**Right choice for ultimate yield**

**LSIS strives to maximize customers' profit in gratitude of choosing us for your partner.**

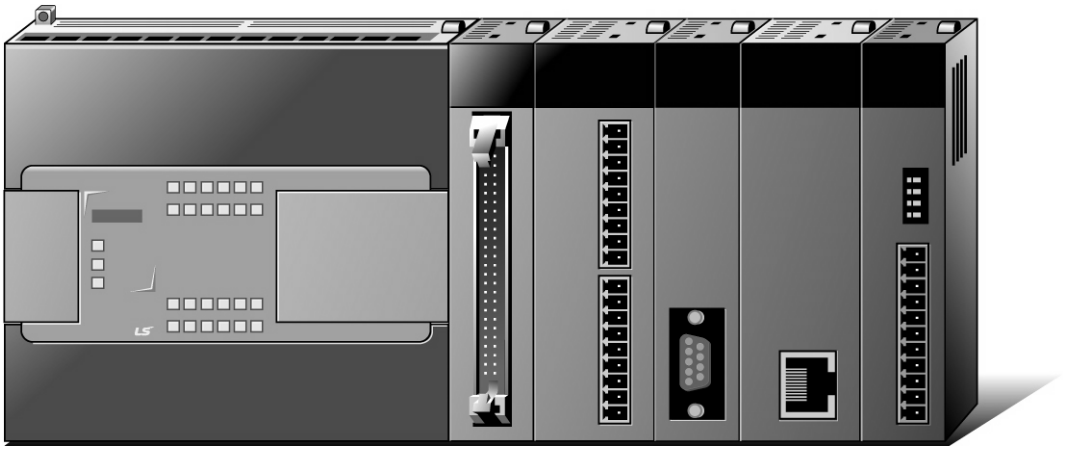
Programmable Logic Controller

# XGB Ethernet/IP IF Module

XGT Series

**User's 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.

LS Industrial Systems

**http://eng.lsis.biz**

## Before using the product …

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

- Safety Instructions should always be observed in order to prevent accident or risk with the safe and proper use the product.

- Instructions are divided into “Warning” and “Caution”, and the meaning of the terms is as follows.

| | |
|---|---|
| ⚠ **Warning** | This symbol indicates the possibility of serious injury or death if some applicable instruction is violated |
| ⚠ **Caution** | This symbol indicates the possibility of severe or slight injury, and property damages if some applicable instruction is violated |

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

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

  ⚠ Be careful! Danger may be expected.

  ⚠ Be careful! Electric shock may occur.

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

# Safety Instructions for design process

## ⚠ Warning

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

## Safety Instructions for design process

### ⚠ Caution

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

## Safety Instructions on installation process

### ⚠ Caution

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

# Safety Instructions for wiring process

## ⚠ Warning

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

## ⚠ Caution

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

# Safety Instructions for test-operation and maintenance

## ⚠ Warning

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

## ⚠ Caution

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

# Safety Instructions for waste disposal

## ⚠ Caution

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

# Revision History

| Version | Date | Contents | Revised position |
|---|---|---|---|
| V 1.0 | ’10.11 | First edition | - |
| | | | |
| | | | |

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

# About User's Manual

Congratulations on purchasing PLC of LS Industrial System 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://eng.lsis.biz/) 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 |

# ◎ Contents ◎

## Chapter 1 Overview



## Chapter 2 Product Specification



## Chapter 3 Installation and Trial- Run



## Chapter 4 System Configuration



## Chapter 5 Installation of Software and Communication Parameters

# 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.

Make a program in reference with these following user guides

- XG5000 user manual
- XGK/XGB instruction
- XGB user manual

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

- XGT PLC XG5000 Programming Tool: Over V3.6
- XG-PD: Over V3.6
- XBC CPU: Over V2.0 (XBC-xxxH)

## 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, Non-circular server)
- ▶ Auto Scan-function providing an information of own corporation's and other corporations' modules connected into network
- ▶ The kinds of packets and the quantity of data received by communication module (Network load – prediction is available)
- ▶ The diagnosis function through network is available

## 1.3 Product Components

### 1.3.1 Indication of Type Names

Components of 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 | XG-PD |

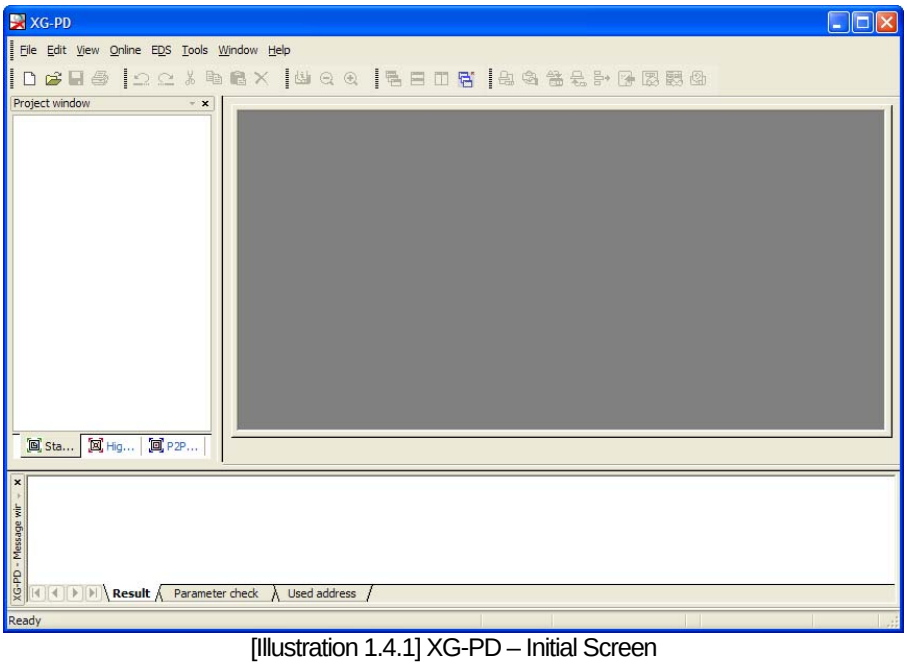
**Notice**

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.eng.lsis.biz
2) To program XG5000 and XG-PD, use RS-232C port and USB of CUP module. For cable, refer to the XGT catalogue. (USB-301A, K1C-050A)

### 1.4.2 XG-PD

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

The following illustration shows the initial screen of XG-PD.




[Illustration 1.4.1] XG-PD – Initial Screen

### 1.4.3 Confirmation of Versions

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

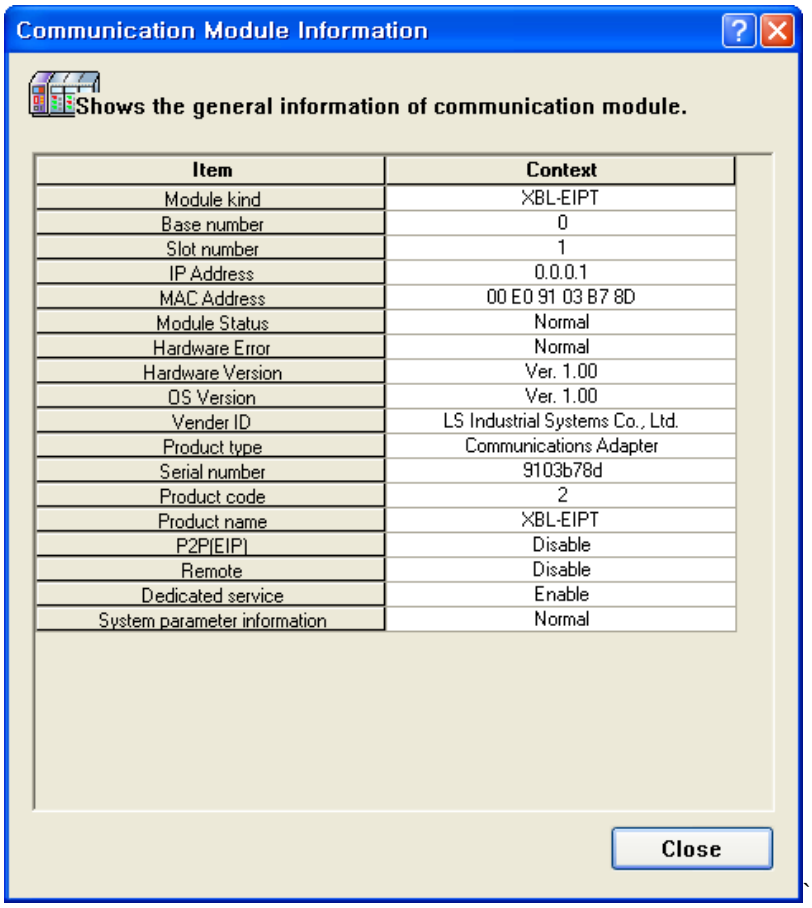
1) Confirmation through XG-PD

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 XG-PD.
(2) Connect with CPU via access through [Online]-[Connect] on menu.
(3) When connected with CPU, execute the diagnosis of XG-PD.
(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.




[Illustration 1.4.2] Confirmation of Versions through XG-PD

2) Confirmation of Versions through Case Label of Products

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

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

# Chapter 2 Specification

## 2.1 General Specification

The general specification of XGT series is as follows.

<table>
<tr><th>No.</th><th>Items</th><th colspan="6">Specifications</th><th>Related standards</th></tr>
<tr><td>1</td><td>Ambient temperature</td><td colspan="6">0 ~ 55 ℃</td><td></td></tr>
<tr><td>2</td><td>Storage temperature</td><td colspan="6">–25 ~ +70 ℃</td><td></td></tr>
<tr><td>3</td><td>Ambient humidity</td><td colspan="6">5 ~ 95%RH (Non-condensing)</td><td></td></tr>
<tr><td>4</td><td>Storage humidity</td><td colspan="6">5 ~ 95%RH (Non-condensing)</td><td></td></tr>
<tr><td rowspan="10">5</td><td rowspan="10">Vibration resistance</td><td colspan="5">Occasional vibration</td><td>-</td><td></td></tr>
<tr><td colspan="2">Frequency</td><td>Acceleration</td><td colspan="2">Amplitude</td><td>How many times</td><td rowspan="9">IEC61131-2</td></tr>
<tr><td colspan="2">10 ≤ f < 57Hz</td><td>–</td><td colspan="2">0.075mm</td><td rowspan="6">10 times each directions (X, Y and Z)</td></tr>
<tr><td colspan="2">57 ≤ f ≤ 150Hz</td><td>9.8m/s$^2$(1G)</td><td colspan="2">–</td></tr>
<tr><td colspan="6">Continuous vibration</td></tr>
<tr><td colspan="2">Frequency</td><td>Acceleration</td><td colspan="2">Amplitude</td></tr>
<tr><td colspan="2">10 ≤ f < 57Hz</td><td>–</td><td colspan="2">0.035mm</td></tr>
<tr><td colspan="2">57 ≤ f ≤ 150Hz</td><td>4.9m/s$^2$(0.5G)</td><td colspan="2">–</td></tr>
<tr><td>6</td><td>Shock resistance</td><td colspan="6">• Peak acceleration: 147 m/s$^2$(15G)<br>• Duration: 11ms<br>• Half-sine, 3 times each direction per each axis</td><td>IEC61131-2</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Noise resistance</td><td colspan="3">Square wave<br>Impulse noise</td><td colspan="2">±1,500 V</td><td>LSIS standard</td></tr>
<tr><td colspan="3">Electrostatic discharge</td><td colspan="2">4kV (Contact discharge)</td><td>IEC61131-2<br>IEC61000-1-2</td></tr>
<tr><td colspan="3">Radiated electromagnetic field noise</td><td colspan="2">80 ~ 1,000 MHz, 10V/m</td><td>IEC61131-2,<br>IEC61000-1-3</td></tr>
<tr><td rowspan="2">Fast transient/bust noise</td><td>Segment</td><td>Power supply module</td><td colspan="2">Digital/analog input/output communication interface</td><td rowspan="2">IEC61131-2<br>IEC61000-1-4</td></tr>
<tr><td>Voltage</td><td>2kV</td><td colspan="2">1kV</td></tr>
<tr><td>8</td><td>Environment</td><td colspan="6">Free from corrosive gasses and excessive dust</td><td></td></tr>
<tr><td>9</td><td>Altitude</td><td colspan="6">Up to 2,000 ms</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="6">Less than equal to 2</td><td></td></tr>
<tr><td>11</td><td>Cooling</td><td colspan="6">Air-cooling</td><td></td></tr>
</table>

**N0ote**

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

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

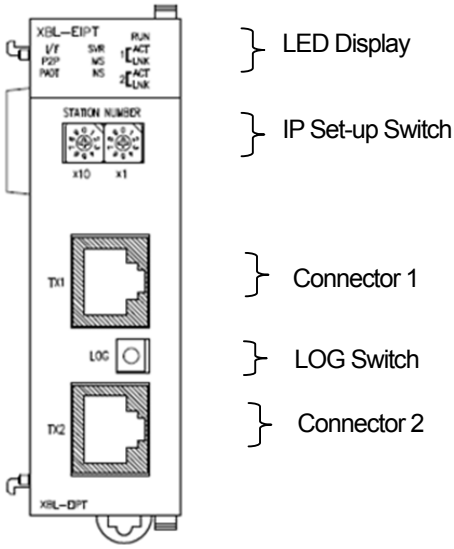
## 2.2 Performance Specification

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

| Item | | Standard |
|---|---|---|
| Transmission Standard | Transmission Speed | 100Mbps |
| | Transmission Method | Base Band |
| | Maximum Extension Distance between Nodes | 100m |
| | Communication Zone Excess Method | CSMA/CD |
| | Frame Error – Checking Method | CRC 32 = $X^{32} + X^{26} + X^{23} + ,,,,, + X^2 + X + 1$ |
| Topology | | Line , Star |
| Diagnosis Function | | Module Information , Service State , Media Information , Auto Scan, Ping Test |
| Service | Periodic Cline t | Implicit IO Client |
| | Aperiodic Client | UCMM Client |
| | Periodic Server | Implicit IO Server |
| The Number of Connections (Client/Server) | TCP | 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 | Periodic client | 500 byte |
| | Aperiodic client | 512 byte |
| Media | | UTP/STP Category 5 |
| Basic Standards | Dimension (mm) | 90(H) X 27(W) X 60(D) |
| | Consumption Current (mA) | 290 |
| | Weight (g) | 102 |

## 2.3 Name of Each Part

The name in each module is as follows.



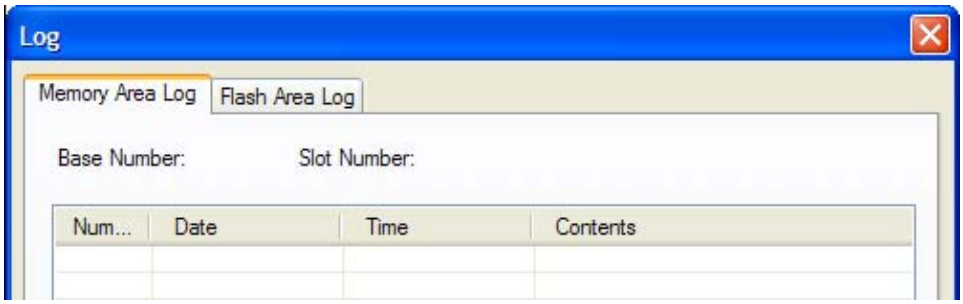

[Illustration 2.3.1] The Front View for Module PLC

▶ LED Names and Contents

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

▶ Log Switch

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




▶ IP Set-up Switch (1~90, 94~99)

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

▶ IP Set-up Switch (90~98)

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

▶ 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

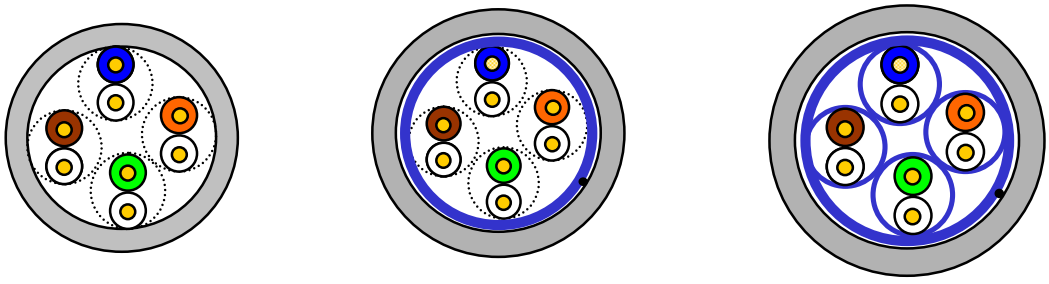
### 2.4.1 UTP Cable

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



UTP FTP STP

**Notice**

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

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

2) Classification by Frequencies used

| Classification | Frequency used (MHz) | Transmission Speed(Mbps) | Uses |
|---|---|---|---|
| Category 1 | Voice Frequency | 1 | Telephone Network (2 Pair) |
| Category 2 | 4 | 4 | Multi- Pair Communication Cable |
| Category 3 | 16 | 16 | Telephone Network + Computation Network |
| Category 4 | 20 | 20 | 1) Computation Network – Transmission Speed Up<br>2)Low-loss Communication Cable |
| Category 5 and Enhanced Category 5 | 100 | 100 | 1)Digital Telephone Network + Computation Network<br>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 | • For Installing ceilings without duct<br>• Plenum Cable<br>• UL 910 (Plenum Test) |
| CMR | 150(kW) | 30 minutes | Less than 3.6m | Not Regulated | • Vertical Installation Type<br>• Non-Plenum Cable<br>• UL 1666(Riser Test) |
| CM | 21(kW) | 20 minutes | Less than 2.4m | Not regulated | • General Type<br>• Non-Plenum Cable<br>• UL 1581(VTFT Test) |
| CMX | 1(kW) | 1 minute | Less than 0.5m | Not regulated | • Restrictive Use<br>• Non-Plenum Cable<br>• UL 1581 (VW-1 Test) |

