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## Programmable Logic Control

# Rnet I/F Module

**XGT Series**

**User Manual**

**XGL-RMEA  
XGL-RMEB  
GOL-RR8T**



### Safety Instructions


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


**LS** ELECTRIC

### Before using the product ...

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

- ▶ Safety Instructions should always be observed in order to prevent accident or risk by using the product properly and safely.
- ▶ Precautionary measures can be categorized as “Warning” and “Caution”, and each of the meanings 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 damages in products if some applicable instruction is violated

Moreover, even classified events under its caution category may develop into serious accidents depending on situations. Therefore we strongly advise users to observe all precautions in a proper way 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.

After reading this user’s manual, it should be stored in a place that is visible to product users.

## Safety Instructions for design process

### Warning

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

## Safety Instructions for design process

### **Caution**

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

## 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**

### 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	Remark	Page
V1.0	'05.03	First Edition.	
V1.1	'05.05	Description of function added (Page: A-1).	A-1
V1.2	'06.06	Terminologies are edited.	
V2.0	'07.03	1. Added separate reset function 2. Version up about XG-PD software	
V2.1	'09.06	Content added and revision	1-1~1-4, 5-1
V2.2	'11.05	How to enable link through flag added	CH 5.2
V2.3	'14.11	XG5000 V4.0 Tool UI Updated	-
V2.4	'17.09	XGL-RMEB Module added	-
V2.5	'19.06	GOL-RR8T Module added	CH1, 2, 4, A.3
V2.6	'20.05	Format and contents modification according to the change of company name (LSIS -> LS ELECTRIC)	
V2.7	'21.01	Cable specifications updated	2-8
V2.8	'21.07	Input data setting added	CH 5

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

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

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

Relevant User's Manuals

Title	Description	No. of User's Manual
XGK-CPUA/CPUE/CPUH/CPUS User's Manual	It describes specifications, system structure and EMC spec. correspondence of CPU module, power module, base, I/O module and increase cable	10310000508
XG5000 User's Manual	It describes how to use XG5000 software especially about online functions such as programming, printing, monitoring and debugging by using XGK series products.	10310000512
XGK Series Instructions & Programming	It is the user's manual for programming to explain how to use commands that are used PLC system with XGK CPU.	10310000510

Currently user manual of XGL-RMEA/B module is written based on the following version.

Related OS version list

Item	OS version
XGK-CPUU, CPUH, CPUS, CPUA, CPUE	V4.55
XGI-CPUU/D, CPUU, CPUH, CPUS, CPUE	V4.06
XGK-CPUSN,CPUHN,CPUUN	V1.05
XGI-CPUUN	V1.12
XGR-CPUH/F, CPUH/T, CPUH/S	V2.72
XG5000	V4.22

# © Table of Contents ©

## Chapter 1 Overview ----- 1-1 ~ 1-4

1.1 Introduction .....	1-1
1.2 Characteristics .....	1-2
1.3 Product Information .....	1-3
1.3.1 Components List .....	1-3
1.3.2 Max. Installation number of modules .....	1-4

## Chapter 2 Specifications ----- 2-1 ~ 2-10

2.1 General Specifications .....	2-1
2.2 Performance Specifications .....	2-2
2.3 Structure and Characteristics .....	2-5
2.4 Terminating Resistor .....	2-9

## Chapter 3 Installation and Test Operation of the Product ----- 3-1 ~ 3-2

3.1 Precautions for Installation .....	3-1
3.1.1 Precautions for installation .....	3-1
3.2 From Setting to Operation .....	3-1

## Chapter 4 System Configuration ----- 4-1 ~ 4-2

4.1 System Configuration of Network.....	4-1
4.1.1 XGL-RMEA/B + Smart I/O .....	4-1
4.1.2 Mixed configuration1 between XGL-RMEA/B + repeater + slave modules.....	4-1
4.1.3 Mixed configuration2 between XGL-RMEA/B + repeater + slave modules.....	4-2

## Chapter 5 High-speed Link Setting ----- 5-1 ~ 5-18

5.1 Introduction .....	5-1
5.2 How to use XG5000 .....	5-3
5.3 High-speed link editing .....	5-7
5.4 Read and write of High-speed Link .....	5-12
5.5 System diagnosis .....	5-13
5.6 High-speed link information .....	5-17

**Chapter 6 Program Example ----- 6-1 ~ 6-4**

6.1 XG5000 program ..... 6-1

**Appendix ----- A-1 ~ A-4**

A.1 Terminology ..... A-1

A.2 List of HS link flags ..... A-2

A.3 External Dimensions ..... A-4

# Chapter 1 Overview

## 1.1 Introduction

This manual of Rnet I/F module is prepared to describe XGT series of dedicated remote net (**hereinafter referred to as Rnet I/F module**). XGT Rnet I/F module is composed of data link layer and physical layer in OSI 7 layers. Rnet system controls I/O data from the sensor of field level and manages the data conveniently for monitoring, troubleshooting and maintenance through LS HMI of PMU unit. Rnet I/F module supports a speed of 1Mbps and provides convenience of data Tx/Rx for users by means of XG5000 parameters setting, through LS dedicated network. In addition, various system configurations (8-port branching) are possible through the Rnet Repeater Hub Module, and up to 63 slave modules can be controlled from one master module.

