

ETHERNET/IP USER MANUAL

XBL-EIPT



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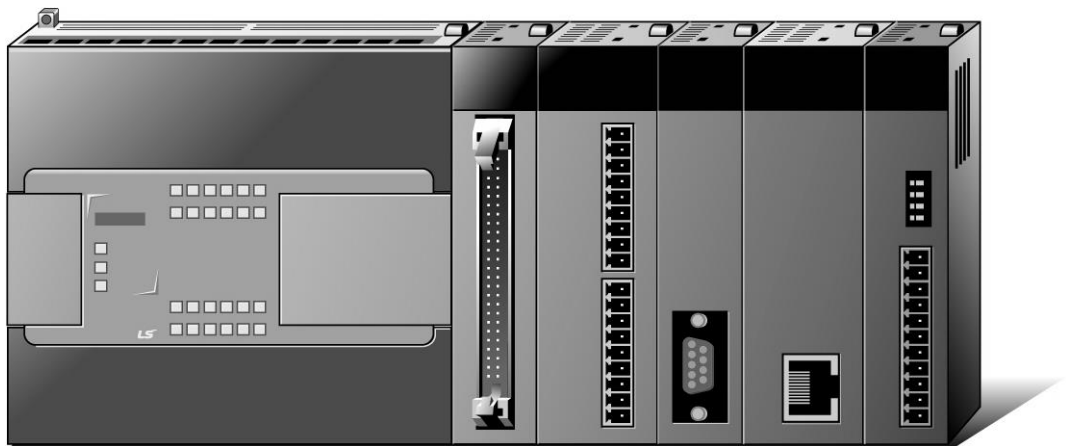
Programmable Logic Control

XGB Ethernet/IP IF Module

XGT Series

User Manual

XBL-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.


LSELECTRIC

Before using the product ...

For your safety and effective operation, please read the safety instructions thoroughly before using the product.

- ▶ Safety Instructions should always be observed in order to prevent accident or risk with the safe and proper use the product.
- ▶ Instructions are divided into “Warning” and “Caution”, and the meaning of the terms is as follows.

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

 **Caution** This symbol indicates the possibility of severe or slight injury, and property damages if some applicable instruction is violated

Moreover, even classified events under its caution category may develop into serious accidents relying on situations. Therefore we strongly advise users to observe all precautions properly just like warnings.

- ▶ The marks displayed on the product and in the user’s manual have the following meanings.

 Be careful! Danger may be expected.

 Be careful! Electric shock may occur.

- ▶ The user’s manual even after read shall be kept available and accessible to any user of the product.

Safety Instructions for design process

Warning

- ▶ **Please install a protection circuit on the exterior of PLC so that the whole system may operate safely regardless of failures from external power or PLC.** Any abnormal output or operation from PLC may cause serious problems to safety in whole system.
 - Install protection units on the exterior of PLC like an interlock circuit that deals with opposite operations such as emergency stop, protection circuit, and forward/reverse rotation or install an interlock circuit that deals with high/low limit under its position controls.
 - If any system error (watch-dog timer error, module installation error, etc.) is detected during CPU operation in PLC, all output signals are designed to be turned off and stopped for safety. However, there are cases when output signals remain active due to device failures in Relay and TR which can't be detected. Thus, you are recommended to install an addition circuit to monitor the output status for those critical outputs which may cause significant problems.
- ▶ **Never overload more than rated current of output module nor allow to have a short circuit.** Over current for a long period time may cause a fire .
- ▶ **Never let the external power of the output circuit to be on earlier than PLC power,** which may cause accidents from abnormal output operation.
- ▶ **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	'10.11	First edition	-
V 2.0	'17. 4	Add service setting by tag	CH6
		XG5000 V4.0 UI updated	Entire
V2.1	'20. 6	Changed company name to LS ELECTRIC	Entire
V2.2	'20. 9	Add allowed communication performance coverage	CH2
V2.3	'22. 8	Changed Homepage address	Entire
V2.4	'22. 10	Minimum distance specification between nodes added	CH2
V2.5	'24.4	Modification of terms	Entire

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

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About User's Manual

Congratulations on 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.ls-electric.com/>) and download the information as a PDF file.

Relevant User's Manuals

Title	Description	No. of User's Manual
XG5000 User's Manual	It describes how to use XG5000 software especially about online functions such as programming, printing, monitoring and debugging by using XGT series products.	10310000512
XGK/XGB Series Instruction & Programming	It describes how to use the instructions for programming using XGK/XGB series.	10310000510
XGB Hardware User's Manual	It describes how to use the specification of power/input/output/expansion modules, system configuration and built-in High-speed counter for XGB basic unit.	10310000926
XGB Analog User's Manual	It describes how to use the specification of analog input/analog output/temperature input module, system configuration and built-in PID control for XGB basic unit.	10310000920
XGB Position User's Manual	It describes how to use built-in positioning function for XGB unit.	10310000927
XGB Cnet I/F User's Manual	It describes how to use built-in communication function for XGB basic unit and external Cnet I/F module.	10310000816
XGB Fast Ethernet I/F User's Manual	It describes how to use XGB FEnet I/F module.	10310000873

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

Related OS version list

Product name	OS version
XGB-XBCH	V2.80
XGB-XBCS	V1.90
XGB-XBCU	V1.70
XGB-XBMH	V1.10
XGB-XBMS	V3.80
XGB-XECH	V2.20
XGB-XECS	V1.80
XGB-XECU	V1.70
XG5000	V4.21

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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 “EIP Module”) among XGB 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.

To use the communication service by Tag, the following version is necessary.

- 1) XBL-EIPT: V2.0 or above
- 2) XBC Series: SU(V1.90 or above), H(V2.80 or above), U(V1.70 or above)
- 3) XEC Series: SU(V1.80 or above), H(V2.20 or above), U(V1.70 or above)
- 4) XBM Series: S(V3.80 or above), H(V1.10 or above)
- 5) XG5000 Software: V4.21 or above

1.2 Features

XGB 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, Explicit 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 XGB EtherNet/IP I/F module product are described.

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

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
XBL-EIPT	Communication Module for XGB	XG5000

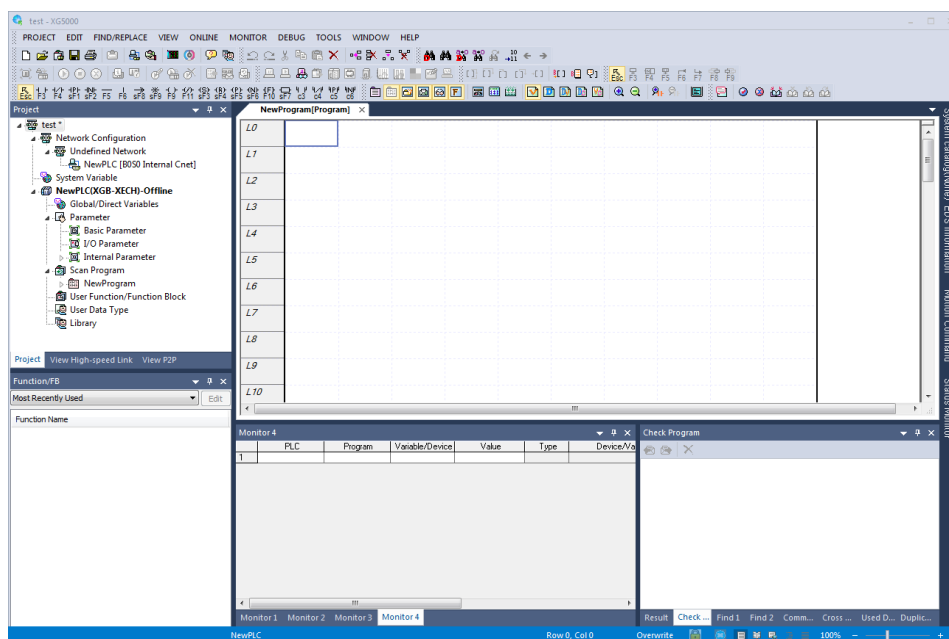
Notice

- 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.ls-electric.com>
- 2) To program XG5000, use RS-232C port and USB of CPU module. For cable, refer to the XGB catalogue. (USB-301A, PMC-310S)

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

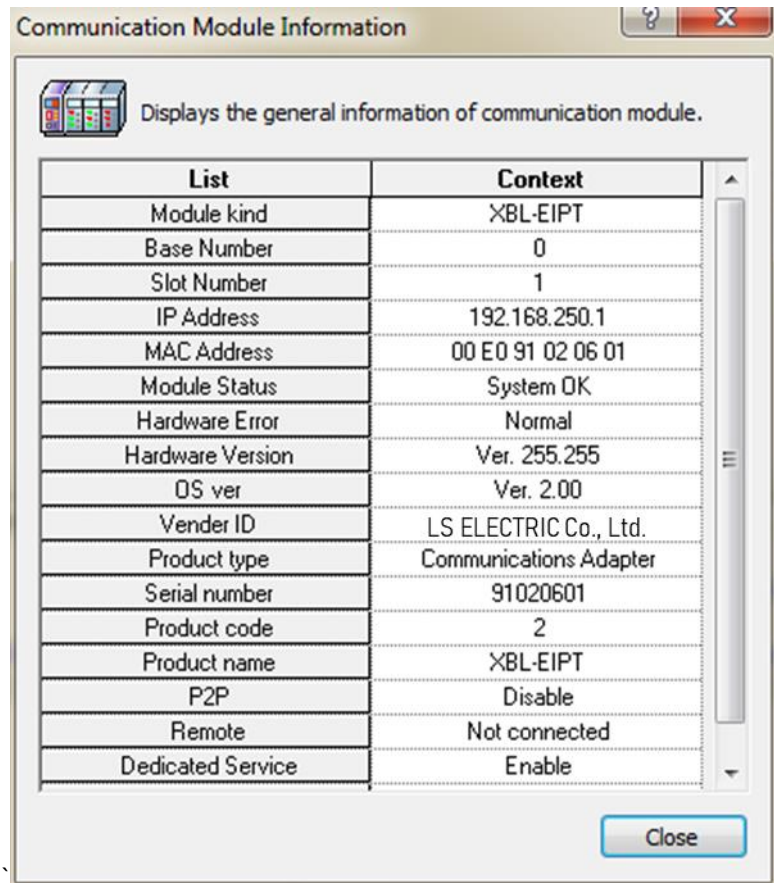
Check out the version of the module before using XGB EtherNet/IP I/F.

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.

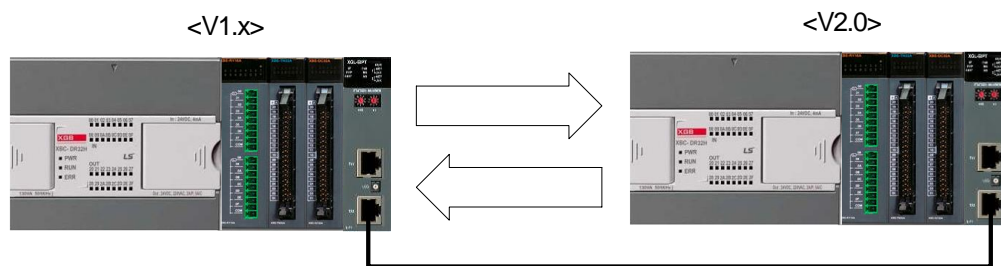
1.5 Compatibility by OS version of XGB EtherNet/IP I/F module

XGB EtherNet/IP I/F module changed from OS V2.0 to Tag communication. To use the communication service by Tag, refer to the following description.

1.5.1 Version information available with communication service by Tag

- 1) XBL-EIPT: V2.0, EDS: Ver2.10
- 2) XG5000: V4.21 XG5000 Software: V4.21 or above
- 3) XBC Series: SU(V1.90 or above), H(V2.80 or above), U(V1.70 or above)
- 4) XEC Series: SU(V1.80 or above), H(V2.20 or above), U(V1.70 or above)
- 5) XBM Series: S(V3.80 or above), H(V1.10 or above)

1.5.2 Operation compatibility according to O/S version



Communication Service	O/S version		Action
	Client	Server	
Implicit message	V2.0	V1.x	○
	V1.x	V2.0	○
Explicit message (Tag Read/Write) *2)	V2.0	V1.x	X*1)
	V1.x	V2.0	○
Explicit message (Read/Write) *2)	V2.0	V1.x	○
	V1.x	V2.0	○

*1) V1.x supports only Multiple Server and V2.0 supports only Single Client

*2) Explicit message (Tag Read/Write): Select this to read/write the Tag registered to the external device.

Explicit message (Read/Write): Select this to read / write the CIP Object of the external device.

It should know service code, class, Instance, and Attribute of CIP Object.

Notice

If you are upgrading the OS of XGB EtherNet/IP I/F module from V1.x to V2.0 or replacing V1.x product with V2.0 product, please refer to [A.4 Action when changing OS version from V1.x to V2.0].

Chapter 2 Specification

2.1 General Specification

The general specification of XGT series is as follows.

No.	Items	Specifications	Related standards			
1	Ambient temperature	0 ~ 55 °C				
2	Storage temperature	-25 ~ +70 °C				
3	Ambient humidity	5 ~ 95%RH (Non-condensing)				
4	Storage humidity	5 ~ 95%RH (Non-condensing)				
5	Vibration resistance	Occasional vibration			-	IEC61131-2
		Frequency	Acceleration	Amplitude	How many times	
		5≤f<8.4Hz	-	3.5mm	10 times each directions (X, Y and Z)	
		8.4≤f≤150Hz	9.8m/s ²	-		
		Continuous vibration				
		Frequency	Acceleration	Amplitude		
		5≤f<8.4Hz	-	1.75mm		
8.4≤f≤150Hz	4.9m/s ² (0.5G)	-				
6	Shock resistance	<ul style="list-style-type: none"> • Peak acceleration: 147 m/s²(15G) • Duration: 11ms • Half-sine, 3 times each direction per each axis 	IEC61131-2			
7	Noise resistance	Square wave Impulse noise		AC: ±1,500 V DC: ±900 V	LS ELECTRIC standard	
		Electrostatic discharge		4kV (Contact discharge)	IEC61131-2 IEC61000-1-2	
		Radiated electromagnetic field noise		80 ~ 1,000 MHz, 10V/m	IEC61131-2, IEC61000-1-3	
		Fast transient/bust noise	Segment	Power supply module	Digital/analog input/output communication interface	IEC61131-2 IEC61000-1-4
Voltage	2kV		1kV			
8	Environment	Free from corrosive gasses and excessive dust				
9	Altitude	Up to 2,000 m				
10	Pollution degree	Less than equal to 2				
11	Cooling	Air-cooling				

Notice

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							
	Max. distance between nodes	100m							
	Min. distance between nodes	1m or more ^{Note1)}							
	Communication Zone Excess Method	CSMA/CD							
	Frame Error – Checking Method	CRC 32 = $X^{32} + X^{26} + X^{23} + \dots + X^2 + X + 1$							
Topology		Line , Star							
Diagnosis Function		Module Information , Service State , Media Information , Auto Scan, Ping Test							
Service	Implicit Connection	IO Scanner							
	Explicit Connection	UCMM Client							
	Implicit Target	IO Adapter							
The Number of Connections (Client/Server)	TCP	16/32							
	CIP(IO Communication)	32/64							
The Number of Maximum Services (P2P count)		2							
The Number of Maximum Installments		2							
Max. setting data size per block	Implicit Connection	500 byte							
	Explicit Connection	512 byte							
Communication performance coverage ^{Note1)} (Implicit Connection)	Max. 200pps (Packets per second)	Cycle	20ms	20ms	20ms	40ms	80ms	160ms	
		Number of Blocks	1	2	4	8	16	32	
		pps	50	100	200	200	200	200	
Media		UTP/STP Category 5							
Basic Standards	Dimension (mm)	90(H) X 27(W) X 60(D)							
	Consumption Current (mA)	290							
	Weight (g)	102							

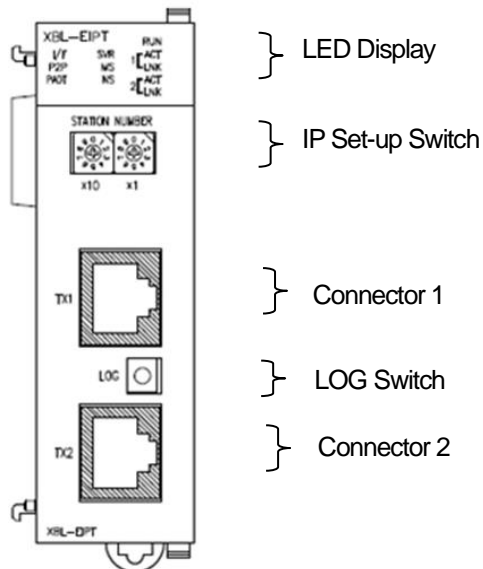
*Note1) When using a cable of less than 1 m, the SNR (Signal to Noise Ratio) decreases due to the influence of reflected waves, which may cause Link Down or packet loss.

Notice

- 1) Communication performance coverage means the transmission performance that can operate normal communications when setting the max/min data per block for 32 EIP blocks.
 - ▶ Communication performance coverage is based on the condition that only one XGB EtherNet/IP I/F module operates as a periodic client and the rest of the modules operate as periodic servers in the system.
 - ▶ This performance could be changed depending on the load of the aperiodic server or network.
 - ▶ Minimum period should be set over 20ms.

2.3 Name of Each Part

The name in each module is as follows.



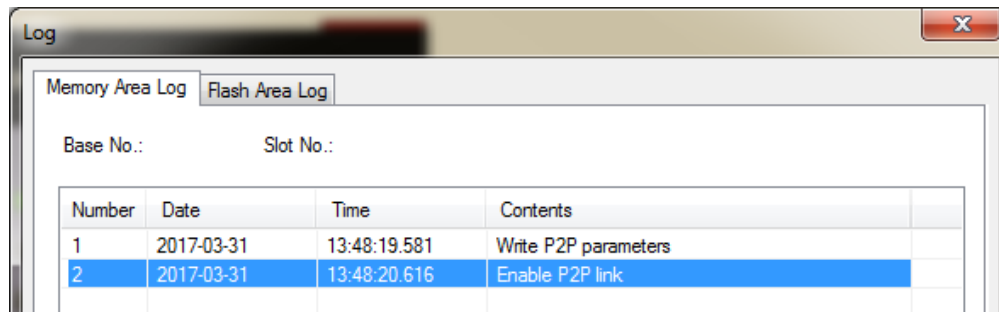
[Figure 2.3.1] The Front View for Module PLC

► 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 setting 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.



The screenshot shows a window titled 'Log' with two tabs: 'Memory Area Log' and 'Flash Area Log'. Below the tabs are fields for 'Base No.:' and 'Slot No.:'. A table with the following data is displayed:

Number	Date	Time	Contents
1	2017-03-31	13:48:19.581	Write P2P parameters
2	2017-03-31	13:48:20.616	Enable P2P link

▶ IP Set-up Switch (1~90, 94~99)

When IP address has not been inserted via XG5000 within 10 seconds after power was supplied, IP is set up as '192.168.250.switch value'.

▶ IP Set-up Switch (91, 92, 93)

This switch is designed for setting up the inside of communication. If you change it arbitrary, it may cause problems.

▶ IP Set-up Switch (99)

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

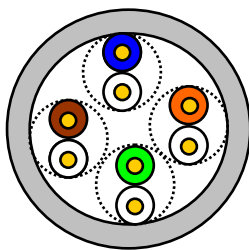
2.4.1 UTP Cable

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

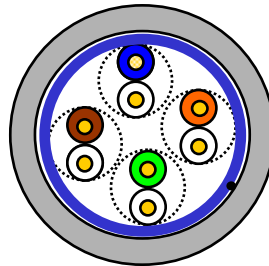
- ▶ With or without Shield: 3 Types (UTP, FTP, STP)
- ▶ Used - frequency Band: 7 Categories (Category 1 ~ Category 7)
- ▶ Inflammable Grade: 4 Grades (CMX, CM, CMR, CMP)

1) Kinds of Cables with or without Shield

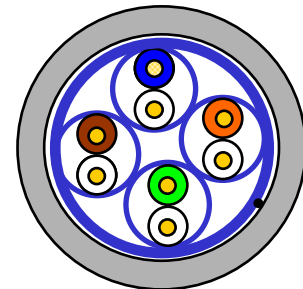
Classification	Details	Use
UTP(or U.UTP)	Unshielded Cables for High Speed – Signals	Maximum 200MHz Voice +Information (Data)+ Low grade Video Signal
FTP(or S.UTP)	1 Layer Shield, Cable Core only shielded * Shield Materials: AL/Plastic Complex Foil Or Copper Braid	Maximum 100MHz Electro Magnetic Interference (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

PLC Ethernet communication cable is recommended to use S.STP cable.

If the S.STP cable cannot be used due to the field conditions, a module error may occur due to communication error and noise.

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 Non-flammable 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	<ul style="list-style-type: none"> • For Installing ceilings without duct • Plenum Cable • UL 910 (Plenum Test)
CMR	150(kW)	30 minutes	Less than 3.6m	Not Regulated	<ul style="list-style-type: none"> • Vertical Installation Type • Non-Plenum Cable • UL 1666(Riser Test)
CM	21(kW)	20 minutes	Less than 2.4m	Not regulated	<ul style="list-style-type: none"> • General Type • Non-Plenum Cable • UL 1581(VTFT Test)
CMX	1(kW)	1 minute	Less than 0.5m	Not regulated	<ul style="list-style-type: none"> • 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)	$\text{M}\Omega/\text{km}$		2500
Anti- voltage	V/minute		AC 500
Characteristic Impedance	$\Omega(1\sim 100\text{MHz})$		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 Trial- Run

3.1 Installation Environment

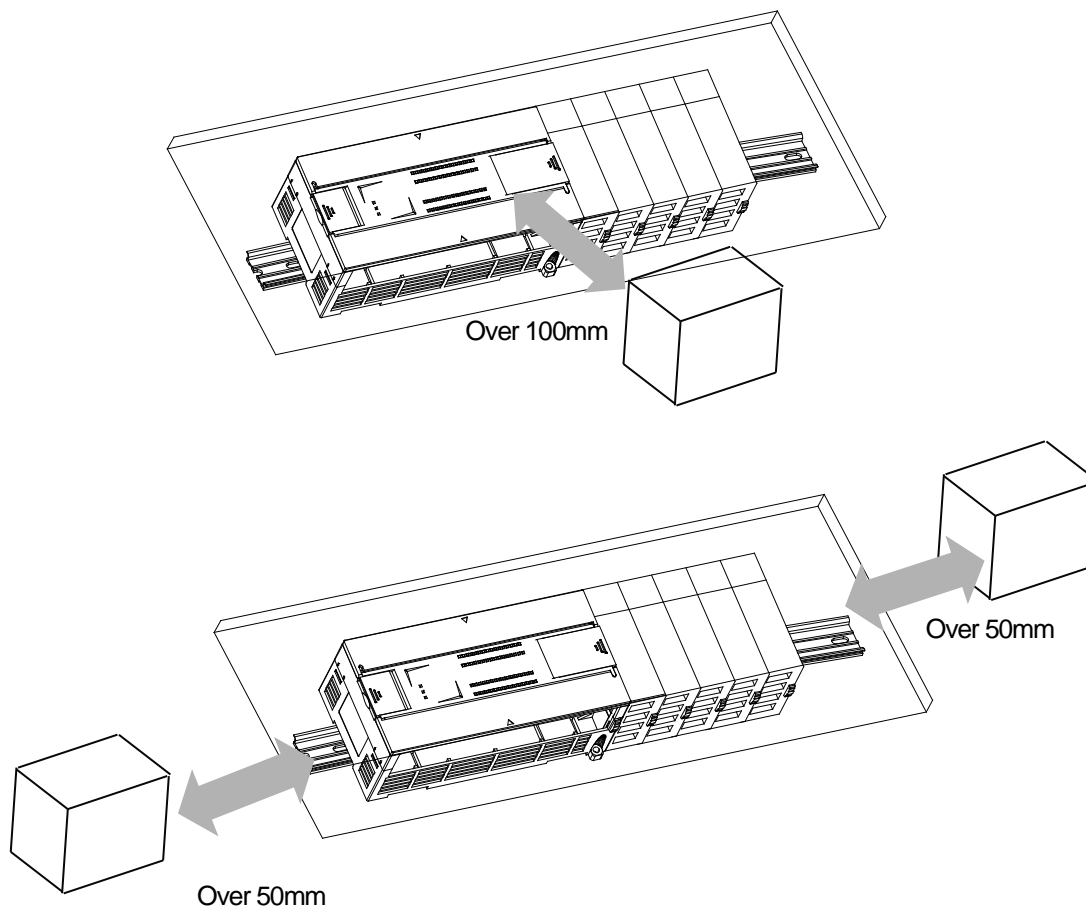
This product is very reliable regardless of installation environments, but to guaranty the reliability and stability of the system, pay attention to the following items.

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 °C.

2) Installation Constructions

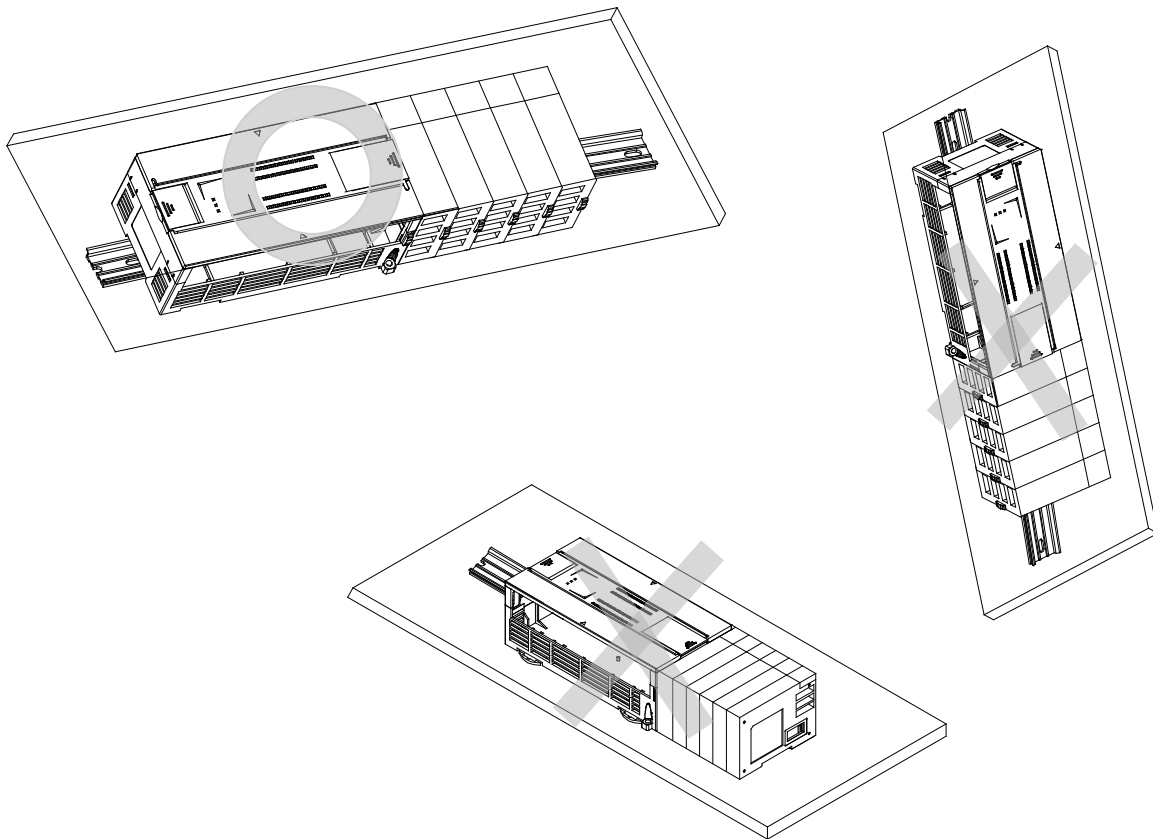
- (1) Make sure wiring leavings are not inserted inside the PLC when you process screw holes or do wiring jobs.
- (2) Install the places where it is easy to control.
- (3) Do not install into the same panel as high press machine.
- (4) Make sure the distance to the duct and the surrounding module is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



3.2 Cautions when Handling

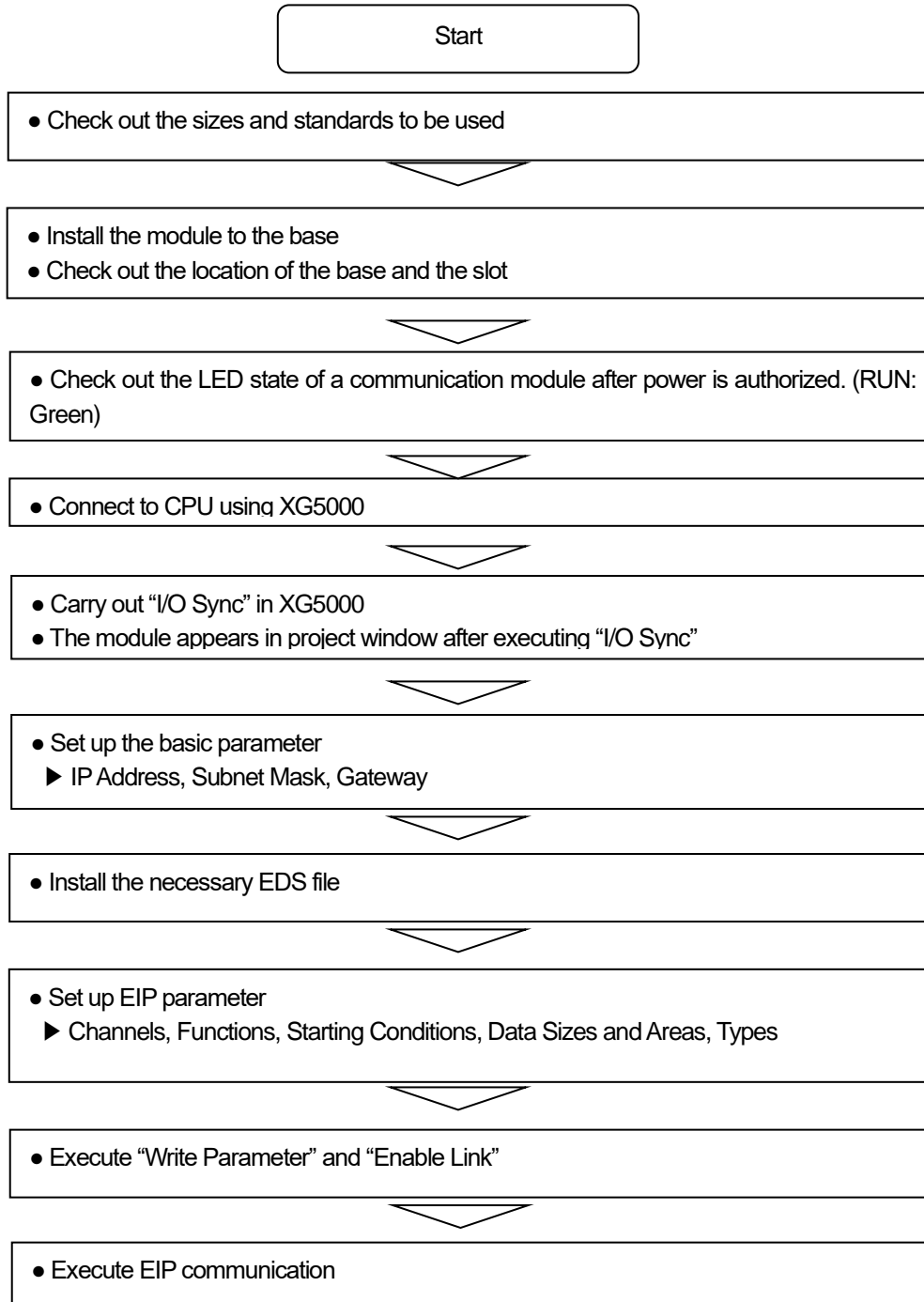
Observe the following directions when you configure the system using EtherNet/IP I/F module.