**Notice**

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

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

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

# Chapter 3 Installation and Trial- Run

## 3.1 Installation Environment

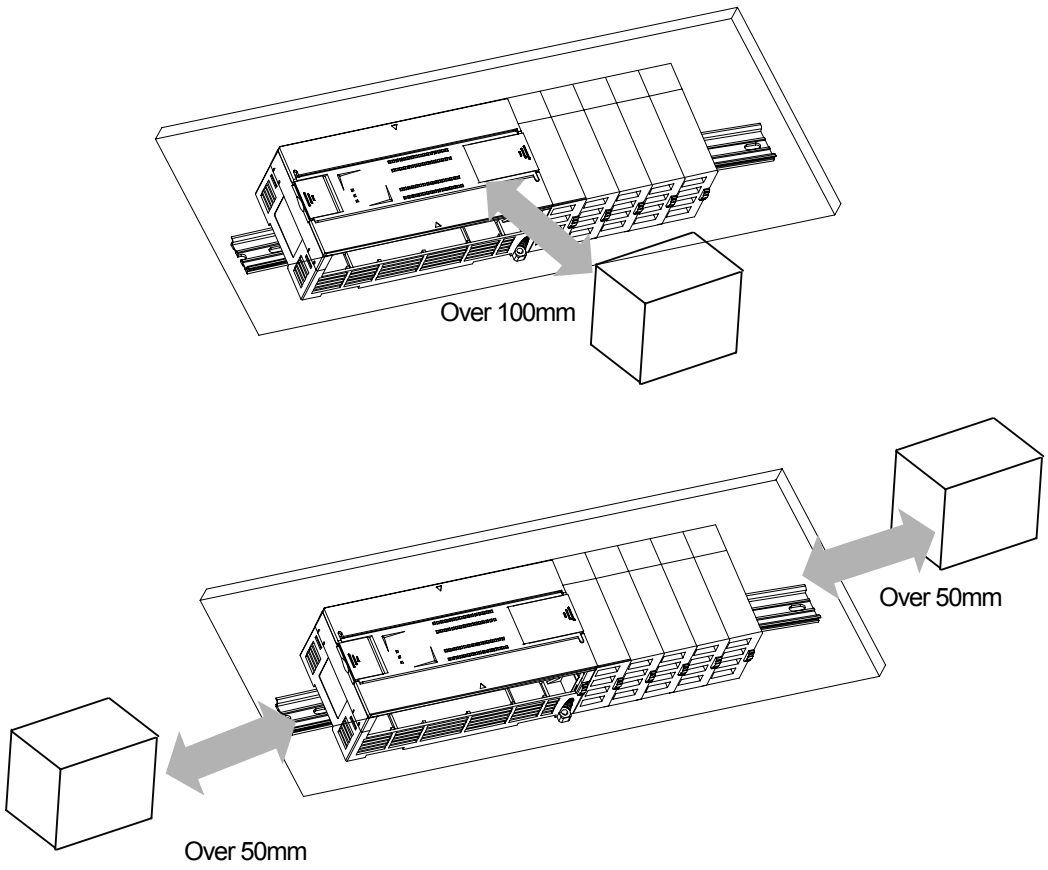
This product is very reliable regardless of installation environments, but to guaranty the reliability and stability of the system, pay attention to the following items.

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℃.

2) Installation Constructions

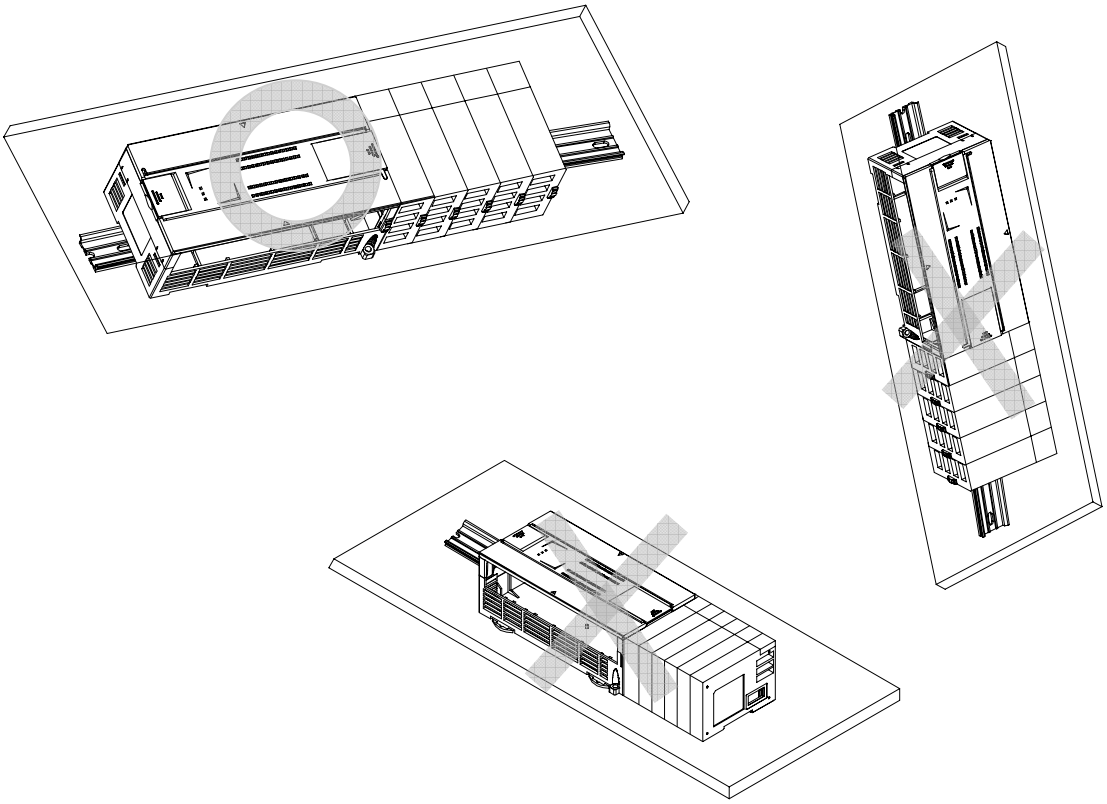
(1) Make sure wiring leavings are not inserted inside the PLC when you process screw holes or do wiring jobs.
(2) Install the places where it is easy to control.
(3) Do not install into the same panel as high press machine.
(4) Make sure the distance to the duct and the surrounding module is maintained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



## 3.2 Cautions when Handling

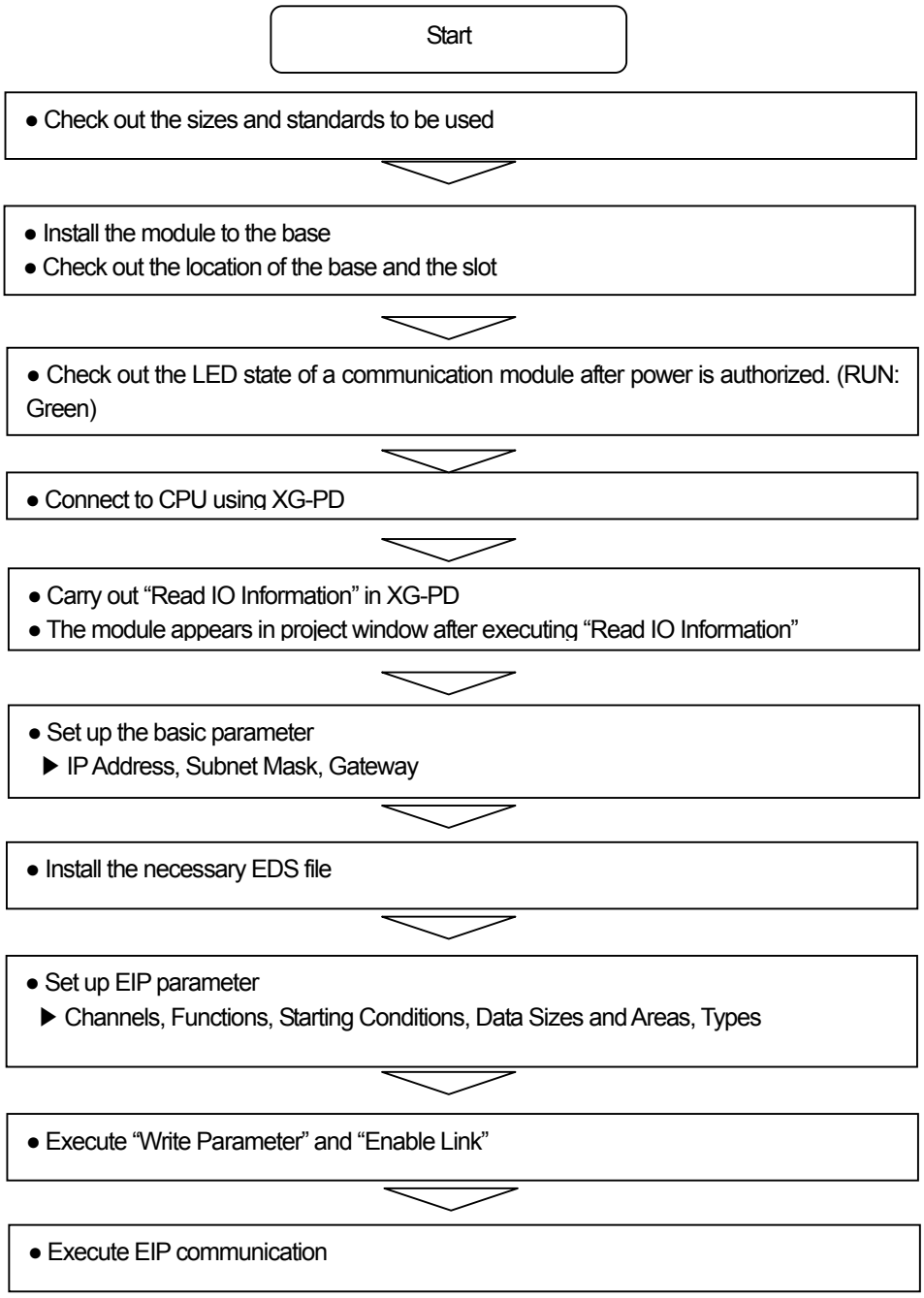
Observe the following directions when you configure the system using EtherNet/IP I/F module.

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



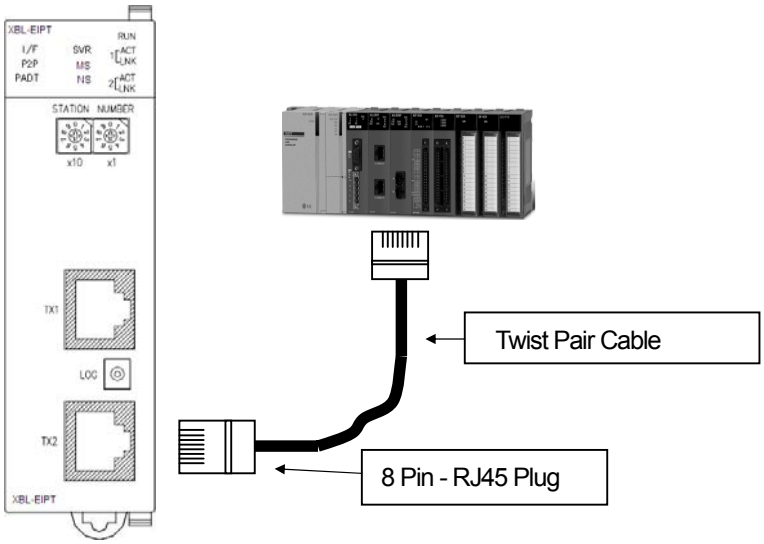
## 3.3 The Order for Setting up Products till Running

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



## 3.4 Installation of Products

### 3.4.1 Installation of XGL-EIPT




[Illustration 3.6.1] How to Install 100BASE-TX

The maximum segment distance of 100BASE-TX reaches 100m. (The distance between modules)
Straight cables and cross cables are used.
If a cross cable is used when connected between these 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.

## 3.5 Trial- Run

### 3.5.1 Directions when Configuring Systems

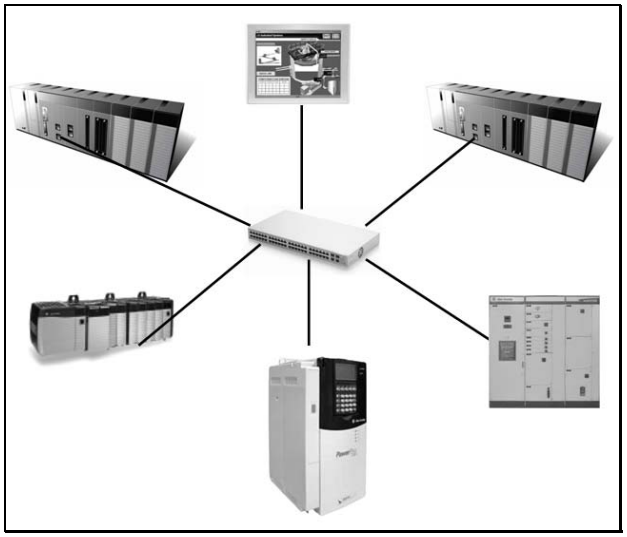
1) To use P2P service including this module, make sure IP Addresses of all stations are different from IP addresses of all other stations.
2) To use communication cables, select the ones in designated sizes. Using cables that have not been designated may cause serious communication obstacles.
3) Check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

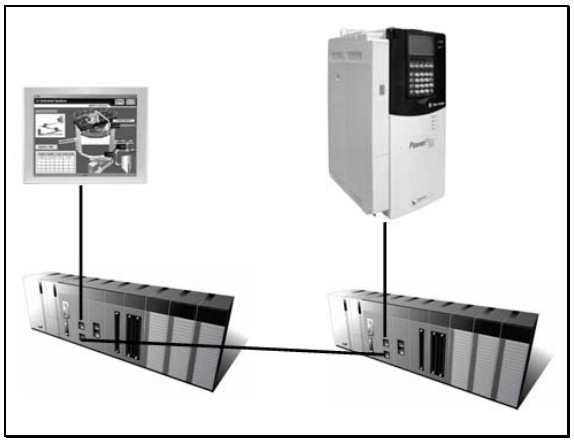
XGB EtherNet/IP I/F modules can be installed on the XBC CPU modules. The number of maximum installments reaches 2 .
It is possible for the communication system using this module to be applied to a variety of configurations. This chapter describes the examples of the cases when system configuration is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

## 4.1 Configuration of a Usable System

### 4.1.1 System Configuration using a Switch



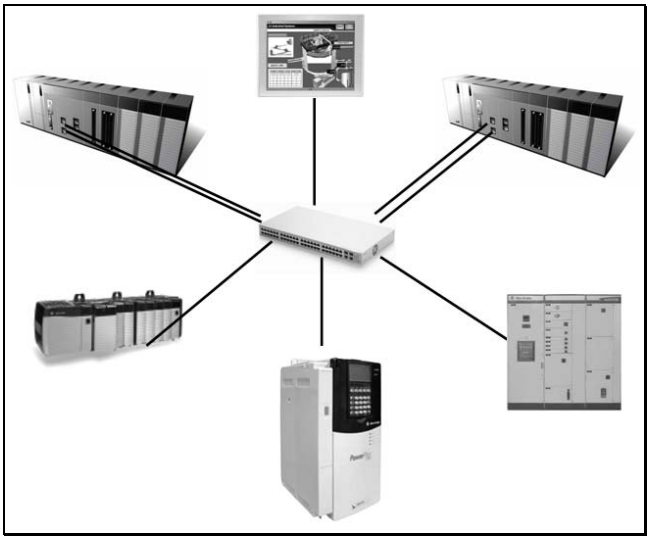
### 4.1.2 System Configuration not using a Switch



## 4.2 Configuration of an unusable System

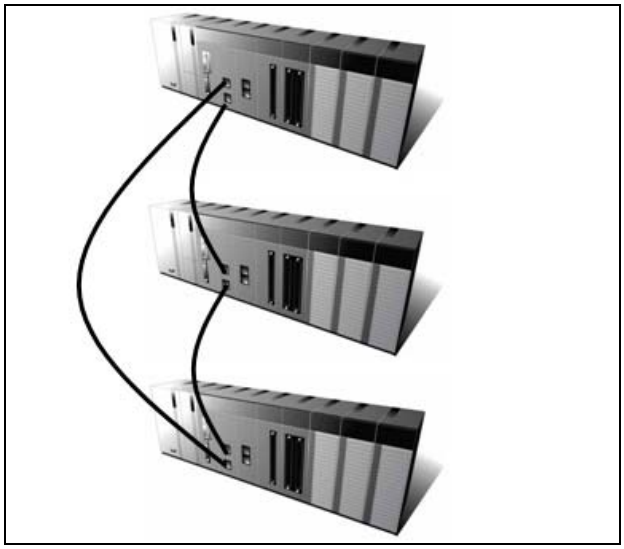
### 4.2.1 System Configuration using a Switch

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

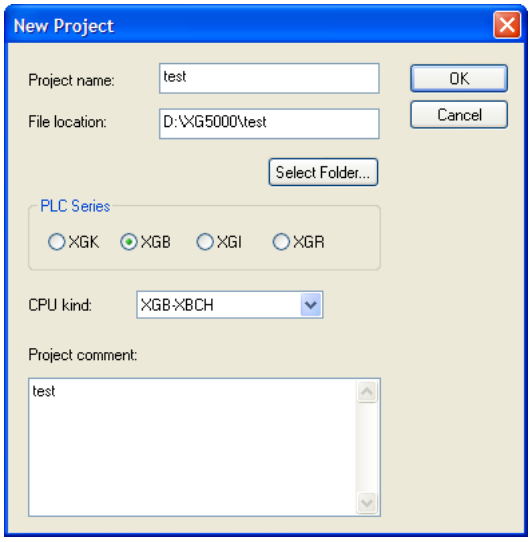
## 5.1 How to Register Communication Modules

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

### 5.1.1 In case of Offline

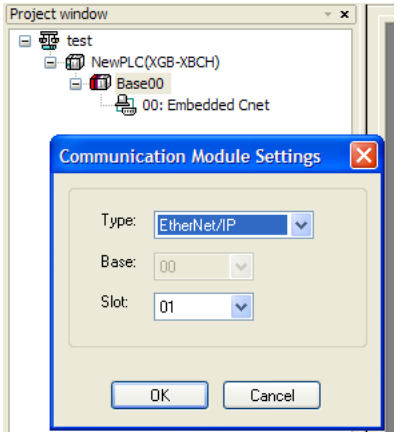
This is the way used in setting up communication modules and making up communication related parameters in the state of not connected with PLC. The execution method is as follows.