To create a program, refer to the following manuals together.

- XG5000 user manual
- XGK instruction
- XGK user manual
- XGI/XGR instruction
- XGI/XGR user manual

The current user's manual of XGT Rnet I/F Module is prepared, based on the following versions.

- XGT PLC XG5000 Programming Tool: V4.22 or above
- XGT Rnet I/F Module O/S
  - XGL-RMEA: V1.1 or above
  - XGL-RMEB: V5.0 or above(Max. station communication via GOL-RR8T is only possible with XGL-RMEB V5.1 or later.)

## 1.2 Characteristics

XGT Rnet I/F module has the following characteristics;

**Rnet I/F module :**

- ▶ LS dedicated network
- ▶ Convenient with High-speed link parameters setting is available
- ▶ Reduced wiring, easy installation
- ▶ Up to 12 units can be installed on 1 basic base
- ▶ Various system configurations are available through basic parameters changes
- ▶ Smart I/O + Rnet system configuration is available

Rnet Repeater Hub module has the following characteristics;

**Rnet Repeater Hub module :**

- ▶ LS dedicated network
- ▶ Reduced wiring, easy installation
- ▶ Various system configuration by network separation
- ▶ Long distance communication possible
- ▶ Maximum station (64 stations including master) Communication possible

**1.3 Product information**

**1.3.1 Components List**

Classification	Connection cable	Model	Product code	Description	Remarks
Master module	Twisted pair (electric)	XGL-RMEB	47200185	-	XGT Rnet master module
Master module	Twisted pair (electric)	XBL-RMEA	47230204	-	XGB Rnet master module
Slave Module	Twisted pair (electric)	G6L-RREA	46640104	Installed on GM6/K200S CPU position	Rack type Remote system
		GRL-D22C	47060133	DC input 16 points	Smart I/O Rnet series - Fixed terminal block - 5-pin communication connector Smart I/O Rnet
		GRL-D24C	47060134	DC input 32 points	
		GRL-TR2C	47060135	TR output 16 points	
		GRL-TR2C1	47060138	TR output 16 points	
		GRL-TR4C	47060137	TR output 32 points	
		GRL-TR4C1	47060138	TR output 32 points	
		GRL-DT4C	47060139	DC input 16 points/ TR output 16 points	
		GRL-DT4C1	47060140	DC input 16 points/ TR output 16 points	
		GRL-RY2C	47060141	Relay output 16 points	
		iS7 Rnet	64110007	iS7 dedicated Rnet I/F adaptor	
	XRL-BSSA	47060158	Digital input/output 512 point	Extendable Smart I/O Rnet	
Repeater module	Twisted pair (electric)	GOL-RR8T	47060192	-	Rnet repeater hub 8 ports module

### 1.3.2 Max. Installation number of modules

The maximum installation number of modules is 12 regardless of base type (basic base and extension). For maximum performance of communication module, it is recommended to equip the module on basic base. The following table indicates available service type per each CPU. After due consideration of the number of communication modules, apply to the system configuration.

Classification	XGK								XGI						XGR		
	CPUH	CPUJ	CPUA	CPUS	CPUE	CPUSN	CPUHN	CPUUN	CPUJ	CPUH	CPUS	CPUE	CPUU/D	CPUUN	CPUH/T	CPUH/F	CPUH/F
No. of module using High Speed Link (Max.)	12 modules																
No. of module using P2P (Max.)	P2P is not used																
No. of module using dedicated service (Max.)	Dedicated service is not used																

## Chapter 2 Specifications

### 2.1 General Specifications

General specifications of XGT series are as below.