- 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 Available device area

Available device areas for each basic unit are as follows

CPU type	Area	Range	Size (word)	Reference
XBC/ XBM	P	P0~P127	128	Read/Write/Monitor available, XBMS
		P0~P1023	1024	Read/Write/Monitor available, XBCH, XBCS, XBMH
		P0~P2047	2048	Read/Write/Monitor available, XBCU
	M	M0~M255	256	Read/Write/Monitor available, XBMS
		M0~M1023	1024	Read/Write/Monitor available, XBCH, XBCS, XBMH
		M0~M2047	2048	Read/Write/Monitor available, XBCU
	K	K0~K2559	2560	Read/Write/Monitor available, XBMS
		K0~K4095	4096	Read/Write/Monitor available, XBCH, XBCS, XBMH
		K0~K8191	8192	Read/Write/Monitor available, XBCU
	F	F0~F255	256	Read/ Monitor available, XBMS
		F0~F1023	1024	Read/ Monitor available, XBCH, XBCS, XBMH
		F0~F2047	2048	Read/ Monitor available, XBCU
	T	T0~T255	16	Read/Write/Monitor available, XBMS
		T0~T1023	64	Read/Write/Monitor available, XBCH, XBCS, XBMH
		T0~T2047	128	Read/Write/Monitor available, XBCU
	C	C0~C255	16	Read/Write/Monitor available, XBMS
		C0~C1023	64	Read/Write/Monitor available, XBCH, XBCS, XBMH
		C0~C2047	128	Read/Write/Monitor available, XBCU
	L	L0~L1279	1280	Read/Write/Monitor available, XBMS
		L0~L2047	2048	Read/Write/Monitor available, XBCH, XBCS
		L0~L4095	4096	Read/Write/Monitor available, XBCU, XBMH
	N	N0~N3935	3936	Read/Write/Monitor available, XBMS
		N0~N5119	5120	Read/Write/Monitor available, XBCH
		N0~N10239	10240	Read/Write/Monitor available, XBCU, XBMH
	D	D0~D5119	5120	Read/Write/Monitor available, XBMS
		D0~D10239	10240	Read/Write/Monitor available, XBCH, XBCS, XBMH
		D0~D19999	20000	Read/Write/Monitor available, XBCU

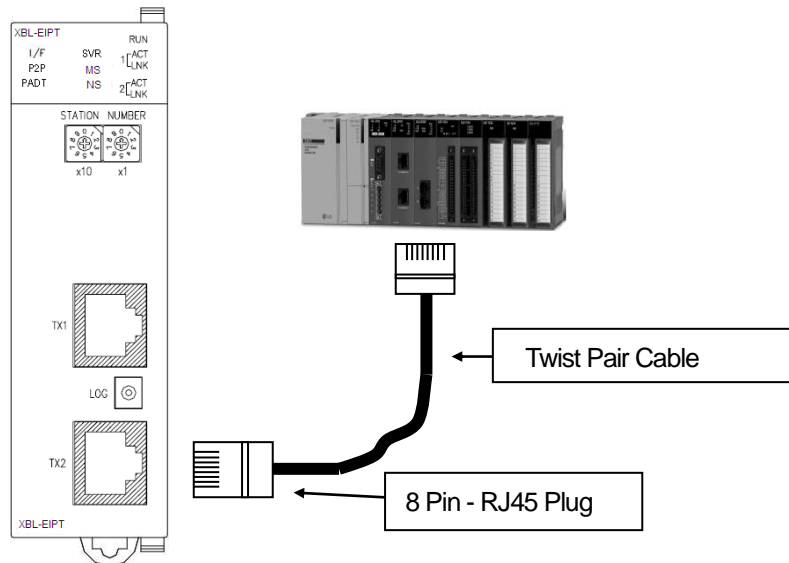
	U	U0~U255	256	Monitor available, XBMS
		U0~U351	352	Monitor available, XBCH , XBCS
		U0~U383	384	Monitor available, XBCU
	Z	Z0~Z127	128	Read/Write/Monitor available
	R	R0~R10239	10240	Read/Write/Monitor available, XBCH , XBCS
		R0~R16383	16384	Read/Write/Monitor available, XBCU
XEC	I	IW0.0.0~IW15.15.3	1024	Read/Write/Monitor available
	Q	QW0.0.0~QW15.15.3	1024	Read/Write/Monitor available
	M	MW0~MW8191	8192	Read/Write/Monitor available, XECH, XECS
		MW0~MW16383	16384	Read/Write/Monitor available, XECU
	R	RW0~RW10239	10240	Read/Write/Monitor available, XECH, XECS
		RW0~RW16383	16384	Read/Write/Monitor available, XECU
	W	WW0~WW10239	10240	Read/Write/Monitor available, XECH, XECS
		WW0~WW32767	32768	Read/Write/Monitor available, XECU
	U	UW0.0.0~UW0.11.31	384	Monitor available, XECU
		UW0.0.0~UW0.15.31	512	Monitor available, XECH, XECS

Notice

- 1) F Device: Writeable address is F220 or later.
- 2) In case of XBL-EIPT V2.0 or later: XEC type can only use I, Q, M, R, and W devices as EIP variable in global variable.
- 3) T / C is a timer / counter device. Bit designation means contact value and Word designation means current value.
- 4) XBMS, XBMH type does not support R device.
- 5) In U device, the address of bit area is hexadecimal (Hex) value and the address of word area is decimal value.

3.5 Installation of Products

3.5.1 Installation of XBL-EIPT



[Figure 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 communication 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 Trial- Run

3.6.1 Directions when Configuring Systems

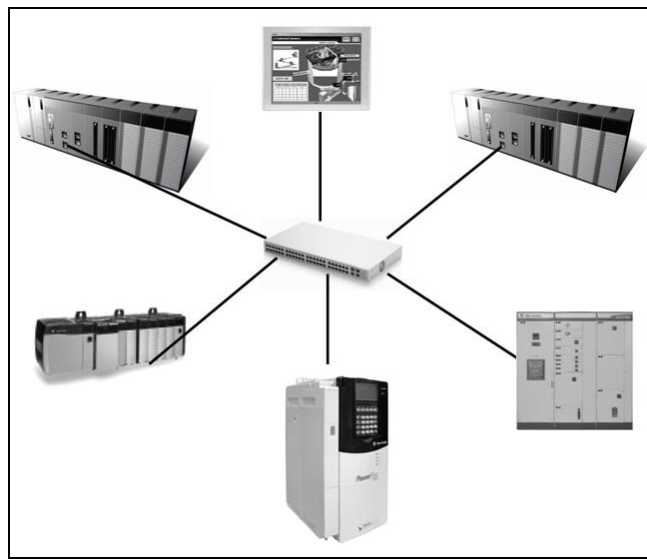
- 1) To use P2P service including this module, make sure IP Addresses of all stations are different from IP addresses of all other stations.
- 2) To use communication cables, select the ones in designated sizes. Using cables that have not been designated may cause serious communication obstacles.
- 3) 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

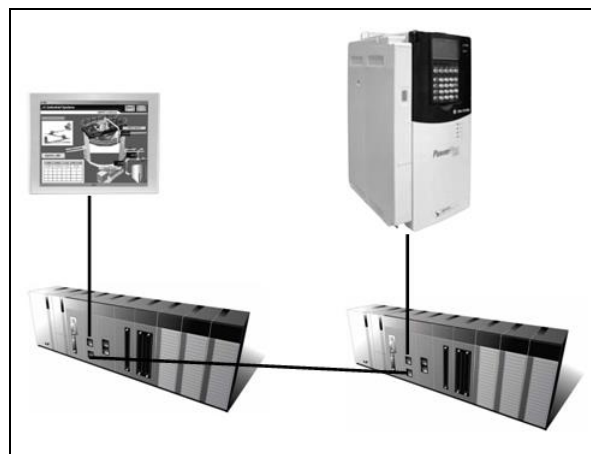
XGB EtherNet/IP I/F modules can be installed on the XBC CPU modules. The number of maximum installments reaches 2 . It is possible for the communication system using this module to be applied to a variety of configurations. This chapter describes the examples of the cases when system configuration is available and unavailable by applications.

4.1 Configuration of a Usable System

4.1.1 System Configuration using a Switch



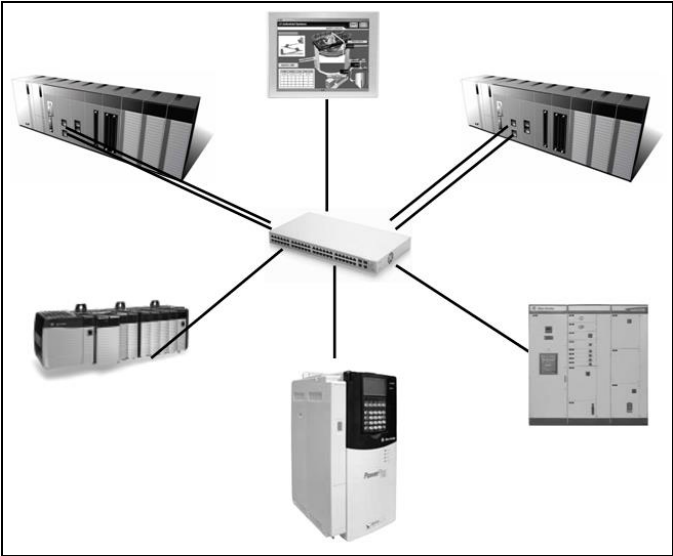
4.1.2 System Configuration not using a Switch



4.2 Configuration of an unusable System

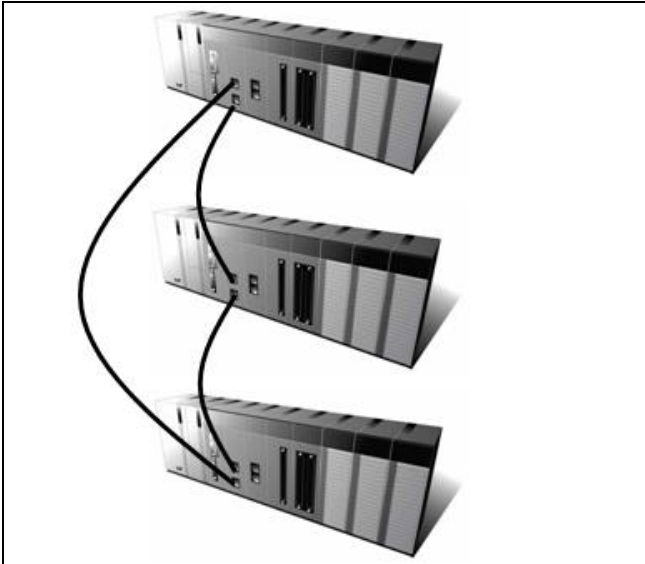
4.2.1 System Configuration using a Switch

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 XBL-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

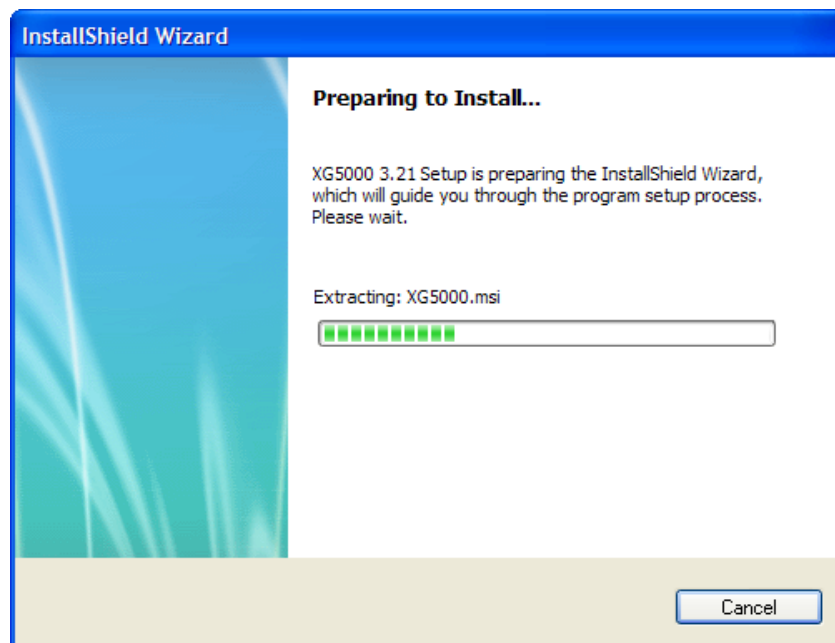
5.1 Installation and Execution of Software

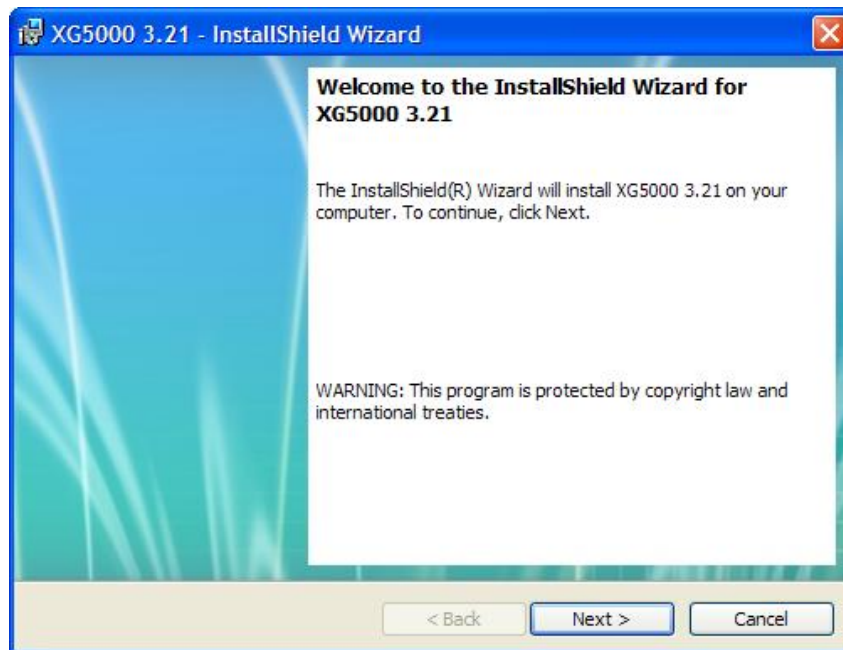
To use software XG5000, it is necessary to install XG5000. Then, XBL-EIPT V1.x should use XG5000 V3.1 or later, XBL-EIPT V2.0 or later should use XG5000 V4.21 or later. The requirements for system needed to execute are as follows.

- 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

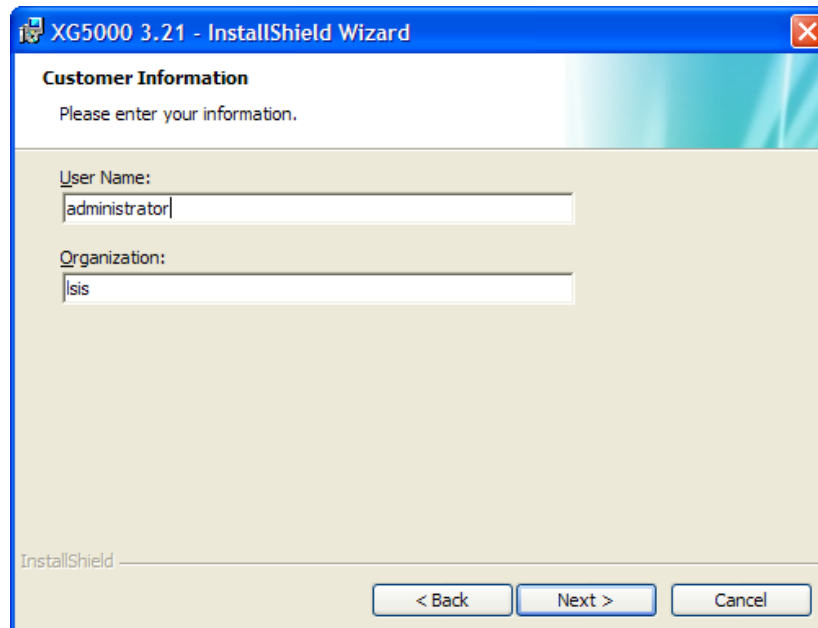
- 1) Execute the installation file.
- 2) InstallShield Wizard prepares for installation as follows.





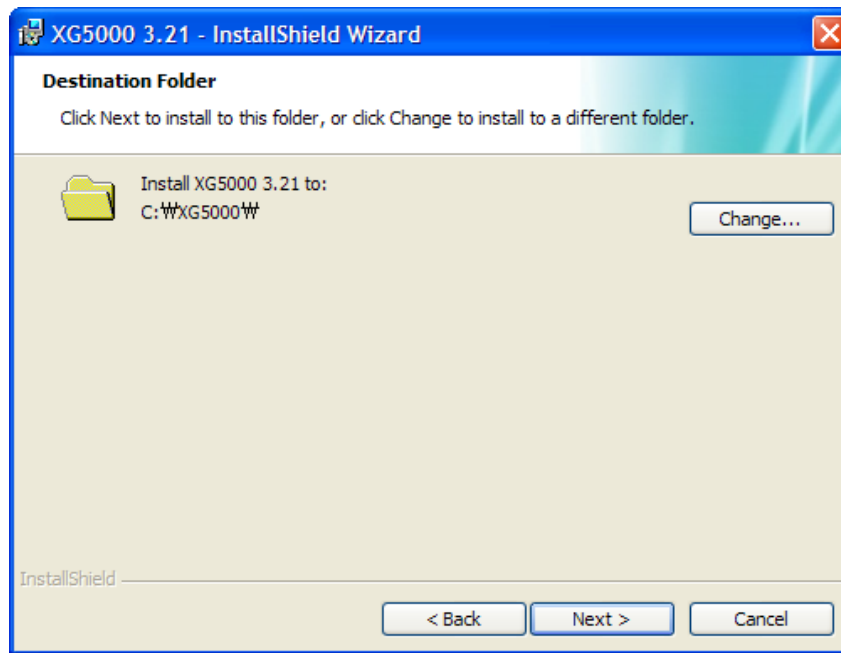
3) Click [Next] button.

4) Insert a company's name and press [Next] button.

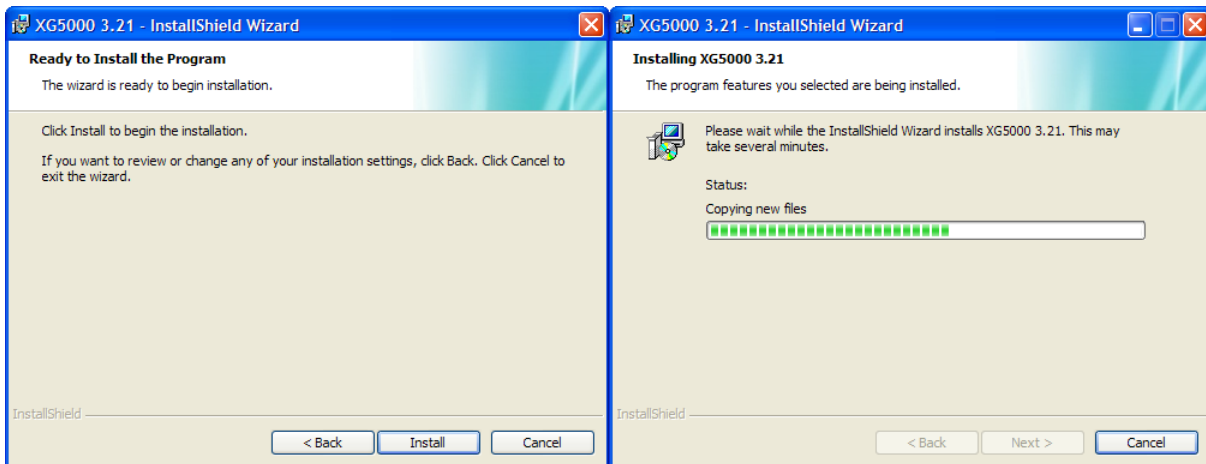


5) Designate the folder that XG5000 will be installed. If you want to change the folder, click [Browse] and enter or select new folder. As XG5000 needs installation space of 500MByte, select the disk with enough room. If the installation room is not enough, warning message is on and thus, it is impossible to proceed to next step.

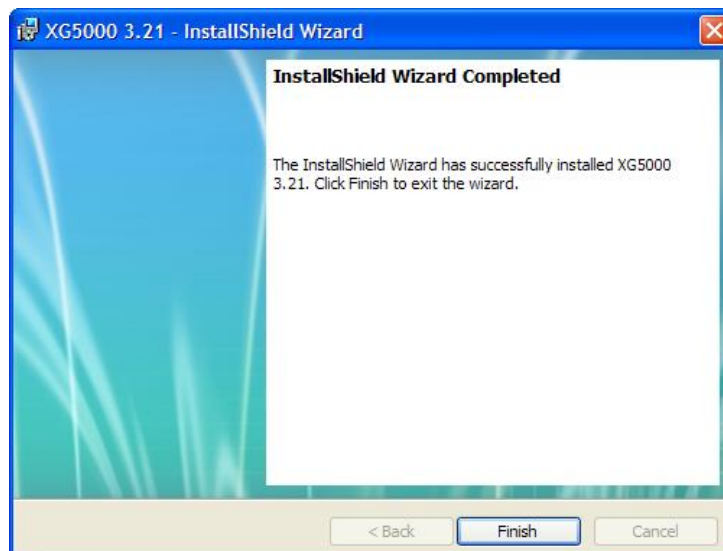
6) If you have selected a folder, press [Next] button.



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.

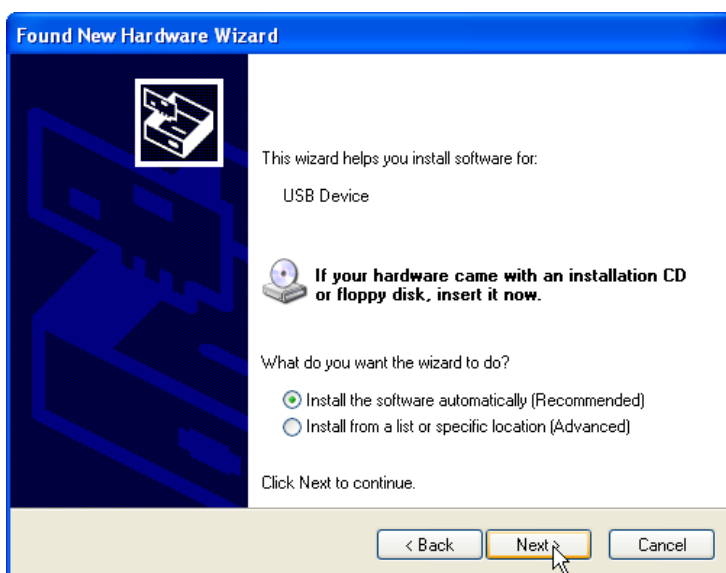


5.1.2 Installation of USB Device Drive

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.

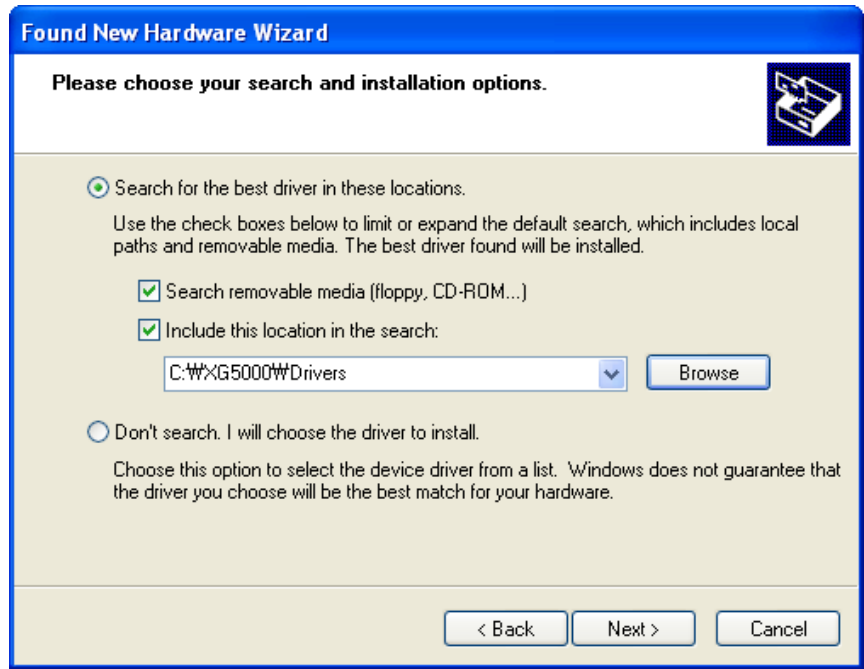
- 1) Check out whether there are driver folders in the folder XG5000 has been installed into. In Drivers folder, there are two drive files - GmUSBD.sys, GmUSBD.inf. If there is no folder or drive file, install XG5000 again.
- 2) Turn on PLC power and connect USB connector to PC. When connected, new hardware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



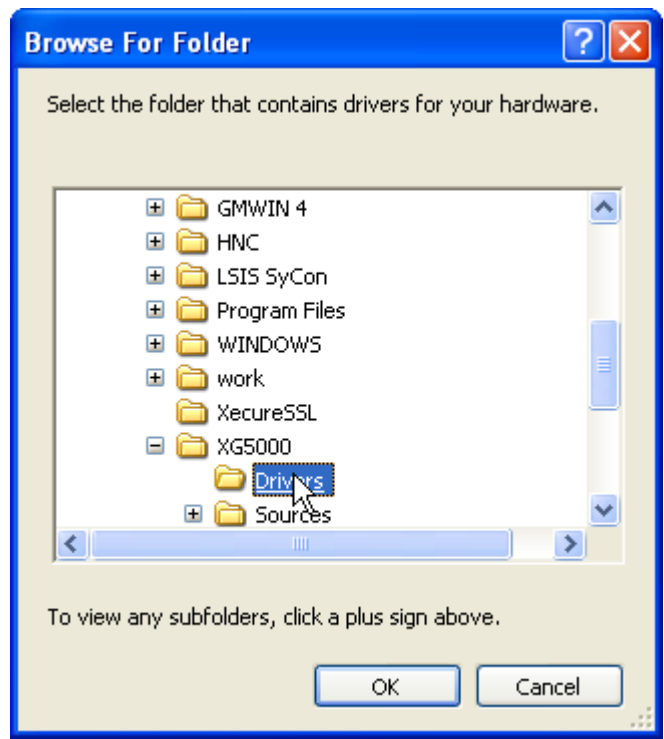
- 4) Select [Install from a list or specific location (Advanced)] of the options in new hardware search wizard dialogue box and press [Next] button.



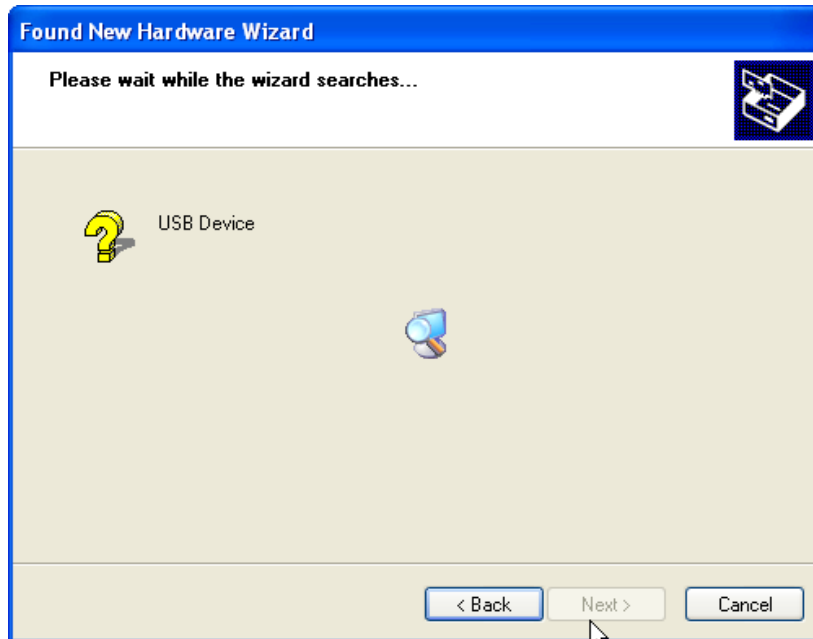
5) Select [Search for the best driver in these locations] of drive search options and check out [Include this location in the search]



6) Press [Browse] button
Select Drivers Folder where XG5000 has been installed in "Browse for Folder"



7) Press [Ok] button. The computer searches for the folder you selected.



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



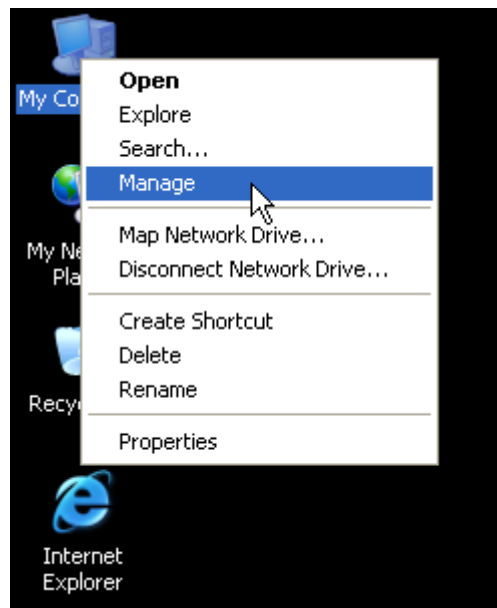
9) The completion of a device driver is completed; the dialogue box for installation like this appears. If you press [Finish] button, driver installation is terminated.