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




New Project

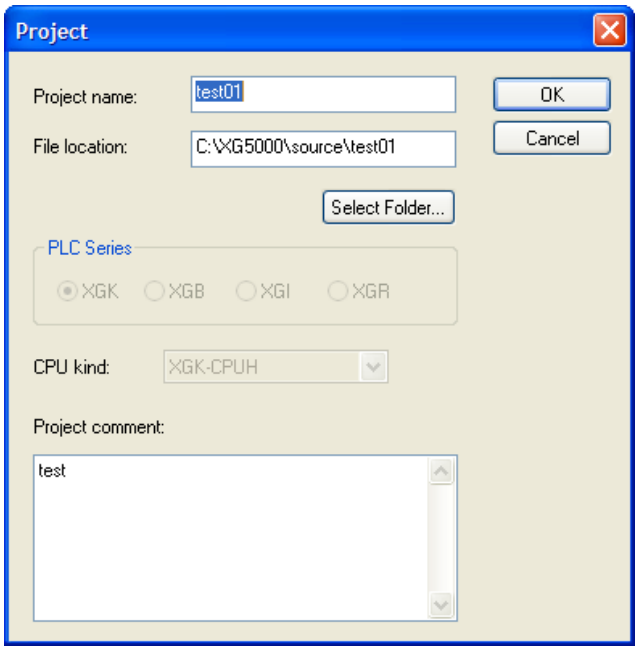
3) After selecting the base where you will register EtherNet/IP I/F module in 'Basic Set-up Screen" of XG-PD, click the right mouse and set up slots and communication modules



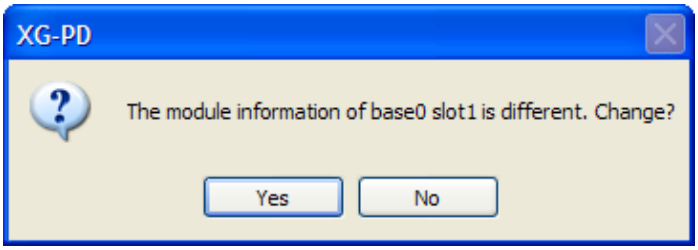
### 5.1.2 In case of Online

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

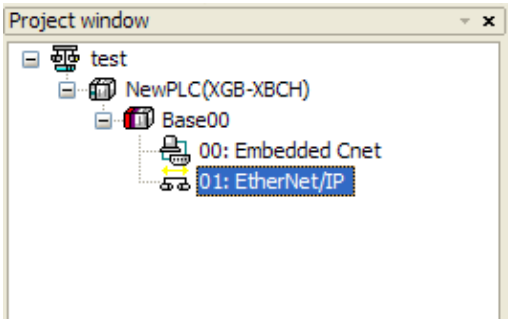
1) Create Project Name you will store and select 'PLC Series" type applied to PLC series and PLC CPU type for CPU.
2) If not connected, check out the state of connection with PLC or select 'Online '-> 'Connection Setting,' or select the connection method by clicking icon . As a connection method, there is a method using RS-232C, a method using USB cables, and a method using Ethernet module and EtherNet/IP module. As for a connection depth, select Local in case of directly connecting with PLC. The remote connection steps will be described in 7.3 remote connection.




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



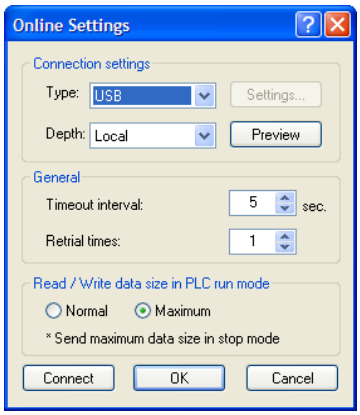
5) The list of the communication module installed to a product is created on “Project Window.”



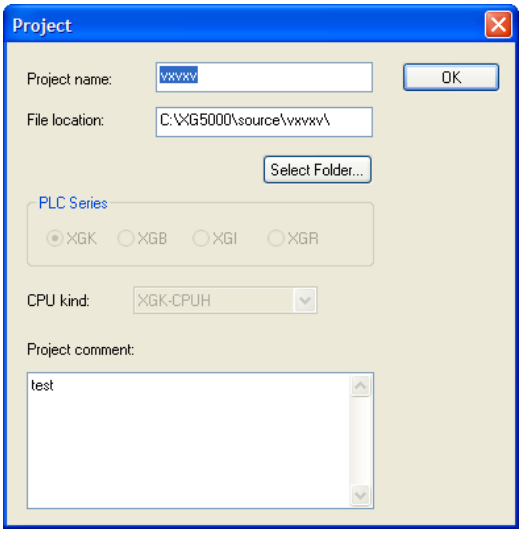
### 5.1.3 In case of Reading Parameter stored in PLC

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 “Open from PLC” in the File.

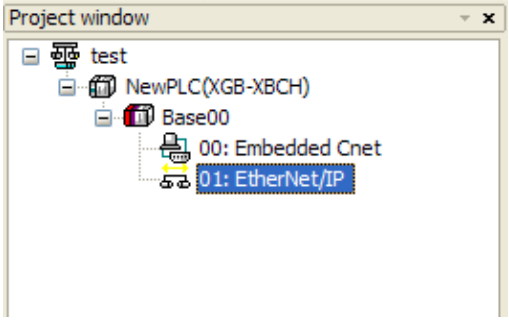



2) Click “Connection” or “Ok” after setting up connection type and connection depth




3) Enter the name of the project you will store and click “Ok” after entering the storing location of the file.

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



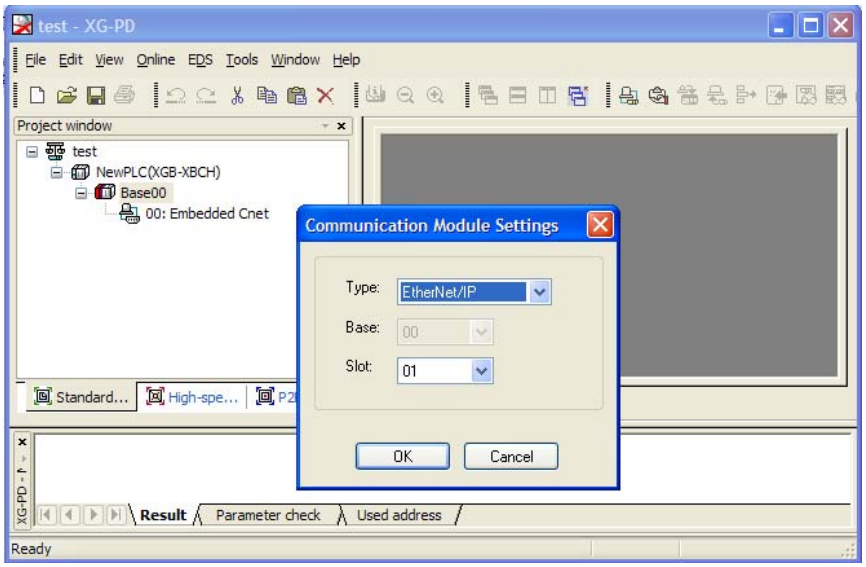
### 5.1.4 How to Set-up Modules

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

1) Execution Order

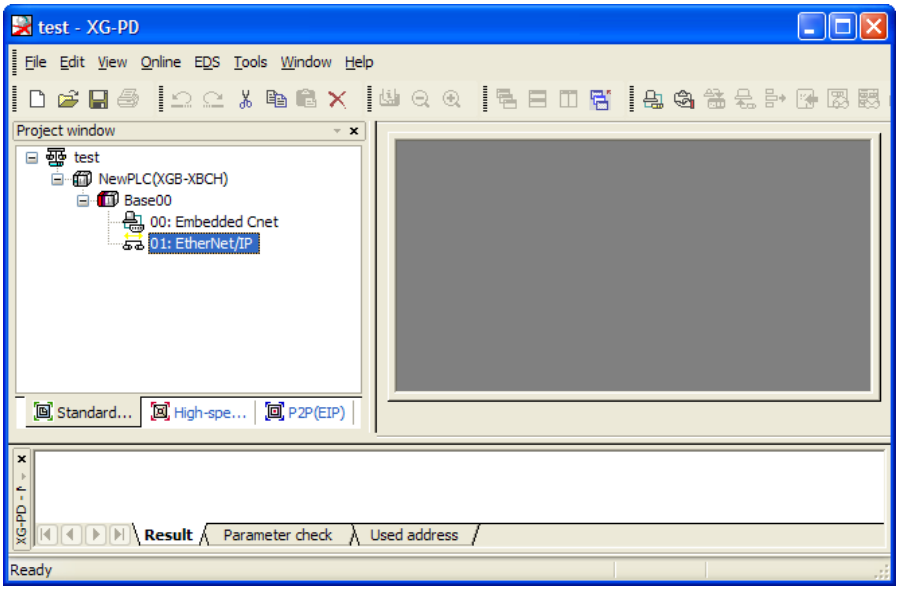
(1) Enter in the Project Window

If you click the right button of the mouse while cursor is on the base where module will be installed in the project window, the communication module set- up window appears as follows.




(2) I/O Information - Read

Select Online → Connect → Read I/O information to read the module installed to the current base.

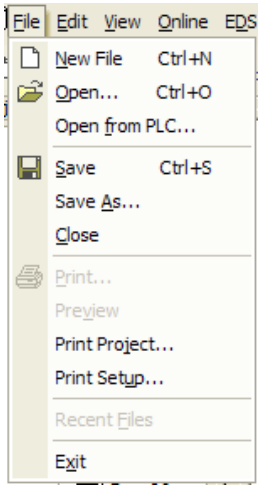
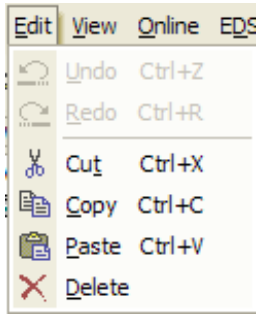


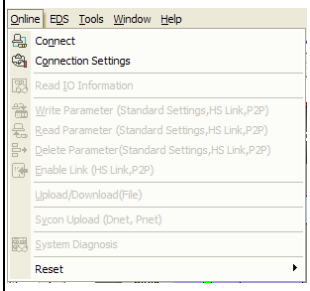
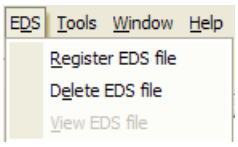
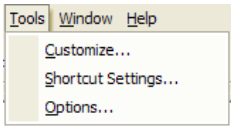
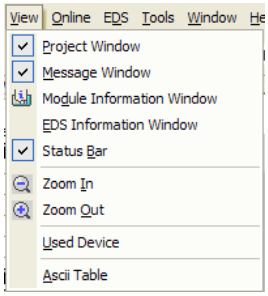
2) Operation Check-out

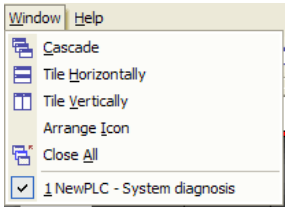
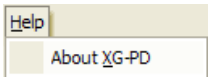
(1) Select Online → System Diagnosis or click icon (  ).

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

### 5.1.5 The Relationship between the Menu Bar and Shortcut Icons

| Menu Bar | | Menu | Icon | Contents |
|---|---|---|---|---|
| File |  | New File | | When making up new files |
| | | Open | | When opening stored files |
| | | Open from PLC | – | When reading the file stored in PLC |
| | | Save | | When storing the file which is being made up |
| | | Save As | – | When storing a file in other names |
| | | Print | | When printing |
| | | Preview | – | When previewing the contents that will be printed |
| | | Print Project | – | When printing set-up parameters |
| | | Printer Setup | – | When setting up a printer and printing direction |
| Edit |  | Undo | | When returning to the current state |
| | | Redo | | When returning to the original state after executing “Undo” |
| | | Cut | | When deleting contents made up or post them to others |
| | | Copy | | When copying |
| | | Paste | | When pasting contented copies |
| | | Delete | | When deleting |

| Menu Bar | | Menu | | Icon | Contents |
|---|---|---|---|---|---|
| Online |  | Connection | |  | When connecting PLC to a computer |
| | | Connection Setting | |  | When setting up connection methods between a computer and PLC |
| | | Read IO Information | |  | When reading the information of PLC |
| | | Write Parameter | |  | When writing parameter contents edited from XG-PD |
| | | Read Parameter | |  | When reading the parameter stored in PLC |
| | | Enable Link | |  | When approving the communication on high speed link and communication set up |
| | | Upload/Download | | - | When O/S downloading communication module |
| | | SyCon Upload | | | When reading the data set in SyCon (Corresponding to Dnet, Pnet) |
| | | System Diagnosis | |  | When monitoring the operating state of communication module |
| | | Reset | Reset PLC | - | When resetting PLC |
| | | | Reset Individual Module |  | When resetting communication modules |
| EDS |  | Register EDS File | | | When registering EDS file |
| | | Delete EDS File | | | When deleting EDS file (Used to delete EDS of the module activated on EIP Configuration Window ) |
| | | View EDS File | | | When marking EDS file on the memo pad (The activated information of the module EIP on the configuration window ) |
| Tools |  | Customize | | - | When selecting / canceling a user of the menu related to a tools |
| | | Shortcut Settings | | - | When setting up/canceling a hotkey for each menu |
| | | Options | | - | Applying/canceling the option related to the projection |
| View |  | Project Window | | - | When activating tool bars in XG-PD |
| | | Message Window | | - | When the message window is activated |
| | | Module Information Window | | - | When displaying whether the online - system diagnosis has been activated |
| | | EDS Information Window | | - | When displaying EDS information window |
| | | State Bar | | - | When displaying a state display line |
| | | Used Device | | - | When displaying the used device area on the parameter |
| | | Ascii Table | | - | When wanting to see Ascii and Sexadecimal Values |

| Menu Bar | | Menu | Icon | Contents |
|---|---|---|---|---|
| Window |  | Cascade | | When arranging the Edit Window in stair type |
| | | Tile Horizontally | | When arranging the Edit Window horizontally |
| | | Te Vertically | | When arranging the Edit Window vertically |
| | | Arrange Icon | | Not used |
| | | Close All | | When closing all - open windows |
| Help |  | About XG-PD | | When checking out XG-PD version information |

# Chapter 6 EIP Service

## 6.1 EtherNet/IP Communication Method

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

### 6.1.1 EtherNet/IP Terms

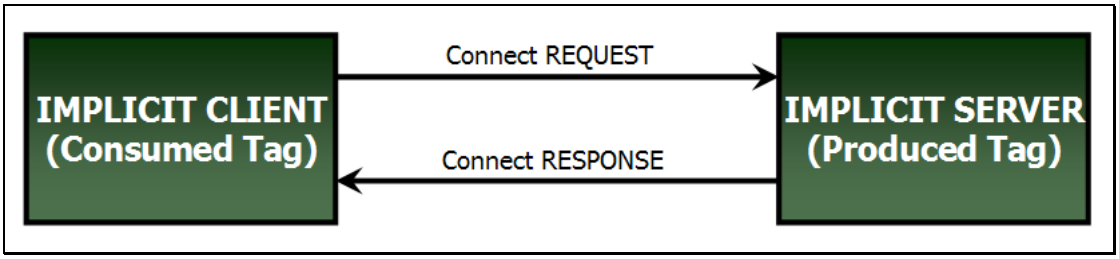
1) Implicit Messaging: Suggestive message, the message where the header information other than data has been implicated to the minimum (In XGB EtherNet/IP I/F module the message is provided via client /periodic server communication)
2) Explicit Messaging: Clear message, including all information that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