No.	Item	Specification	Related specifications			
1	Operating temperature	0°C~+55°C	-			
2	Storage temperature	-25°C~+70°C	-			
3	Operating humidity	5~95%RH, Non-condensing	-			
4	Storage humidity	5~95%RH, Non-condensing	-			
5	Vibration	For discontinuous vibration		IEC 61131-2		
		Frequency	Acceleration		Amplitude	Each 10 times in X, Y, Z directions
		5≤f< 8.4 Hz	-		3.5mm	
		8.4≤f≤150 Hz	9.8 m/s <sup>2</sup> (1G)		-	
		Continuous vibration			Each 10 times in X, Y, Z directions	
		Frequency	Acceleration			Pulse width
		5≤f< 8.4 Hz	-			1.75mm
		8.4≤f≤150 Hz	4.9 m/s <sup>2</sup> (0.5G)	-		
6	Shock	* Maximum impact acceleration:147 m/s <sup>2</sup> (15G) * Authorized time: 11 m/s * Pulse wave : Signal half-wave pulse (Each 3 times in X,Y,Z directions)	IEC 61131-2			
7	Noise Immunity	Square wave impulse noise	AC : ±1,500V DC : ±900V	Test specification LS ELECTRIC		
		Electrostatic discharging	Voltage: 4kV (Contact discharge)	IEC 61131-2, IEC 61000-4-2		
		Radiated electromagnetic	27 ~ 500 MHz, 10 V/m	IEC 61131-2, IEC 61000-4-3		
		Fast Transient /burst noise	Class Voltage	Power module 2 kV	Digital/Analog I/O communication interface 1 kV	IEC 61131-2, IEC 61000-4-4
8	Ambient conditions	No corrosive gas or dust	-			
9	Operating height	2,000 m or less	-			
10	Pollution degree	2 or less	-			
11	Cooling type	Natural air cooling	-			

#### Notes

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

Specifications for system configuration of Rnet I/F module are as described below.

Please refer to the table below for system configuration.

### 1) XGL-RMEA/B Performance Specifications

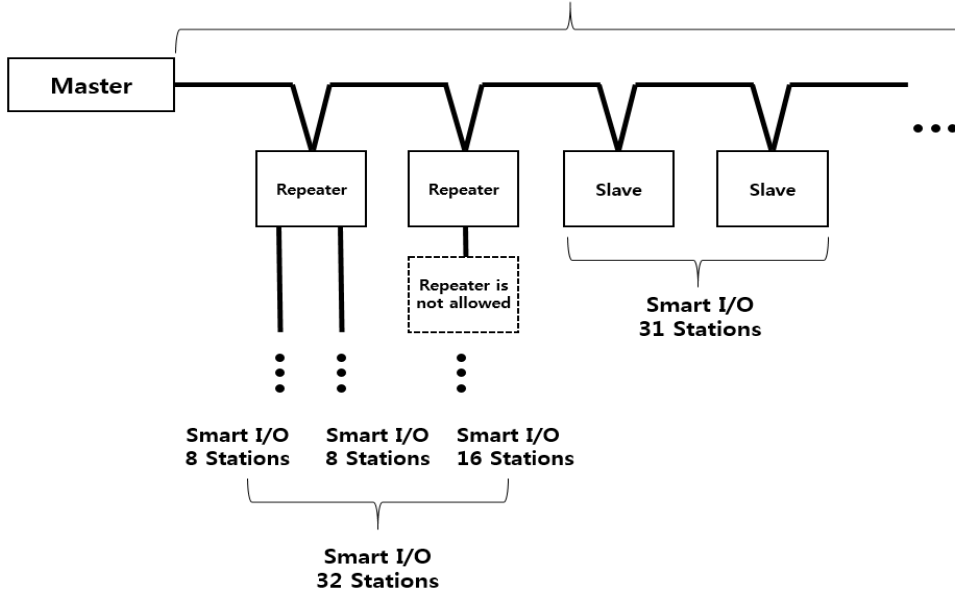
Item		Specifications
Transmission Speed		1Mbps (Rnet I/F modules common)
Max. Tx distance		Max. 750m
Connection Cable		Twisted pair shielded cable
Maximum stations connected	Network	Master station 1[station no:0(fixed)] + Slave station 31[station no:1~63] = Max. 32 stations (In case of 32 stations, you have to use repeater.) - Only 1 master is available in the network.
Diagnostic function		XG5000 : High Speed Link Monitoring
System characteristic		Available detachment and attachment of slave module during communication
Terminating resistor( $\Omega$ )		110(5%,1/2W)
Master/Slave operation		Only available as Master
XG5000 (HS Link)	Data Processing unit	Byte
	Tx/Rx cycle	Selection among 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s(default :200ms)
	Max. Communication points.	3,720bytes(slave 31stations * 120bytes/station)
	Max. Block number	63(setting range : 0~62)
	Max. points by Block	120 Byte(60words)
	Max. Tx. Block number	32 Blocks
	HS Link number	Max. 12
Specification	Max. module mounted	12 modules(Main Base + Extension Base)
	Internal current consumption	410mA
	Weight	115g