5.1.3 Confirmation on the Installation of USB Device Driver

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

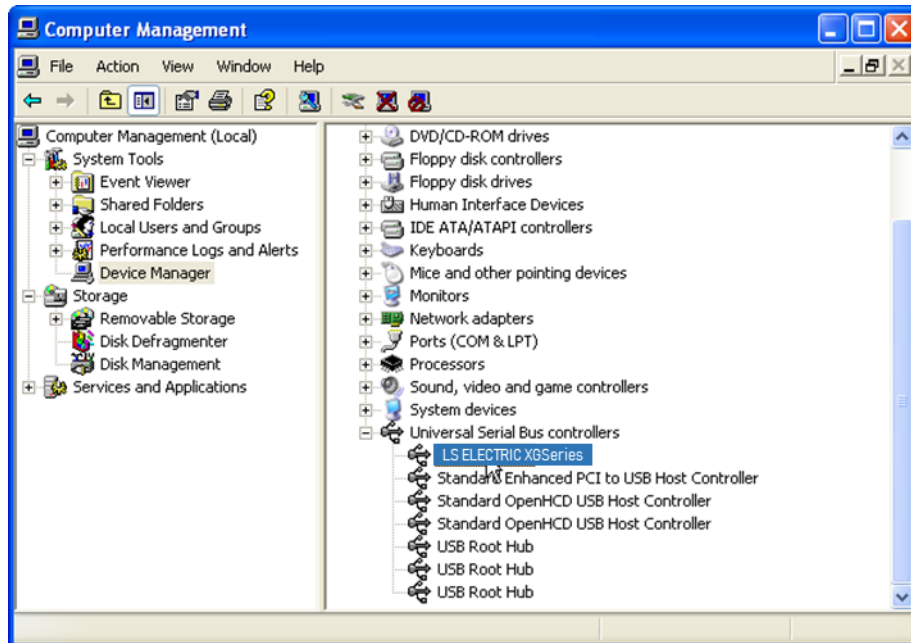
- (1) Click the right button in [My Computer] on the desktop and select menu [Manage].



- 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.

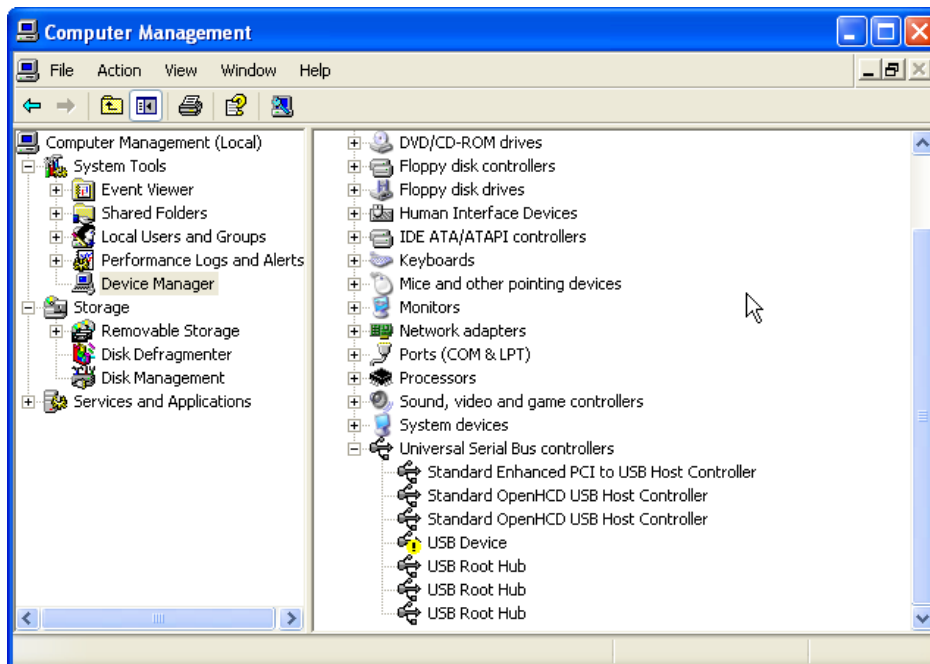
(1) In case of normal state

If the list [LS ELECTRIC XGSeries] located in the lower of [Universal Serial Bus controllers] appears, the device driver has been normally installed.



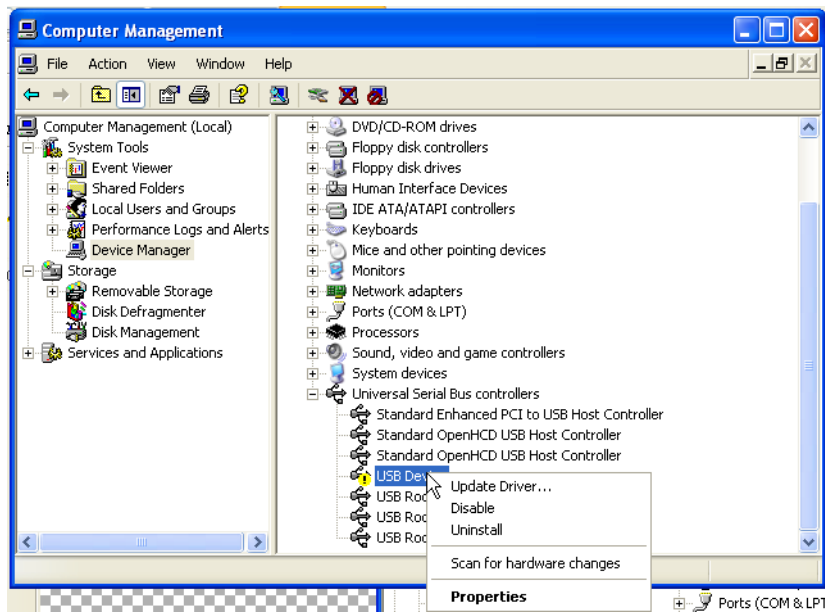
(2) In case of abnormal state

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

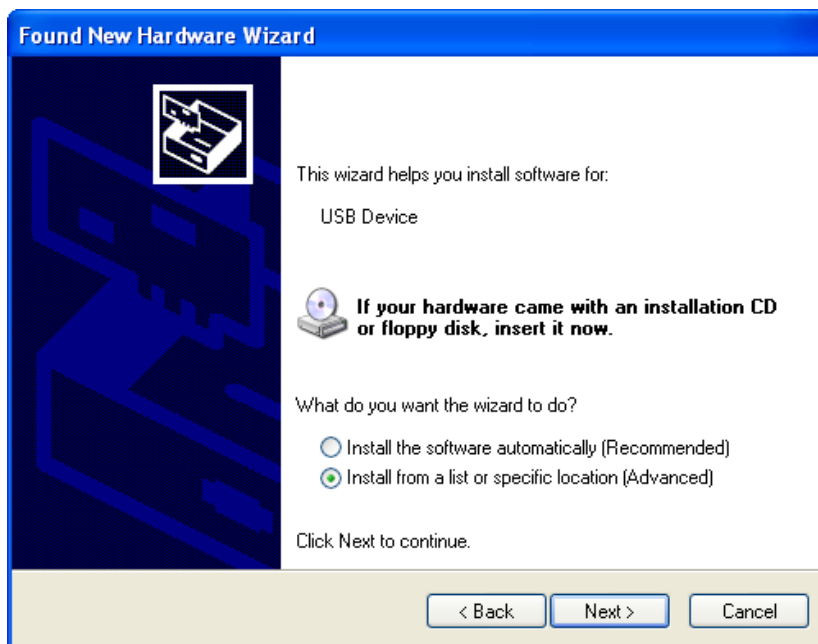


In case of not normally installed, reinstall according to the following order.

- (3) Click the right button in the device driver where “Exclamation Mark” appears.
- (4) Select Menu [Update Driver]

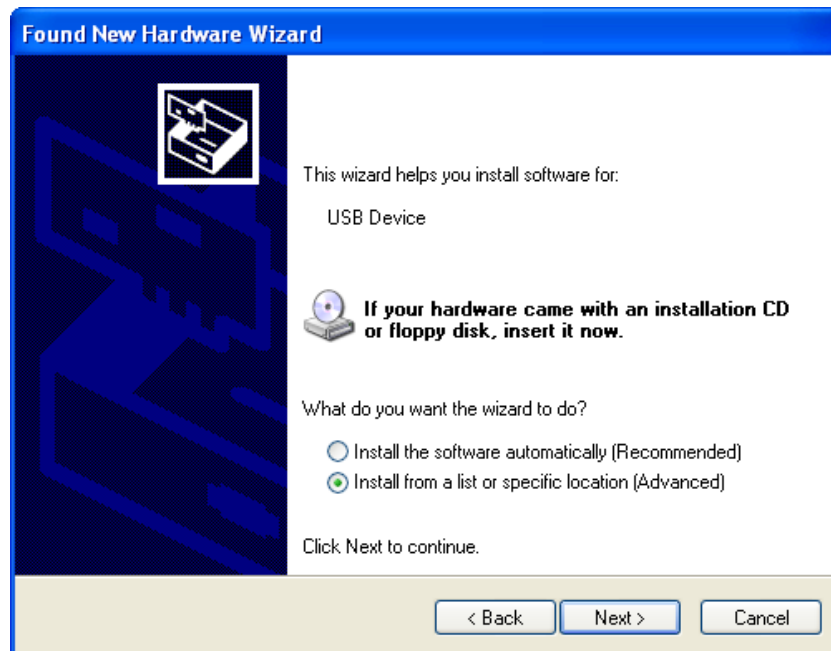


(5) Hardware Update Wizard Dialogue Box appears. Select Option [Install from a list or specific location (Advanced)] List and press next button. The following procedures are manual and are the same to the installation of the device driver.

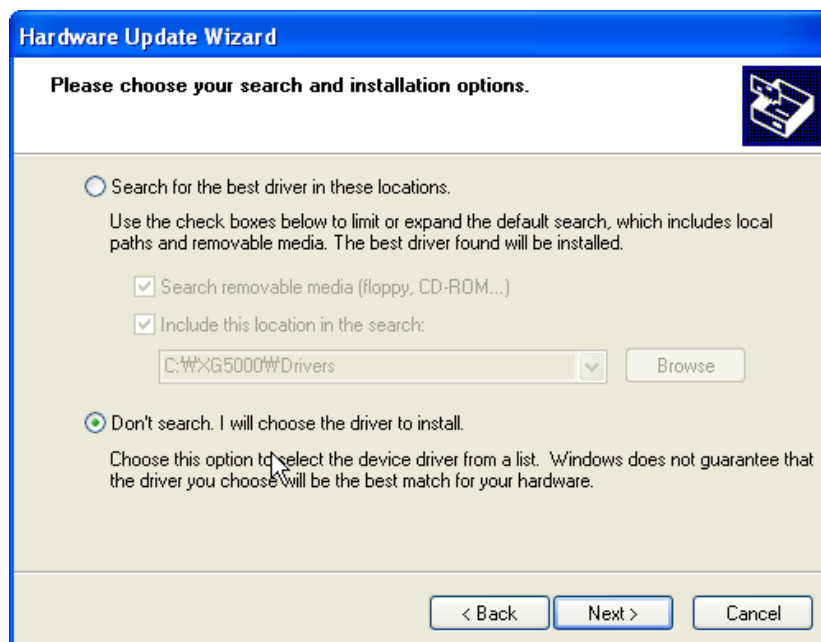


If not installed, reinstall according to the following order.

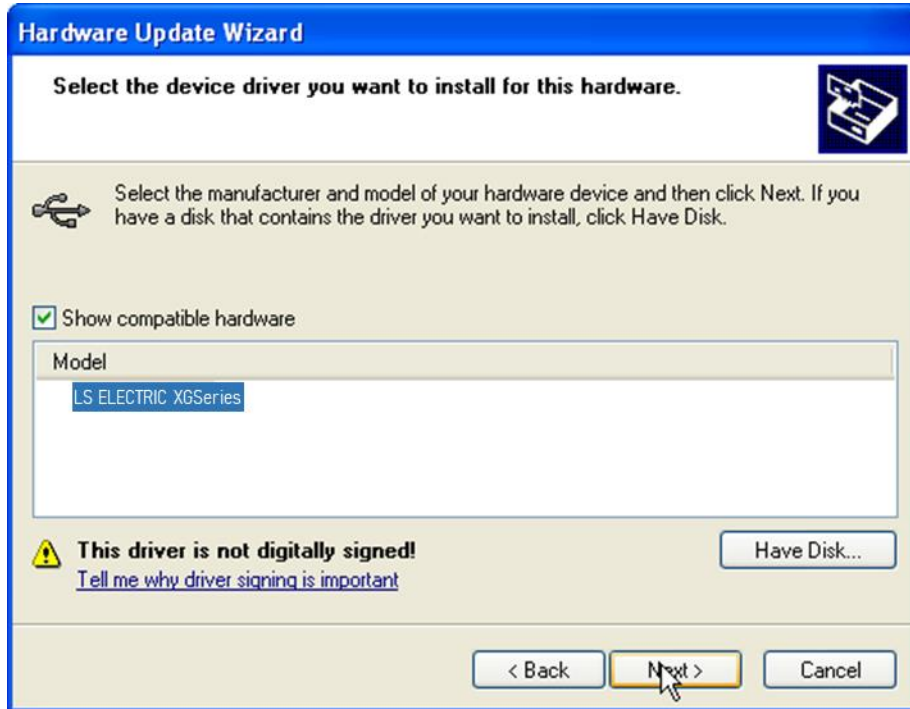
- (1) In case a device driver has been wrongly installed or is problematic, execute Hardware Update Wizard Start.
- (2) Select Option [Installation from a List or a specific location (Advanced)] List and press next button.



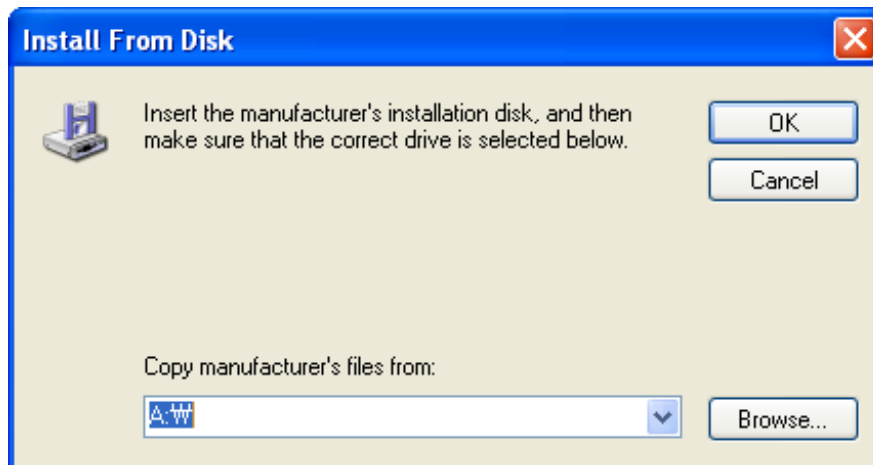
- (3) On search and installation options, select [Don't Search. I will choose the driver to install.] and click [Next].



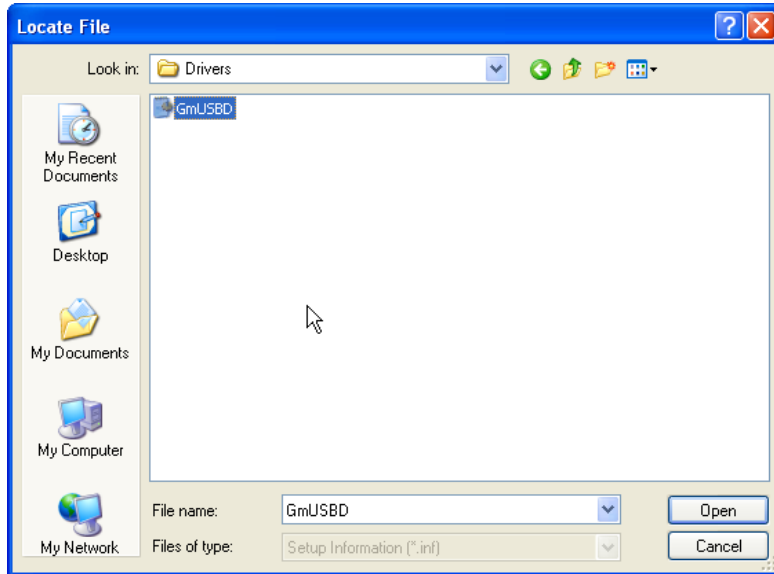
(4) Click [Have Disk...] on the Dialog Box below.



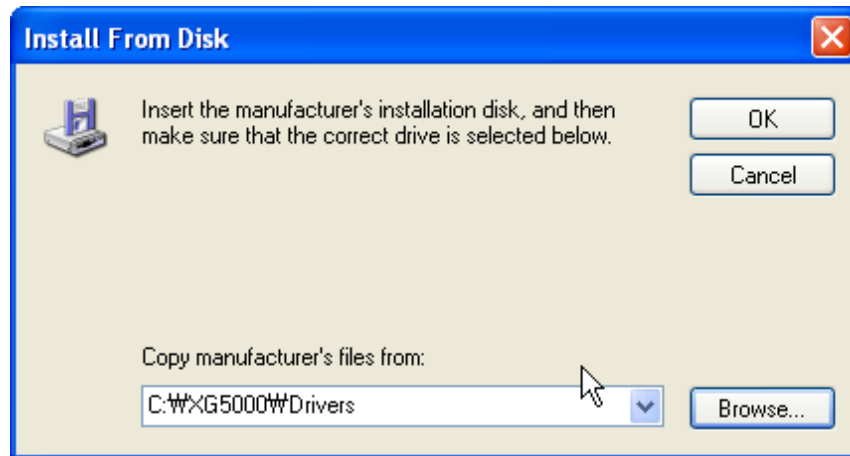
(5) If Installation Dialogue Box appears from the disc appears, press button [Browse.]



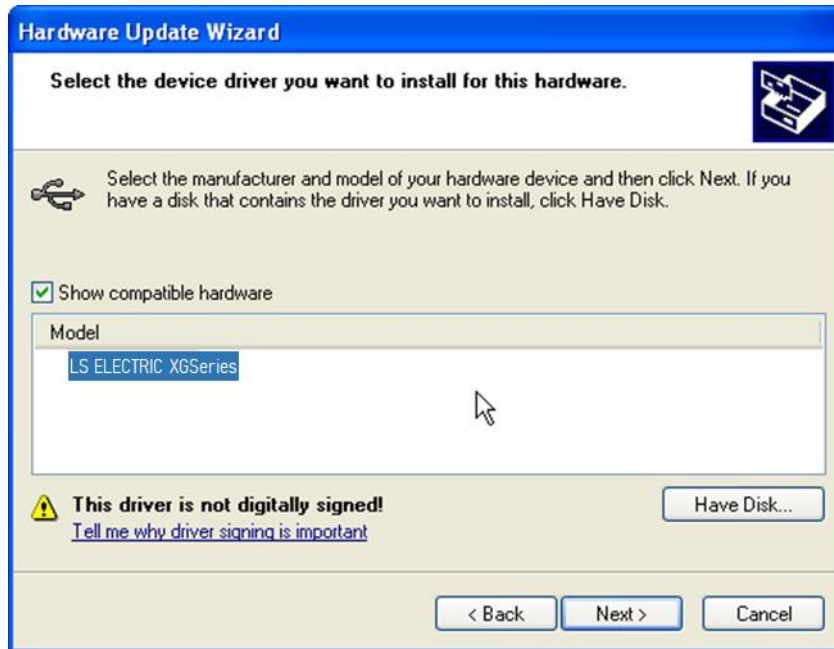
- (6) Move to the folder File XG5000 has been installed from File Search Dialogue Box. If drivers fold selected, GmUSBD.inf file appears. Select this file and press button [Open].



- (7) The directory with device driver files appears on the location of the manufacturer's file. Press button [Ok].



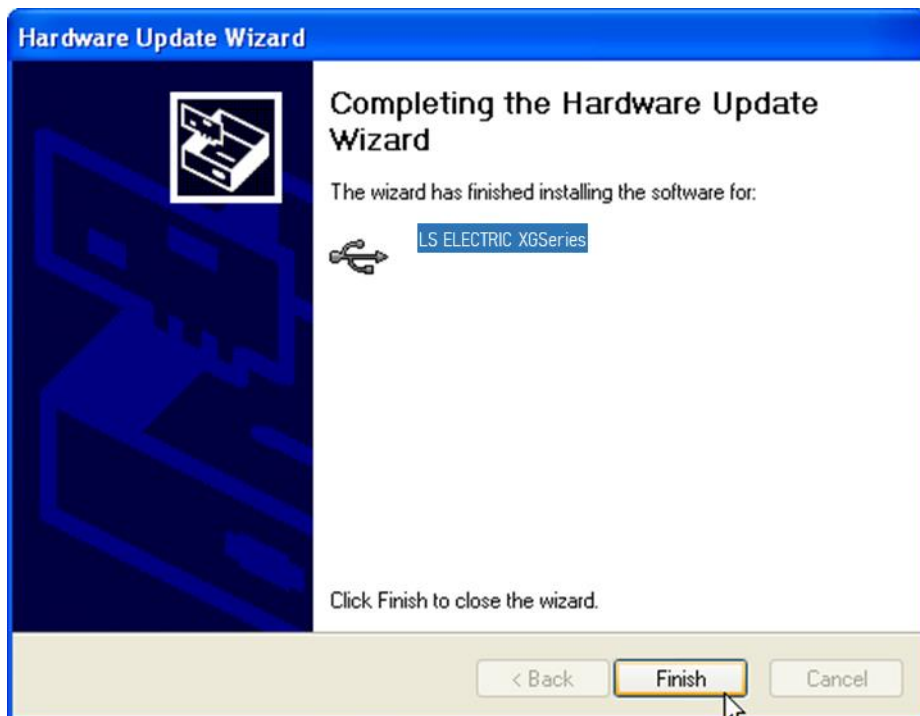
(8) On the compatible H/W display list of the device driver Select Dialog Box, select “LS ELECTRIC XGSeries” driver and then click [Next] button.



(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

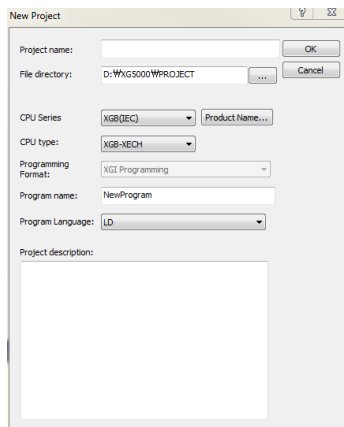
To use Ethernet/IP I/F module, communication parameter must be made up in XG5000 and to set up the system on Ethernet/IP I/F module, the module must be registered to XG5000.

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

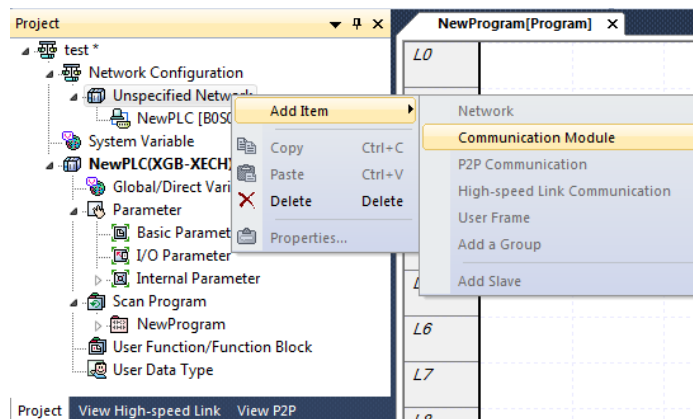
This is the way used in setting up communication modules and making up communication related parameters in the state of not connected with PLC. The execution method is as follows.

- 1) After execute XG5000, select [Project] → [New Project] 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.



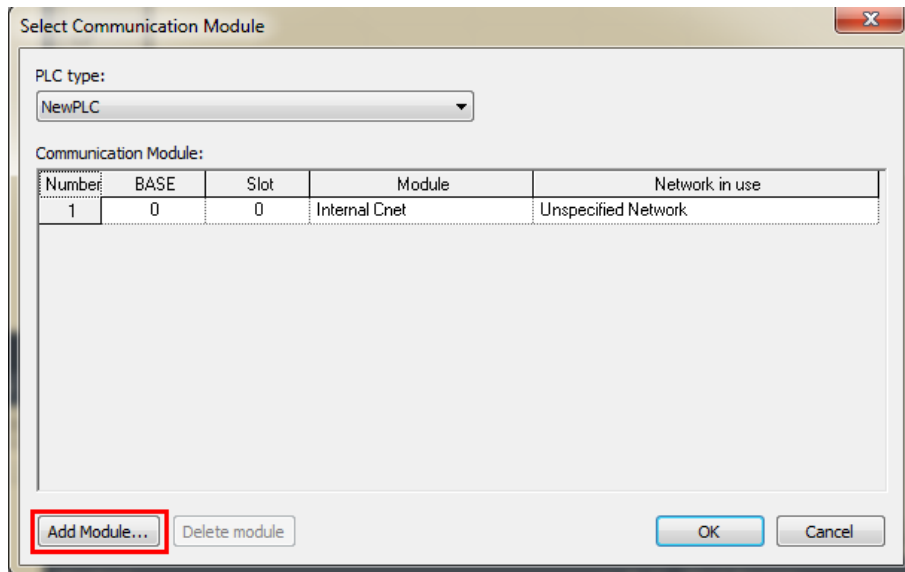
- 3) If you register a communication module without connected to PLC, Use a “Communication module setting” window. If Ethernet/IP is to be registered on base 0 and slot 1, Set it in the following procedure at a project Window.

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



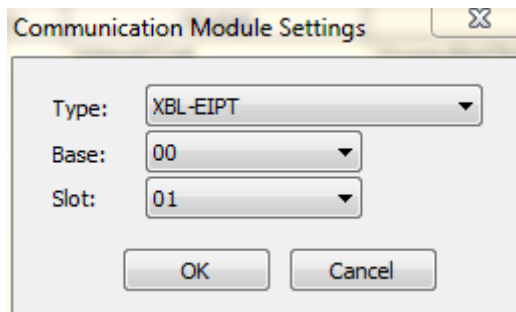
[Fig 5.2.4] Select communication module menu

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



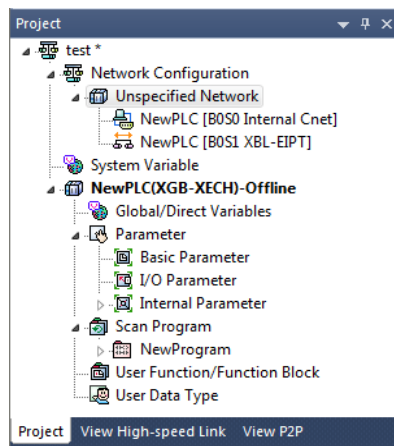
[Fig 5.2.5] Add module

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



[Fig. 5.2.6] Communication module setting


Ethernet/IP module is registered on Slot 1 of Base 0 is as shown below;

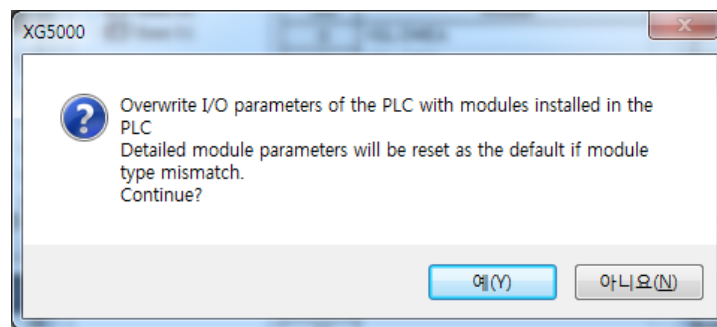


[Fig. 5.2.7] Manually register communication module

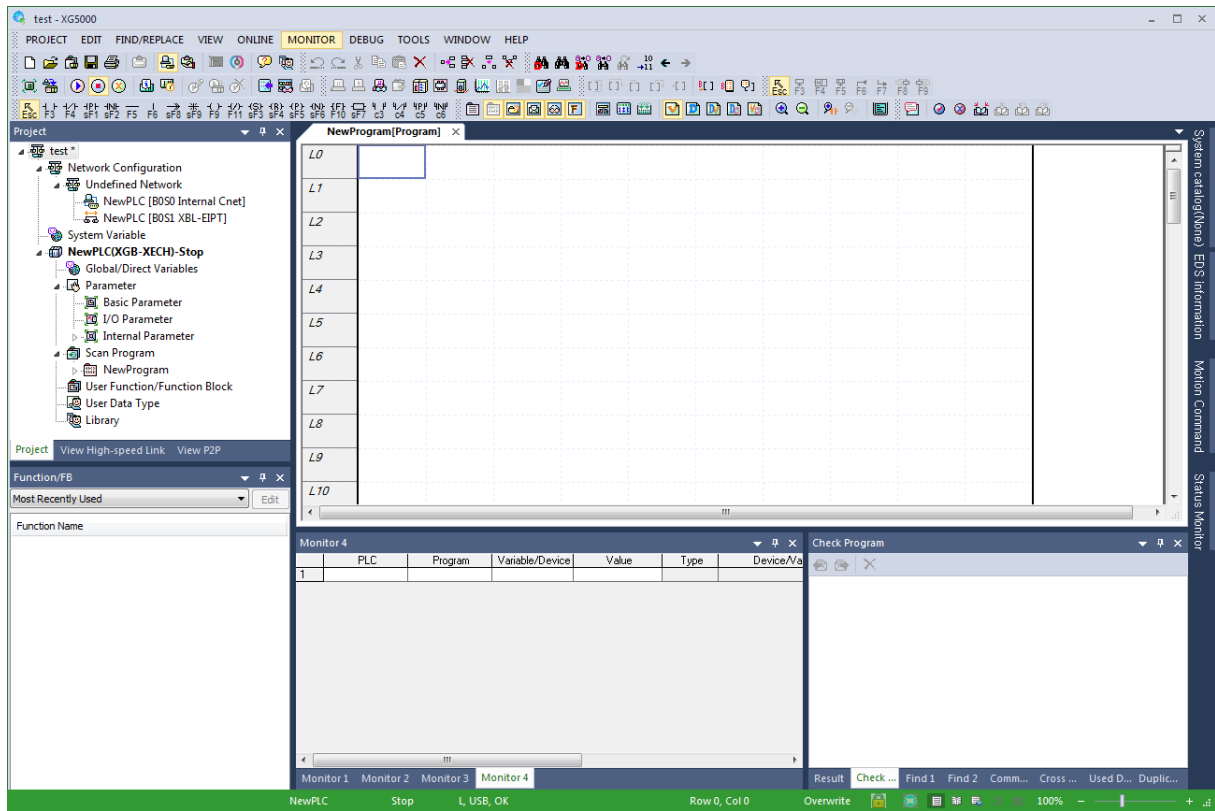
5.2.2 In case of Online

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) 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 USB 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.
- 2) When normally connected, the lower menus of online menus are activated.
- 3) To check out the modules installed to the current main unit, select [Online] → [Diagnosis] → [I/O information...], communication modules existing in the main unit 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.