### 6.1.2 EDS File

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

### 6.1.3 Periodic Communication (Implicit) System

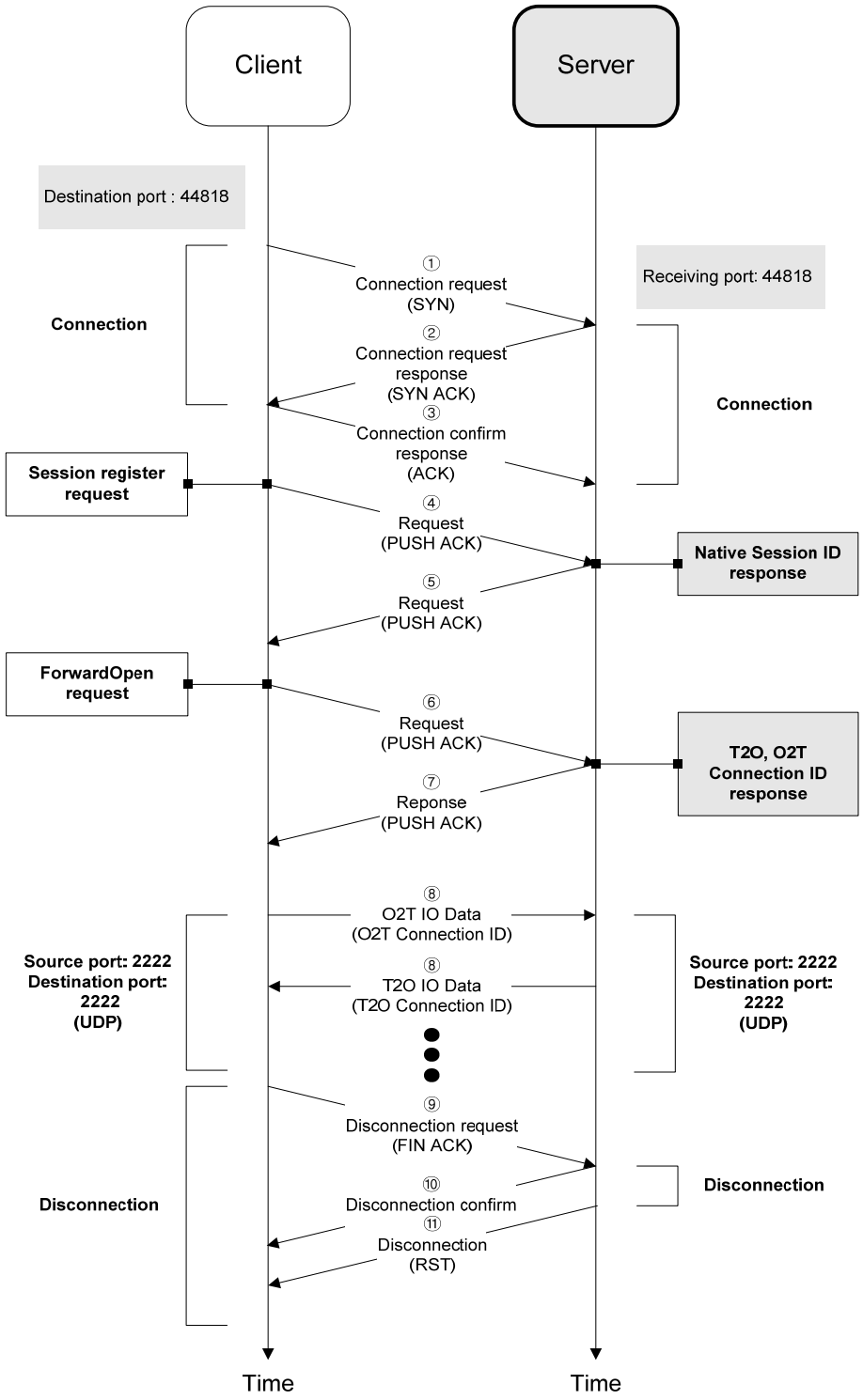
Implicit Message provided in periodic communication in XGB EtherNet/IP I/F module means a suggestive and implied message. As this message contains header information to the minimum except for the data in frame, it also refers to the message which is impossible to see what data means. In addition, if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




[Illustration 6.1] Client and Server in XGT EtherNet/IP I/F - Module Periodic Communication

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

Operating procedure of periodic communication is as follows.



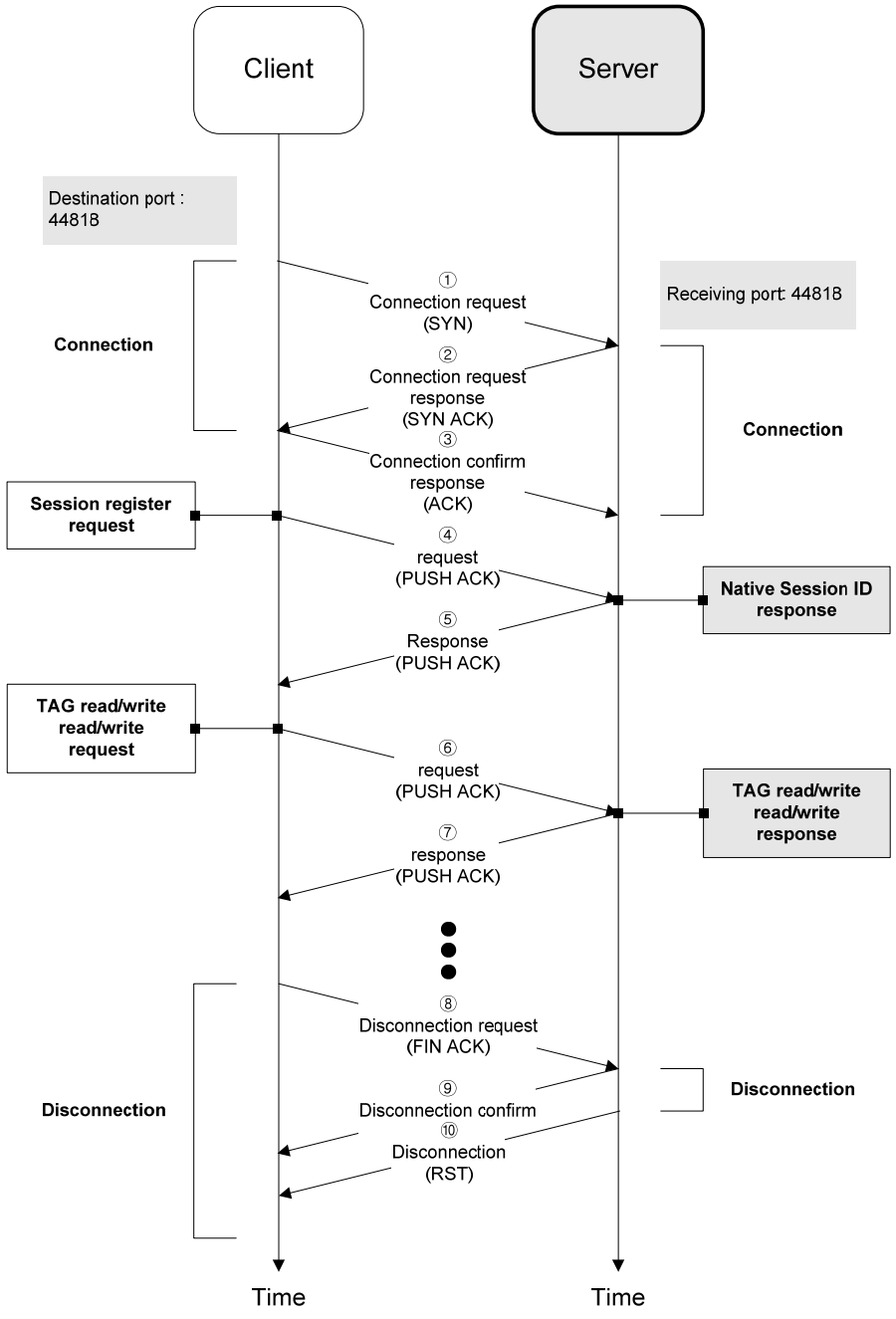

[Illustration 6.2] Operating procedure of periodic communication

### 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.

| Parameter | Inferior Configuration | Set-up Items | Set-up Scope | Set-up or Not | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | | | Periodic Client | Periodic Server | Aperiodic Client | |
| EIP | EIP Configuration | - | - | o | x | x | Drag & drop from EDS File |
| | EIP Channel | - | 0-15 | x | o | o | Set up other's IP |
| | EIP Block | Channel | 0-15 | o | o | o | Enter the channel you will use of set up channels in EIP channel |
| | | Operation Mode | Pursuant to EIP Channel | o | o | o | Automatically displayed in accordance with set up channels |
| | | I/O Type | Defined in EDS | o | x | x | Select I/O type defined in EDS |
| | | Connection Type | Multicast, Point to Point | o | x | x | Select one among connection types defined in EDS |
| | | Function | Write, Read, Tag Read, Tag Write | x | x | o | Select one among aperiodic clients |
| | | Parameter | Parameter item | o | x | o | Set up the parameter defined in EDS<br>- In case of aperiodic client, only read/write can be set up for read /write |
| | | Parameter Contents | Defined in parameter | x | x | | Display the contents set up in the Parameter |
| | | Mobile Conditions | Contact Point | x | x | o | Set up mobile conditions |
| | | Transmitting Period | 20-10000 | o | x | X | Period transmitting data |
| | | Timeout | 0-7 | o | x | X | Transmission Period – Timeout(0-7) |
| | | Data Type | BIT,1/2/4/8 BYTE | o | o | o | Set up a data type |
| | | Tag Set- up/ Local Tag | PLC Device | o | o | O | The device area of the local axis where "Write" or "Read" is executed you will |
| | | Tag Set- up/ Remote Tag | Destination TAG name | o | x | o | Designate Other's TAG(Maximum 40 letters)<br>In case remote station is XGT PLC, it is set up as "% + Device Name" (Ex.% MW200) |
| | | Tag Set-up/Size | | o | o | O | Periodic Client/Server : Maximum 500 Byte<br>Aperiodic Client : Maximum 1400 Byte |

Operating procedure of aperiodic communication is as follows.

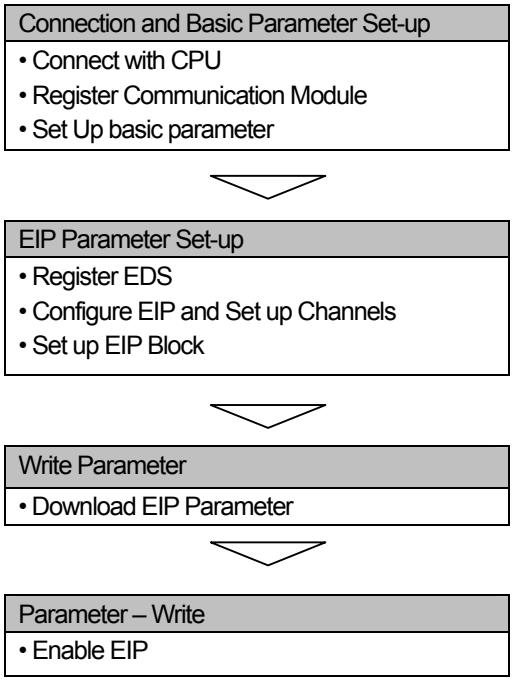



[Illustration 6.3] Operating procedure of aperiodic communication

## 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 periodic/client server and aperiodic client.
In Periodic Client / Server Service the tag for communication must be set up in parameter system. Thus, client and server tag must be shared with information for communication when parameter is exchanged. In XGB EhterNet/IP I/F module, client and server must be set up with XG-PD. Make sure client is set up in periodic client and sever is set up with periodic server. For the detail contents, see 6.2.
Aperiodic client service must be communicated after you put the tag to be communicated and communication set-up. Thus, when required from client, server receives al information in frame and translates, and responds. In other words, it is the service without setting up from server side.

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

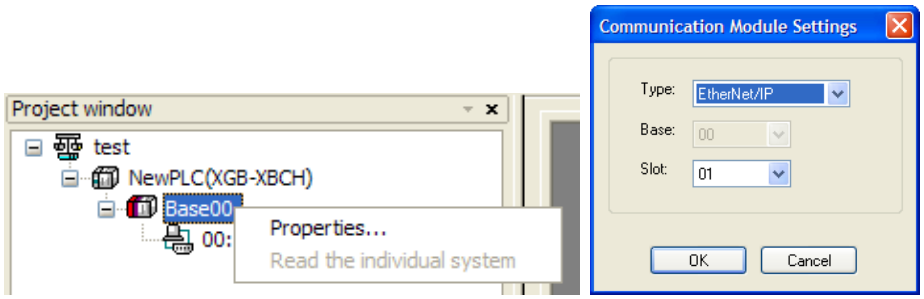
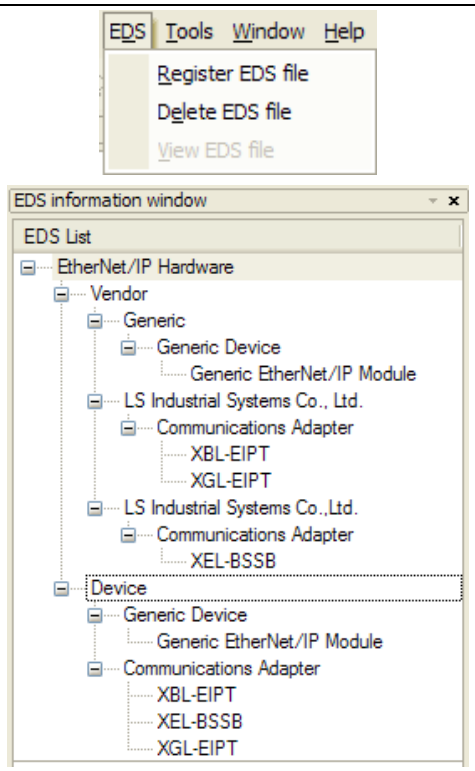


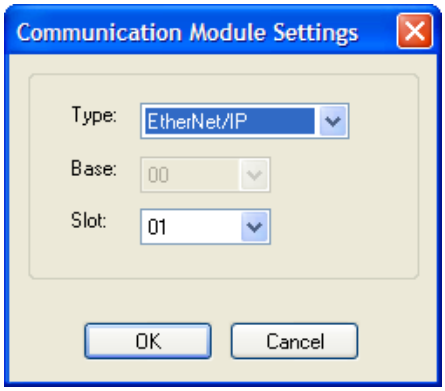
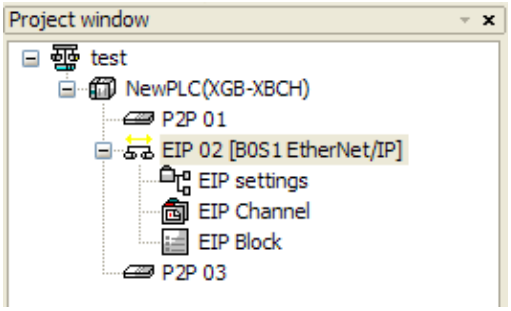
## 6.3 Communication Set-up with Own Communication Module

### 6.3.1 Periodic Client Communication Service

After set up the communication module and the basic parameter using XG-PD, drag EDS File with the mouse of an opponent's country and start set-up.