2) GOL-RR8T Performance Specifications  
 - Communication Specifications

Item		GOL-RR8T	
Communication method		Rnet	
Communication ports (Master : Slave)		1 : 8	
Max. Slave stations / All repeaters		32 Stations	
Number of Max. slaves when using repeater /a Network		XGL-RMEB	XBL-RMEA
		63 Stations	31 Stations
Max. repeaters /a Network (Repeaters can be connected to trunk line only)		2 Modules	
Communication speed		1Mbps	
Max. transmission distance / Each repeater port	LIREV-AMESB 1Px22AWG (7/0.254)_LS Cable	300m	
	CAN Bus Drag Chain, UL (1x2x0.34mm <sup>2</sup> )_Helukable	600m	
Master Max. transmission distance (Master + Slave or Master + Repeater)		750m	
Network max. transmission distance (Master + Repeater + Slave)		- LIREV-AMESB 1Px22AWG: 1.05km - CAN Bus Drag Chain: 1.35km	
Weight		580g	

< Network configuration using repeaters >

\* Trunk line : Distance 750m, repeater 2modules, slave 31stations



Note

- 1) In order to minimize the reflected wave, the line connecting with the repeater should Use more than 1m cable.
- 2) Repeater hub 8port module in the user's manual is called a repeater module for convenience.

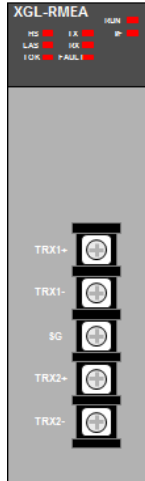
## - Power Specifications

Items		Specifications	reference
Input	Input voltage range	DC20.4~28.8V(-15%, +20%)	-
	Rated voltage	DC24V	-
	Input current	1A or less	Input +DC28.8V, Max.load
	Inrush current	70A peak or less	Input +DC28.8V, Max.load
	Efficiency	60% or more	Input +DC28.8V, Max.load
	Permitted momentary power failure	10ms or less	Input +DC28.8V, Max.load
Output	Output voltage	DC5V(±2%)	-
	Output current	Max. 2.0A	-
Power supply status indication		LED On when power supply is normal	-
Cable specification		0.75 ~ 2mm <sup>2</sup>	-

**2.3 Structure and Characteristics**

1) LED display

- XGL-RMEA



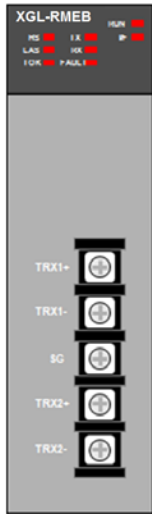
◀ LED display

◀ Cable connection part

SILK display	LED Description		
RUN	On	Normal	Normal
	Off	Error	Serious defect, Contact Customer Service Center
I/F	Blinks	Normal	Normal
	On/Off	Error	Serious defect, Contact Customer Service Center
H/S	On	Normal	Normal
	Blinks	Standby	Downloading parameters while High-speed Link enabled
	Off	Error	Fatal link failure occurs in high speed link service when high speed link is enabled
LAS	On	Normal	Normal
	Blinks/Off	Failure	Master Module, Contact Customer Service Center
TOK	Blinks	Normal	Normal
	Off	Failure	Master Module, Contact Customer Service Center
TX	Blinks	Normal	Normal
	Off	Error	Check High-speed link parameters
RX	Blinks	Normal	Normal
	Off	Error	Check High-speed link parameters
FAULT	On/Blinks	Error	Check cable connection and wiring
	OFF	Normal	Normal

\*Reference: TOK, TX, RX blink quickly. Those seems like "On".