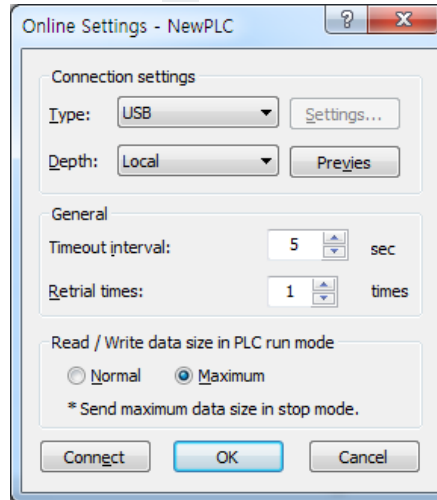
- 4) The list of the communication module installed to a product is created on "Project Window."



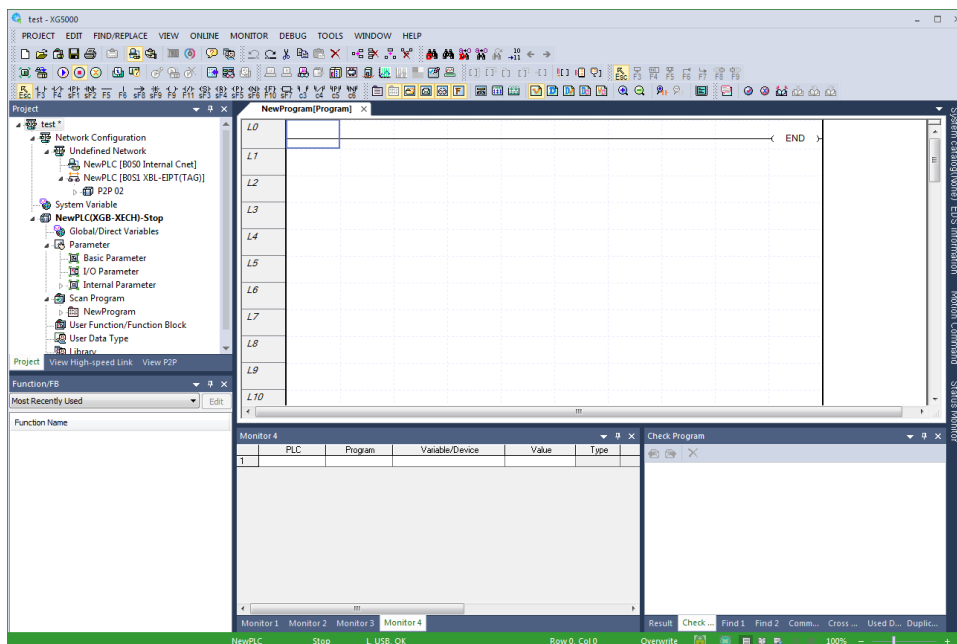
5.2.3 In case of Reading Parameter stored in PLC

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 [Project.] → [Open from PLC...] or click ().



- 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

Please refer to 5.2.1 In case of Offline.

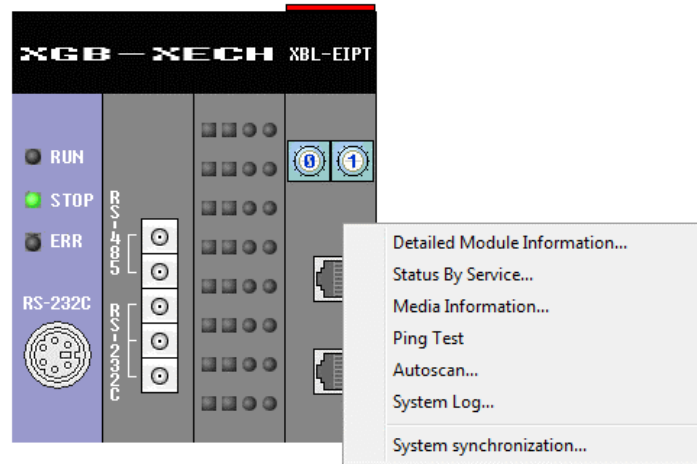
(2) I/O Information – Read

Please refer to 5.2.2 In case of Online

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 [Detailed Module Information...] or [Status By Service...].



5.2.5 Menu bar and shortcut of XG5000

The following is menu bar and short cut of XG5000. (For other menus, refer to XG5000 User's Manual)

	Menu bar	Menu	Icon	Contents
Project		New Project		Creates a new project.
		Open Project		Opens the existing project.
		Open from PLC		Uploads the project and program stored in PLC.
		Open KGLWIN File		Opens the project file for KGLWIN.
		Open GMWIN File		Opens the project file for GMWIN.
		Save Project		Saves the project.
		Save As	-	Saves the project as a different name.
		Close Project		Closes the project.
		Save as Binary		Saved as the binary file that cannot show the details of the project.
		Write Binary to PLC		Writes the binary file with the PLC. You cannot see the details of the project.
		Add Item		Adds a new item to the project.
		Import Item from File		Imports a item from a separated file.
		Export to File		Saves the selected items included opened project as separated file.
		Save Variable Names to File		Saves variable names to file for using other programs.
		Save EtherNet/IP Tags to File		Registers EtherNet/IP tag and saves the established EtherNet/IP tag list to the file.
		Compare Projects		Compares two projects stored in PC and displays its result.
		Print		Prints the active window's details.
		Preview	-	Previously displays the screen to be printed.
		Print Project	-	Selects the project item to print
		Print Setup	-	Sets the printer options.
Edit		Undo		Cancels the edit on Program Edit Window to recovers its previous status.
		Redo		Recovers the edit cancelled above.
		Cut		Copies the selects block to clipboard and deletes the block.
		Copy		Copies the selects block to the clipboard.
		Paste		Copies from the clipboard onto Edit Window.
		Delete		Deletes the selected block or items.

Menu bar		Menu	Icon	Contents
Online	ONLINE Connect Connection Settings... Safety Lock Safety Signature Change Mode Read... Write... Compare with PLC... Set Flash Memory... Control Redundancy Slave Communication Module Setting Reset/Clear Diagnosis	Connect/Disconnect		Connects or disconnects with PLC.
		Connect Settings		Specifies the connection method.
		Change Mode		Changes PLC mode.
		Read		Reads parameter/program/comment from PLC.
		Write		Writes parameter/program/comment on PLC.
		Compare with PLC		Compares the project to the project saved in PLC
		Set Flash Memory	-	Shows the window for setting up the flash memory.
		Communication Module Setting		Sets up Link-Enable and Upload/Download EIP Tag
		Reset/Clear		Reset the PLC or Clear all memory
		Diagnosis		Shows up the PLC information or history windows
Tools	TOOLS Temperature Control Position Control Address Calculator Start Simulator NC Simulator ASCII Table Library Manager Customize... Options... Setting File... EDS N Configurator	Temperature control		Executes the XG-TCON tool.
		Position control		Executes the XG-PM tool.
		Address calculator		Executes the address calculator.
		Start simulator		Starts the simulator.
		ASCII Table		Displays the ASCII code table.
		Customize		Users define tools, commands.
		Options	-	Can change the XG5000's environment for a user.
		EDS		Register or delete the EDS file used for EtherNet/IP module
		N Configurator		Executes the N Configurator tool

Chapter 6 EIP Service

6.1 EtherNet/IP Communication Method

EtherNet/IP communication methods are divided into explicit messaging connections and implicit (I/O data) connections.

An explicit messaging connection is established to execute request-response transactions between two nodes, distinguished by a client-server model. Unconnected Message Manager (UCMM) communication and Class 3 correspond to explicit messaging connections. An implicit connection is established to periodically exchange I/O data, and multicast transmission is possible with a producer-consumer model. Class 1 corresponds to implicit connection.

The producer is set to a periodic target, the consumer is set to a periodic connection, and the UCMM client is set to an acyclic connection mode. The UCMM server and Class 3 server must download the EIP tag, and there are no other communication parameter settings.

The periodic connection is similar to the high-speed link of the existing XGT communication service and is mainly used to transmit and receive data periodically. Non-periodic connection is a communication method mainly used when a specific event occurs.

6.1.1 EtherNet/IP Terms

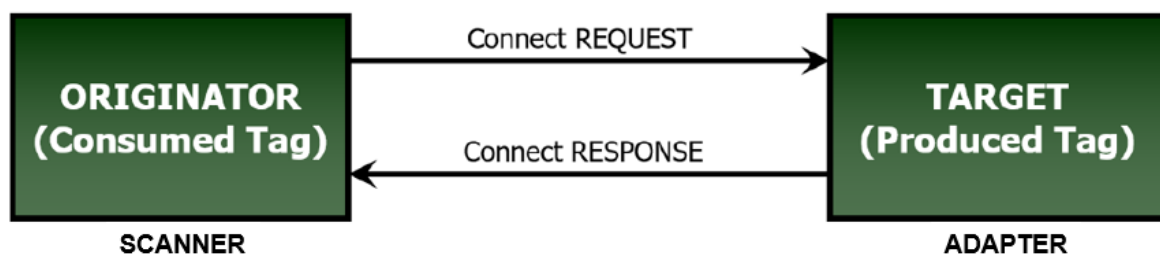
- 1) Implicit Messaging: Suggestive message, the message where the header information other than data has been implicated to the minimum (In XGB EtherNet/IP I/F module the message is provided via Implicit Connection /Implicit Target communication)
- 2) Explicit Messaging: Clear message, including all information that can translate frames besides data
(In XGB EtherNet/IP I/F module the message is provided via Explicit Connection 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 XGB 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 EDS File, EDS register menu of XG5000 should be set up.

6.1.3 Periodic Communication (Implicit) System

Implicit Message provided by periodic communication means implicit (implicit) message and contains minimum header information except the data on the frame. As a result, the frame itself is a message that does not know what the data means. This means less header information, which simplifies the process of interpreting frames, enabling faster data processing. In EtherNet / IP, a connection is established between the originator and target as parameters for data transfer. An originator is an object that receives and uses the data received after request a connection. The target receives a connection request and Transmission Cycle data desired by the originator in the requested packet interval (RPI) and the desired method (Unicast / Multicast). Therefore, the originator sets up the Consumed Tag and the target sets up the Produced Tag.

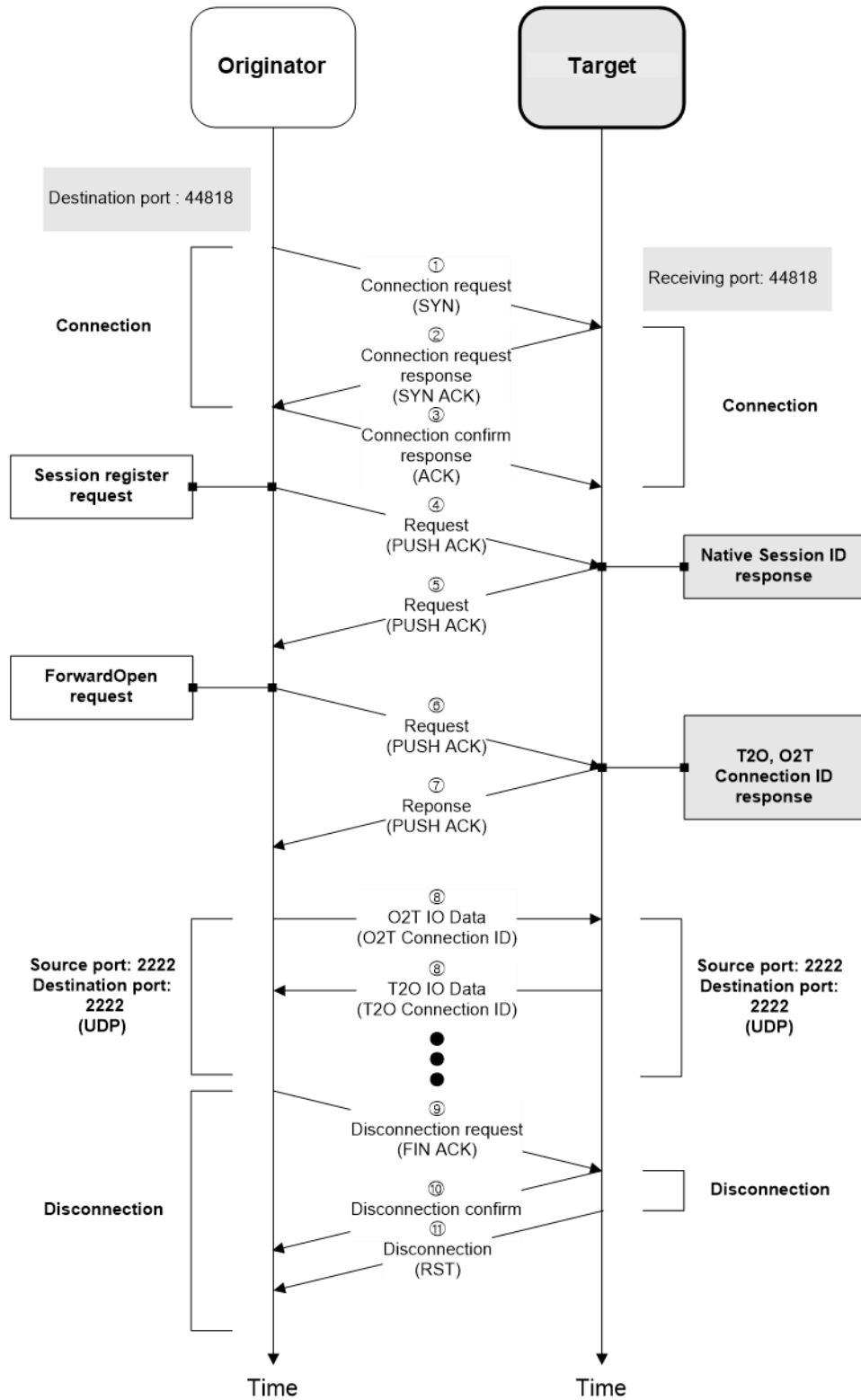


[Figure 6.1] Originator and Target in XGB EtherNet/IP I/F - Module Periodic Communication

Notice

Data is also created as a target in the originator. Depending on the I/O type, the target can set the timeout to the period of data provided by the originator, and can also output to its own module using the data provided by the originator.

Operating procedure of periodic communication is as follows.



[Figure 6.2] Operating procedure of periodic communication

6.1.4 Aperiodic Communication (Explicit) System

Explicit Message provided in aperiodic communication from XGB 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.

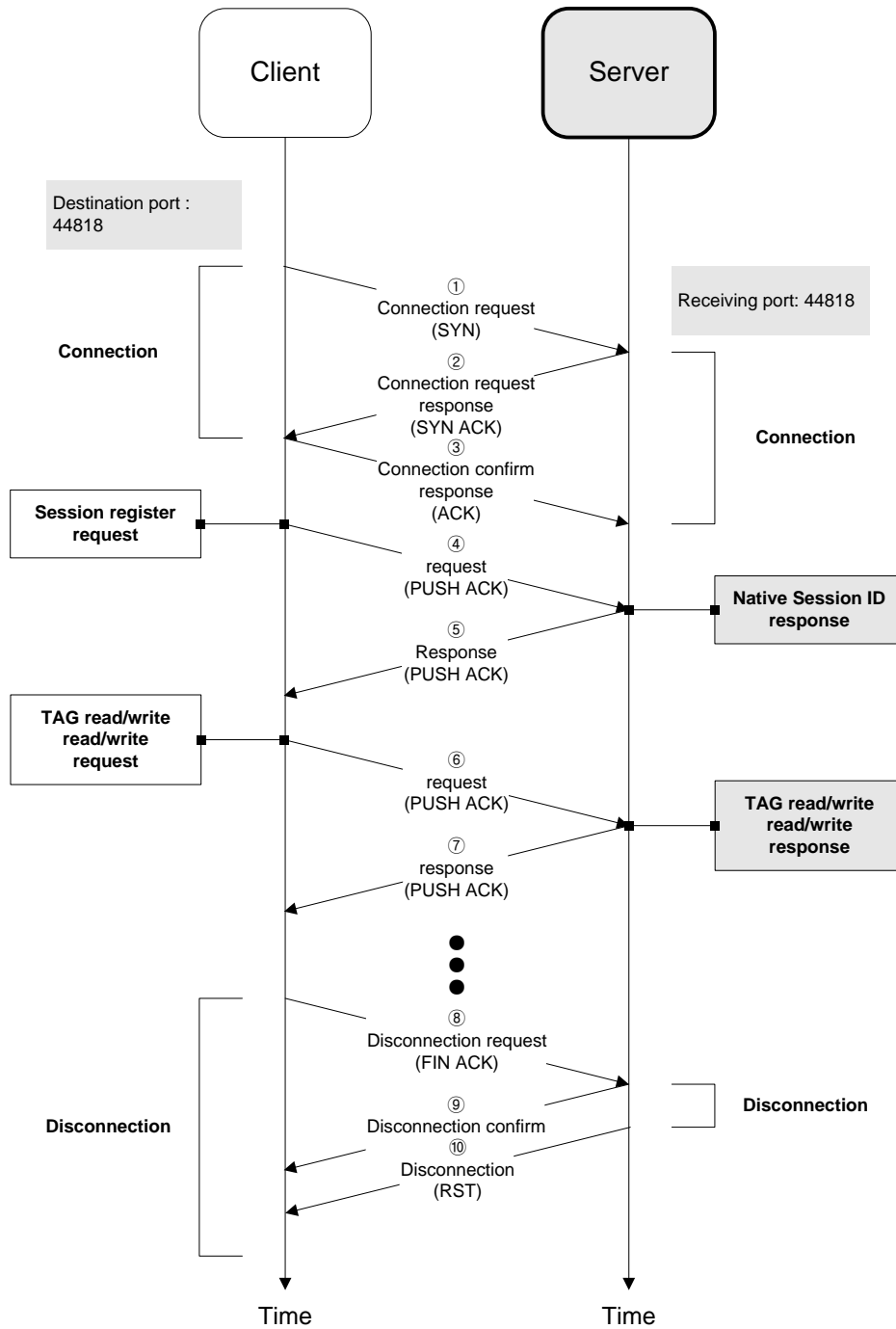
In general it is utilized as monitoring data to aperiodic data rather than control data.

The following table shows the parameter items set up when XGB EtherNet/IP I/f module is used.

Inferior Configuration	Set-up Items	Set-up Scope	Set-up or Not			Remarks
			Periodic Client	Periodic Server	Aperiodic Client	
EIP Configuration	-	-	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Drag & drop from EDS File
EIP Channel	-	0-15	<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	Set up other's IP
EIP Block	Channel	0-15	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Enter the channel you will use of set up channels in EIP channel
	Operation Mode	Pursuant to EIP Channel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Automatically displayed in accordance with set up channels
	I/O Type	Defined in EDS	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Select I/O type defined in EDS
	Connection Type	Multicast, Point to Point	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Select one among connection types defined in EDS
	Function	Write, Read, Tag Read, Tag Write	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Select one among aperiodic clients
	Parameter	Parameter item	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Set up the parameter defined in EDS - In case of Implicit Connection, only read/write can be set up for read /write
	Parameter Contents	Defined in parameter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Display the contents set up in the Parameter
	Mobile Conditions	Contact Point	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Set up mobile conditions
	Transmitting Period	20-10000	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Period transmitting data
	Timeout	x4/8/16/32/64 /128/256/512	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Transmission Period x Timeout(x4/8/16 /32/64/128/256/512)
	Data Type	BIT,1/2/4/8 BYTE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Set up a data type
	Tag Set-up/ Local Tag	PLC Device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	The device area of the local axis where "Write" or "Read" is executed you will
	Tag Set-up/ Remote Tag	Destination TAG name	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	Designate Other's TAG
Tag Set-up/Size		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Implicit Connection/Target: Maximum 500 Byte Explicit Connection: Maximum 512 Byte	

- 1) Data type: The data type is the same as above table for XBL-EIPT V1.x, and the same as the registered tag type for V2.0 or later. BOOL(BIT), BYTE, WORD, DWORD, LWORD, SINT, INT, DINT, LINT, USINT, UINT, UDINT, ULINT, REAL, LREAL types are available. The data size in V1.x is fixed at 1 for BIT and 2 BYTE in case of periodic server, but in V2.0 and above, size and type are the same as registered tags.
- 2) Tag setting / Local tag: When XBL-EIPT V2.0 or later is used, tag name can be up to 38 characters for XBC/XBM and up to 46 characters for XEC. This is the maximum number of variable names including the members of the structure.
- 3) Tag Setting / Remote Tag: In the channel where XBL-EIPT is set as Explicit Connection, remote tag name can be set up to 40 characters for IEC type and 32 characters for K type. Tag name can be up to 80 characters when operated as a Explicit server.

Operating procedure of aperiodic communication is as follows.



[Figure 6.3] Operating procedure of aperiodic communication

6.2 EIP Service

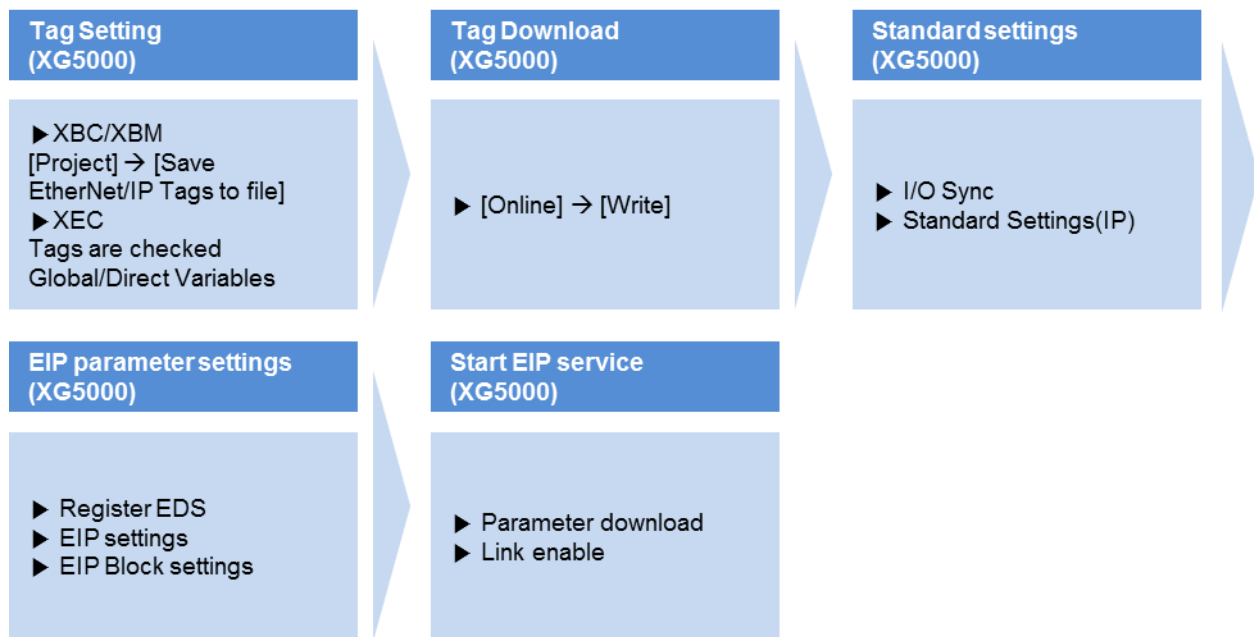
EtherNet/IP is divided into a periodic message service (Implicit Service), and an aperiodic message service (Explicit Service). In XBL-EIPT module these two services are incorporated to be provided as Implicit Connection/Target and Explicit Connection.

In Implicit Connection/Target Service, the tag for communication must be set up in parameter system. Thus, both the Scanner and Adapter must share the tag information for communication when parameter is exchanged. In XGB EhterNet/IP I/F module, Scanner and Adapter must be set up with XG5000. Make sure Scanner is set up in Implicit Connection and Adapter is set up with Implicit Target. For the detail contents, see CH 6.3.

Explicit Connection 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.

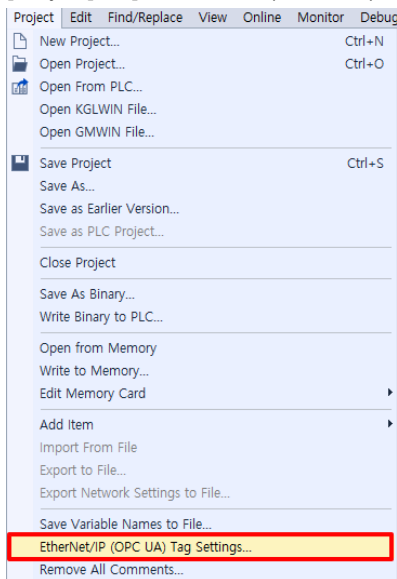


6.3 Tag setup

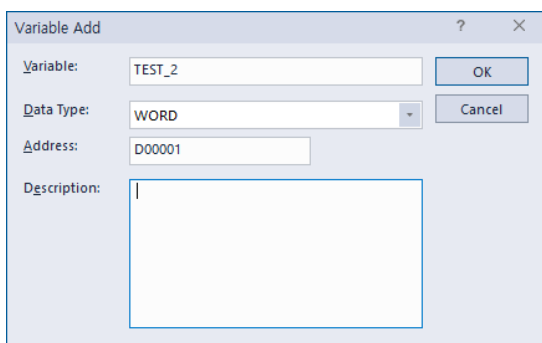
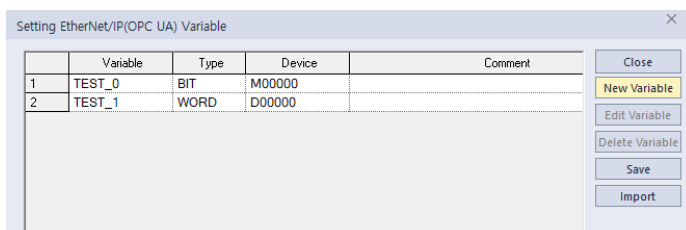
6.3.1 XBC/XBM

For XBC/XBM, you can set up the tag in [EtherNet/IP (OPC UA) Tag settings...] of the project menu. For more details, refer to the below setup procedures.

- 1) [Project] → [EtherNet/IP (OPC UA) Tag settings...]



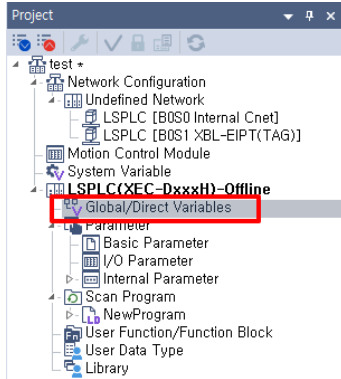
- 2) In the Setting EtherNet/IP variable window, set the EtherNet/IP variables via [New Variable]. Variable name (local tag) length is maximum 38 characters. If you select [Save] button, you can save the set variable.



6.3.2 XEC

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

- 1) [Project] → [Global/Direct Variables]



- 2) Declare the variable to be used as tag in XG5000. Variable name can be up to 46 characters, including the members of the structure

	Variable Kind	Variable	Type	Address	Initial Value	Retain	Used	EIP/OPC UA	HMI	Comment
1	VAR_GLOBAL	TEST_0	BOOL	%MX0		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	VAR_GLOBAL	TEST_1	WORD	%MW100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	VAR_GLOBAL	TEST_2	DINT	%MD100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

- 3) Tick the EIP/OPC UA Check Box to be used in EtherNet/IP.