1) Basic Parameter Set – up and EDS Register

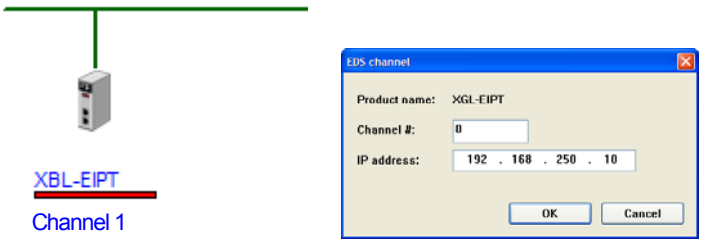
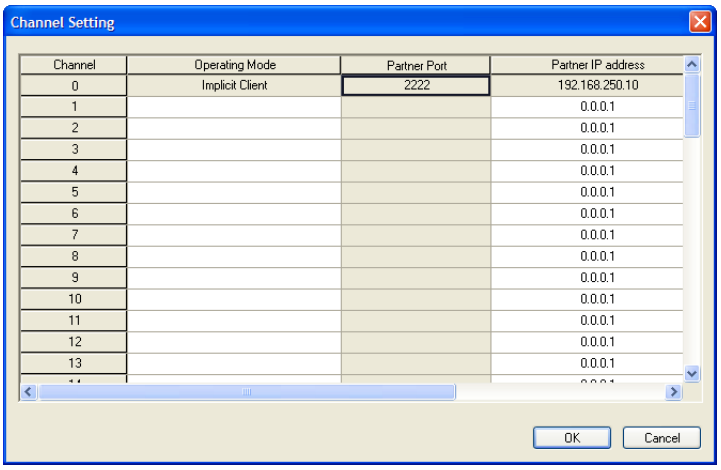
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Communication Module Set-up</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the base you want and select EtherNet/IP I/F module<br>2) Double click communication module and set up basic parameter</td></tr>
<tr><td rowspan="2">2</td><td>EDS File Register</td><td> 
</td></tr>
<tr><td colspan="2">1) Register the EDS file of the communication module you want to set up<br>2) Clock View→EDS Information Window of XG-PD<br>3) If you register, you will be able to view EDS File registered in EDS File Information Window</td></tr>
</table>

| Order | Set-up Procedure | How to Set up |
|---|---|---|
| 3 | EIP Service Register |  <br>  |
| | Double click P2P(EIP) of Set - up Window and enter the module number and the slot number. | |

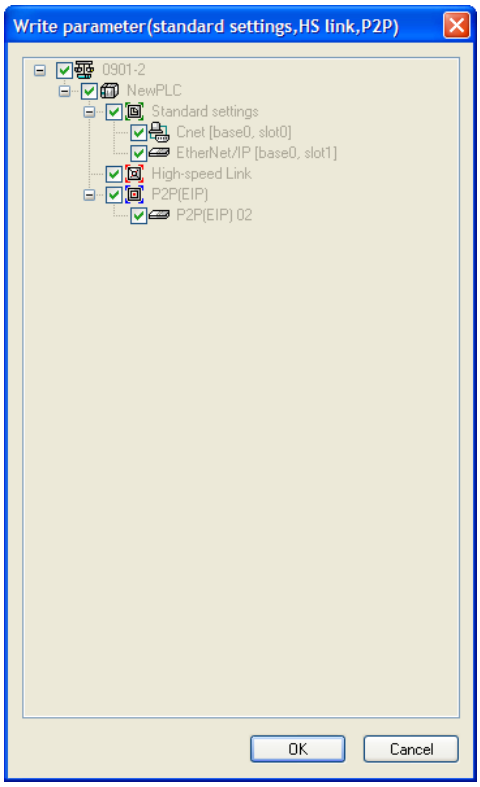
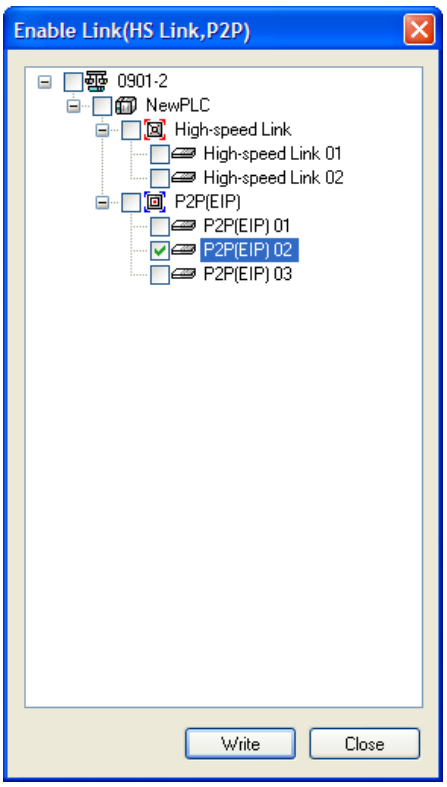
**Notice**

P2P 01 is allocated for built-in communication, P2P 02 for the first communication module and P2P 03 for the second communication module. Keep this in mind when setting.

2) EIP Configuration and Parameter Set-up

<table>
<tr><th>Order</th><th>Set – up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>EIP Configuration</td><td> 
</td></tr>
<tr><td colspan="2">1) Drag registered EDS File from EDS Information Window and post it on EIP Configuration Window.<br>2) Channel Set-up Window appears as soon as registered EDS is posted.<br>3) Set up channel No. and IP address.</td></tr>
<tr><td rowspan="2">2</td><td>EIP Channel Information Check-out</td><td> 
</td></tr>
<tr><td colspan="2">1) After registration in EIP Configuration, it is possible to check out the information on channels in EIP channel window.<br>2) In periodic client communication, more set-up is not required, so the said channel becomes inactivated.</td></tr>
</table>

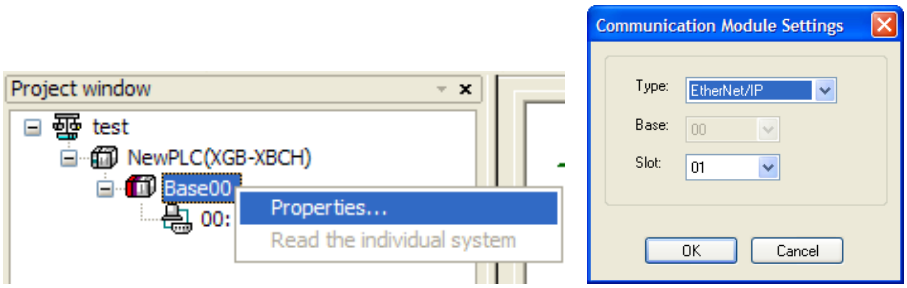
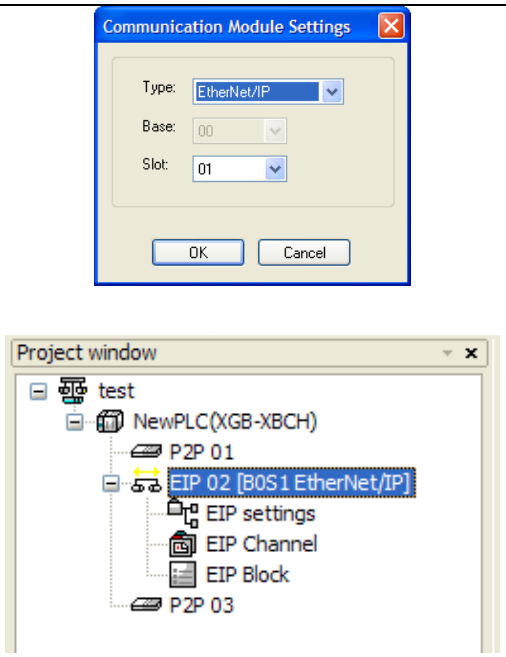
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">3</td><td>EIP Block Set-up</td><td>
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch.</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Implicit Client</td><td>0.Read Only(ID)</td><td>Multicast</td><td></td><td>Parameter</td><td>T2O Tag Size:1<br>Output Assembly Instance(8bit):0<br>Input Assembly Instance(8bit):0</td><td></td><td>200</td><td>0. RPI x4</td><td>2 BYTE</td><td>%QW0.1.0</td><td></td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">
1) Channel: Drag EDS File and display channels set up. If several channels are set up, it is possible to select the channel a user wants and form the block.<br>
2) Operating Mode: This mode is the contents displayed in accordance with the channel set up and it is expressed as periodic communication, aperiodic communication, and periodic server.<br>
3) I/O Type: The name of connection defined in the EDS File of the device. Connection will be open with server the connection way as set up here.<br>
4) Connection Type: The method for communicating with server is set up. The information supported according to modules is recorded in EDS, which can be MULTICAST, Point To Point (UNICAST).<br>
5) Parameter: This is the parameter on the server side that a user must set up. For the contents of the parameter, refer to the manual of the server side<br>
▶In case of using own EtherNet/IP: In case of own company, Output/Input Assembly Instance should be the same.<br>
(1) T2O Tag Size : The data size that server will read (Word)<br>
(2) Output Assembly Instance(8bit) : The block number of server that will write<br>
- After selecting Generic EDS, when connecting to the periodic server set at the P2P block 0 of XGB, set as 150.<br>
- After selecting XBL-EIPT EDS, when connecting to the periodic server set at the P2P block 0 of XGB, set as 0. (Since the offset in the XBL-EIPT is 150, it is adjusted as (setting value +150)<br>
(3) Input Assembly Instance(8bit) : The block number of the server that will read<br>
- After selecting Generic EDS, when connecting to the periodic server set at the P2P block 0 of XGB, set as 100.<br>
- After selecting XBL-EIPT EDS, when connecting to the periodic server set at the P2P block 0 of XGB, set as 0. (Since the offset in the XBL-EIPT is 150, it is adjusted as (setting value +100)<br><br>
6) Parameter Contents: The contents of the parameter set up are displayed.<br>
7) Transmission period (ms): This is the transmission period of data and the set – up scope is established at 20~10000 ms.<br>
8) Timeout: If frame does not appear within the time set up after the value as much as constant times of the time set up in transmission period, the time for displaying errors is set up.<br>
Set up scope is obtained in this calculation – transmission period × 0~7.<br>
9) Date Type: This refers to data type (BIT, 1 BYTE, 2 BYTE, 4 BYTE, 8 BYTE).<br>
In own company, it is fixed to be 2BYTE.<br>
10) Local Tag: This tag is used to read local data or to set up the area to write it.
</td></tr>
</table>

| Order | Set-up Procedure | How to Set up |
|---|---|---|
| 4 | Write Parameter and Enable Link |   |
| | 1) Online → Click " Write Parameter," check out P2P(EIP), and click "Ok"<br>2) After click online → Enable Link, check out P2P(EIP)set up, click "Write."<br>3) If Enable Link has not been checked out, EIP set up does not operate. | |

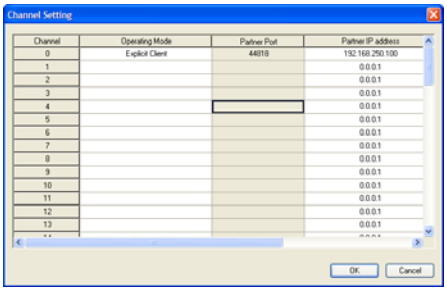
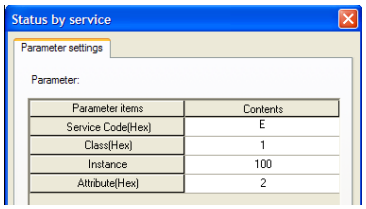
### 6.3.2 Set-up of Aperiodic Client Communication Service

Aperiodic Communication is the service when reading or writing an opponent's tag data. This service is used similarly to P2P service of XGB. It is possible to use an opponent's tag service without setting up EDS set-up.

1) Basic Parameter Set-up and EIP Service Register

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Communication Module Set-up</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the base you want and select EtherNet/IP I/F module.<br>2) Double click the communication module and set up the basic parameter.</td></tr>
<tr><td rowspan="2">2</td><td>EIP Service Register</td><td> 
</td></tr>
<tr><td colspan="2">Double - click P2P (EIP) on P2P (EIP) Set-up Window and enter modules and slot numbers.</td></tr>
</table>

2) EIP Channel and Parameter Set-up

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>Hot to Set up</th></tr>
<tr><td rowspan="2">1</td><td>EIP Channel Information Check-out</td><td> 
</td></tr>
<tr><td colspan="2">1) After double click EIP Channel, set up operation mode into aperiodic client.<br>2) Enter an opponent country's IP address</td></tr>
<tr><td rowspan="2">2</td><td>Block Set-up</td><td>▶ Example of Tag Read<br>
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch.</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Explicit Client</td><td></td><td></td><td>TAG READ</td><td></td><td></td><td>%FX92</td><td></td><td></td><td></td><td>2 BYTE</td><td>%MW100</td><td>mw100</td><td>2</td></tr>
<tr><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
▶ Example of Read<br>
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch.</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Explicit Client</td><td></td><td></td><td>Generic READ</td><td>Parameter</td><td>Service Code(Hex):E<br>Class(Hex):1<br>Instance:100<br>Attribute(Hex):2</td><td>%FX92</td><td></td><td></td><td>2 BYTE</td><td>%MW100</td><td></td><td>2</td></tr>
</table>
▶ Example of Parameter Set-up<br> 
</td></tr>
<tr><td colspan="2">1) Channel: Select and use the one among those set up with aperiodic client.<br>2) Operating Mode: The operation of the channel set up in accordance with channel set-up is displayed.<br>3) Function: There are Tag Read – Order that reads tag data from server and Tag Write - Order that stores data into server, and Read/Write that enters parameter, not tag.<br>4) Parameter: Set up is available only if Read/Write is set up.<br>▶ Service Code(Hex): Enter the Service Code that you will use.(Example : 0E : Get ,10 : Set)<br>▶ Class(Hex): Enter the Class that sets up parameter<br>▶ Instance(Hex): Enter the Instance that you will set up parameter<br>▶ Attribute(Hex): Enter the Attribute that you will set up parameter<br>5) Conditional flag: Set up operation conditions where you will send messages.<br>6) Data Type: Input the Data Type if Tag that you will set up.<br>7) Tag Settings: Make sure client (own) tag is set up into local tag and the tag of server is set up into remote tag, and set up the size.</td></tr>
</table>

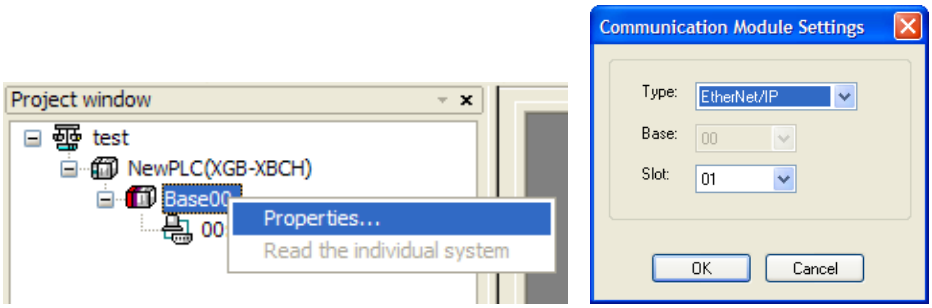
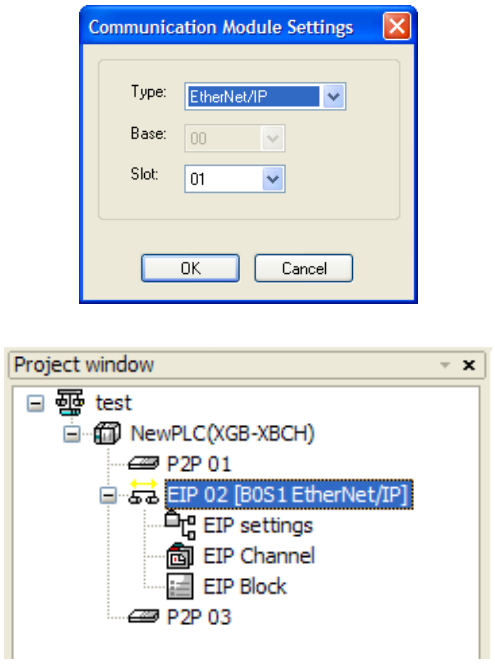
**Notice**

After adding two XBL-EIPTs to a basic unit and registering 32 blocks as aperiodic client 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.

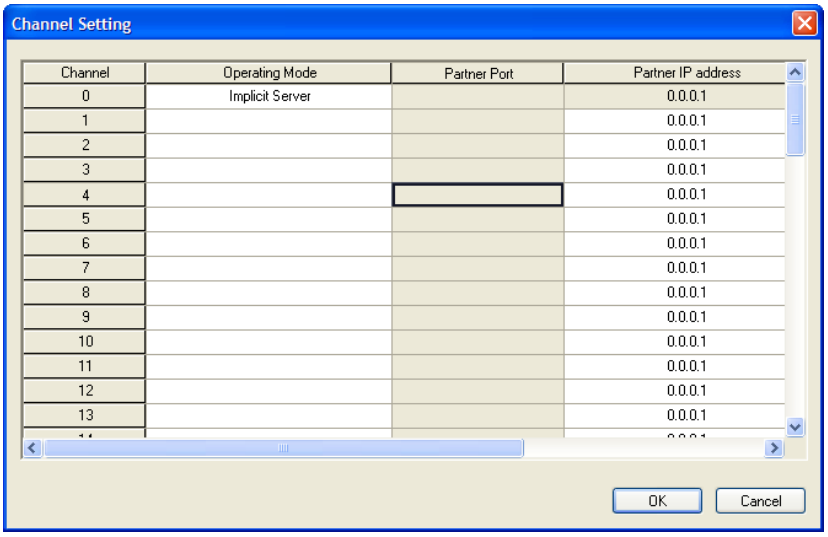
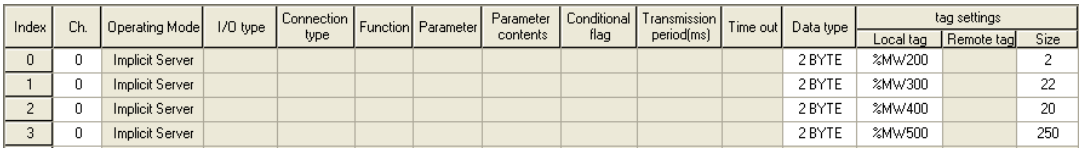
### 6.3.3 Periodic Server Communication Service

In case of the module operating via sever when a user communicates via periodic communication, using EtherNet/IP I/F, it is necessary to set up the size of tag and address.

1) Basic Parameter Set-up and EIP Service Registry

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Communication Module Set – up</td><td> 
</td></tr>
<tr><td colspan="2">1) Click the base you want using the right side of the mouse and select EtherNet/IP I/F module<br>2) Double click communication module and set up the basic parameter</td></tr>
<tr><td rowspan="2">2</td><td>EIP Service Register</td><td> 
</td></tr>
<tr><td colspan="2">Double - click P2P (EIP) on P2P (EIP) Set-up Window and enter modules and slot numbers.</td></tr>
</table>

2) EIP Channel and Parameter Set-up

<table>
<tr><th>Order</th><th>Set - up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>EIP Channel Information Check - out</td><td> 
</td></tr>
<tr><td colspan="2">1) Double click EIP channel and set up operation mode into periodic server.<br>2) The module where the basic module has been set up operates, there is no need to enter an opponent country's IP address.</td></tr>
<tr><td rowspan="2">2</td><td>Block Set-up</td><td> 
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch.</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Implicit Server</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2 BYTE</td><td>%MW200</td><td></td><td>2</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>%MW300</td><td></td><td>22</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>%MW400</td><td></td><td>20</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>%MW500</td><td></td><td>250</td></tr>
</table></td></tr>
<tr><td colspan="2">1) Channel : Select and use the one among the channels where periodic servers have been set up<br>2) Operating Mode: The operation mode of the channel set up according to the channel set-up is displayed.<br>3) Date Type: Enter the data type of the tag that you will set up.<br>4) Local Tag: This tag is the device area of the module operating via server.<br>5) Size: The data size of the module operating via server.</td></tr>
</table>

**Notice**

When a user sets up the module operating via periodic server, 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 periodic server, 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.