- XGL-RMEB

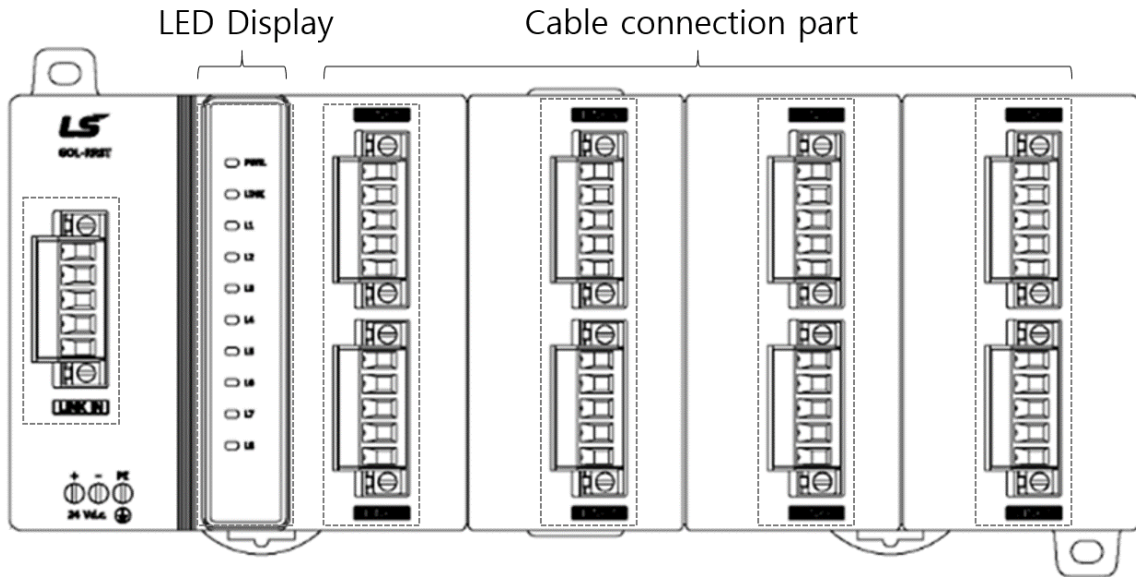


◀ LED display

◀ Cable connection part

SILK display	LED Description		
RUN	On	Normal	Normal
	Off	Error	Serious defect, Contact Customer Service Center
I/F	Blinks	Normal	Normal
	On/Off	Error	Serious defect, Contact Customer Service Center
H/S	On	Normal	Normal
	Blinks	Standby	Downloading parameters while High-speed Link enabled
	Off	Error	Fatal link failure occurs in high speed link service when high speed link is enabled
LAS	On	Normal	Normal
	Blinks/Off	Failure	Master Module, Contact Customer Service Center
TOK	Blinks	Normal	Normal
	Off	Failure	Master Module, Contact Customer Service Center
TX	Blinks	Normal	Normal
	Off	Error	Check High-speed link parameters
RX	Blinks	Normal	Normal
	Off	Error	Check High-speed link parameters
FAULT	On/Blinks	Error	Check cable connection and wiring
	OFF	Normal	Normal

- GOL-RR8T



SILK display	LED Description		
PWR	On	Normal	DC 24V power is connected normally.
	Off	Error	DC 24V power is not connected.
LINK	Blink	Normal	LINK IN port is working normally (Rnet master must be connected to LINK IN)
	Off	Error	LINK IN port is malfunctioned or Rnet master signal has problem.
L1~8	Blink	Normal	Each port of LINK1~8 is working normally (Rnet master must be connected to LINK IN.)
	Off	Error	Each port of LINK 1~8 is malfunctioned or Rnet master signal has problem.

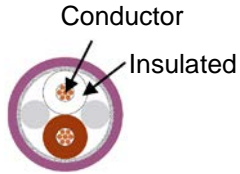
2) Cable connection part

(1) Cable specifications

- For fixed system

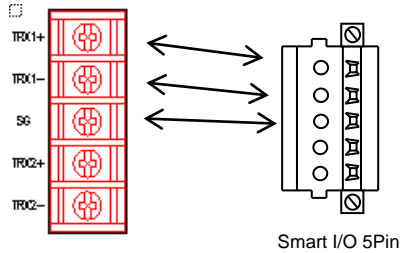
Designations	Type A	Type B
Impedance	135~160Ω(freq. 3~20MHz)	100~130Ω(freq. > 100kHz)
Capacity	< 30 pF/m	< 60 pF/m
Resistance	< 110 Ω	-
Conductor Area	> 0.34 mm <sup>2</sup> (22 AWG)	> 0.22 mm <sup>2</sup> (24 AWG)

- For moving system

Designations	CAN Bus Drag Chain, UL (1x2x0.34mm <sup>2</sup> )	Structure
Manufacturer	Helukable	
Cable type	twisted pair	
Conductor resistance	56Ω/km(normal temperature)	
Insulated resistance	5,000 MΩ/km or more	
Capacitance	40 pF/m or less(1 kHz)	
Characteristic impedance	120Ω±15% (10 MHz)	
Number of cores	2 Core	

(2) Cable connection

a) Connection with Smart I/O / GOL-RR8T 5-pin

XGL-RMEA/B	Smart I/O / GOL-RR8T	Wiring
TRX1+/TRX2+	TRX+	
TRX1-/TRX2-	TRX-	
SG	Colorless (SG)	

**Note**

- 1) Use the repeater module for branching Rnet network.
- 2) There are two types of Rnet communication cable but, type A is recommended to use for new installation.  
please contact to the cable maker for model names corresponding to type A and type B