6.3.3 Supported Device by Main Unit

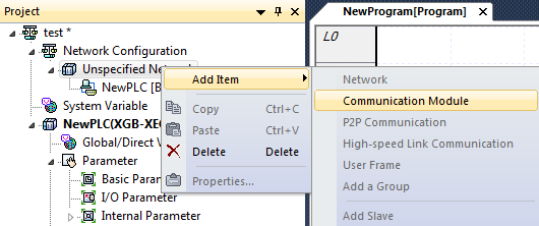
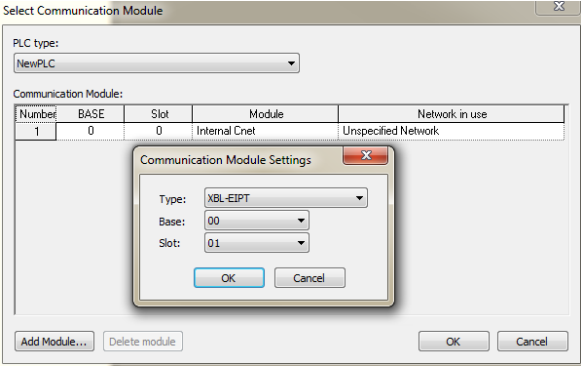
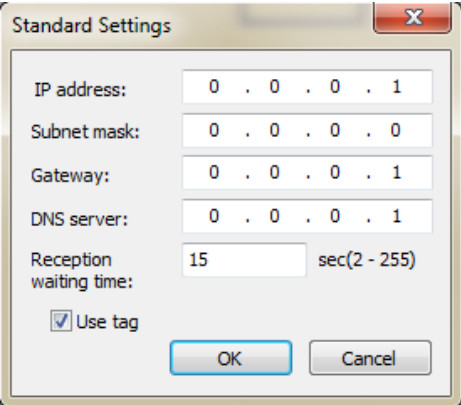
Supported Device	XBC/XBM	XEC
BIT (BOOL)	○	○
BYTE	○	○
WORD	○	○
DWORD	○	○
LWORD	○	○
SINT	○	○
INT	○	○
DINT	○	○
LINT	○	○
USINT	○	○
UINT	○	○
UDINT	○	○
ULINT	○	○
REAL	○	○
LREAL	○	○

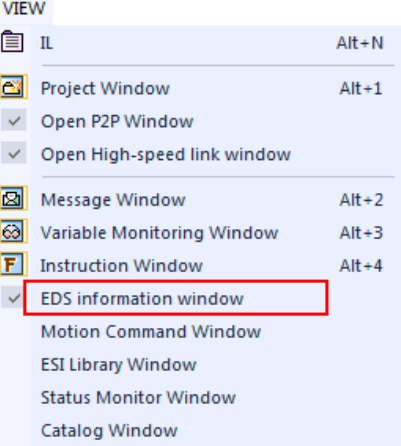
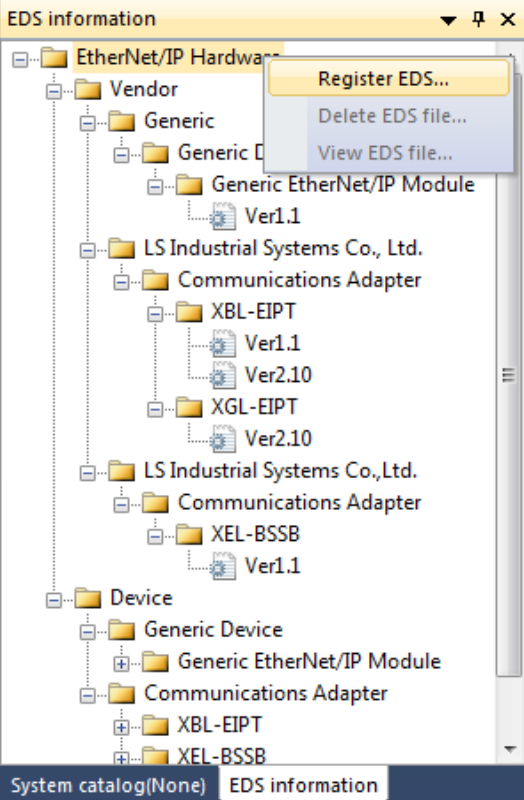
6.4 Setup of Periodic/Non-periodic Communication Service

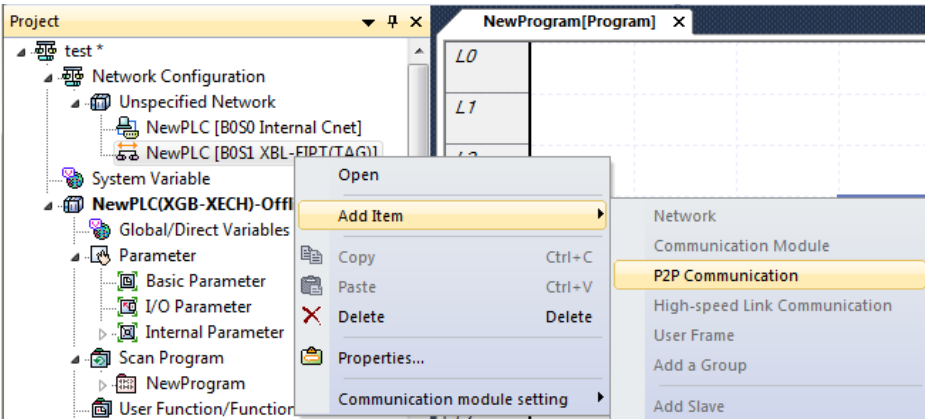
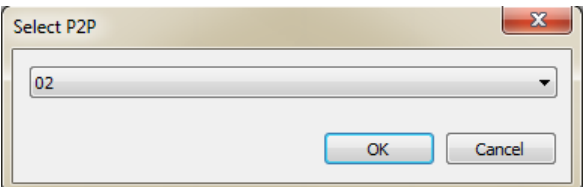
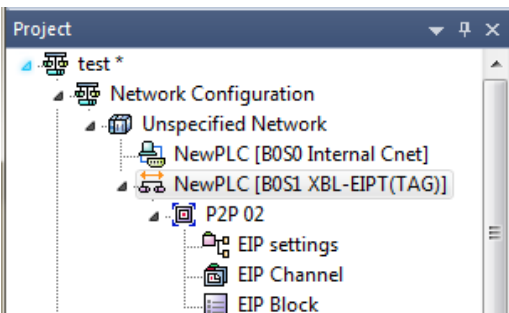
6.4.1 Implicit Connection Communication Service

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 Parameter Set - up and EDS Register

Order	Set-up Procedure	How to Set up															
1	Communication Module Set-up	<p>1) In Network Configuration, right click on the Unspecified Network and select "Add Item" -> "Communication Module".</p>  <p>2) Click the "Add Module" button in the "Select Communication Module". Select XBL-EIPT as the type in the communication module setting window and select the base and slot where XBL-EIPT is installed.</p>  <table border="1" data-bbox="376 1459 1343 1582"> <thead> <tr> <th>Number</th> <th>BASE</th> <th>Slot</th> <th>Module</th> <th>Network in use</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>0</td> <td>Internal Cnet</td> <td>Unspecified Network</td> </tr> <tr> <td>2</td> <td>0</td> <td>1</td> <td>XBL-EIPT</td> <td>Unspecified Network</td> </tr> </tbody> </table> <p>3) Double-click the communication module to set the basic parameters. At this time, if XBL-EIPT is Ver2.0 or later, use tag should be checked.</p> 	Number	BASE	Slot	Module	Network in use	1	0	0	Internal Cnet	Unspecified Network	2	0	1	XBL-EIPT	Unspecified Network
Number	BASE	Slot	Module	Network in use													
1	0	0	Internal Cnet	Unspecified Network													
2	0	1	XBL-EIPT	Unspecified Network													

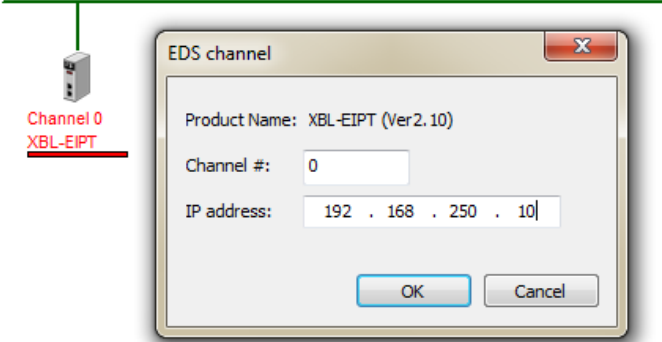
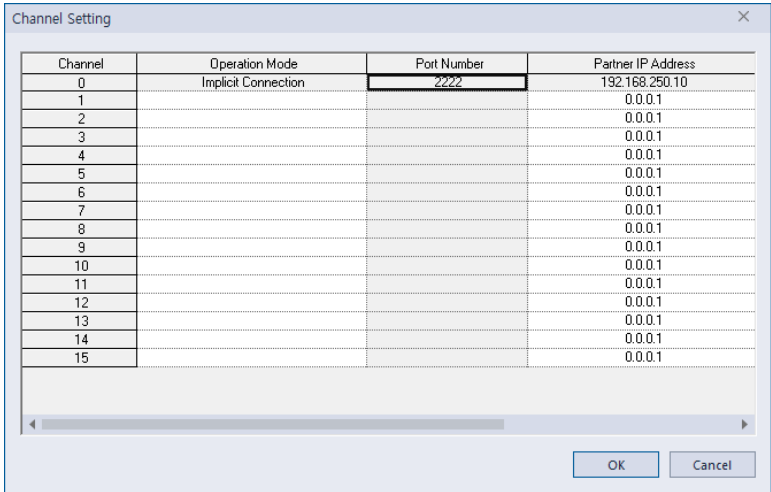
Order	Set-up Procedure	How to Set up
2	EDS File Register	<p>1) Register the EDS file of the communication module you want to set up. 2) Click 'XG5000 -> EDS information window'</p>  <p>3) Right-click on the EDS information window and a pop-up menu will appear as shown below. Select "Register EDS" and select the EDS file you want to register.</p>  <p>4) After completing the above procedures, you can see the registered EDS file in the EDS file information window. If XBL-EIPT is Ver2.0 or later, use EDS Ver2.10. If XBL-EIPT is less than Ver2.0, use EDS Ver1.1.</p>

Order	Set-up Procedure	How to Set up
3	EIP Service Register	<p>1) Right-click on the XBL-EIPT module for which you want to configure the service and select "Add Item" -> "P2P Communication".</p>  <p>2) Select the P2P number in the P2P selection window.</p>  <p>3) P2P 02 is assigned to the XBL-EIPT module installed in slot 1</p> 

Notice

P2P 01 is allocated for built-in communication, P2P 02 for the first communication module and P2P 03 for the second communication module. However, in the case of the main unit with built-in Ethernet, P2P 02 is assigned to the built-in Ethernet, and P2P 03 and P2P 04 are assigned to the communication module, respectively. Keep this in mind when setting.

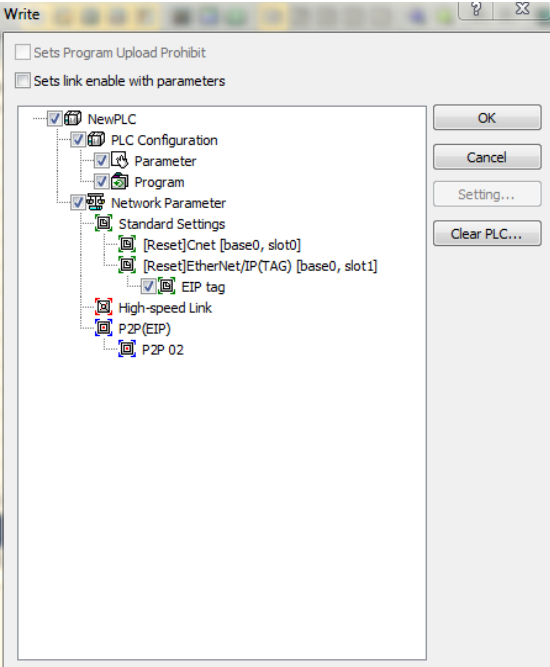
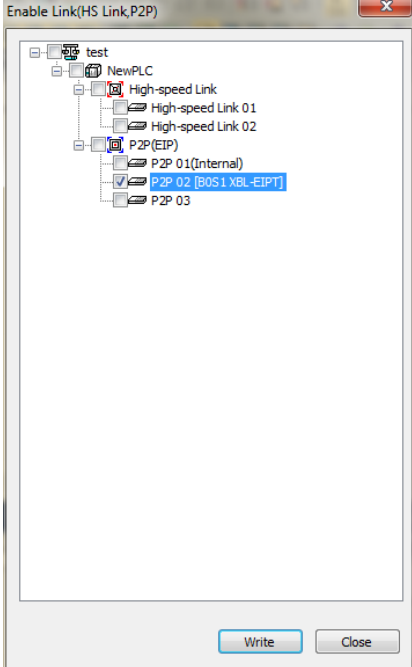
2) EIP Configuration and Parameter Set-up

Order	Set – up Procedure	How to Set up
1	EIP settings	
<p>1) Drag the registered EDS file from the EDS information window and paste it to the EIP configuration window. If the relative XBL-EIPT is V2.0 or higher, select Ver2.10 from the EDS information window and select Ver1.1 if it is V1.x. 2) The channel setup window will be displayed at the same time as pasting. 3) Set up the channel number and IP address in the setup window.</p>		
2	EIP Channel Information Check-out	
<p>1) After registration in EIP settings, it is possible to check out the information on channels in EIP channel window. 2) Implicit Connection communication does not require additional settings after registration in the EIP settings window, so the channel is deactivated. .</p>		

Order	Set-up Procedure	How to Set up																																																																																																																																																																																																																																							
3	EIP Block Set-up	<p>1) Enter the channel number set in the Implicit Connection and select the I/O type and connection type.</p> <p>2) Click the "Parameter" to change the Tag Size and Instance.</p> <p>3) How to set the Tag of EIP block depends on XBL-EIPT version</p> <p>(a) For XBL-EIPT V1.x</p> <p>a) Write the device address in the local tag of the tag settings.</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Client</td> <td>0:Input Only(ID)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Tag Size:2 Input Assembly Instance(8bit):0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>1 BYTE</td> <td>%MB0</td> <td></td> <td>2</td> </tr> </tbody> </table> <p>(b) For XBL-EIPT V2.0 or later</p> <p>a) Double-click on the local tag of the tag setting and the "Select EtherNET / IP Tag" window will appear.</p> <p>b) Double-click the tag to set it.</p> <p>c) The type of the input local tag is displayed in the data type.</p> <p>The following example shows how to set the tag size according to the tag type.</p> <table border="1"> <thead> <tr> <th></th> <th>Variable Kind</th> <th>Variable</th> <th>Type</th> <th>Address</th> <th>Initial Value</th> <th>Retain</th> <th>Used</th> <th>EIP</th> <th>HMI</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VAR_GLOBAL</td> <td>TEST_0</td> <td>BYTE</td> <td>%MB100</td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>2</td> <td>VAR_GLOBAL</td> <td>TEST_1</td> <td>WORD</td> <td>%MW100</td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>3</td> <td>VAR_GLOBAL</td> <td>TEST_2</td> <td>DINT</td> <td>%MD100</td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>4</td> <td>VAR_GLOBAL</td> <td>TEST_3</td> <td>ARRAY[0..6] OF BYTE</td> <td>%MB300</td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>5</td> <td>VAR_GLOBAL</td> <td>TEST_4</td> <td>ARRAY[0..2.0..2.0..2] OF BYTE</td> <td>%MB500</td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> </tbody> </table> <p>i) To input basic type tags such as TEST_0, TEST_1, TEST_2: Enter 1 in T20 Tag Size</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Client</td> <td>0:Input Only(ID)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Tag Size:1 Input Assembly Instance(8bit):0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>DINT</td> <td>TEST_2/%MD100</td> <td></td> <td>1</td> </tr> </tbody> </table> <p>ii) To input array type tags such as TEST_3: Enter the size of array in T20 Tag Size</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Client</td> <td>0:Input Only(ID)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Tag Size:7 Input Assembly Instance(8bit):0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>ARRAY[0..6] OF BYTE</td> <td>TEST_3/%MB300</td> <td></td> <td>7</td> </tr> </tbody> </table> <p>iii) To input a specific index of a one-dimensional array type such as TEST_3 [1]: Enter 1 for T20 Tag Size.</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Client</td> <td>0:Input Only(ID)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Tag Size:1 Input Assembly Instance(8bit):0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>BYTE</td> <td>TEST_3[1]/%MB301</td> <td></td> <td>1</td> </tr> </tbody> </table> <p>iv) To input a specific index of a 3-dimensional array type such as TEST_4 [1,1,0]: Enter 1 in T20 Tag Size</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Client</td> <td>0:Input Only(ID)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Tag Size:1 Input Assembly Instance(8bit):0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>BYTE</td> <td>TEST_4[1,1,0]/%MB512</td> <td></td> <td>1</td> </tr> </tbody> </table>	Index	Ch	Operation 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	Data count	0	0	Implicit Client	0:Input Only(ID)	Multicast		Parameter	T20 Tag Size:2 Input Assembly Instance(8bit):0		200	1. RPI x8	1 BYTE	%MB0		2		Variable Kind	Variable	Type	Address	Initial Value	Retain	Used	EIP	HMI	Comment	1	VAR_GLOBAL	TEST_0	BYTE	%MB100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		2	VAR_GLOBAL	TEST_1	WORD	%MW100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		3	VAR_GLOBAL	TEST_2	DINT	%MD100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		4	VAR_GLOBAL	TEST_3	ARRAY[0..6] OF BYTE	%MB300		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		5	VAR_GLOBAL	TEST_4	ARRAY[0..2.0..2.0..2] OF BYTE	%MB500		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Index	Ch	Operation 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	Data count	0	0	Implicit Client	0:Input Only(ID)	Multicast		Parameter	T20 Tag Size:1 Input Assembly Instance(8bit):0		200	1. RPI x8	DINT	TEST_2/%MD100		1	Index	Ch	Operation 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	Data count	0	0	Implicit Client	0:Input Only(ID)	Multicast		Parameter	T20 Tag Size:7 Input Assembly Instance(8bit):0		200	1. RPI x8	ARRAY[0..6] OF BYTE	TEST_3/%MB300		7	Index	Ch	Operation 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	Data count	0	0	Implicit Client	0:Input Only(ID)	Multicast		Parameter	T20 Tag Size:1 Input Assembly Instance(8bit):0		200	1. 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		3	VAR_GLOBAL	TEST_2	DINT	%MD100		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																														
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- 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 Target side will be opened based on the connection method set here.
- 4) Access mode: Sets up how to communicate with the Target. 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 Target side that should be set by a user. For more details on parameters, refer to the Target manual.
 - ▶ Input Only(ID): Data is provided in the T-> O direction and heartbeat is provided in the O-> T direction.
 - ▶ Listen Only(ID): A non-Listen Only connection must exist to allow access. Data is provided in the T-> O direction and heartbeat is provided in the O-> T direction. If the non-Listen Only connection requests T-> O path does not exist, return an error.
 - ▶ Exclusive Owner(ID): T-> O, O-> T Connection type that can provide data in both directions. The Target accepts only one exclusive owner connection for the same O-> T path.
 - ▶ Input Only(Tag): Data is provided in the T-> O direction and heartbeat is provided in the O-> T direction. Input Only (ID) specifies the input assembly instance of the Target, whereas Input Only (Tag) specifies the tag name of the Target.
 - i) T2O Tag Size: Number of data to read from the Target side. It also appears in the Size of the Tag settings.
 - ii) O2T Tag Size: Number of data to write to the Target side. It also appears in the Size of the Tag settings.
 - iii) Output Assembly Instance (8bit): Block number on the Target side to write.
 - Generic EDS: It should be set to 150 when connecting to the Implicit Target set in P2P block 0 of XGB.
 - XBL-EIPT EDS: It should be set to 0 when connecting to the Implicit Target set in P2P block 0 of XGB. (The offset is set to 150 in XBL-EIPT EDS (set value +150).)
 - iv) Input Assembly Instance (8bit): Block number on the Target side to read.
 - Generic EDS: It should be set to 100 when connecting to the Implicit Target set in P2P block 0 of XGB.
 - XBL-EIPT EDS: It should be set to 0 when connecting to the Implicit Target set in P2P block 0 of XGB. (The offset is set to 100 in XBL-EIPT EDS (set value +100).)
- 6) Parameter Contents: Displays the details of the set parameters.
- 7) Transmission period (ms): Means the transmission cycle of the data and the setting range is 20~10000 ms.
- 8) Timeout: 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 x4~512.
- 9) Date Type: Displays the tag type set in the local tag..
- 10) Local Tag: Set the area to read or write local data
In case of V2.0 or later, the size of the local tag must be the same as the Tag Size of the parameter contents.
- 11) Remote Tag: Input the set Producer Tag to the opposing station for the period communication

3) Parameter download and Link enable

Order	Set-up Procedure	How to Set up
		<p>1) After clicking [Online] → [Write], check the set Network Parameter and click [OK]. If "Set link enable with parameter" is checked, 'Enable Link' setting can be made at the same time.</p>  <p>Write</p>
4	<p>Parameter and Enable Link</p>	<p>2) After clicking [Online] → [Communication module setting] → [Enable Link], check the P2P(EIP) and click [Write]. If "Set link enable with parameter" is checked, 'Enable Link' setting can be made at the same time. If you do not check Link Enable, the set EIP will not be operated</p> 

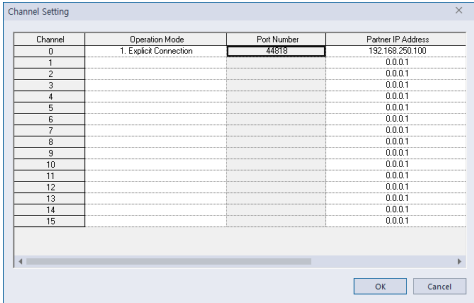
6.4.2 Explicit Connection Communication Service

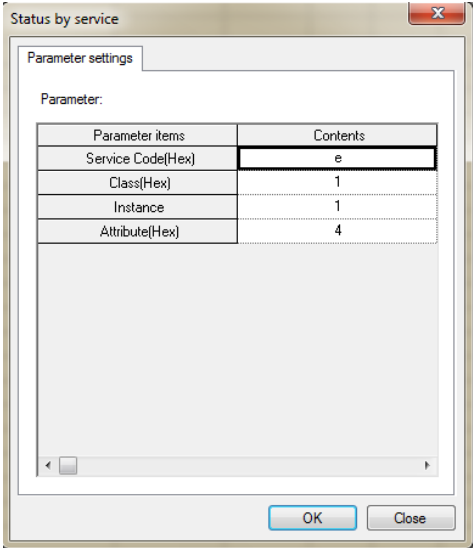
Aperiodic Communication is the service to read or write the opposing tag data. It can be used similarly to XGB's P2P service and you can use it by setting the opposing tag data without setting EDS..

1) Basic Parameter Set-up and EIP Service Register

For basic parameter setting, refer to 1) Basic Parameter Set-up and EDS Register of 6.4.1 Implicit Connection Communication Service.

2) EIP Channel and Parameter Set-up

Order	Set-up Procedure	Hot to Set up																																																																																																																																				
1	EIP Channel Information Check-out																																																																																																																																					
<p>1) Set the Operation mode of EIP channel to 'Explicit Connection.' 2) Input the IP address of the opposing station.</p>																																																																																																																																						
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Order	Set-up Procedure	Hot to Set up
	Block Set-up	<p>▶ Example of Parameter Set-up</p> 
2		<ol style="list-style-type: none"> 1) Channel: Select and use the one among those set up with Explicit Connection. 2) Operating Mode: Displays the operation mode depending on the set channel. 3) Function: There are 'Tag Read' command that reads and saves the tag data from the server; 'Tag Write' command that saves the data to the server; 'Read/Write' that inputs directly the parameters not tag. 4) Parameter: Can be set only when setting 'Read/Write' in Functions. <ul style="list-style-type: none"> ▶ Service Code(Hex): Input the service code to be used. (Example.: 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) Conditional flag: Sets the operation conditions to send messages. 6) Data Type: <ol style="list-style-type: none"> i) For XBL-EIPT V1.x: Input the Data Type if Tag that you will set up. ii) For XBL-EIPT V2.0 or later: If you select the local tag, the data type of the selected tag will be displayed. 7) Tag Settings <ol style="list-style-type: none"> a) Local tag: Set up the client's (own) tag. b) Remote tag: Set up the server's tag. The remote tag name can be set up to 40 characters for XEC and 32 characters for XBC / XBM. c) Size <ol style="list-style-type: none"> i) For XBL-EIPT V1.x: Sets up the size depending on the data type. ii) For XBL-EIPT V2.0 or later: If you select the local tag, the size of the selected tag will be displayed.

3) Parameter download and Link enable

Refer to 3) Parameter download and Link enable of 6.4.1 Implicit Connection Communication Service.

After adding two XBL-EIPTS to a basic unit and registering 32 blocks as Explicit Connection for one and setting another module acting as server, if you time how long it takes for 32 blocks to be serviced, it is 1.3s. So time to deal with 1 block is about 40ms, when registering 32 blocks, service count per second get less 1. So if you set start condition fast, the service faster than 1.3 is not available.

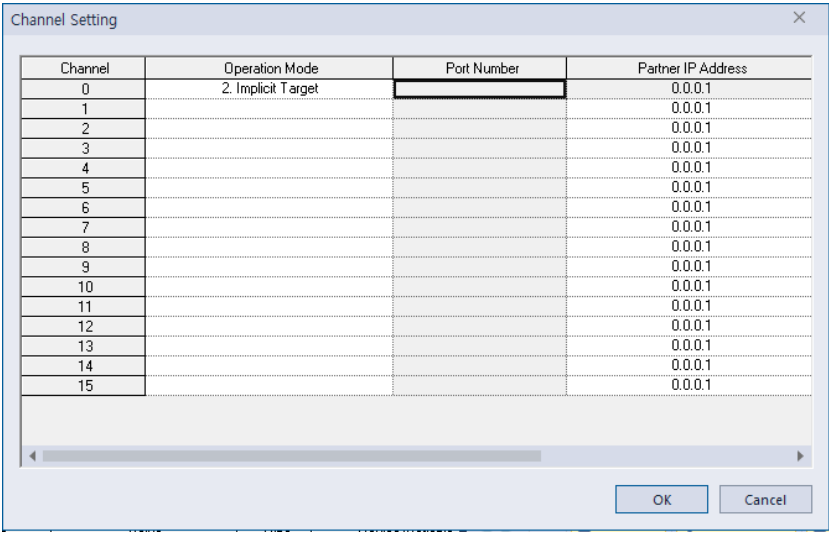
6.4.3 Implicit Target Communication Service

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

1) Basic Parameter Set-up and EIP Service Registry

For basic parameter setting, refer to 1) Basic Parameter Set-up and EDS Register of 6.4.1 Implicit Connection Communication Service.

2) EIP Channel and Parameter Set-up

Order	Set - up Procedure	How to Set up
1	EIP Channel Information Check - out	
<p>1) Set the Operation mode of EIP channel to 'Implicit Target' .</p> <p>2) The module for which the basic parameters are set is operated as the Implicit Target so you do not need to input the IP address of the opposing station.</p>		

Order	Set - up Procedure	How to Set up																																																																																																																																																												
2	Block Set-up	<p>► Example of Block Set-up</p> <p>(a) For XBL-EIPT V1.x</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <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>2 BYTE</td> <td>%MW0</td> <td></td> <td>1</td> </tr> <tr> <td>1</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>2 BYTE</td> <td>%MW100</td> <td></td> <td>2</td> </tr> <tr> <td>2</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>2 BYTE</td> <td>%MW200</td> <td></td> <td>10</td> </tr> <tr> <td>3</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>2 BYTE</td> <td>%MW300</td> <td></td> <td>20</td> </tr> </tbody> </table> <p>(b) For XBL-EIPT V2.0 or later</p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Ch</th> <th rowspan="2">Operation 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>Data count</th> </tr> </thead> <tbody> <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>BYTE</td> <td>TEST_0/%MB100</td> <td></td> <td>1</td> </tr> <tr> <td>1</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/%MW100</td> <td></td> <td>1</td> </tr> <tr> <td>2</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>DINT</td> <td>TEST_2/%MD100</td> <td></td> <td>1</td> </tr> <tr> <td>3</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>ARRAY[0..6] OF BYTE</td> <td>TEST_3/%MB300</td> <td></td> <td>7</td> </tr> </tbody> </table> <p>1) Channel : Select and use the one among the channels where Implicit Target have been set up</p> <p>2) Operating Mode: The operation mode of the channel set up according to the channel set-up is displayed</p> <p>3) Date Type</p> <p>i) For XBL-EIPT V1.x: Fixed to 2 bytes.</p> <p>ii) For XBL-EIPT V2.0 or later: If you select the local tag, the data type of the selected tag will be displayed.</p> <p>4) Local Tag: This tag is the device area of the module operating via Implicit Target.</p> <p>5) Size</p> <p>i) For XBL-EIPT V1.x: Input the data size of the module operating via Implicit Target.</p> <p>ii) For XBL-EIPT V2.0 or later: If you select the local tag, the size of the selected tag will be displayed.</p>	Index	Ch	Operation 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	Data count	0	0	Implicit Server									2 BYTE	%MW0		1	1	0	Implicit Server									2 BYTE	%MW100		2	2	0	Implicit Server									2 BYTE	%MW200		10	3	0	Implicit Server									2 BYTE	%MW300		20	Index	Ch	Operation 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	Data count	0	0	Implicit Server									BYTE	TEST_0/%MB100		1	1	0	Implicit Server									WORD	TEST_1/%MW100		1	2	0	Implicit Server									DINT	TEST_2/%MD100		1	3	0	Implicit Server									ARRAY[0..6] OF BYTE	TEST_3/%MB300		7
		Index													Ch	Operation Mode	I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Time out	Data type	tag settings																																																																																																																																				
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3) Parameter download and Link enable

Refer to 3) Parameter download and Link enable of 6.4.1 Implicit Connection Communication Service.

When a user sets up the module operating via Implicit Target, the index of EIP block is granted the following meanings.

(In case of being set by other company's client)

1. Input Assembly Instance's start index is 100
2. Output Assembly Instance's start index is 150
3. For example, in case index 0 is set as Implicit Target, Input Assembly Instance should be 100 and Output Assembly Instance should be 150.
4. O2T Input Only Heartbeat Instance ID is 198.
5. O2T Listen Only Heartbeat Instance ID is 199.
6. Configuration Assembly Instance ID is 197.

6.4.4 Aperiodic Server Communication Service

1) Basic Parameter Set-up and EIP Service Registry

For basic parameter setting, refer to 1) Basic Parameter Set-up and EDS Register of 6.4.1 Implicit Connection Communication Service.

2) EIP Channel and EIP Block do not need to be set if they only operate as aperiodic servers.

3) Parameter download and Link enable

Refer to 3) Parameter download and Link enable of 6.4.1 Implicit Connection Communication Service.

6.4.5 Tag naming rule for aperiodic communication services

This chapter describes on how to name the tag in the client when EtherNet/IP I/F module acts as aperiodic server. When our company's EtherNet/IP modules, XBL-EIPT or XGL-EIPT become the client, you input the tag name of the server at the "Remote tag" in the XG5000. For one TAG READ or WRITE request frame, up to 64 tags are allowed. But in case XBL-EIPT, XGL-EIPT is client, you can input only one tag.

i) For XBL-EIPT V1.x

Index	Ch	Operation 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	Data count
0	0	Explicit Client			0. TAG READ			_T200MS			2 BYTE	%Mw100	%Mw0	1

ii) For XBL-EIPT V2.0 or later

For Tag registration, refer to 6.3 Tag setup.

Index	Ch	Operation 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	Data count
0	0	Explicit Client			0. TAG READ			_T200MS			WORD	TEST_1/%Mw100	%Mw0	1

1) Tag type and size

For XBL-EIPT V1.x, max Read/Write count and EIP type per one tag by type are as follows..

	Bit	Byte	Word	Double Word	Long Word
Max. count	1	512	256	128	64
EIP type	<u>hC1</u>	hC2, <u>hC6</u> , hD1	hC3, <u>hC7</u> , hD2	hC4, <u>hC8</u> , hD3, hCA	hC5, <u>hC9</u> , hD4, hCB

Notice

For XBL-EIPT V1.x: When acting as server, this is available EIP type list. Types other than them are considered as error. Type with an underline, when XGL-EIPT, XBL-EIPT is client, is EIP type which is changed about the type set in the XG5000. When the server responds, it responds by using the requested type.
 For XBL-EIPT V2.0 or later: The registered tag type will be used as it is.

2) Standard for tag naming

This information applies to XBL-EIPT V1.x.

There are 5 kinds of the supported type (Bit, Byte, Word, Double Word, Long Word). The format of tag name per type is as follows.

a) Bit type tag format

'%' (1 letter)	Device name (1letter)	Type (1 letter)	Word address (at least 1 letter)	Bit address (1 letter)
'%'	Refer to 3.4 Available device area	'X' or 'x'	Refer to 3.4 Available device area	'0' ~ 'F'

- 1) '%' is not necessary item. Tag name can start from '%' or device name.
- 2) Both small letter and capital letter are available for device name.
- 3) Both small letter 'a' ~ 'f' and capital letter 'A' ~ 'F' are available for bit address.

- Valid tag name example) "PX0F"

- Invalid tag name example) "MX0" -> there have to be at least 2 letters after type

b) Byte, Word, Double Word, Long Word type tag format

'%' (1Byte)	Device name (1Byte)	Type (1Byte)	Word address
'%'	Refer to 3.4 Available device area	Byte: 'B' or 'b' Word: 'W' or 'w' Double Word: 'D' or 'd' Long Word: 'L' or 'l'	Refer to 3.4 Available device area

- 1) '%' is not necessary item. Tag name can start from '%' or device name.
- 2) Both small letter and capital letter are available for device name.

