P2P1_SVCCNT00	DOUBLE WORD	P2P PARAMETER No. 00 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN NORMAL STATE	Displays P2P PARAMETER No. 00 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN NORMAL STATE
L00629	_P2P1_ERRCNT00	DOULE WORD	P2P PARAMETER No. 1. AND No. 00 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN ABNORMAL STATE	Displays P P2P PARAMETER No. 1. AND No. 00 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN ABNORMAL STATE
L006310	_P2P1_NDR01	BIT	P2P PARAMETER No. 1 and No. 01– BLOCK SERVICE IN NORMAL STATE COMPLETED	Displays P2P PARAMETER No. 1 and No. 01– BLOCK SERVICE IN NORMAL STATE COMPLETED
L006311	_P2P1_ERR01	BIT	P2P PARAMETER No. 1 and No. 01– BLOCK SERVICE IN ABNORMAL STATE COMPLETED	Displays ETER No. 1 and No. 01– BLOCK SERVICE IN ABNORMAL STATE COMPLETED P2P
L00632	_P2P1_STATUS01	WORD	IF P2P PARAMETER No.1 AND No. 00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED, ERROR CODE	Displays IF P2P PARAMETER No.1 AND No. 00 – BLOCK SERVICE IN ABNORMAL STATE COMPLETED, ERROR CODE
L00633	_P2P1_SVCCNT01	DOUBLE WORD	P2P PARAMETER No.1 AND No. 01 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN NORMAL STATE	Displays PARAMETER No.1 AND No. 01 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN NORMAL STATE
L00635	_P2P1_ERRCNT01	DOUBLE WORD	P2P PARAMETER No.1 AND No. 01 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN ABNORMAL STATE	Displays P2P PARAMETER No.1 AND No. 01 – THE NUMBER OF BLOCK SERVICE PERFORMANCES IN ABNORMAL STATE

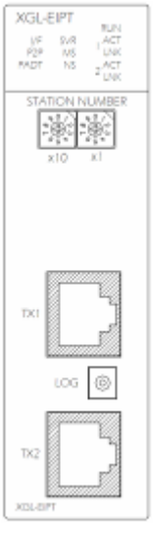
[TABLE 2] Communication Flag List in accordance with P2P Service Set-up

A.3 Dimension

Dimension Unit : mm

● **XGL-EIPT**





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

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

About Disposal

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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