### 6.3.4 Aperiodic Server Communication Service

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 XG-PD.

| Index | Ch. | Operating Mode | I/O type | Connection type | Function | Parameter | Parameter contents | Conditional flag | Transmission period(ms) | Time out | Data type | tag settings | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Local tag | Remote tag | Size |
| 0 | 1 | Explicit Client | | | TAG READ | | | F00092 | | | 2 BYTE | M0100 | %MW100 | 2 |
| 1 | | | | | | | | | | | | | | |

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.

Max. 16 characters are available as tag name.

The following is max. Read/Write count and EIP type per one tag by type

| | Bit | Byte | Word | Double Word | Long Word |
|---|---|---|---|---|---|
| Max. count | 1 | 512 | 256 | 128 | 64 |
| EIP type(note1) | **hC1** | hC2, **hC6**, hD1 | hC3, **hC7**, hD2 | hC4, **hC8**, hD3, hCA | hC5, **hC9**,hD4, hCB |

* Note1) 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, XBL0EIPT is client, is EIP type which is changed about the type set in the XG-PD. When the server responds, it responds by using the requested type.

1) Standard for tag naming

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) |
|---|---|---|---|---|
| '%' (note1) | * 2) Refer to available device type and size (note2) | 'X' or 'x' | * 2) Refer to available device type and size (note2) | '0' ~ 'F' (note3) |

* note1) '%' is not necessary item. Tag name can start from '%' or device name.
* note2) Both small letter and capital letter are available for device name.
* note3) 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 |
|---|---|---|---|
| '%' (note1) | * 2) Refer to available device type and size (note2) | Byte: 'B' or 'b'<br>Word: 'W' or 'w'<br>Double Word: 'D' or 'd'<br>Long Word: 'L' or 'l' | * 2) Refer to available device type and size (note2) |

* note1) '%' is not necessary item. Tag name can start from '%' or device name.

* note2) 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

2) Available device type and size

- XBM-DXXXS and XBC-DXXXH

| Area | "S" type range | "H" type range | Size (Word) | Remark |
|---|---|---|---|---|
| P | P0 – P127 | P0 – P1023 | 1024 | Read/Write/Monitor available |
| M | M0 – M255 | M0 – M1023 | 1024 | Read/Write/Monitor available |
| K | K0 – K2559 | K0 – K4095 | 4096 | Read/Write/Monitor available |
| F | F0 – F255 | F0 – F1023 | 1024 | Read/Monitor available |
| T | T0 – T255 | T0 – T1023 | 1024 | Read/Write/Monitor available |
| C | C0 – C255 | C0 – C1023 | 1024 | Read/Write/Monitor available |
| L | L0 – L1279 | L0 – L2047 | 2048 | Read/Write/Monitor available |
| N | N0 – N3935 | N0 – N5119 | 5120 | Read/Monitor available |
| D | D0 – D5119 | D0 – D10239 | 10240 | Read/Write/Monitor available |
| U | U00.00 – U07.31 | U00.00 – U0A.31 | 352 | Read/Write/Monitor available |
| Z | Z0 – Z127 | Z0 – Z127 | 128 | Read/Write/Monitor available |
| R | - | R0 – R10239 | 10240 | Read/Write/Monitor available |

- XEC-DXXXH

| Area | Range | Size (Word) | Remark |
|---|---|---|---|
| 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 |
| W | %WW0 ~ %WW10239 | 10240 | Read/Write/Monitor available |
| R | %RW0 ~ %RW10239 | 10240 | Read/Write/Monitor available |
| F | %FW0 ~ %FW1023 | 1024 | Read/Monitor available |
| K | %KW0 ~ %KW4095 | 4096 | Read/Write/Monitor available |
| L | %LW0 ~ %LW2047 | 2048 | Read/Write/Monitor available |
| N | %NW0 ~ %NW5119 | 5120 | Read/Monitor available |
| U | %UW0.0.0 ~ %UW0.15.31 | 512 | Read/Write/Monitor available |

**Notice**

1. In the timer/counter, Bit means contact point and Byte, Word means current value.

3) EIP data type

The following is EIP data type used at the XGL-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) |

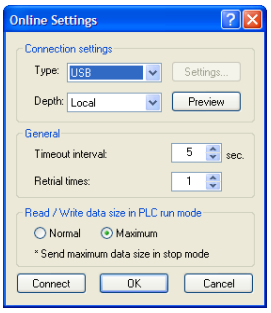
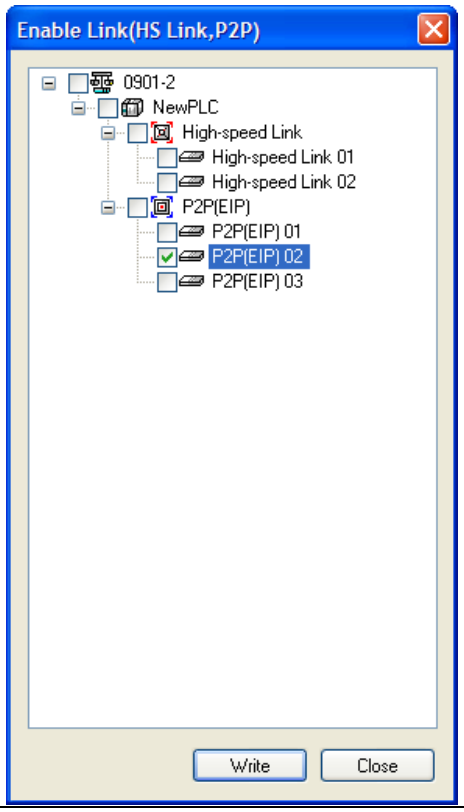
C-6.1 Elementary Data type Reporting

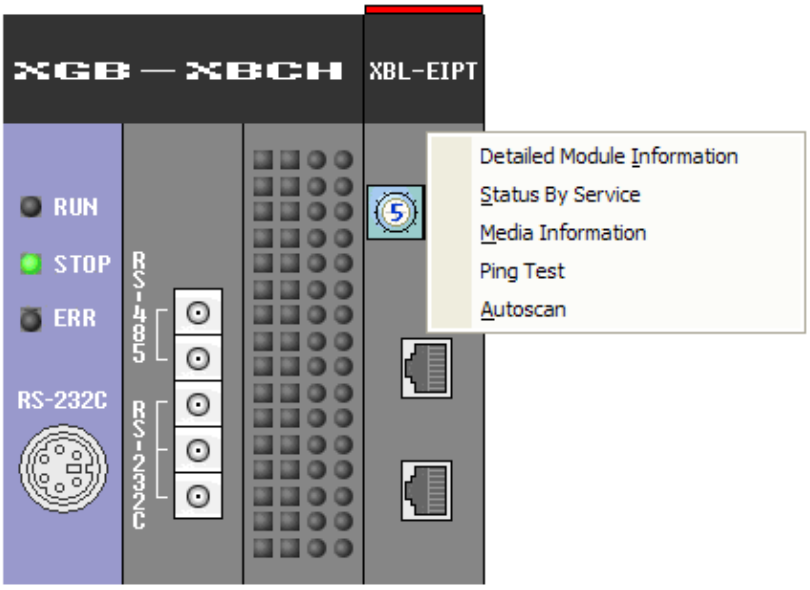
| Data Type Name | Data Type Code (in hex) | Data Type Description |
|---|---|---|
| BOOL | C1 | Logical Boolean with values TRUE and FALSE |
| SINT | C2 | Signed 8–bit integer value |
| INT | C3 | Signed 16–bit integer value |
| DINT | C4 | Signed 32–bit integer value |
| LINT | C5 | Signed 64–bit integer 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 |

## 6.4 Operation Start

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

### 6.4.1 XG-PD Set-up

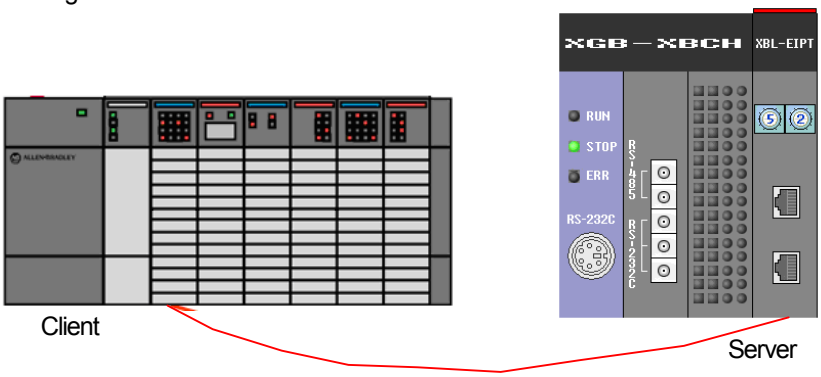
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">1</td><td>Connection Set-up</td><td> 
</td></tr>
<tr><td colspan="2">1) Online → Select Connection Set-up or Click Icon ( ).<br>2) After setting up the connection option suitable for a use's environment,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

| Order | Set-up Procedure | How to Set up |
|---|---|---|
| 4 | Operation Check-out |  |
| | | 1) Select Online → System Diagnosis or click icon ( ).<br>2) After clicking the module, press the right side of the mouse, then it is possible to check out whether communication has been successfully done by clicking frame monitoring or the state by services.<br>* For the details on system diagnosis, refer to Diagnosis Function Chapter 7. |

## 6.5 Use Examples

### 6.5.1 Communication with Rockwell 1756-ENBT Communication Module

1) System Configuration




| Segment | 1756-ENBT | XGL-EIPT |
|---|---|---|
| IP Address | 192.168.250.100 | 192.168.250.00 |
| Data Size | 4 BYTE | 4 BYTE |
| Reading Area | - | %MW0~1 |
| Storing Area | EIPT Tag | - |
| Communication Method | Periodic Client (Implicit service) | Periodic Server |

2) Set –up of XGT EtherNet/IP I/F Module Parameter

XGT is used as Server, so refer to the Server Set-up Contents in 6.2.3 above. Herein, for example, server has been set up to Channel No.0 and Block No.0.

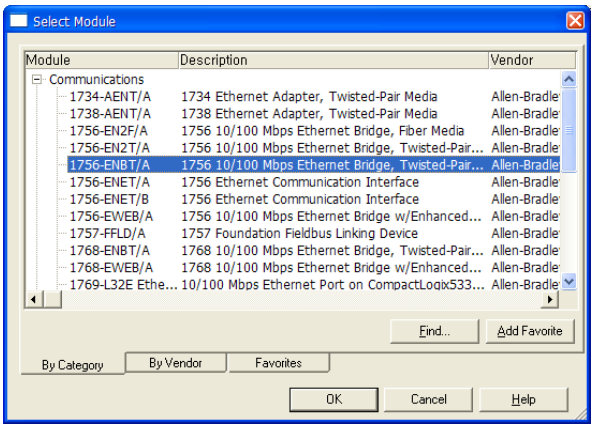
| Order | Set-up Procedure | How to Set up |
|---|---|---|
| 1 | Server Set-up | |

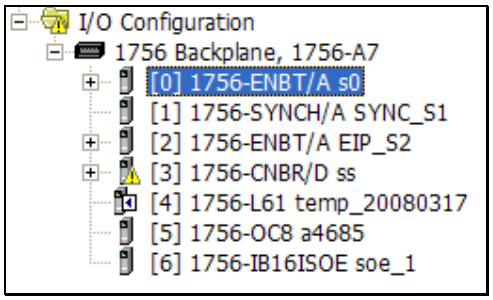
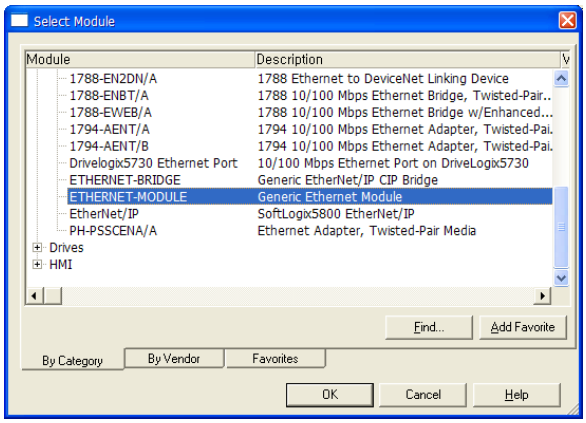
| Index | Ch. | Operating Mode | I/O type | Connection type | Function | Parameter | Parameter contents | Conditional flag | Transmission period(ms) | Time out | Data type | tag settings | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Local tag | Remote tag | Size |
| 0 | 0 | Implicit Server | | | | | | | | | 2 BYTE | M0000 | | 2 |
| 1 | | | | | | | | | | | | | | |

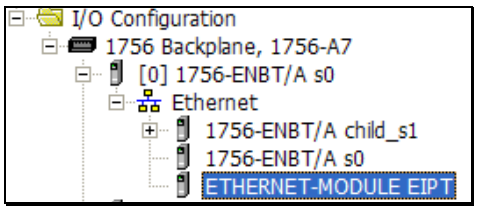
1) Channel: Select the one among the channels where periodic servers have been set up.
2) Operating Mode: The operation mode of the channel set up in accordance with channel set-up is displayed.
3) Data Type: Enter the data type of the tag a user will set up
4) Local Tag : This tag is the device area of the module operating via server
5) Size: The data size of the module operating via server.

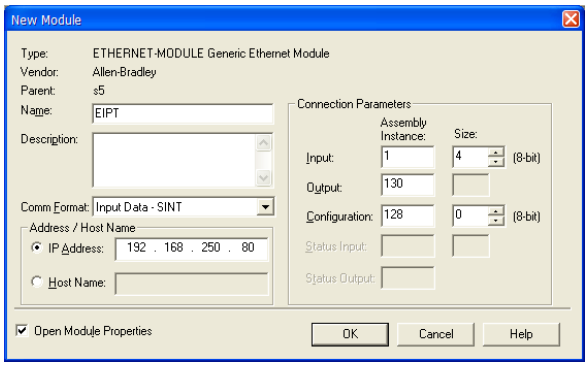
### 3) Rockwell 1756-ENBT Communication Module and Communication Set-up

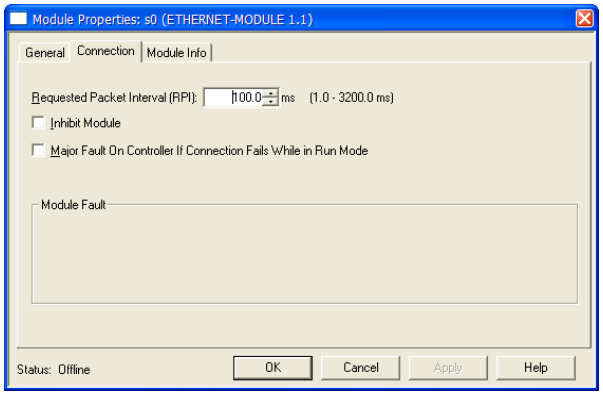
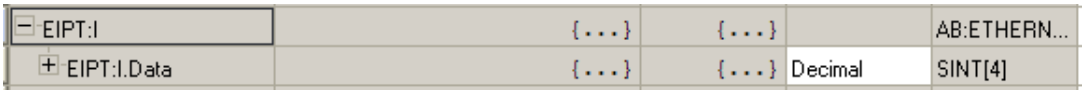
Set up Rockwell's의 Client using Rockwell의 S/W(RSLogix 5000).