- Valid tag name example) "MW0"

- Invalid tag name example) "M0000" -> There have to be type after device name

Notice

The following is EIP data type used at the XBL-EIPT which comes from CIP (Common Industrial Protocol) certificate

C-5.2.1 BOOL Encoding

If the value is:	Then:
FALSE	bit 0 of the octet is 0 ('00'H)
TRUE	bit 0 of the octet is 1 ('01'H)

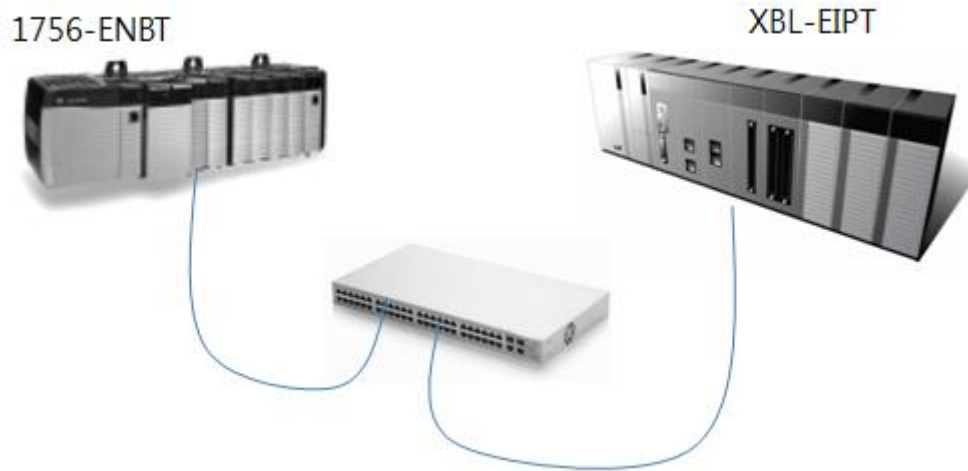
C-6.1 Elementary Data type Reporting

Data Type Name	Data Type Code (in hex)	Data Type Description
BOOL	C1	Logical Boolean with values TRUE and FALSE
SINT	C2	Signed 8-bit integer value
INT	C3	Signed 16-bit integer value
DINT	C4	Signed 32-bit integer value
LINT	C5	Signed 64-bit integer value
USINT	C6	Unsigned 8-bit integer value
UINT	C7	Unsigned 16-bit integer value
UDINT	C8	Unsigned 32-bit integer value
ULINT	C9	Unsigned 64-bit integer value
REAL	CA	32-bit floating point value
LREAL	CB	64-bit floating point value
BYTE	D1	bit string - 8-bits
WORD	D2	bit string - 16-bits
DWORD	D3	bit string - 32-bits
LWORD	D4	bit string - 64-bits

6.5 Examples

6.5.1 Communication with Rockwell 1756-ENBT Communication Module

The system configuration is as follows.



Segment	1756-ENBT	XBL-EIPT
IP Address	192.168.250.41	192.168.250.52

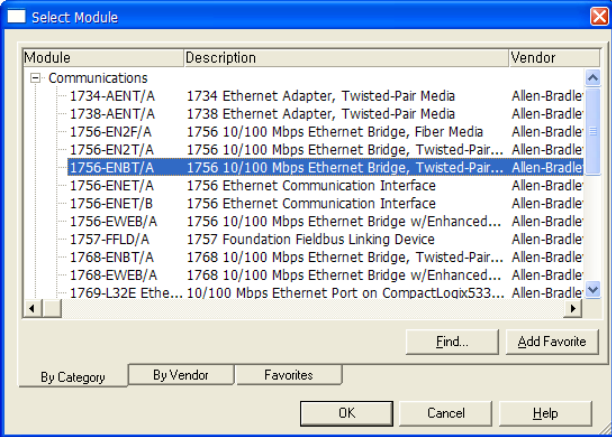
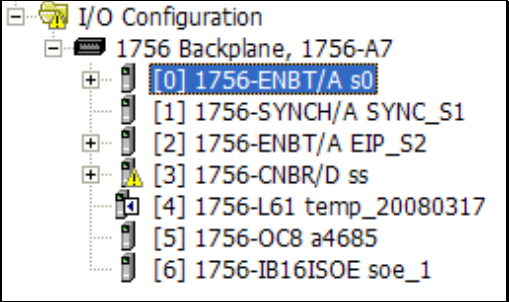
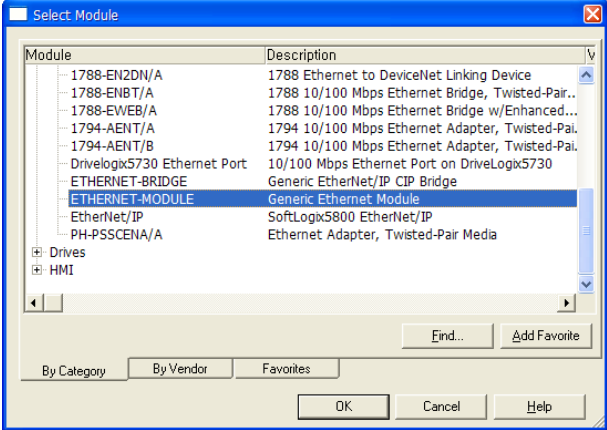
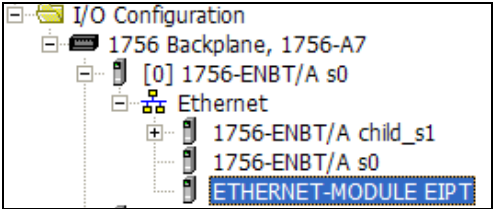
1. Setup of 1756-ENBT Consumer, XBL-EIPT Producer

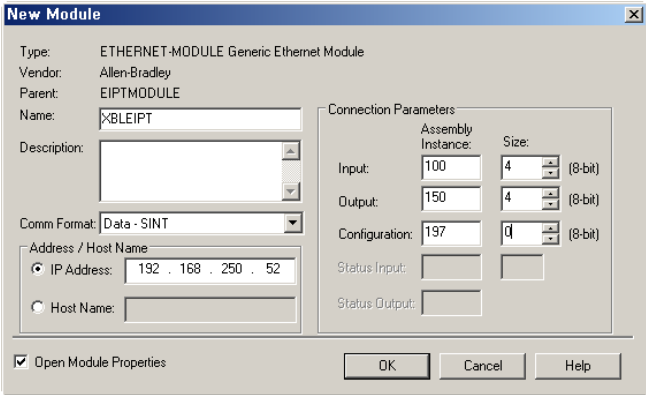
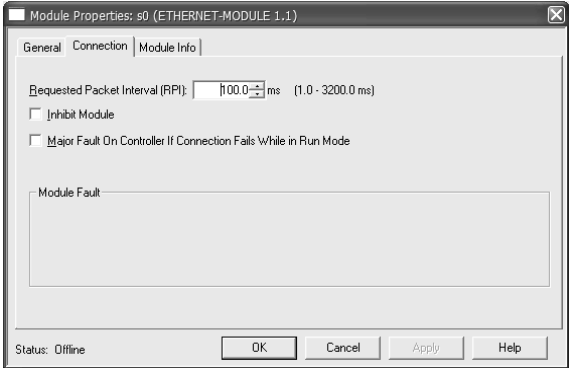
(1) Setup of XGB Ethernet/IP I/F module parameter

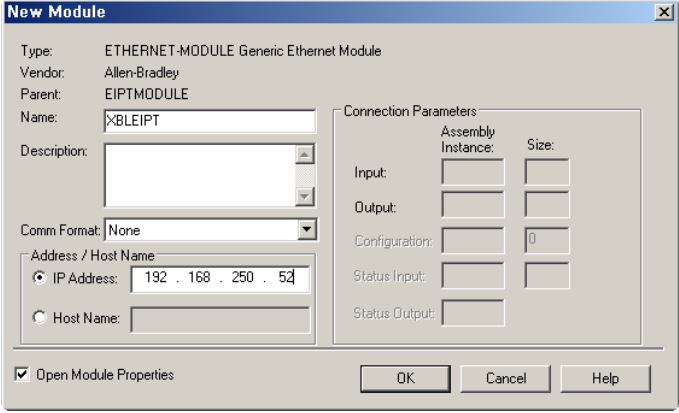
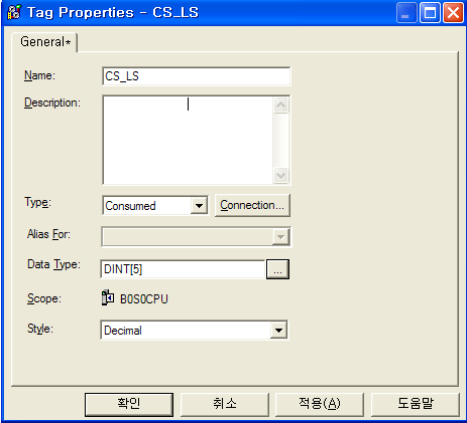
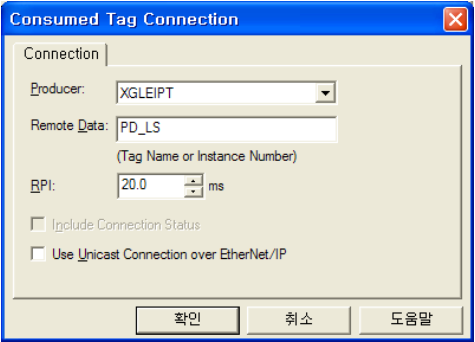
XGB is used as producer so refer to the details of the above 6.4.3 to set it as Implicit Target.

Order	Set-up Procedure	How to Set up																																																																		
1	Producer Set-up	<p><XBL-EIPT V1.x></p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Channel</th> <th rowspan="2">Operation 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">Timeout</th> <th rowspan="2">Data Type</th> <th colspan="3">tag settings</th> </tr> <tr> <th>Local tag</th> <th>Remote tag</th> <th>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Target</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2 BYTE</td> <td>%MW2000</td> <td></td> <td>10</td> </tr> </tbody> </table> <p><XBL-EIPT V2.0 or later></p> <table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Channel</th> <th rowspan="2">Operation 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">Timeout</th> <th rowspan="2">Data Type</th> <th colspan="3">tag settings</th> </tr> <tr> <th>Local tag</th> <th>Remote tag</th> <th>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Target</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>ARRAY[0..4] OF DINT</td> <td>PD_LS/%MD1000</td> <td></td> <td>5</td> </tr> </tbody> </table> <p>1) Channel: Selects one among the channels set as Implicit Target. 2) Operating Mode: Displays the operation mode depending on the set channel. 3) Data Type: Shows the data type of the set tag. 4) Local Tag : This tag is the device area of the module operating via Implicit Target 5) Size: The data size of the module operating via Implicit Target . If V2.0 or later, shows the number of selected local tags</p>	Index	Channel	Operation Mode	I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Timeout	Data Type	tag settings			Local tag	Remote tag	Data count	0	0	Implicit Target									2 BYTE	%MW2000		10	Index	Channel	Operation Mode	I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Timeout	Data Type	tag settings			Local tag	Remote tag	Data count	0	0	Implicit Target									ARRAY[0..4] OF DINT	PD_LS/%MD1000		5
Index	Channel	Operation Mode													I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Timeout	Data Type	tag settings																																												
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												Local tag	Remote tag	Data count																																																						
0	0	Implicit Target									ARRAY[0..4] OF DINT	PD_LS/%MD1000		5																																																						

(2) Rockwell 1756-ENBT Communication Module and Communication Set-up
Set up Rockwell's Client using Rockwell's S/W(RSLogix 5000)

Order	Set-up Procedure	How to Set up
1	Module Set - up	 
Search for the module in I/O Configuration and install it		
2	Network Module Installation	 
<p>1) If ENBT Module has been installed, extend it into network and install the module of the network connected.</p> <p>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.</p> <p>3) For the connection of XGT EtherNet/IP I/F Module, set up Generic Device.</p>		

Order	Set-up Procedure	How to Set up										
3	Network Address and Connection Information Input/ RPI set-up/ Tag set-up	<p>1) Communication based on Assembly Instance</p> <p>a) Input the IP Address and Connection Parameter.</p>  <p>b) Input the RPI.</p>  <p>i) Requested Packet Interval (RPI): Set up the period of data that a user will receive from Implicit Target.. Scanner sets up on what information to get and the Adapter adopts this set-up, data (Produced Tag) will be transmitted as the way set up. Thus, Scanner allots to this RPI parameter in how long period Adapter will transmit.</p> <p>ii) If clicking OK, parameter is downloaded and is automatically connected. Then, data communication starts.</p> <p>c) When a module set up, the tag named to Controller Tags in module name is automatically set up, so the check-out of data is confirmed in Controller Tags. In case of being set up as seen above, data check - out is available in EIPT: I.</p> <table border="1" data-bbox="404 1640 1428 1722"> <tr> <td>- EIPT:I</td> <td>{...}</td> <td>{...}</td> <td></td> <td>AB:ETHERN...</td> </tr> <tr> <td>+ EIPT:I.Data</td> <td>{...}</td> <td>{...}</td> <td>Decimal</td> <td>SINT[4]</td> </tr> </table>	- EIPT:I	{...}	{...}		AB:ETHERN...	+ EIPT:I.Data	{...}	{...}	Decimal	SINT[4]
- EIPT:I	{...}	{...}		AB:ETHERN...								
+ EIPT:I.Data	{...}	{...}	Decimal	SINT[4]								

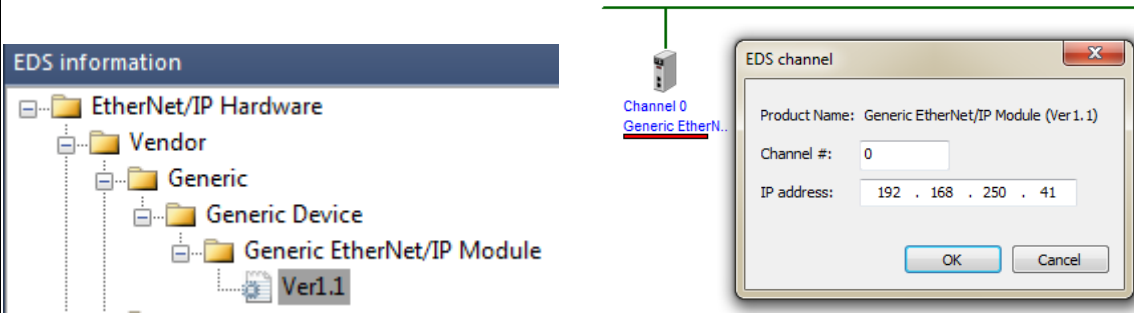
Order	Set-up Procedure	How to Set up
3	Network Address and Connection Information Input/ RPI set-up/ Tag set-up	<p>2) Communication based on Tag.</p> <p>a) Input the IP Address.</p>  <p>b) Input the Producer Tag and Consumer Tag.</p>   <p>i) Name: Input the name of the consumer tag. ii) Data Type: Input the data type to be communicated. iii) Connection: Input the producer tag to be connected with the consumed tag. iv) RPI: Input the transmission cycle that the producer will receive.</p>

Order	Set-up Procedure	How to Set up
3		<p>1) Name: Input the name to be used for the module.</p> <p>2) IP Address: Input XBL-EIPT module's IP.</p> <p>3) Comm. Format: Set to "None" for communication based on Tag. Set "Input Data - SINT" for communication based on Assembly Instance.</p> <p>4) Connection Parameter: Activated when "Comm Format" is selected as "None" and enter connection parameters. Mapping has been done between this information and block index number, and the number has been allotted to Consumed Tag input by blocks and Produced Tag output, respectively. XBL-EIPT operates as Implicit Target.</p> <p>(a) Assembly Instance</p> <p>i) In case of Input Only</p> <ul style="list-style-type: none"> - Input Assembly Instance: '100+P2P index number' in Generic EDS, 'P2P index number' in XBL-EIPT EDS - Output Assembly Instance: '198' (Heartbeat Assembly Instance) <p>ii) In case of Listen Only</p> <ul style="list-style-type: none"> - Input Assembly Instance: '100+P2P index number' in Generic EDS, 'P2P index number' in XBL-EIPT EDS - Output Assembly Instance: '199' (Heartbeat Assembly Instance) <p>iii) In case of Exclusive Owner</p> <ul style="list-style-type: none"> - Input Assembly Instance: '100+P2P index number' in Generic EDS, 'P2P index number' in XBL-EIPT EDS - Output Assembly Instance: '150+P2P index number' in Generic EDS, 'P2P index number' in XBL-EIPT EDS <p>(b) Configuration Assembly Instance: 197</p> <p>(c) Size : When Generic EDS, Byte unit When XBL-EIPT Ver1.1 EDS, Word unit</p>

2. Setup of 1756-ENBT Producer, XBL-EIPT Consumer

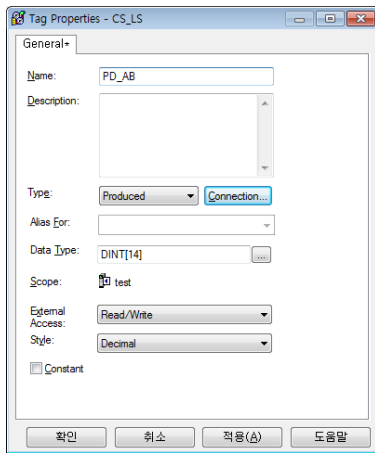
(1) Setup of XGB Ethernet/IP I/F module parameter

XGB is used as consumer so refer to the details of the above 6.4.1 to set it as Implicit Connection

Order	Set-up Procedure	How to Set up																																	
1	Set up channel with Generic EDS	 <p>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.</p>																																	
	Block setup	<table border="1"> <thead> <tr> <th rowspan="2">Index</th> <th rowspan="2">Channel</th> <th rowspan="2">Operation 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">Timeout</th> <th rowspan="2">Data Type</th> <th colspan="3">tag settings</th> </tr> <tr> <th>Local tag</th> <th>Remote tag</th> <th>Data count</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Implicit Connection</td> <td>6.Input Only(Tag type)</td> <td>Multicast</td> <td></td> <td>Parameter</td> <td>T20 Data Size:56 D2T Tag Size:0</td> <td></td> <td>200</td> <td>1. RPI x8</td> <td>ARRAY[0..13] OF DINT</td> <td>CS_AB/%MD2000</td> <td>PD_AB</td> <td>14</td> </tr> </tbody> </table> <p>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.</p>	Index	Channel	Operation Mode	I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Timeout	Data Type	tag settings			Local tag	Remote tag	Data count	0	0	Implicit Connection	6.Input Only(Tag type)	Multicast		Parameter	T20 Data Size:56 D2T Tag Size:0		200	1. RPI x8	ARRAY[0..13] OF DINT	CS_AB/%MD2000	PD_AB	14
Index	Channel	Operation Mode													I/O type	Connection type	Function	Parameter	Parameter contents	Conditional flag	Transmission period(ms)	Timeout	Data Type	tag settings											
			Local tag	Remote tag	Data count																														
0	0	Implicit Connection	6.Input Only(Tag type)	Multicast		Parameter	T20 Data Size:56 D2T Tag Size:0		200	1. RPI x8	ARRAY[0..13] OF DINT	CS_AB/%MD2000	PD_AB	14																					

(2) Rockwell 1756-ENBT Communication setup

You can set up the producer of Rockwell by using Rockwell's SW(RSLogix 5000).

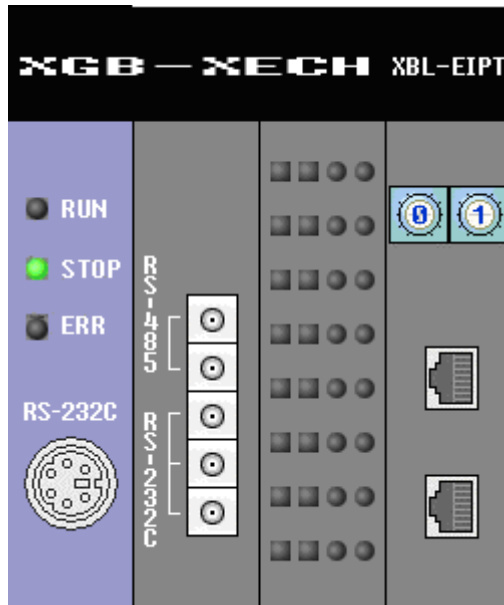
Order	Set-up Procedure	How to Set up
1	Producer tag setup	 <p>1) Name: You can input the name of the producer tag. 2) Data Type: You can input the data type to be communicated.</p>

Chapter 7 Diagnosis Function

This chapter describes how to check out systems and modules, how to check out network state, and how to download I/O. 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].



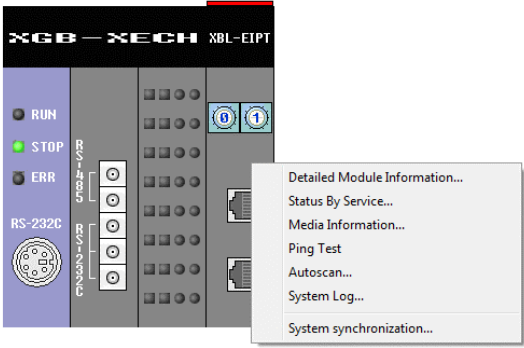
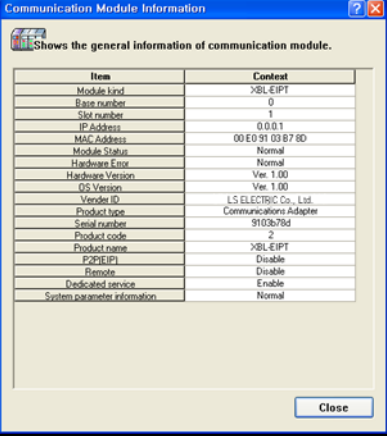
[Figure 7.1.1] System Diagnosis Screen

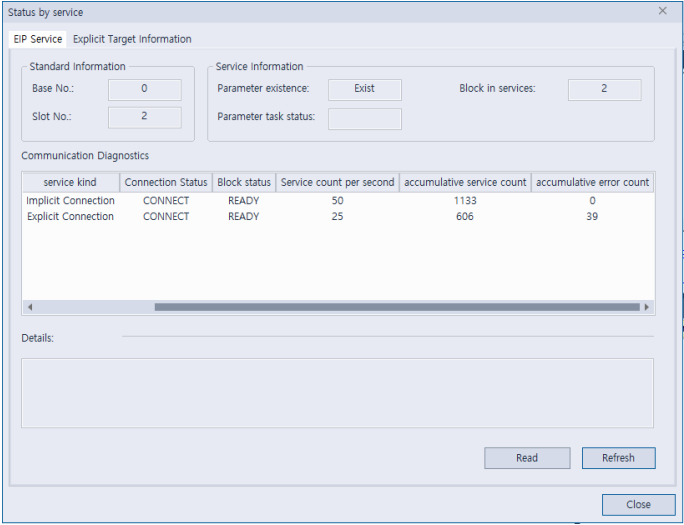
System information	Allocation information - Fixed	Comment
<ul style="list-style-type: none"> Base 0 : XGB-M11A C CPU: XGB-XECH 0 Slot 0: Internal Cnet 0 Slot 0: XEC-DN/DP32H 1 Slot 1: XBL-EIPT 2 Slot 2: Empty slot 3 Slot 3: Empty slot 4 Slot 4: Empty slot 5 Slot 5: Empty slot 6 Slot 6: Empty slot 7 Slot 7: Empty slot 8 Slot 8: Empty slot 	<p>[%IX0,0,0 ~ %IX0,0,15]/[%QX0,0,0 ~ %QX0,0,15]</p>	<p>Main Base(11 Slots) High Performance CPU Module(I/O: Maximum 384 Points) Internal Cnet Module, RS-232C/RS-485 DC 24V Input, Transistor Output, 32 Contacts (Sink Output/Source ... EtherNet/IP Module</p>

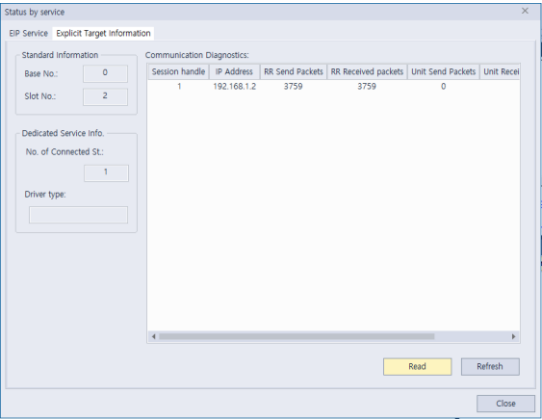
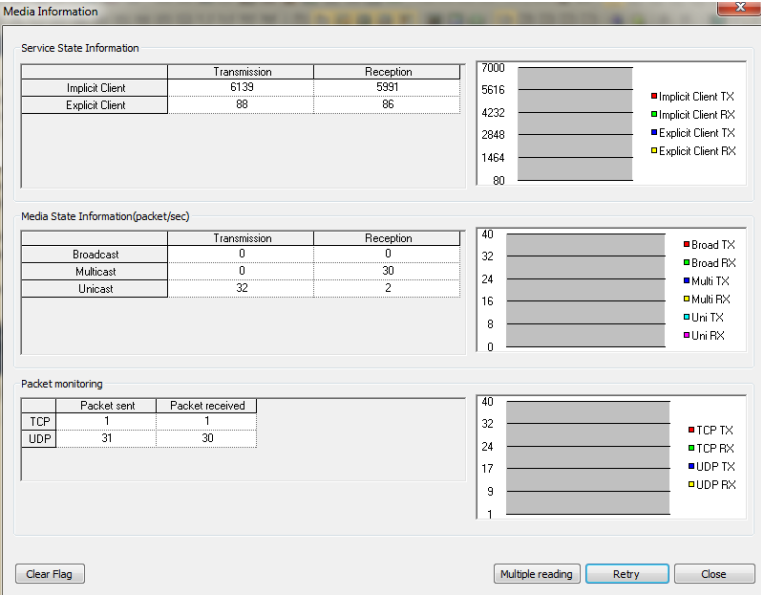
[Figure 7.1.2] Module Information Window

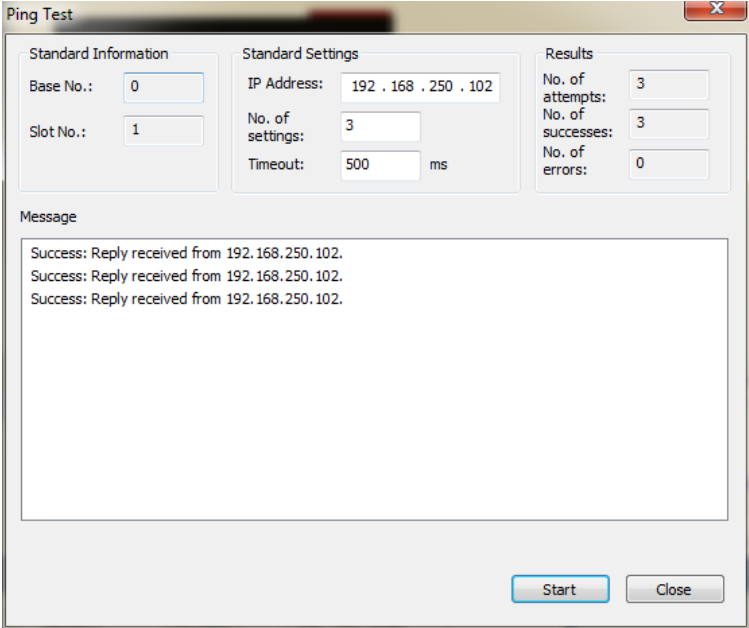
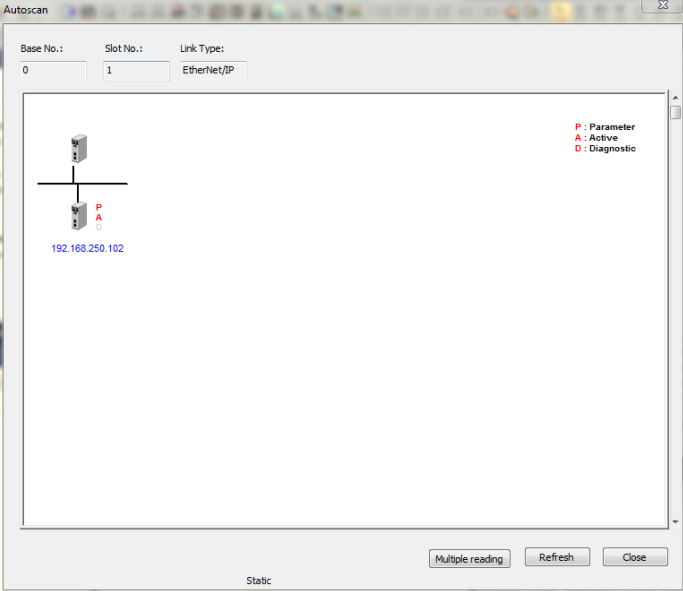
7.2 System Diagnosis Items and Contents

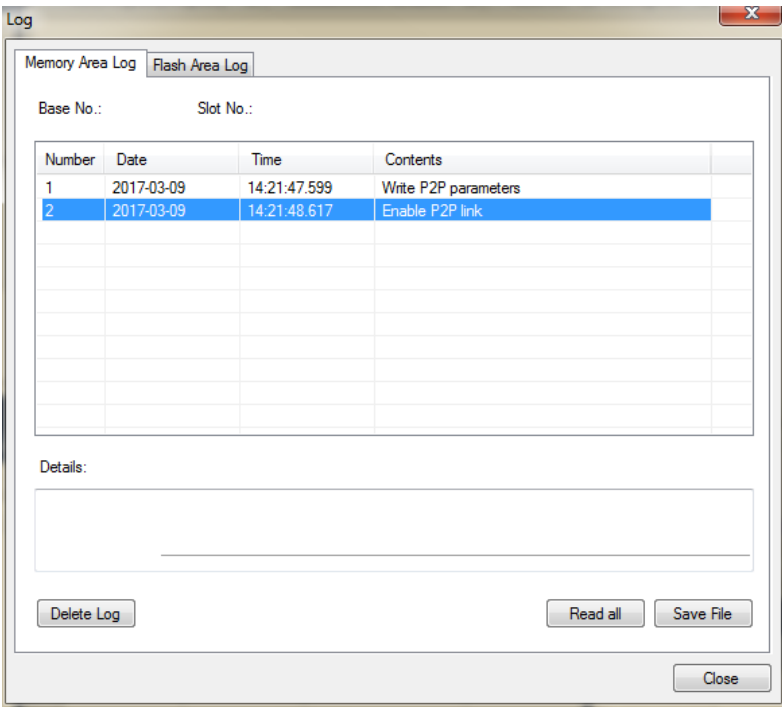
1) This part describes the diagnosis items and contents of EtherNet/IP I/F Module provided from XG5000.