## 2.4 Terminating resistor

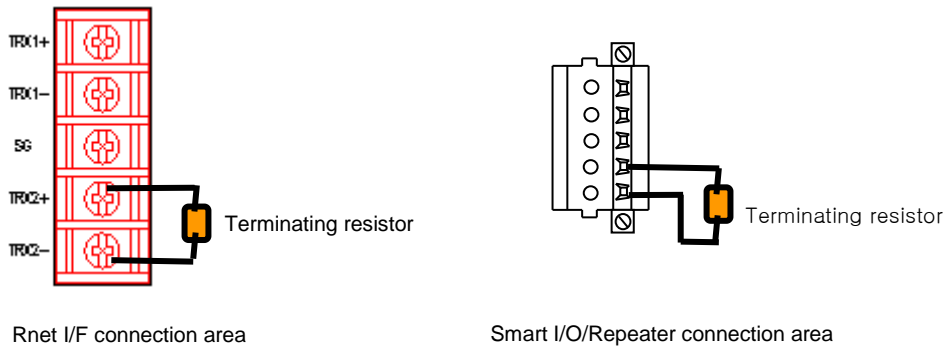
1) How to install terminating resistor

Be sure to install the terminating resistor on the both ends of the line.

(Rnet I/F module and last slave node)

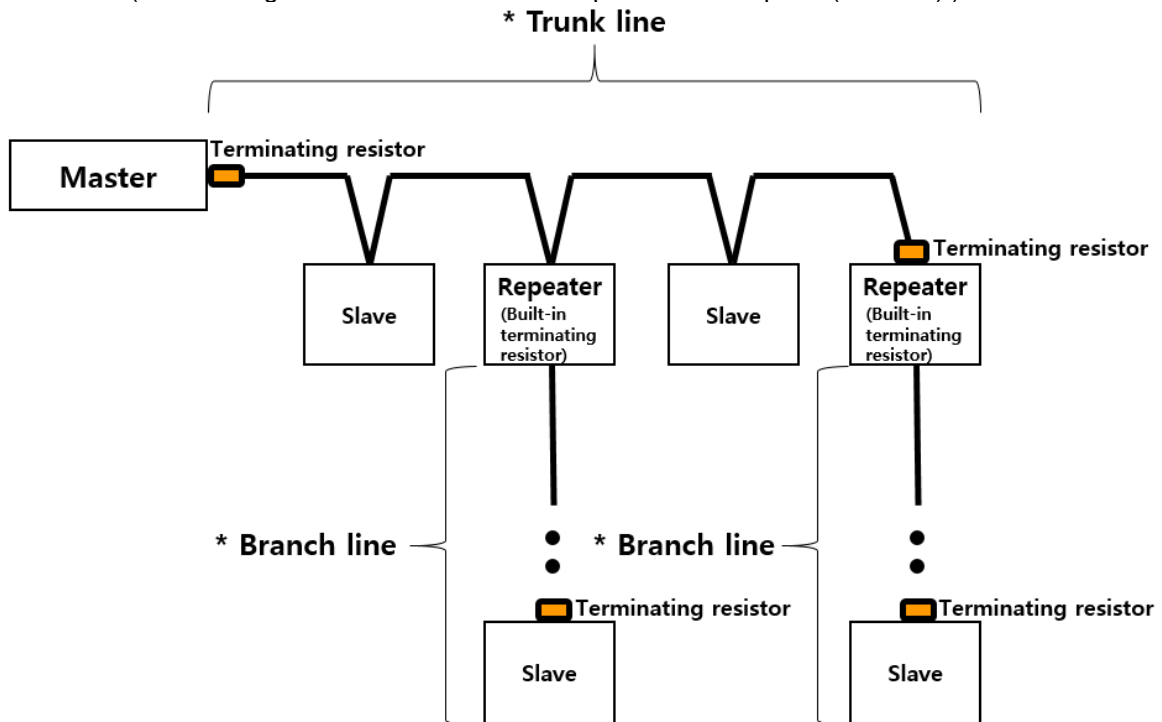
Connect Rnet I/F module with TRX2+ and TRX2- and Smart I/O Rnet module with TRX2+ and TRX2-.

- Resistance value: 110Ω, 1/2W, allowance 5%
- Contact between connector case and terminating resistor is not allowed.



2) How to install terminating resistor when using repeater module in a network with a repeater, the terminating resistor is divided into trunk line and branch lines.

- Terminating resistor shall be installed at both ends of the trunk.
- Install a terminating resistor only at the slave end of the repeater branch (L1 to L8 port).  
(Terminating resistors are built in the repeater's slave ports (L1 to L8).)