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


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


</td></tr>
<tr><td colspan="2">1) If ENBT Module has been installed, extend it into network and install the module of the network connected.<br>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.<br>3) For the connection of XGT EtherNet/IP I/F Module, set up Generic Device.</td></tr>
</table>

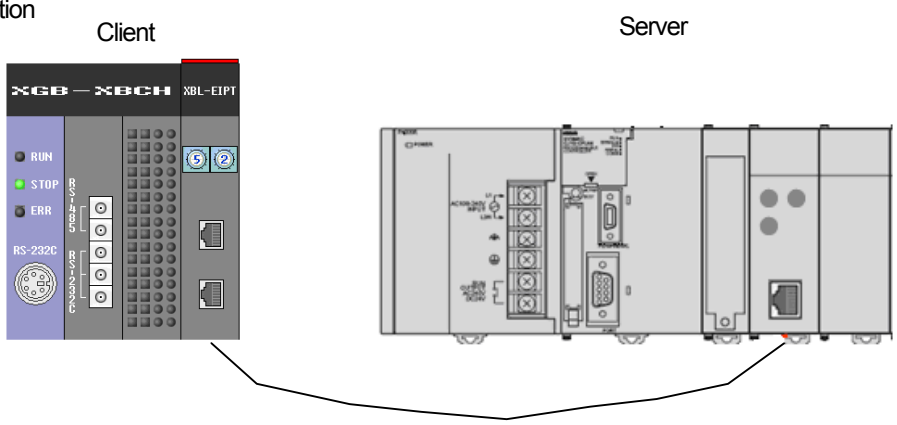
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">3</td><td>Network Address and Connection Information Input</td><td> 
</td></tr>
<tr><td colspan="2">1) Name: Enter the names that will used to modules<br>2) IP Address: Enter IP of Sever Module<br>3) Connection Parameter: Enter connection information. Mapping has been done between this information and block set-up number), and the number has been allotted to Consumed Tag input by blocks and Produced Tag output, respectively. Our EtherNet/IP module operates as server.<br>(a) In case of Input Only<br>100+P2P index number at Input Assembly Instance in Generic EDS<br>198(Heartbeat Assembly Instance) at Output Assembly Instance에<br>P2P index number in XBL-EIPT EDS<br>(b) In case of Listen Only인<br>100+P2P index number at Input Assembly Instance in Generic EDS<br>199(Heartbeat Assembly Instance) at Output Assembly Instance<br>P2P index number in XBL-EIPT EDS<br>(c) In case of Exclusive Owner<br>100+P2P index number at Input Assembly Instance in Generic EDS<br>150 + P2P index number at Output Assembly Instance<br>P2P index number in XBL-EIPT EDS<br>4) Configuration Assembly Instance: 197<br>5) Size : When Generic EDS, Byte unit<br>When XBL-EIPT EDS, Word unit</td></tr>
</table>

<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">4</td><td>PPI Set-up</td><td> 
</td></tr>
<tr><td colspan="2">1) Requested Packet Interval (RPI): Set up the period of data that a user will receive from server. Client sets up on what information to get and the server adopts this set-up, data (Produced Tag) will be transmitted as the way set up. Thus, client allots to this RPI parameter in how long period server will transmit.<br>2) If clicking OK, parameter is downloaded and is automatically connected. Then, data communication starts.</td></tr>
<tr><td rowspan="2">5</td><td>Data Check-out</td><td> 
</td></tr>
<tr><td colspan="2">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.</td></tr>
</table>

### 6.5.2 Communication with OMRON CJ1W-EIPT Communication Module

This illustration is the example on when XGT EtherNet/IP I/F Module and OMRON CJ1W-EIPT Communication is communicated (Implicit). Then, the periodic client is XGT EtherNet/IP I/F and the server will be OMRON CJ1W-EIPT.

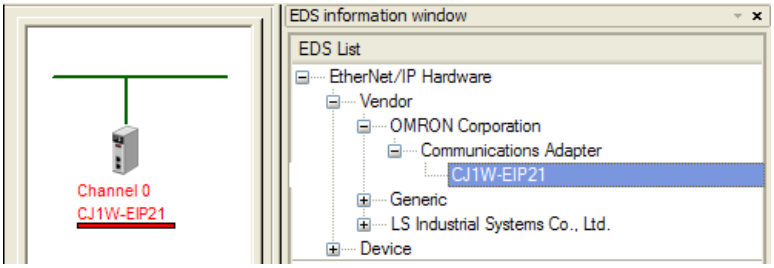
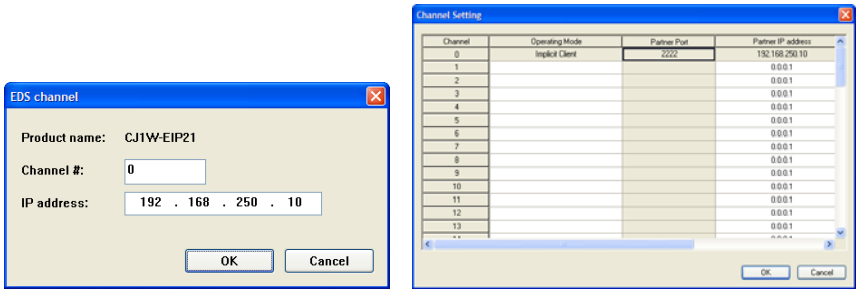
1) System Configuration




| Segment | XGL-EIPT | |
|---|---|---|
| IP Address | 192.168.250.100 | 192.168.250.10 |
| Data Size | 2 BYTE | 2 BYTE |
| Reading Area | - | D0 |
| Storing Area | MW0 | - |
| Communication Method | Periodic Client (Implicit service) | Periodic Server |

2) XGB EtherNet/IP I/F Module Parameter Set-up

In case of the basic set-up and EDS registry, the set-up is same as 6.2.1 - periodic client communication service.

| Order | Set-up Procedure | How to Set up |
|---|---|---|
| 1 | EIP Configuration |   |
| | | 1) Drag registered EDS File from EDS Information Window and posts it on EIP Configuration Window.<br>2) As soon as EDS File is posted, Channel Set-up Window appears.<br>3) In Set-up Window, set up channel numbers and IP addresses. |
| 2 | Channel Set-up |   |
| | | Set up channel numbers and IPs and start setting up blocks. |

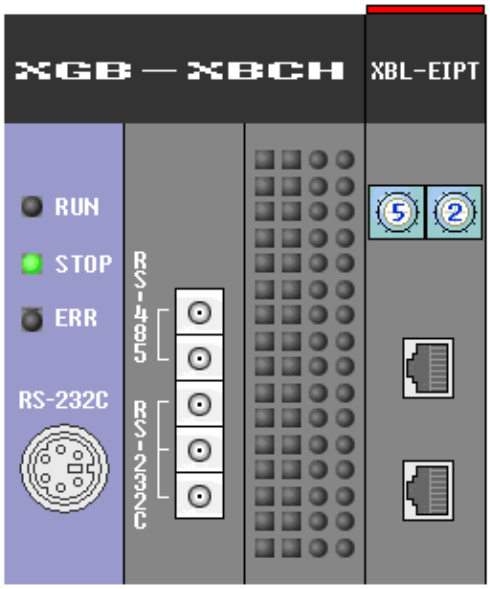
<table>
<tr><th>Order</th><th>Set-up Procedure</th><th>How to Set up</th></tr>
<tr><td rowspan="2">3</td><td>EIP Block Set-up</td><td>
<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Ch.</th><th rowspan="2">Operating Mode</th><th rowspan="2">I/O type</th><th rowspan="2">Connection type</th><th rowspan="2">Function</th><th rowspan="2">Parameter</th><th rowspan="2">Parameter contents</th><th rowspan="2">Conditional flag</th><th rowspan="2">Transmission period(ms)</th><th rowspan="2">Time out</th><th rowspan="2">Data type</th><th colspan="3">tag settings</th></tr>
<tr><th>Local tag</th><th>Remote tag</th><th>Size</th></tr>
<tr><td>0</td><td>0</td><td>Implicit Client</td><td>0.Input Only (Tag type)</td><td>Multicast</td><td></td><td>Parameter</td><td>T2O Size:1</td><td></td><td>200</td><td>0. RPI x4</td><td>2 BYTE</td><td>%MW0</td><td>d0</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">If a user sets up blocks, using the channels set up, the information that has to be input in EDS File that OMRON Module provides appears.<br>A user must enter this information and complete Connection.<br>1) I/O Type: The Connection name that EDS provides.<br>2) Connection Type: Select from Multicast/Unicast.<br>3) Transmission Period : Set up transmission period(RPI)(ms unit)<br>4) Timeout: Select as much as constant times of the time set up in transmission period and carry out set-up.<br>5) Remote Tag: Set up the tag of server side. On the server side tag must be set up already.</td></tr>
<tr><td>4</td><td colspan="2">1) After carrying out Write the EIP of Parameter, execute Enable EIP Link.</td></tr>
</table>

# Chapter 7 Diagnosis Function

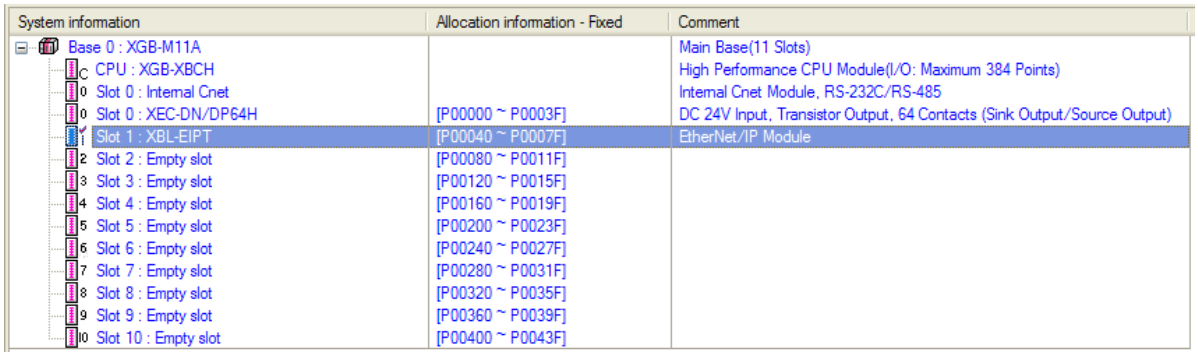
This chapter describes how to check out systems and modules, how to check out network state, and how to download 0/S. When checking out states of system configuration and EtherNet/IP I/F Module, a user should review the following procedure.

## 7.1 System Diagnosis

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




[Illustration 7.1.1] System Diagnosis Screen

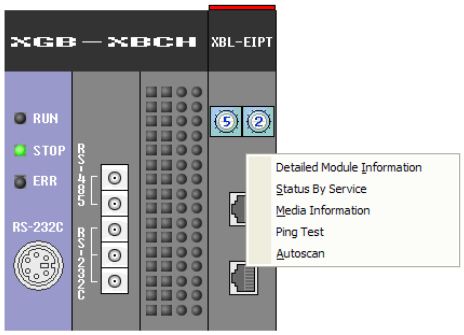
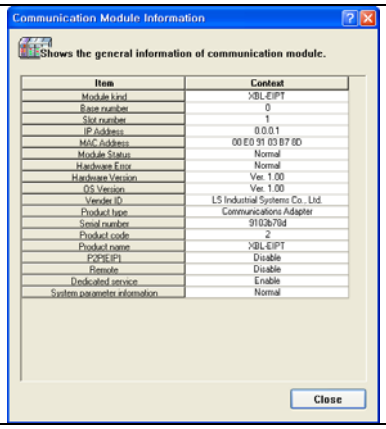


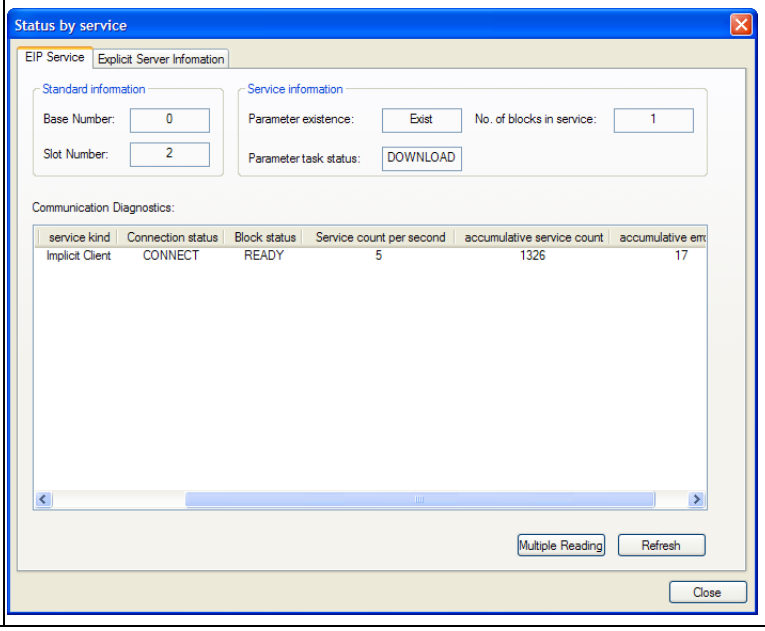

[Illustration 7.1.2] Module Information Window

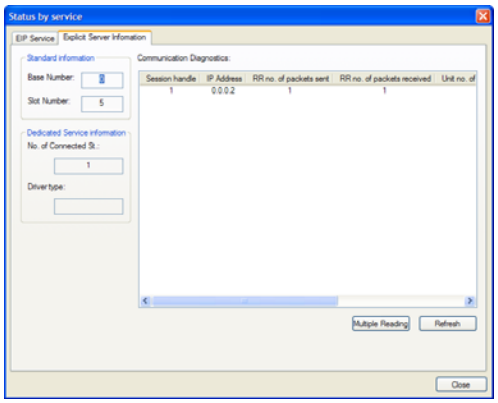
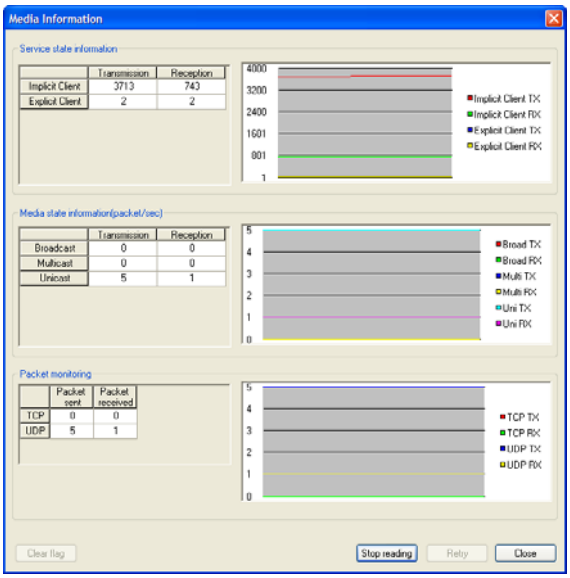
When Extension Base has been connected, if a user clicks the extension base on module information window to open System Diagnosis Screen, the system diagnosis screen of the extension base appears. The above [Illustration 7.1.1] and [Illustration 7.1.2] show the main base system diagnosis screen of the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

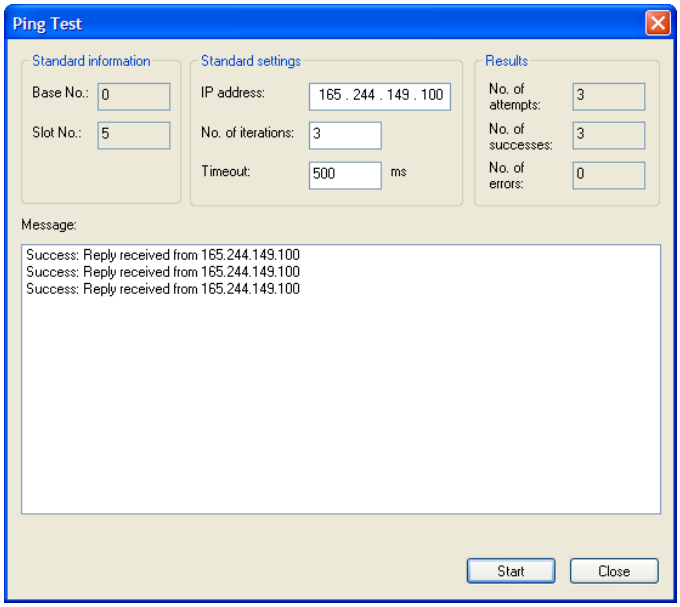
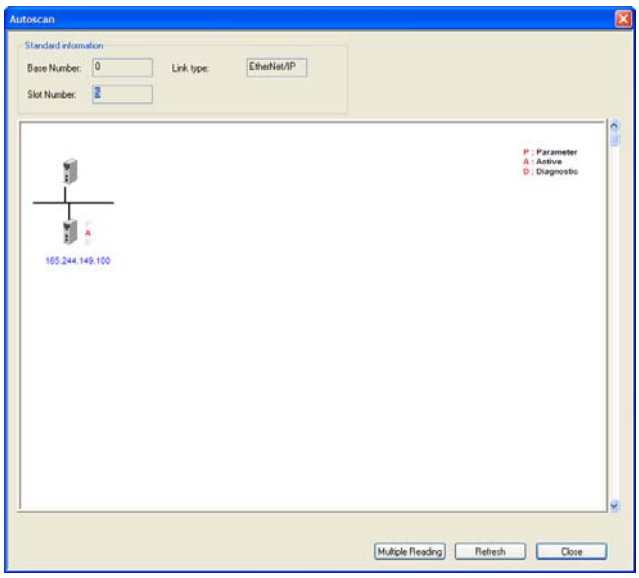
## 7.2 System Diagnosis Items and Contents

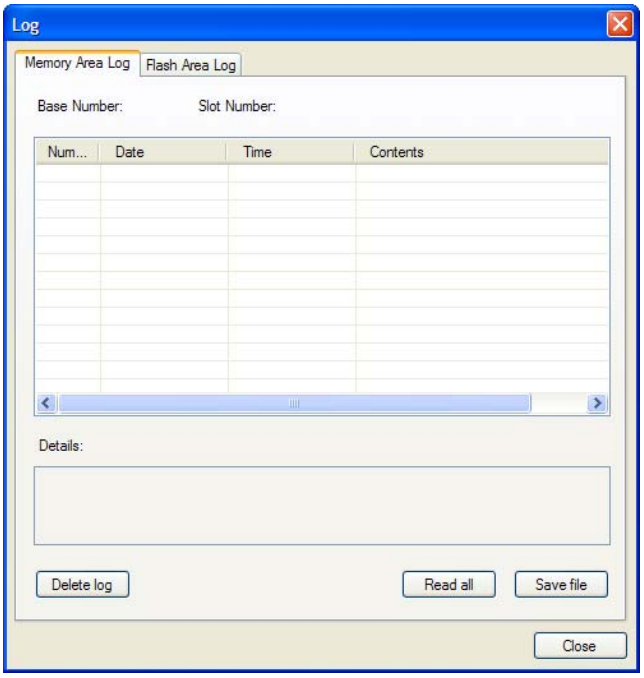
This part describes the diagnosis items and contents of EtherNet/IP I/F Module provided from XG-PD.