Order	Diagnosis Items	How to Set up and Contents
1	System Diagnosis	 <p>1) Select [Connection] → [Online] → [Communication module setting] → [System Diagnosis] 2) Put the mouse on XBL-EIPT and click it with the right side of the mouse to check out the diagnosis information of EtherNet/IP I/F Module a user wants.</p>
2	Communication Module Information	 <p>The general information of EtherNet/IP I/F Module is displayed.</p> <ol style="list-style-type: none"> 1) Module Kind: Displays kinds of modules (XBL-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

Order	Diagnosis Items	How to Set up and Contents																		
	<p>State by Services</p> <p>EIP Service</p>	 <table border="1" data-bbox="733 583 1364 641"> <thead> <tr> <th>service kind</th> <th>Connection Status</th> <th>Block status</th> <th>Service count per second</th> <th>accumulative service count</th> <th>accumulative error count</th> </tr> </thead> <tbody> <tr> <td>Implicit Connection</td> <td>CONNECT</td> <td>READY</td> <td>50</td> <td>1133</td> <td>0</td> </tr> <tr> <td>Explicit Connection</td> <td>CONNECT</td> <td>READY</td> <td>25</td> <td>606</td> <td>39</td> </tr> </tbody> </table>	service kind	Connection Status	Block status	Service count per second	accumulative service count	accumulative error count	Implicit Connection	CONNECT	READY	50	1133	0	Explicit Connection	CONNECT	READY	25	606	39
service kind	Connection Status	Block status	Service count per second	accumulative service count	accumulative error count															
Implicit Connection	CONNECT	READY	50	1133	0															
Explicit Connection	CONNECT	READY	25	606	39															
3		<p>1) Specific Flag Information Window</p> <p>(1) Block No. : Displays the index of the parameter that a user set up with EIP Service.</p> <p>(2) Channel No.: Displays the number of the channel that a user set up in each block.</p> <p>(3) Service Kind: Displays the type of the service that a user set up : Implicit Connection / Implicit Target / Explicit Connection</p> <p>(4) Connection Status: Displays whether EIP Block has been connected or not.</p> <ul style="list-style-type: none"> ▶CONNECT: State that connection has been completed ▶IDLE: State that connection has not been completed <p>(5) Block Status: Displays the block state of EIP Block</p> <ul style="list-style-type: none"> ▶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 <p>(6) Service Count per Second: Displays how many times the service has been carried out per 1 second.</p> <p>(7) Accumulative Service Count : Displays the number of services till now</p> <p>(8) Accumulative Error Count : Displays the number of errors till now</p>																		

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

Order	Diagnosis Items	How to Set up and Contents
6	Ping Test	 <p>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</p>
7	Auto Scan	 <p>A user can check out the system configuration state of the whole system.</p> <ul style="list-style-type: none"> ▶ 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	 <p>The screenshot shows a 'Log' window with two tabs: 'Memory Area Log' and 'Flash Area Log'. The 'Flash Area Log' tab is active. It contains fields for 'Base No.:' and 'Slot No.:'. Below these is a table with the following data:</p> <table border="1"> <thead> <tr> <th>Number</th> <th>Date</th> <th>Time</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2017-03-09</td> <td>14:21:47.599</td> <td>Write P2P parameters</td> </tr> <tr> <td>2</td> <td>2017-03-09</td> <td>14:21:48.617</td> <td>Enable P2P link</td> </tr> </tbody> </table> <p>Below the table is a 'Details:' section with a text area. At the bottom are buttons for 'Delete Log', 'Read all', 'Save File', and 'Close'.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Number	Date	Time	Contents	1	2017-03-09	14:21:47.599	Write P2P parameters	2	2017-03-09	14:21:48.617	Enable P2P link
Number	Date	Time	Contents											
1	2017-03-09	14:21:47.599	Write P2P parameters											
2	2017-03-09	14:21:48.617	Enable P2P link											

2) NDR flag condition according to service type

Channel	Operation Mode	Flag condition	Remark
Explicit Connection	-	NDR = 1 NDR = 0	Cleared to 0 each time the Conditional flag is On, and set to 1 if a normal response is received
Implicit Connection	O2T	NDR = 0	Cleared to 0 every Transmission period
	T2O	NDR = 1	Set to 1 each time it is received
Implicit Target	connected with O2T	NDR = 1 NDR = 0	Before connecting: Cleared to 0 every second After connecting: Cleared to 0 every second, and set to 1 each time it is received
	connected with T2O	NDR = 0	Before connecting: Cleared to 0 every second After connecting: Cleared to 0 every T2O period
	connected with T2O, O2T	NDR = 1 NDR = 0	Before connecting: Cleared to 0 every second After connecting: Cleared to 0 every T2O period, and set to 1 each time it is received

3) Service count condition according to service type

Channel	Operation Mode	Service count condition
Explicit Connection	-	Service count is incremented by 1 when a response to the request is received Error count is incremented by 1 when an abnormal response is received
Implicit Connection	O2T	After connection, service count is incremented by 1 after transmission for every O2T period
	T2O	After connection, service count is incremented by 1 each time it is received
Implicit Target	connected with O2T	After connection, service count is incremented by 1 each time it is received
	connected with T2O	After connection, service count is incremented by 1 after transmission for every T2O period
	connected with T2O, O2T	After connection, service count is incremented by 1 after transmission for every T2O period, and is incremented by 1 each time it is received

Notice

- 1) NDR Flag: It is a communication flag according to P2P service setting. Normally, it is On when P2P service normally processes the corresponding block, but it depends on service type in case of EIP.
- 2) P2P parameters are 1 ~ 3, and P2P blocks are 0 ~ 31. For the detailed configuration, refer to the NDR flag in the flag list in Appendix A.2.

7.3 Troubleshooting

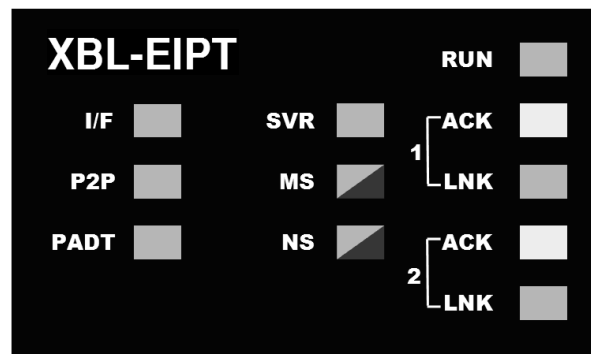
This part describes causes and actions on failures and errors that may happen in operating systems. When a user wants to check out errors and problems in EtherNet/IP I/F Module, the following procedure will help you check out those malfunctions. When judging whether the module is in abnormal state or 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.



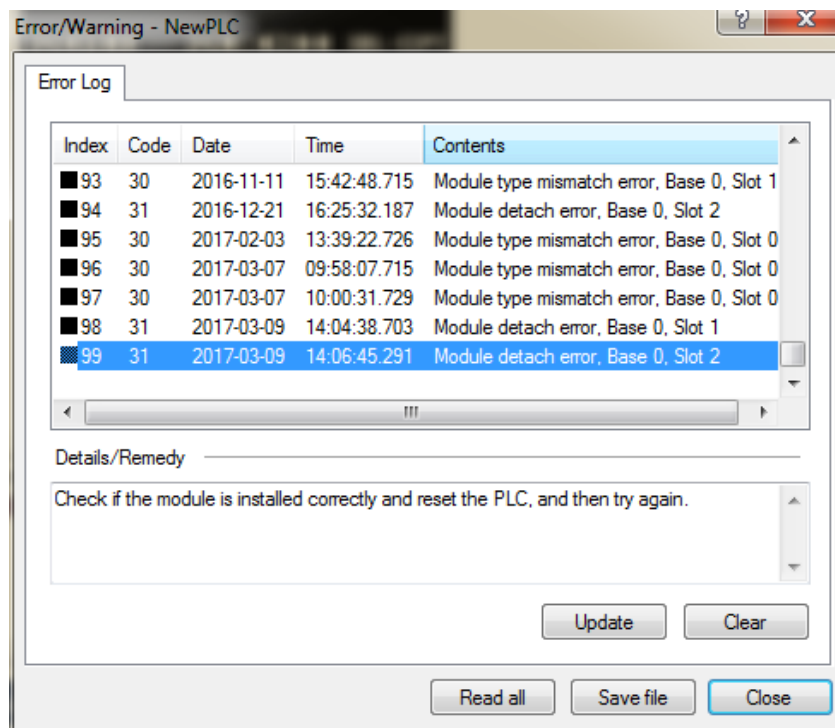
[Illustration 7.3.1] LED of EtherNet/IP I/F Module

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 communication module has been properly installed to the main unit 2) Consult with Warranty Service Center
I/F	Operation stops when light is on and off	1) Check out whether main unit 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
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	1) Check out the transmission or reception parameter

LED Contents	Error Contents	Actions
	communication	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] → [Diagnosis] → [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.

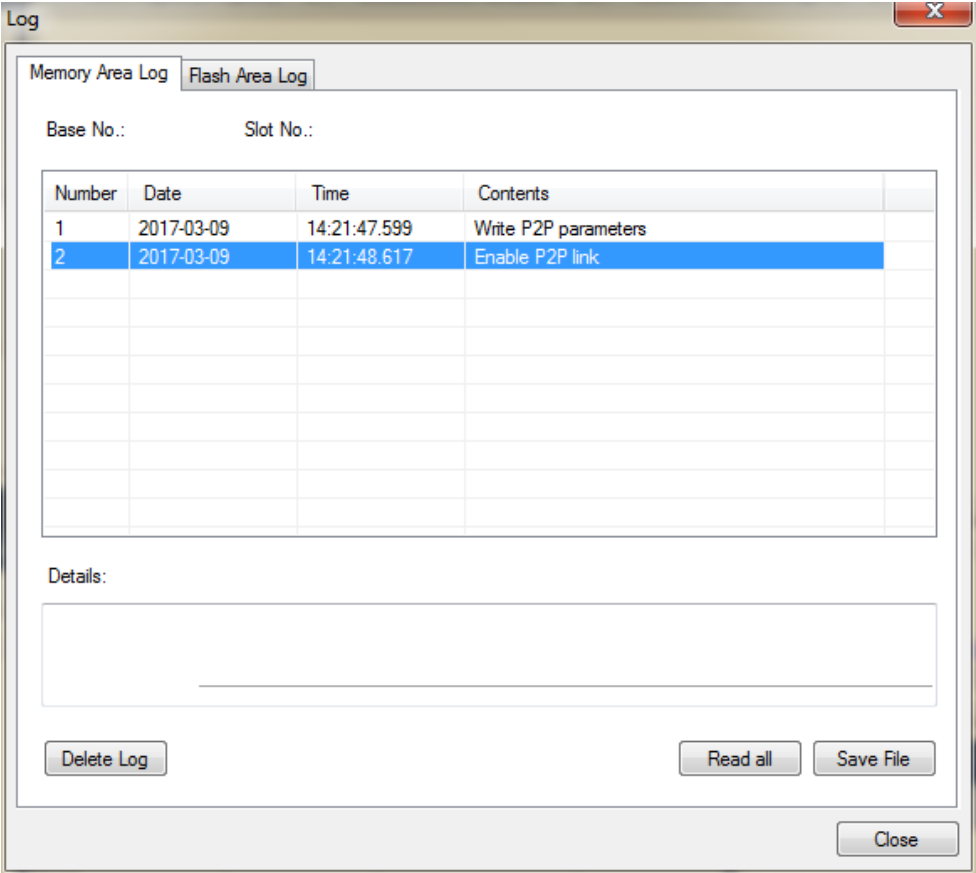
[Figure 7.3.2] will help a user check out error/warning information through PLC history from [Online] of XG5000 and it is possible to solve problems by referring to “Details and Actions” contents.

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.'



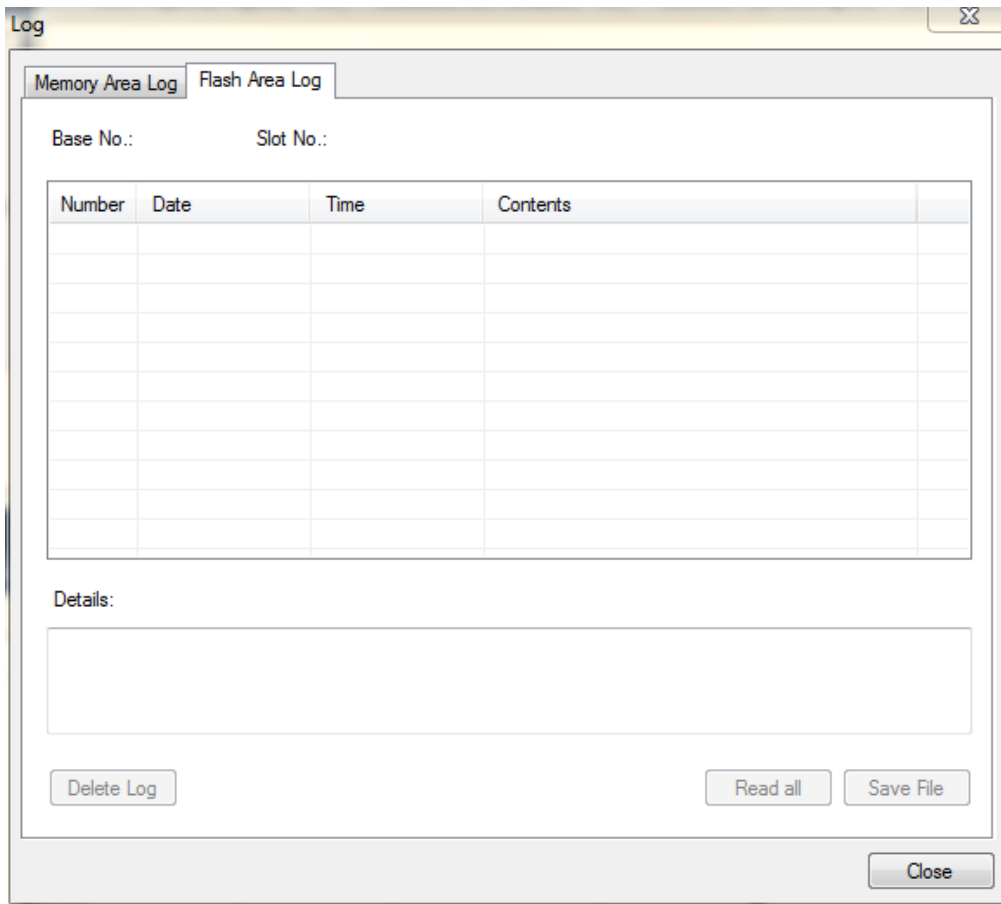
[Figure 7.3.3] Memory Area Log Screen of 'System Log'

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.'

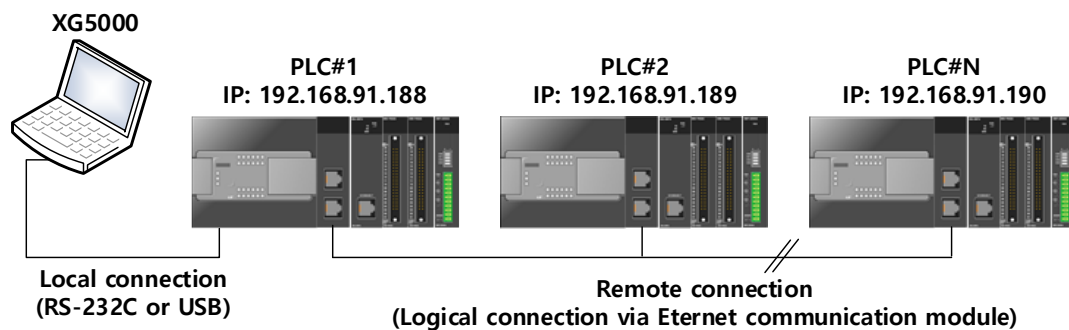


[Figure 7.3.4] Flash Area Log Screen of 'System Log'

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.



[Figure 7.4.1] Ethernet/IP 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 [Figure 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 XBL-EIPT 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.

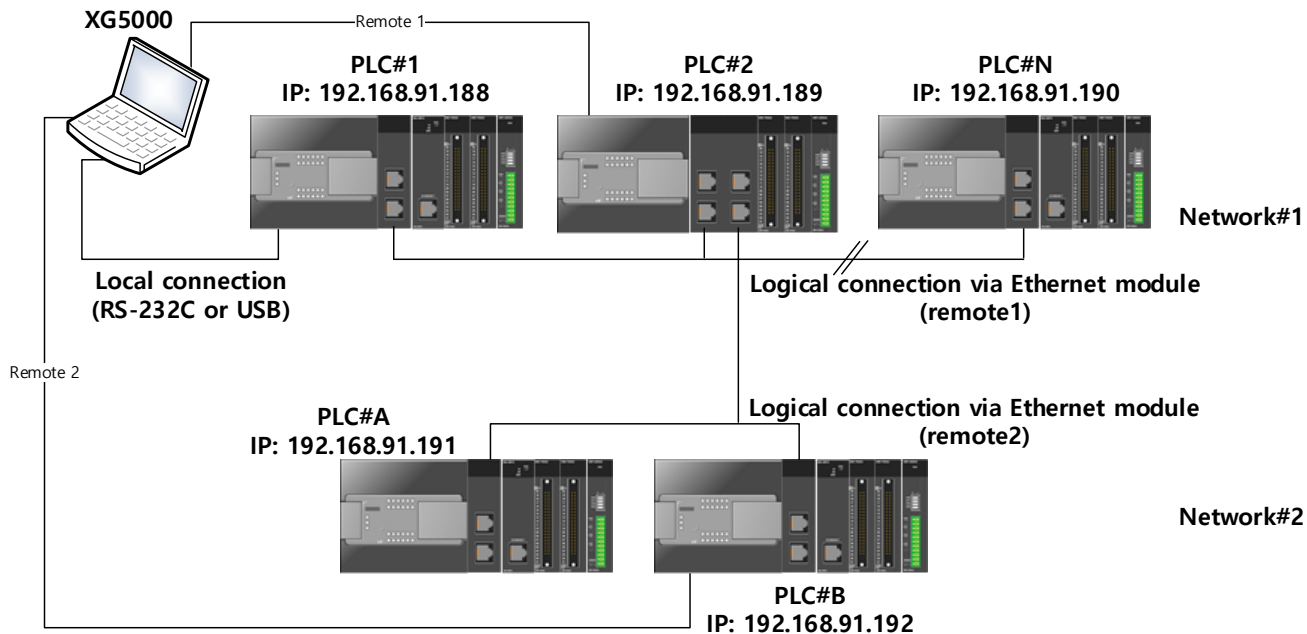
Also, if Ethernet/IP module (LAN Card) is installed on PC where XG5000 is installed and connected to the identical network to PLC, remote stage 1 connection with PLC is available via Ethernet without local connection via RS-232C.

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.



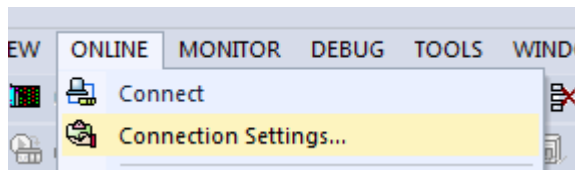
[Figure 7.4.2] Remote connection

[Figure 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]



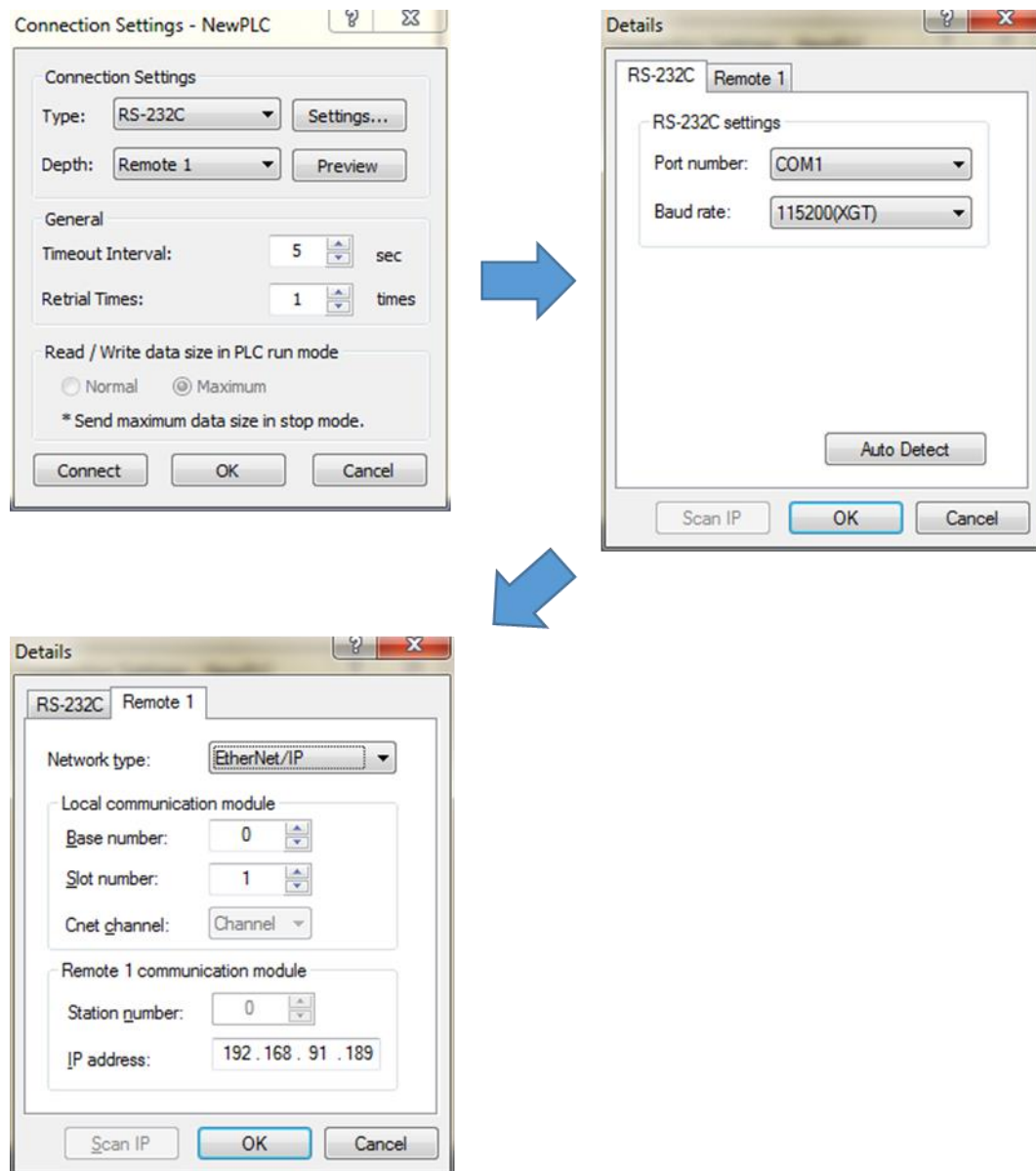
[Figure 7.4.3] XG5000 remote connection option to select

(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.



[Figure 7.4.4] XG5000 remote stage 1 connection

(c) Network type

Select a network type for stage 1 connection among Rnet, Cnet, FEnet, RAPIEnet and EtherNet/IP. EtherNet/IP is to be selected because stage 1 connection is applied through EtherNet/IP in [Figure 7.4.4].

(d) Base No.

Specify the base No. where EtherNet/IP module of PLC #1 for remote connection is installed. Since XGB does not have a base, enter 0 as the base number.

(e) Slot

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

(f) IP address

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

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)

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

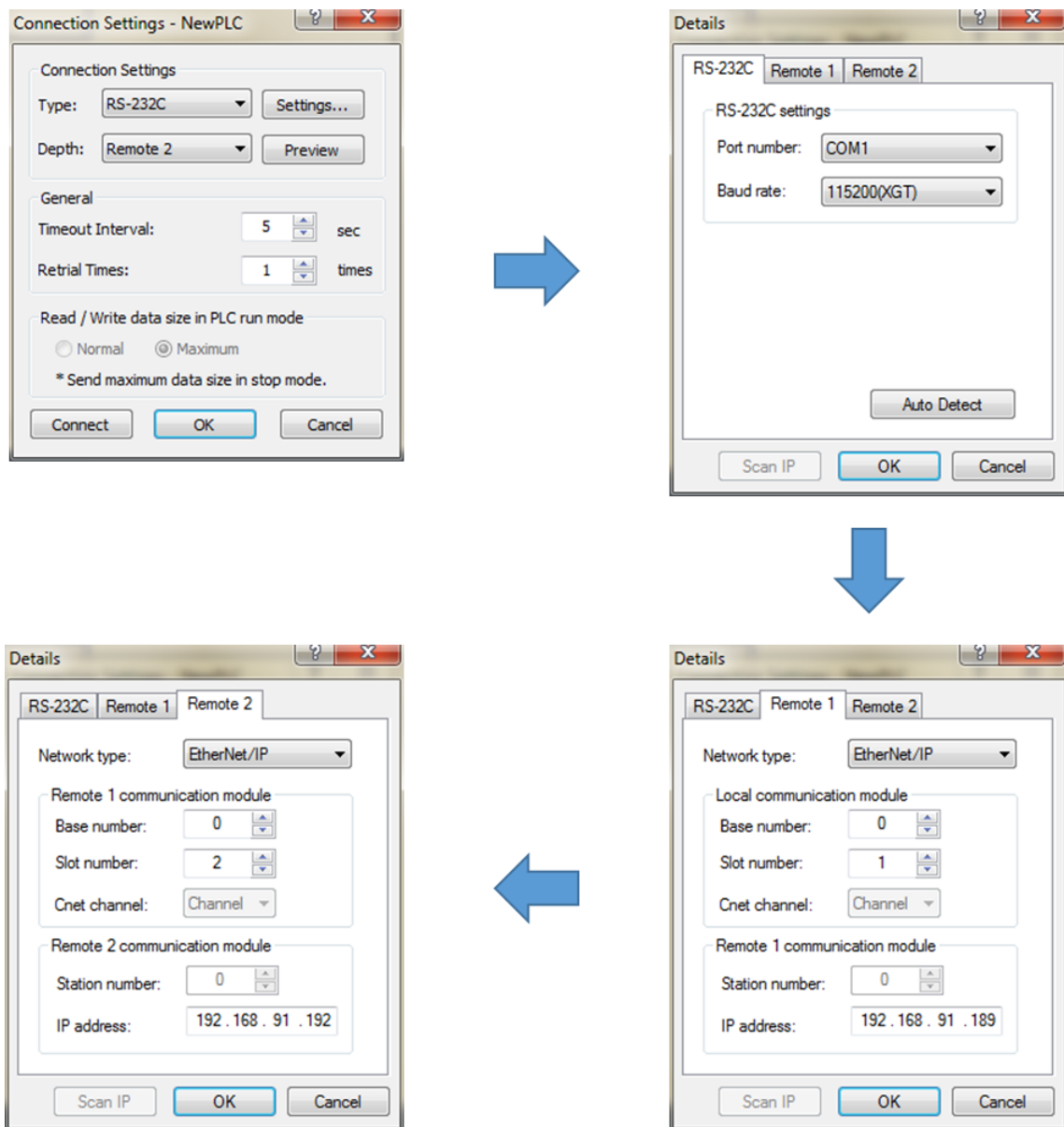
For remote stage 2 connection, XG5000 shall be in off-line state. Click [Online] -> [Connection settings] like [Figure 7.4.3]

(a) 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.

(b) Connection depth

Select Remote 2.



[Figure. 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.

(c) Setting of network type

Select a network type for remote stage 2 connection among XGT Rnet, Cnet, FENet, RAPIenet and EtherNet/IP. Network types of stage 1 and stage 2 connections bear no relation to each other. EtherNet/IP is to be selected since stage 2 connection is with EtherNet/IP in [Figure 7.4.5].

(d) Base and slot No.

Set the Base and Slot No. where EtherNet/IP module is installed in the PLC #2 which will be connected with stage 2 in the network 2.

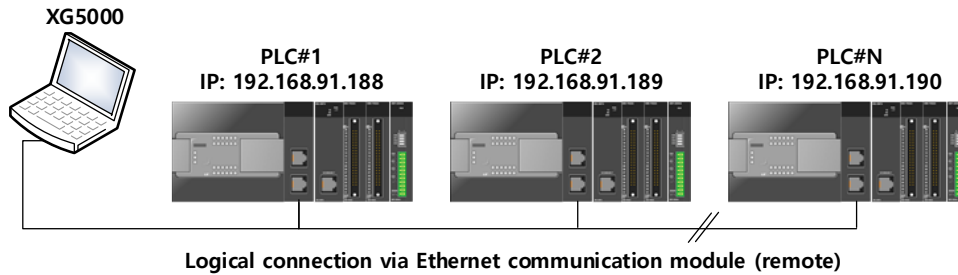
(e) IP address

Specify the IP address of EtherNet/IP module installed in the PLC which will be connected with XG5000 in the network 2. Use the IP address of EtherNet/IP module installed in PLC #B station, 192.168.91.192 in [Figure 7.4.5].

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

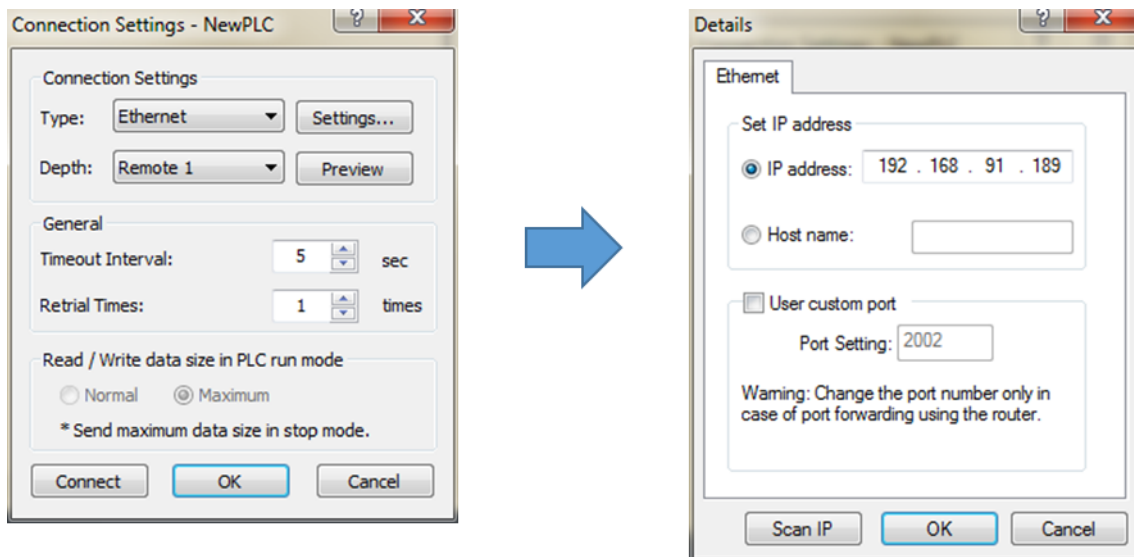
Remote stage 1 connection via Ethernet without connecting RS-232C is available if a PC where XG5000 is operating is included in PLC Ethernet network.



[Figure 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.