## Chapter 3 Installation and Test Operation of the Product

### 3.1 Precautions for Installation

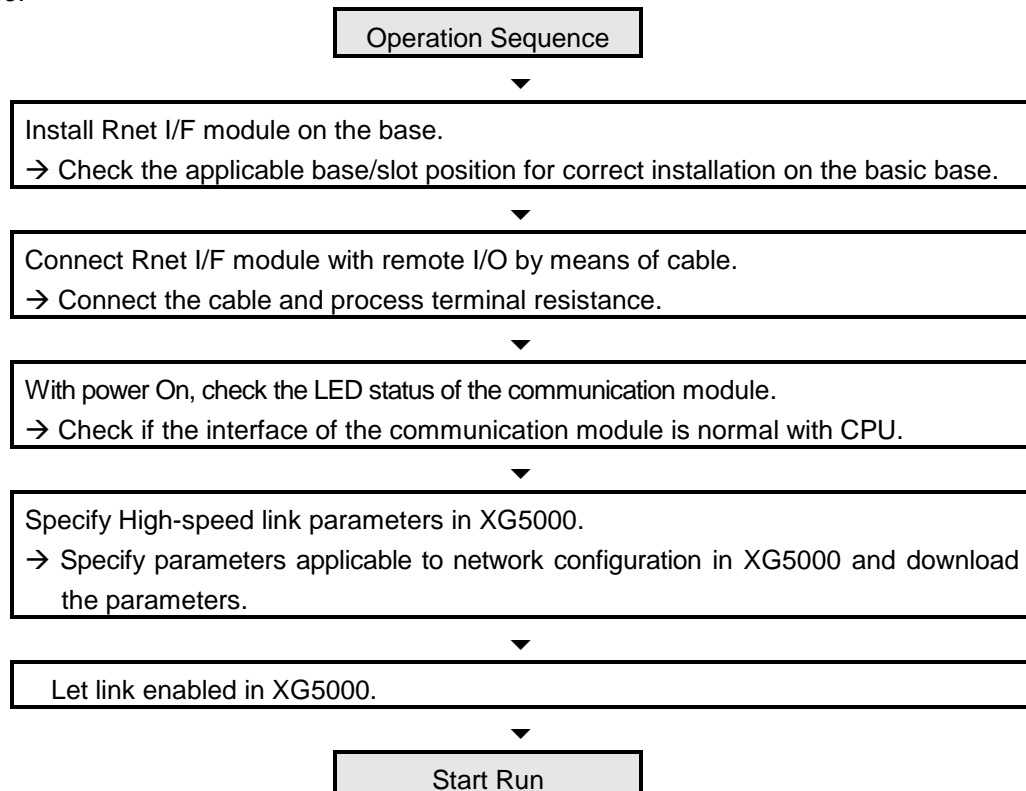
#### 3.1.1 Precautions for installation

For system configuration through Rnet I/F module, carefully make sure of the following items prior to installation.

- 1) Check the basic factors for necessity of configuring the system and select an appropriate communication module.
- 2) Select the cable to be used for this communication module (surely use the standard cable).
- 3) Before the communication module is installed, check with any foreign material on the base connector the module will be installed on and any damage on the connector pin of the module.
- 4) For installation of the module, exactly insert the protuberant part at the bottom of the module with the communication cable disconnected into the base groove and then apply enough strength until its top is locked up with the locking device of the base. If the lock is not applied, it may cause an error on the interface with CPU.

### 3.2 From Setting to Operation

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



#### Notes

- 1) The station number of the master module is set to 0.
- 2) The station number of the remote I/O should not be set to 0.