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

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

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

<table>
<tr><th>Order</th><th>Diagnosis Items</th><th>How to Set up and Contents</th></tr>
<tr><td rowspan="2">6</td><td>Ping Test</td><td> 
</td></tr>
<tr><td colspan="2">It is possible to check out the operation state of an opponent country by entering an opponent country's IP Address<br>In case of not receiving the signal from an opponent country, it is necessary to check out the basic set-up information</td></tr>
<tr><td rowspan="2">7</td><td>Auto Scan</td><td> 
</td></tr>
<tr><td colspan="2">A user can check out the system configuration state of the whole system.<br>▶ Parameter: In case EIP Parameter is set up, it is marked as P.'<br>▶ Active: The module operating normally (Online State) is marked as'A.'<br>▶ Diagnostic: The module that diagnosis needs to be marked as 'D.'</td></tr>
</table>

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

## 7.3 Troubleshooting

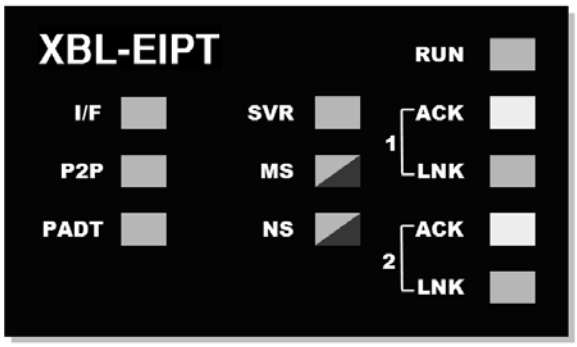
This part describes causes and actions on failures and errors that may happen in operating systems. When a user wants to check out errors and problems in EtherNet/IP I/F Module, the following procedure will help you check out those malfunctions. When judging whether the module is in abnormal state or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

### 7.3.1 Check-out through LED in Communication Module

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

1) Abnormal Operation Display

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



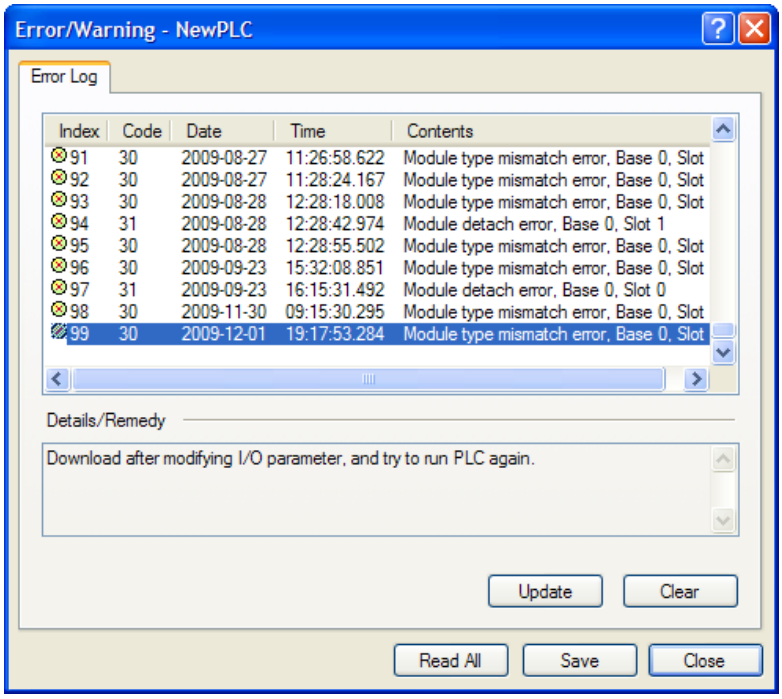

[Illustration 7.3.1] LED of EtherNet/IP I/F Module

| 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<br>- Check out whether the DC 5V – supply power for power module has been normal or not.<br>- Check out whether the communication module has been properly installed to the base<br>2) Consult with Warranty Service Center |
| I/F | Operation stops when light is on and off | 1) Check out whether CPU and Communication Modules have been properly installed<br>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<br>2) Check out connection has been properly done or not<br>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<br>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<br>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) |

| LED Contents | Error Contents | Actions |
|---|---|---|
| ACT | Light is off during normal communication | 1) Check out the transmission or reception parameter<br>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<br>2) Check out whether an opponent's port is normally operating ha been |

### 7.3.2 Check out of Module Errors through XG5000

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




[Illustration 7.3.2] PLC History - Specific Information Monitor

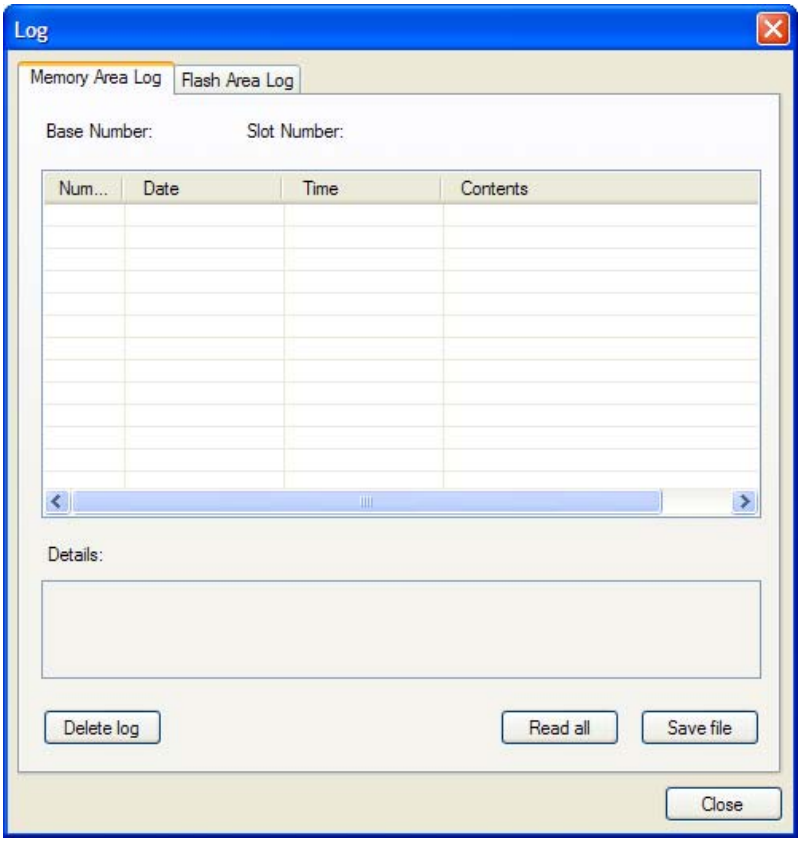
In case hard errors or CPU interface errors are made to the module, naturally LED abnormally operates, but it is possible to figure out this state, using exclusive programs.
[Illustration 7.7.2] will help a user check out error/warning information through PLC history from [Online] of XG5000 and it is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

### 7.3.3 Check-out on Module Errors through System Log

It is possible to monitor whether communication module has been malfunctioned through XG-PD 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 XG-PD 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.
[Illustration 7.3.3] shows the memory area log screen of ‘System Log.’

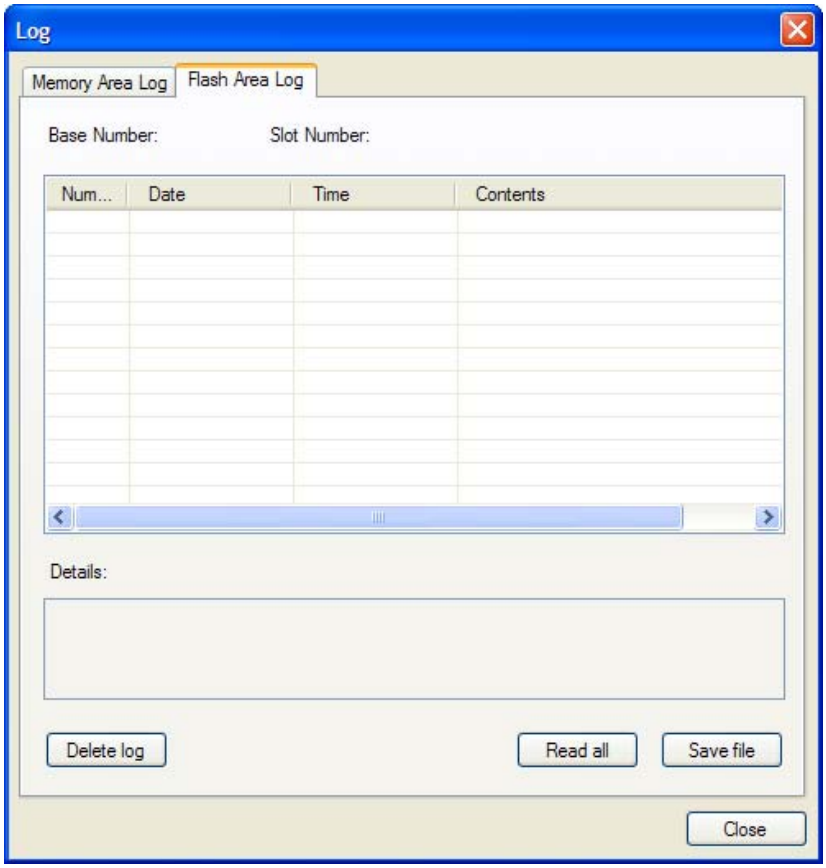



[Illustration 7.3.3] Memory Log Area Screen of ‘System Log’

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

1) Flash Area Log

If it is impossible to check out errors or service performances through XG-PD 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.
[Illustration 7.3.4] shows the flash area – log screen of ‘System Log.’




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

# Appendix

## A.1 Terms

1. IEEE 802.3

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

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

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

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

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

2. ARP (Address Resolution Protocol)

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

3. Bridge

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

(1) Related Standards: IEEE 802.1D

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

4. Client

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

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

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

6. DNS (Domain Name System)

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

7. Dot Address

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

8. E-mail Address

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

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

9. Ethernet

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

10. 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 | SYTEM 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 CONTACING 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 | 1st Scan Only On –State |
| | F009C | _1OFF | 1 SCAN -OFF | 1st 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 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 0 |
| | F0101 | _USR_CLK1 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 1 |
| | F0102 | _USR_CLK2 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 2 |
| | F0103 | _USR_CLK3 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 3 |
| | F0104 | _USR_CLK4 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 4 |
| | F0105 | _USR_CLK5 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 5 |
| | F0106 | _USR_CLK6 | DEGIGNATED SCAN REPEATED | On/Off Clock as much as Designated Scan 6 |
| | F0107 | _USR_CLK7 | DEGIGNATED 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 Error s were Made |
| F0144 | - | _MOD_HIS_CNT | MODE CONVERSIO N 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 | EXTERNA L 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 | INTIALIZATION 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 |

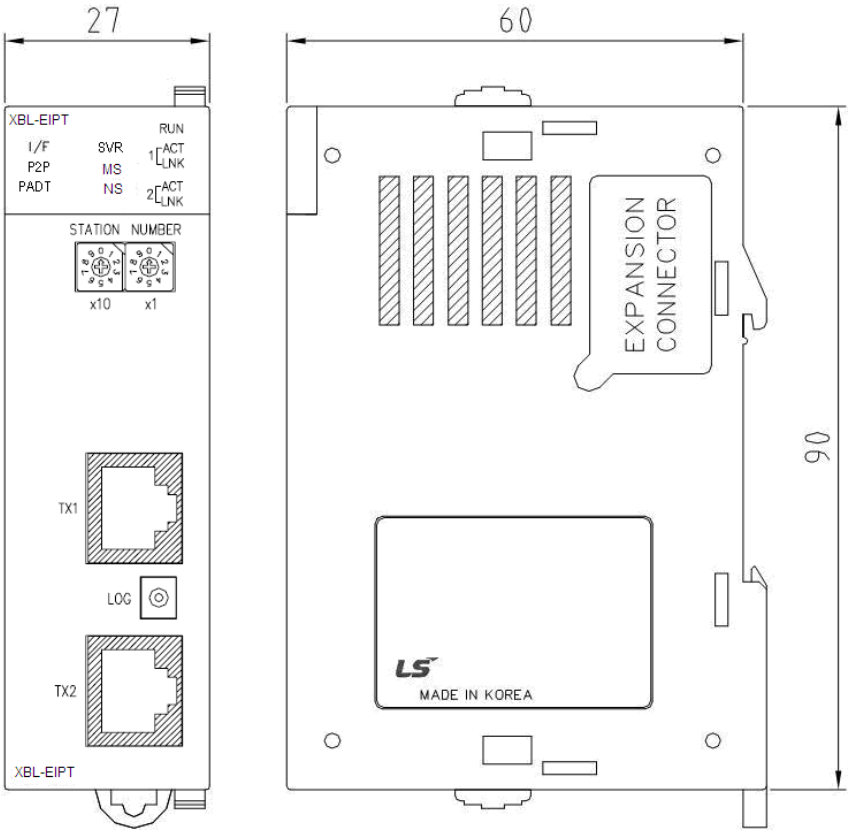
**Notice**

❑ Network register is Read Only device in the XGB.

## A.3 External Dimension

**Dimension Unit : mm**

• **XBL-EIPT**



## 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 Industrial Systems Co., Ltd supports and observes the environmental policy as below.

### Environmental Management

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

### About Disposal

LS Industrial Systems' 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.


**LS values every single customers.**

**Quality and service come first at LSIS.**

**Always at your service, standing for our customers.**

**http://eng.lsis.biz**

LS Industrial Systems

**10310001159**

■ **HEAD OFFICE**
LS tower, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do 1026-6,
Korea http://eng.lsis.biz
Tel : (82-2)2034-4870/Fax : 82-2-2034-4648 e-mail : cshwang@lsis.biz

■ **LS Industrial Systems Tokyo Office _ Tokyo, Japan**
Address: 16FL. Higashi-Kan. Akasaka Twin Tower 17-22,
Akasaka.Monato-ku Tokyo 107-8470. Japan
Tel : 81-3-3582-9128/Fax : 81-3-3582-2667 e-mail : jschuna@lsis.biz

■ **LS Industrial Systems(ME) FZE _ Dubai, U.A.E.**
Address : Jafza View Tower Lob 19, Room 205 Along Sheikh Zayed
Road Jebel Aali Free Zone Dubai, United Arab Emirates
Tel : 971-4-886-5360/Fax : 971-4-886-5361 e-mail : jungyongl@lsis.biz

■ **LS Industrial Systems Shanghai Office _ Shanghai, China**
Address : Room E-G. 12FL Hiamin Empire Plaza. No.726. West.
Yan'an Road Shanghai 200050. P.R. China e-mail : liyong@lsis.com.cn
Tel : 86-21-5237-9977(609)/Fax : 89-21-5237-7189

■ **LS Industrial Systems Beijing Office _ Beijing, China**
Address : B-Tower 17FL. Beijing Global Trade Center B/D. No. 36.
East BeisanHuan-Road. DongCheng-District. Beijing 100013. P.R. China
Tel : 86-10-5825-6027(666)/Fax : 86-10-5825-6028 e-mail : xunmj@lsis.com.cn

■ **LS Industrial Systems Guangzhou Office _ Guangzhou, China**
Address : Room 1403.14FL. New Poly Tower.
2 Zhongshan Liu Road.Guangzhou.P.R China
Tel : 86-20-8328-6754/Fax : 86-20-8326-6287 e-mail : chenxs@lsis.com.cn

■ **LS Industrial Systems Chengdu Office _ Chengdu, China**
Address : 12FL. Guodong Buiding. No.52 Jindun
Road Chengdu.610041. P.R. China
Tel : 86-28-8612-9151(9226)/Fax : 86-28-8612-9236 e-mail : comysb@lsis.biz

■ **LS Industrial Systems Qingdao Office _ Qingdao, China**
Address : YinHe Bldg. 402 Room No. 2P Shandong Road,
Qingdao-City,Shandong-province 266071, P.R. China
Tel : 86-532-8501-6068/Fax : 86-532-8501-6057 e-mail : wangzy@lsis.com.cn

■ **LS Industrial Systems Europe B.V. , Netherlands**
Address : 1st. Floor, Tupolevlaan 48, 1119NZ, Schiphol-Rijk, The Netherlands
Tel : +31 (0)20 654 1420/Fax : +31 (0)20 654 1429 e-mail : junshickp@lsis.biz

■ **Wuxi LS Industrial Systems Co., Ltd _ Wuxi, China**
Address : 102-A. National High & New Tech Industrial Development Area.
Wuxi. Jiangsu. 214028. P.R. China
Tel : 86-510-8534-6666/Fax : 86-510-8534-4078 e-mail : caidx@lsis.com.cn

■ **Dalian LS Industrial Systems Co., Ltd. _ Dalian, China**
Address : No. 15. Liaohexi 3-Road. Economic and Technical Development zone.
Dalian 116600. China
Tel : 86-411-273-7777/Fax : 86-411-8730-7560 e-mail : cuibx@lsis.com.cn

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



**2010. 11**