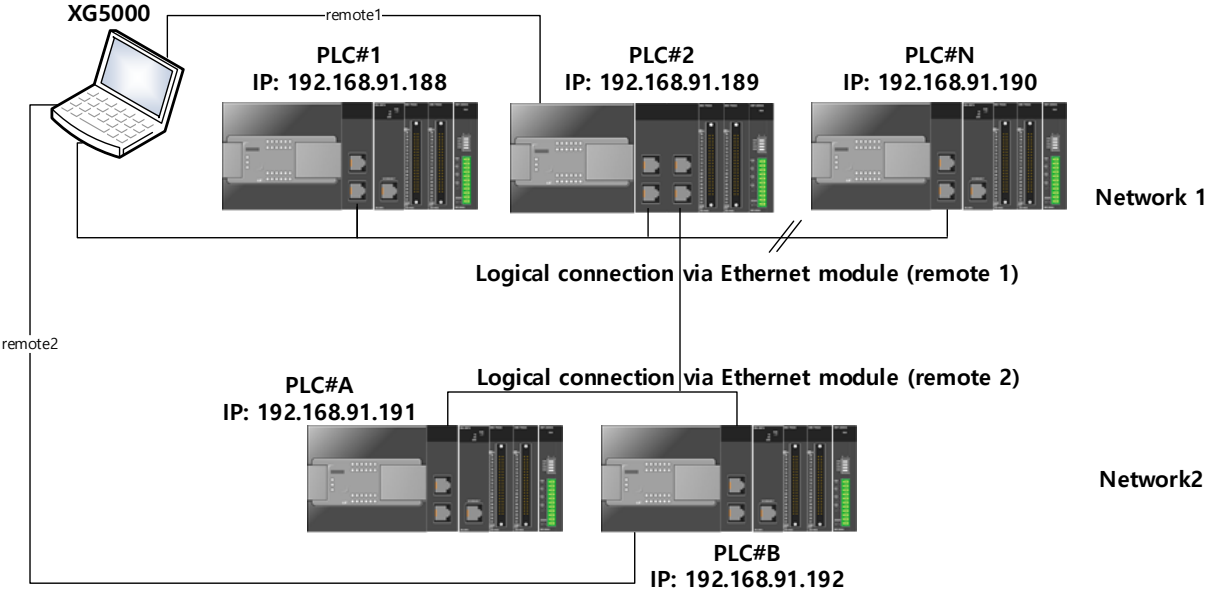
[Figure 7.4.7] Remote 1 connection directly via Ethernet

- (a) Connection type
Select an applicable type for connection. In the case of [Figure 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, 192.168.91.189 to connect to PLC [n] in [Figure. 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.

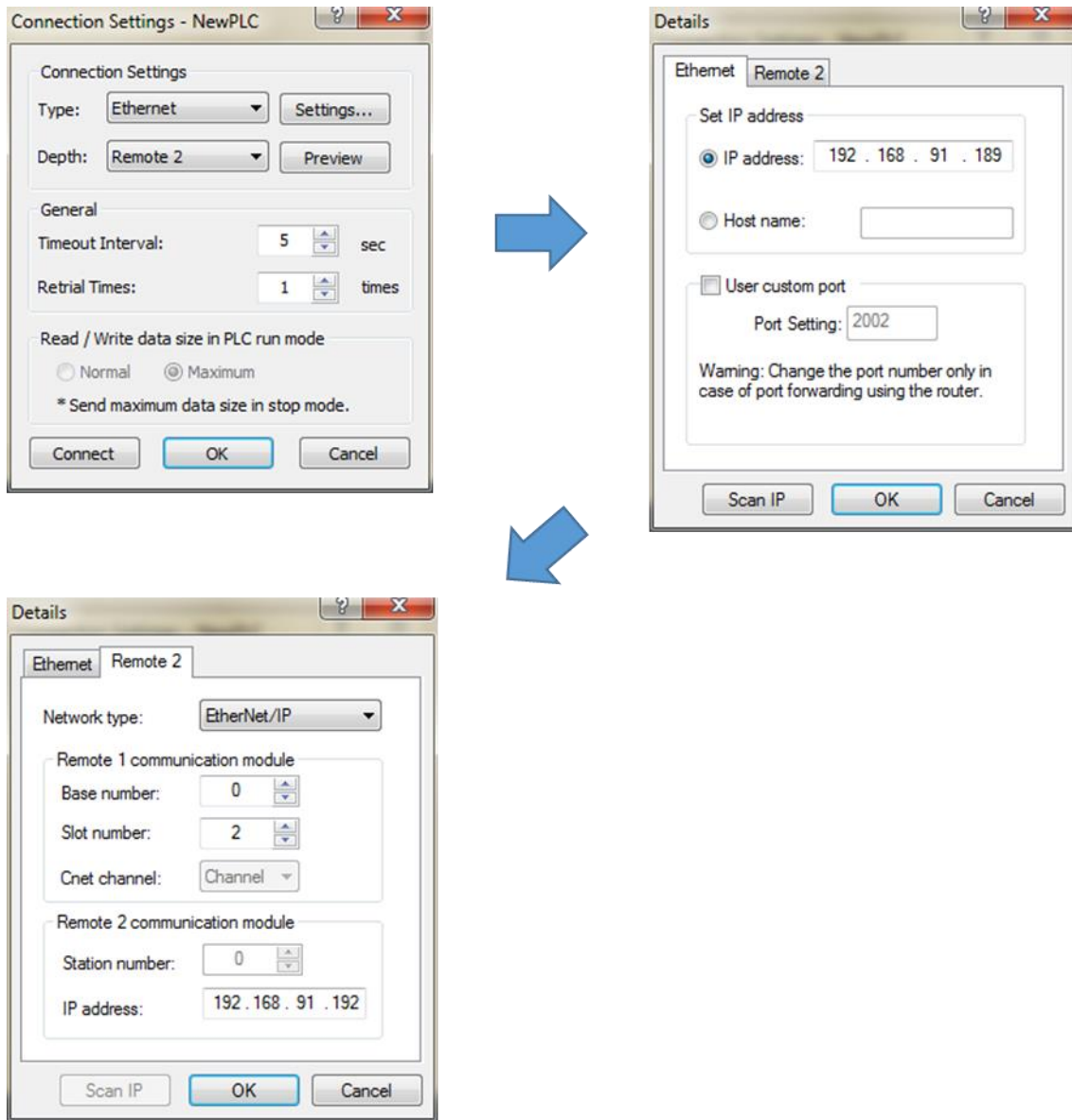
(4) Remote 2 connection directly from PC connected with Ethernet

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.



[Figure 7.4.8] Remote connection

The procedures are the same as in remote 1 connection and a setting example of 'Connection Setting' is as [Fig. 7.4.9].



[Fig. 7.4.9] Remote 2 connection directly via Ethernet

Notice

- (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
 - 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.

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 and 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 device 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: Canada / .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. 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.

11. 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.

12. 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.

13. 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).

14. 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

15. ISO (International Organization for Standardization)

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

16. 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.

17. MAC (Medium Access Control)

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

18. Node

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

19. 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.

20. 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

21. 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.

22. 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.

23. 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.

24. Server

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

25. 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

26. 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.

27. 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

Word	Bit	Variable	Function	Description
F000~1	-	_SYS_STATE	Mode and State	Displays the Mode and Run State of PLC
	F0000	_RUN	RUN	Run State
	F0001	_STOP	STOP	Stop state
	F0002	_ERROR	ERROR	Error state.
	F0003	_DEBUG	DEBUG	Debug State
	F0004	_LOCAL_CON	LOCAL CONTROL	Local Control Mode
	F0006	_REMOTE_CON	REMOTE MODE	Remote Control Mode
	F0008	_RUN_EDIT_ST	CORRECTING WHILE RUN	Downloading Correction Program while Run.
	F0009	_RUN_EDIT_CHK	CORRECTING WHILE RUN	Internal Processing for Correction while Run
	F000A	_RUN_EDIT_DONE	CORRECTION COMPLETED WHILE RUN	Correction Completed while Run
	F000B	_RUN_EDIT_END	CORRECTION END WHILE RUN	Correction Ended while Run
	F000C	_CMOD_KEY	OPERATION MODE	Operation Mode Transformed by the Key
	F000D	_CMOD_LPADT	OPERATION MODE	Operation Mode Transformed by the Local PADT
	F000E	_CMOD_RPADT	OPERATION MODE	Operation Mode Transformed by Remote PADT
	F000F	_CMOD_RLINK	OPERATION MODE	Operation Mode Transformed by Remote Communication Mode
	F0010	_FORCE_IN	FORCIBLE ENTRY	Forcible Entry State
	F0011	_FORCE_OUT	FORCIBLE OUTPUT	Forcible Output State
	F0014	_MON_ON	MONITOR	Executing Monitor
	F0015	_USTOP_ON	STOP	Stopped by Stop Function
	F0016	_ESTOP_ON	ESTOP	Stopped by EStop Function
	F0017	_CONPILE_모드	COMPILING	Performing Compiling
	F0018	_INIT_RUN	INITIALIZING	Performing Initializing Task
	F001C	_PB1	PROGRAM CODE 1	Program Code 1 Selected
F001D	_PB2	PROGRAM CODE 2	Program Code 2 Selected	
F001E	_CB1	COMPILE CODE1	Compile Code 1 Selected	
F001F	_CB2	COMPILE CODE 2	Compile Code 2 Selected	

Word	Bit	Variable	Function	Description
F002~3		_CNF_ER	SYSTEM ERROR	Reports Serious Failure State of the System
	F0021	_IO_TYER	MODULE TYPE ERROR	Module Type does not corresponds.
	F0022	_IO_DEER	MODULE REMOVAL ERROR	Module Removed
	F0024	_IO_RWER	MODULE IN/OUTPUT ERROR	Problems occurred in to Module In/Output
	F0025	_IP_IFER	MODULE INTERFACE ERROR	Problems occurred in the special/communication module interface
	F0026	_ANNUM_ER	EXTERNAL DEVICE ERROR	Serious Errors detected from External Devices
	F0028	_BPRM_ER	BASIC PARAMETER	Errors in Basic Parameter
	F0029	_IOPRM_ER	IO PARAMETER	Errors with IO Configuration Parameter
	F002A	_SPPRM_ER	SPECIAL MODULE PARAMETER	Special Module Parameter is in Abnormal State
	F002B	_CPPRM_ER	COMMUNICATION MODULE PARAMETR	Communication Module Parameter is in Abnormal State
	F002C	_PGM_ER	PROGRAM ERROR	Errors in Program
	F002D	_CODE_ER	CODE ERROR	Errors in Program Code
	F002E	_SWDT_ER	SYSTEM WATCH DOG	Scan Watchdog Operated
	F0030	_WDT_ER	SCAN WATCHDOG	Scan Watchdog Operated
F004	-	_CNF_WAR	SYSTEM WARNIGN	Reports on the Light Errors of the System
	F00041	_DBCK_ER	BACKUP ERROR	Problem Occurred in Data Back Up
	F00043	_ABSD_ER	OPERATION ERROR STOP	Stops due to Abnormal Operation
	F00046	_ANNUM_WAR	EXTERIAL DEVCIE ERROR	The Light Error of the External Device Detected
	F00048	_HS_WAR1	HIGH SPEED LINK1	High Speed Link – abnormal
	F00049	_HS_WAR2	HIGH SPEED LINK2	High Speed Link – abnormal
	F0054	_P2P_WAR1	P2P PARAMETER 1	P2P – abnormal
	F0055	_P2P_WAR2	P2P PARAMETER 2	P2P – abnormal
	F0056	_P2P_WAR3	P2P PARAMETER 3	P2P – abnormal
F005C	_CONSTANT_ER	FIXED PERIOD ERROR F	Fixed Period Errors	

Word	Bit	Variable	Function	Description
F009	-	_USER_F	USER CONTACTING POINT	User Usable Timer
	F0090	_T20MS	20ms	20ms Periodic Clock
	F0091	_T100MS	100ms	100ms Periodic Clock
	F0092	_T200MS	200ms	200ms Periodic Clock
	F0093	_T1S	1s	1s Periodic Clock
	F0094	_T2S	2s	2s Periodic Clock
	F0095	_T10S	10s	10s Periodic Clock
	F0096	_T20S	20s	20s Periodic Clock
	F0097	_T60S	60s	60s Periodic Clock
	F0099	_ON	ALWAYS - ON	Always On – State Bit
	F009A	_OFF	ALWAYS - ON	Always Off – State Bit
	F009B	_1ON	1 SCAN - ON	1 st Scan Only On –State
	F009C	_1OFF	1 SCAN -OFF	1 st Scan Only Off –State
F009D	_STOG	ANTI - CLOCK	Every Scan Anti –Clocked	
F0010	-	_USER_CLK	USER-CLOCK	User Set-up Available Clock
	F0100	_USR_CLK0	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 0
	F0101	_USR_CLK1	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 1
	F0102	_USR_CLK2	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 2
	F0103	_USR_CLK3	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 3
	F0104	_USR_CLK4	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 4
	F0105	_USR_CLK5	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 5
	F0106	_USR_CLK6	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 6
F0107	_USR_CLK7	DEIGNATED SCAN REPEATED	On/Off Clock as much as Designated Scan 7	
F0011	-	_LOGIC_RESULT	LOGIC RESULTS	Displays Logic Results
	F00110	_LER	CALCULATION ERROR	On during 1 Scan when Errors made to Calculation
	F00111	_ZERO	ZERO FLAG	On if Calculation Result is 0
	F00112	_CARRY	CARRY FLAG	On if Carry occurred during Calculation
	F00113	_ALL_OFF	ALL OUTPUT OFF	On if All Outputs are OFF
	F00115	_LER_LATCH	CALCULATION ERROR LATCH	On Maintained when Errors made to Calculation
F0012	-	_CMP_RESULT	COMPARISION RESULTS	Display Comparison Results
	F0120	_LT	LT FLAG	On if " Less Than "
	F0121	_LTE	LTE FLAG	On if "The Same or Less Than"
	F0122	_EQU	EQU FLAG	On if "The Same "
	F0123	_GT	GT FLAG	On if "Larger Than "
	F0124	_GTE	GTE FLAG	On "Larger Than or The Same "
	F0125	_NEQ	NEQ FLAG	On if "Not The Same "
F014	-	_FALS_NUM	FALS NUMBER	Displays the Number of FALS

Word	Bit	Variable	Function	Description
F015	-	_PUTGET_ERR0	PUT/GET ERROR 0	Main Base PUT / GET ERROR
F023	-	_PUTGET_NDR0	PUT/GET COMPLETED 0	Main Base PUT / GET COMPLETED
F044	-	_CPU_TYPE	CPU TYPE	Displays the Information on CPU Type
F045	-	_CPU_VER	CPU VERSION	Displays CPU Version
F046	-	_OS_VER	O/S VERSION	Displays O/S Version
F048	-	_OS_DATE	O/S DATE	Displays O/S Distribution Date
F050	-	_SCAN_MAX	MAXIMUM SCAN TIME	Displays Maximum Scan Time
F051	-	_SCAN_MIN	MINIMUM SCAN TIME	Displays Minimum Scan Time
F052	-	_SCAN_CUR	CURRENT SCAN TIME	Displays Current Scan Time.
F0053	-	_MON_YEAR	MONTH / YEAR	Month, Year Data of PLC
F0054	-	_TIME_DAY	HOUR / DATE	Hour, Date Data of PLC
F0055	-	_SEC_MIN	SECOND / MINUTE	Second, Minute Data of PLC
F0056	-	_HUND_WK	100 YEARS / DAY	100 Years , Minute Data of PLC
F0057	-	_FPU_INFO	Not used	
	F00570	_FPU_LFLAG_I	Not used	
	F00571	_FPU_LFLAG_U	Not used	
	F00572	_FPU_LFLAG_O	Not used	
	F00573	_FPU_LFLAG_Z	Not used	
	F00574	_FPU_LFLAG_V	Not used	
	F0057A	_FPU_FLAG_I	Not used	
	F0057B	_FPU_FLAG_U	Not used	
	F0057C	_FPU_FLAG_O	Not used	
	F0057D	_FPU_FLAG_Z	Not used	
	F0057E	_FPU_FLAG_V	Not used	
	F0057F	_FPU_FLAG_E	IRREGULAR VALUE ENTRY	Reports when Entering Irregular Value
F0058	-	_ERR_STEP	ERROR STTEP	Stores Error Step.
F0060	-	_REF_COUNT	REFRESH	Increases if Module Refresh Performed
F0062	-	_REF_OK_CNT	REFRESH OK	Increases if Module Refresh is in Normal State
F0064	-	_REF_NG_CNT	REFRESH NG	Increases if Module Refresh in Abnormal State
F0066	-	_REF_LIM_CNT	REFRESH LIMIT	Increases if Module Refresh in Abnormal State (Timeout)
F0068	-	_REF_ERR_CNT	REFRESH ERROR	Increases if Module Refresh in Abnormal State
F0070	-	_MOD_RD_ERR_CNT	Not used	
F0072	-	_MOD_WR_ERR_CNT	Not used	
F0074	-	_CA_CNT	Not used	
F0076	-	_CA_LIM_CNT	Not used	
F0078	-	_CA_ERR_CNT	Not used	
F0080	-	_BUF_FULL_CNT	BUFFUR FULL	Increases if CPU Internal Buffer FULL

Word	Bit	Variable	Function	Description
F0082	-	_PUT_CNT	PUT COUNT	Increases if Performing PUT.
F0084	-	_GET_CNT	GET COUNT	Increases if Performing GET.
F0086	-	_KEY	CURRENT KEY	Displays the Current State of Local Key.
F0088	-	_KEY_PREV	PREVIOUS KEY	Displays the Previous State of Local Key
F0090	-	_IO_TYER_N	INCONSISTENT SLOT	Displays Module Type – Inconsistent Slot No.
F0091	-	_IO_DEER_N	REMOVAL SLOT	Displays Slot No. where Module Removal Occurred
F0093	-	_IO_RWER_N	RW ERROR SLOT	Displays Module Read/Write –Error Slot No.
F0094	-	_IP_IFER_N	I/F ERROR SLOT	Displays Interface Error Slot No.
F0096	-	_IO_TYER0	MODULE TYPE 0 ERROR	Main Base - Module Type Error
F0104	-	_IO_DEER0	MODULE REMOVAL 0 ERROR	Main Base Module Removal Error
F0120	-	_IO_RWER0	MODULE RW 0 ERROR	Main Base - Module Read/Write Error
F0128	-	_IO_IFER_0	MODULE I/F 0 ERROR	Main Base Module - Interface Error
F0140	-	_AC_FAIL_CNT	POWER SHUT-OUT FREQUENCY	Stores the Frequency that Power has been Shut out.
F0142	-	_ERR_HIS_CNT	ERROR OCCURRENCE FREQUENCY	Stores the Frequency that Errors were Made
F0144	-	_MOD_HIS_CNT	MODE CONVERSION FREQUENCY	Stores the Frequency that the Mode has been Converted
F0146	-	_SYS_HIS_CNT	HISTORY OCCURRENCE FREQUENCY	Stores the Frequency that the System History Occurred.
F0148	-	_LOG_ROTATE	LOG ROTATE	Stores Log Rotate Information
F0150	-	_BASE_INFO0	SLOT INFORMATION 0	Main Base Slot Information
F200	-	_USER_WRITE_F	USABLE CONTACTING POINT	Contacting Point Usable in Program
	F2000	_RTC_WR	RTC RW	Writes and Read Data to RTC
	F2001	_SCAN_WR	SCAN WR	Scan Value Initialization
	F2002	_CHK_ANC_ERR	EXTERNAL SERIOUS FAILURE REQUEST	Requires Serious Failures from External Devices
	F2003	_CHK_ANC_WAR	EXTERNAL WARNING REQUEST	Requests to Detect Light Failures from External Devices
F201	-	_USER_STAUS_F	USER CONTACTING POINT	User Contacting Point
	F2010	_INIT_DONE	INITIALIZATION COMPLETED	Displays Initialization Task Performance Completed
F202	-	_ANC_ERR	EXTERNAL SERIOUS FAILURE INFORMATION	Displays Serious Failures Information of External Devices
F203	-	_ANC_WAR	EXTERNAL LIGHT FAILURE WARNING	Displays the Light Failures Information of External Devices
F210	-	_MON_YEAR_DT	MONTH / YEAR	Clock Information Data (Month / Year)
F211	-	_TIME_DAY_DT	HOUR / DAY	Clock Information Data (Hour / Day)
F212	-	_SEC_MIN_DT	SECOND / MINUTE	Clock Information Data (Second / Minute)
F213	-	_HUND_WK_DT	100 YEARS / DAY	Clock Information Data(100 Years / Day)

(2) Common area

Communication flag according to P2P service setting
In case of XGB, P2P parameter 1~3, P2P block 0~31

Device	IEC type	Key word	Type	Description
L5120	%LX8192	_P2P1_NDR00	Bit	P2P Parameter 1 block 0 service normal end
L5121	%LX8193	_P2P1_ERR00	Bit	P2P Parameter 1 block 0 service abnormal end
L513	%LW513	_P2P1_STATUS00	Word	When P2P Parameter 1 block 0 service abnormal end, indicates error code.
L514	%LD257	_P2P1_SVCCNT00	Double Word	Indicates P2P Parameter 1 block 0 service normal execution count
L516	%LD258	_P2P1_ERRCNT00	Double Word	Indicates P2P Parameter 1 block 0 service abnormal execution count
L5180	%LX8288	_P2P1_NDR01	Bit	P2P Parameter 1 block 1 service normal end
L5181	%LX8289	_P2P1_ERR01	Bit	P2P Parameter 1 block 1 service abnormal end
L519	%LW519	_P2P1_STATUS01	Word	When P2P Parameter 1 block 1 service abnormal end, indicates error code.
L520	%LD260	_P2P1_SVCCNT01	Double Word	Indicates P2P Parameter 1 block 1 service normal execution count
L522	%LD264	_P2P1_ERRCNT01	Double Word	Indicates P2P Parameter 1 block 1 service abnormal execution count
L524~L529	%LW524~ %LW529	-	Word	P2P parameter1 block 2 service
L530~L535	%LW530~ %LW535	-	Word	P2P parameter1 block 3 service
L536~L697	%LW536~ %LW697	-	Word	P2P parameter1 block 4~30 service
L698~L703	%LW698~ %LW703	-	Word	P2P parameter1 block 31 service

A.2.2 Network Register (N) List

This chapter describes on communication network register (P2P parameter: 1~3, P2P block: 0~31)

Device	IEC type	Key word	Type	Description
N000	%NW000	_P1B00SN	Word	Saves P2P parameter1 block 00's partner station number.
N0001~0004	%NW0001~0005	_P1B00RD1	Word	Saves Saves P2P parameter1 block 00 Read area device 1
N005	%NW006	_P1B00RS1	Word	Saves Saves P2P parameter1 block 00 Read area size 1
N0006~0009	%NW0007~0011	_P1B00RD2	Word	Saves Saves P2P parameter1 block 00 Read area device 2
N010	%NW012	_P1B00RS2	Word	Saves Saves P2P parameter1 block 00 Read area size 2
N0011~0014	%NW0013~0017	_P1B00RD3	Word	Saves Saves P2P parameter1 block 00 Read area device 3
N015	%NW018	_P1B00RS3	Word	Saves Saves P2P parameter1 block 00 Read area size 3
N0016~0019	%NW0019~0023	_P1B00RD4	Word	Saves Saves P2P parameter1 block 00 Read area device 4
N020	%NW024	_P1B00RS4	Word	Saves Saves P2P parameter1 block 00 Read area size 4
N0021~0024	%NW0025~0029	_P1B00WD1	Word	Saves Saves P2P parameter1 block 00 Save area device 1
N025	%NW030	_P1B00WS1	Word	Saves Saves P2P parameter1 block 00 Save area size 1
N0026~0029	%NW0031~0035	_P1B00WD2	Word	Saves Saves P2P parameter1 block 00 Save area device 2
N030	%NW036	_P1B00WS2	Word	Saves Saves P2P parameter1 block 00 Save area size 2
N0031~0034	%NW0037~0041	_P1B00WD3	Word	Saves Saves P2P parameter1 block 00 Save area device 3
N035	%NW042	_P1B00WS3	Word	Saves Saves P2P parameter1 block 00 Save area size 3
N0036~0039	%NW0043~0047	_P1B00WD4	Word	Saves Saves P2P parameter1 block 00 Save area device 4
N040	%NW0048	_P1B00WS4	Word	Saves Saves P2P parameter1 block 00 Save area size 4
N0041~0081	%NW0049~0097	-	Word	P2P parameter 1 block 01 Save area
N0082~0122	%NW0098~0146	-	Word	P2P parameter 1 block 02 Save area
N0123~1311	%NW0147~1567	-	Word	P2P parameter 1 block 03 ~ 31 Save area
N1312~2623	%NW1568~3135	-	Word	P2P parameter 2 Save area
N2624~3935	%NW3136~4703	-	Word	P2P parameter 3 Save area

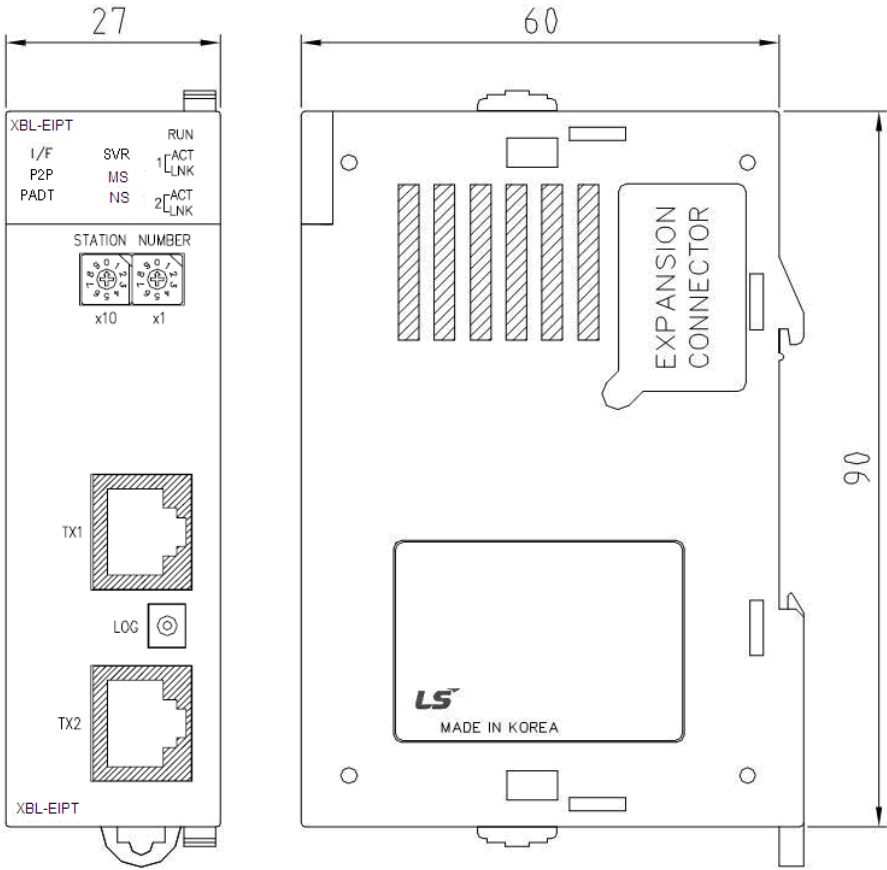
Notice

Network register is Read Only device in the XGB.

A.3 External Dimension

Dimension Unit : mm

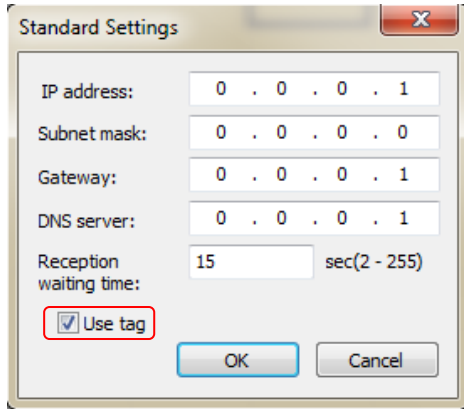
• XBL-EIPT



A.4 Action when changing OS version from V1.x to V2.0

1) Communication Module Set-up

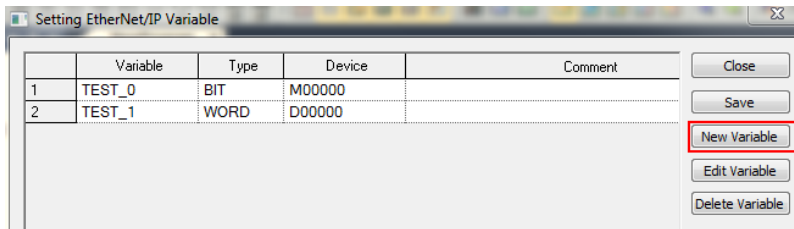
- Use tag should be checked.



2) Tag setup

- Register the sending / receiving data device with Tag.

a) XBM/XBC



b) XEC

Global/Direct Variables										
Variable Kind	Variable	Type	Address	Initial Value	Retain	Used	EIP	HMI	Comment	
VAR_GLOBAL	TEST_0	BOOL	%MX0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
VAR_GLOBAL	TEST_1	WORD	%MW100		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
VAR_GLOBAL	TEST_2	DINT	%MD100		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

3) Periodic Client Communication Service

- Enter the Tag name instead of the device address in the local tag in the tag settings.

a) For XBL-EIPT V1.x

Index	Ch	Operation 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	Data count
0	0	Implicit Client	0:Input Only(ID)	Multicast	Parameter	T20 Tag Size:2 Input Assembly Instance(8bit)0			200	1. RPI x8	1 BYTE	%M80		2

b) For XBL-EIPT V2.0 or later

Index	Ch	Operation 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	Data count
0	0	Implicit Client	0:Input Only(ID)	Multicast	Parameter	T20 Tag Size:1 Input Assembly Instance(8bit)0			200	1. RPI x8	DINT	TEST_2/%MD100		1

4) Periodic Server Communication Service

- Register the XBL-EIPT EDS V2.10 file from the client device. (XBL-EIPT_V21.eds)
- Enter the Tag name instead of the device address in the local tag in the tag settings.

a) For XBL-EIPT V1.x

Index	Ch	Operation 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	Data count
0	0	Implicit Server									2 BYTE	%Mw0		1
1	0	Implicit Server									2 BYTE	%Mw100		2
2	0	Implicit Server									2 BYTE	%Mw200		10
3	0	Implicit Server									2 BYTE	%Mw300		20

b) For XBL-EIPT V2.0 or later

Index	Ch	Operation 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	Data count
0	0	Implicit Server									BYTE	TEST_0/%MB100		1
1	0	Implicit Server									WORD	TEST_1/%Mw100		1
2	0	Implicit Server									DINT	TEST_2/%MD100		1
3	0	Implicit Server									ARRAY[0..6] OF BYTE	TEST_3/%MB300		7

5) Aperiodic Client Communication Service

- Enter the Tag name instead of the device address in the local tag in the tag settings.

a) For XBL-EIPT V1.x

Index	Ch	Operation 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	Data count
0	0	Explicit Client			0. TAG READ			_T200MS			2 BYTE	%Mw100	Tag_test	1

Index	Ch	Operation 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	Data count
0	0	Explicit Client			2. Generic READ	Parameter	Service Code(Hex):e Class(Hex):1 Instance:1 Attribute(Hex):4	_T200MS			2 BYTE	%Mw100		1

b) For XBL-EIPT V2.0 or later

Index	Ch	Operation 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	Data count
0	0	Explicit Client			0. TAG READ			_T200MS			WORD	TEST_1/%Mw100	Tag_test	1

Index	Ch	Operation 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	Data count
0	0	Explicit Client			2. Generic READ	Parameter	Service Code(Hex):e Class(Hex):1 Instance:1 Attribute(Hex):4	_T200MS			WORD	TEST_1/%Mw100		1

6) Aperiodic Server Communication Service

- Enter the Tag name instead of the device name on the client device

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 pleasurable 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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