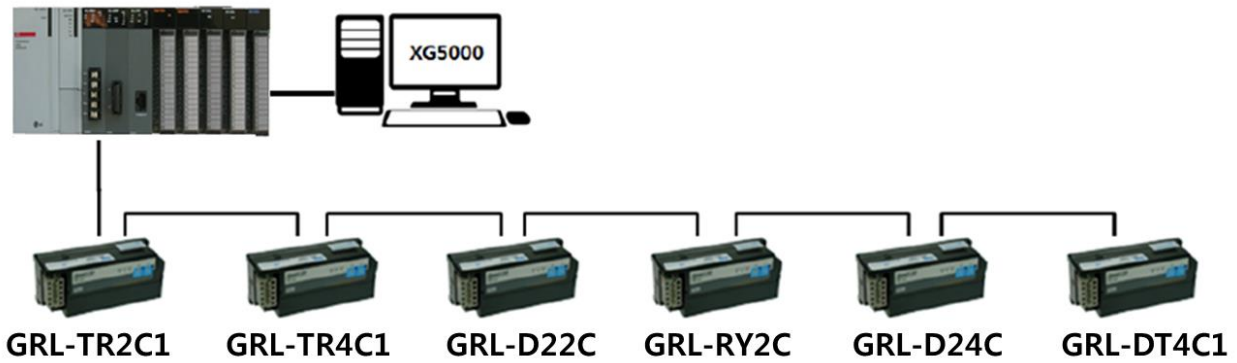


## Chapter 4 System Configuration

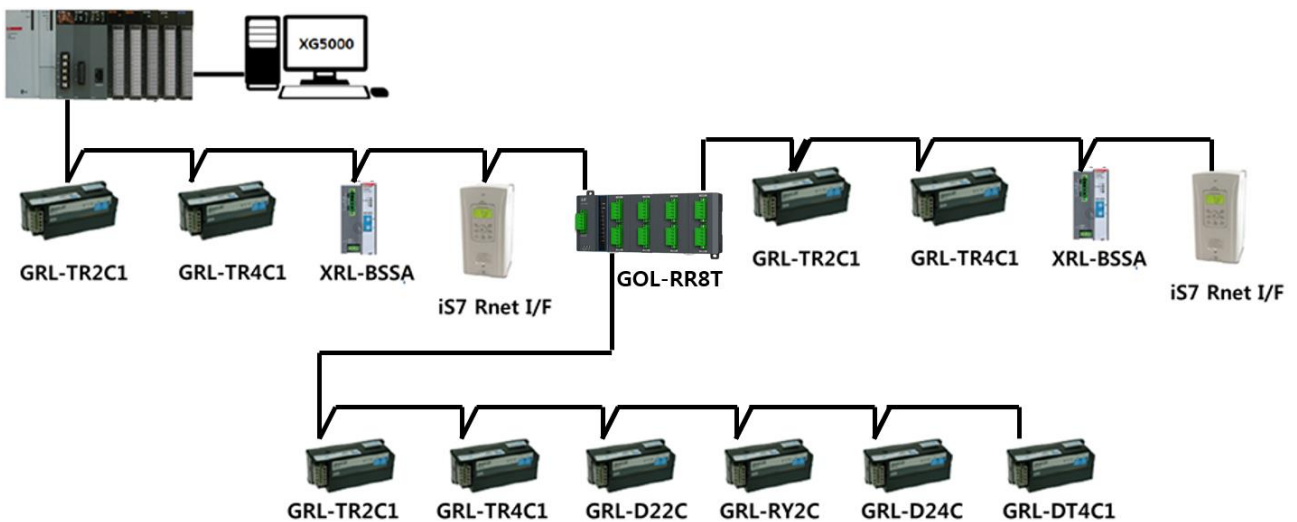
### 4.1 System Configuration of Network

The communication system between Rnet I / F modules can be configured as follows  
In order to connect to LS inverter, Rnet I / F option module must be installed in LS inverter to enable communication.

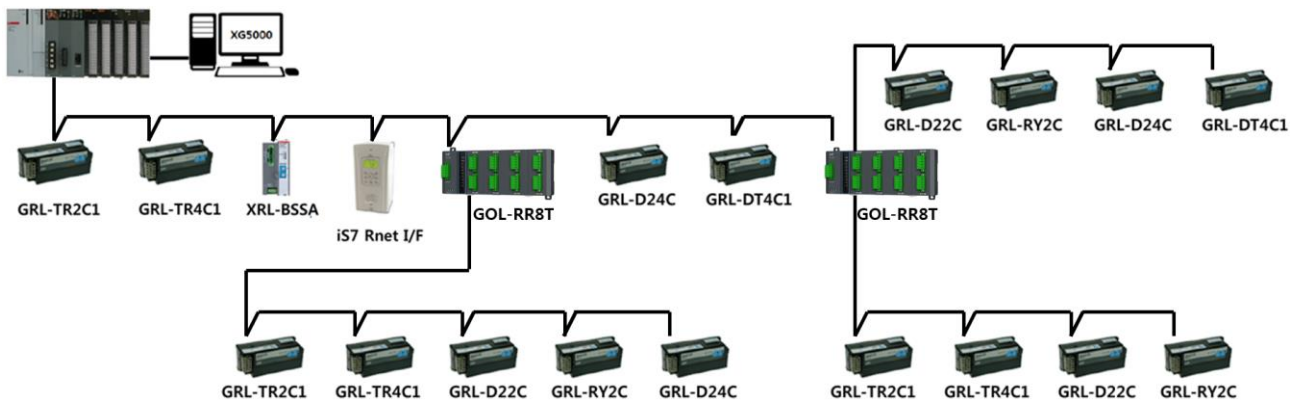
#### 4.1.1 XGL-RMEA/B + Smart I/O



#### 4.1.2 Mixed configuration 1 between XGL-RMEA/B + repeater + Rnet slave



4.1.3 Mixed configuration 2 between XGL-RMEA/B + repeater + Rnet slave



# Chapter 5 High-speed Link Setting

## 5.1 Introduction

High-speed link specifies the Send/Receive device area and data size between CPU module and the communication module by XG5000.

High-speed link can be set the function as shown below.

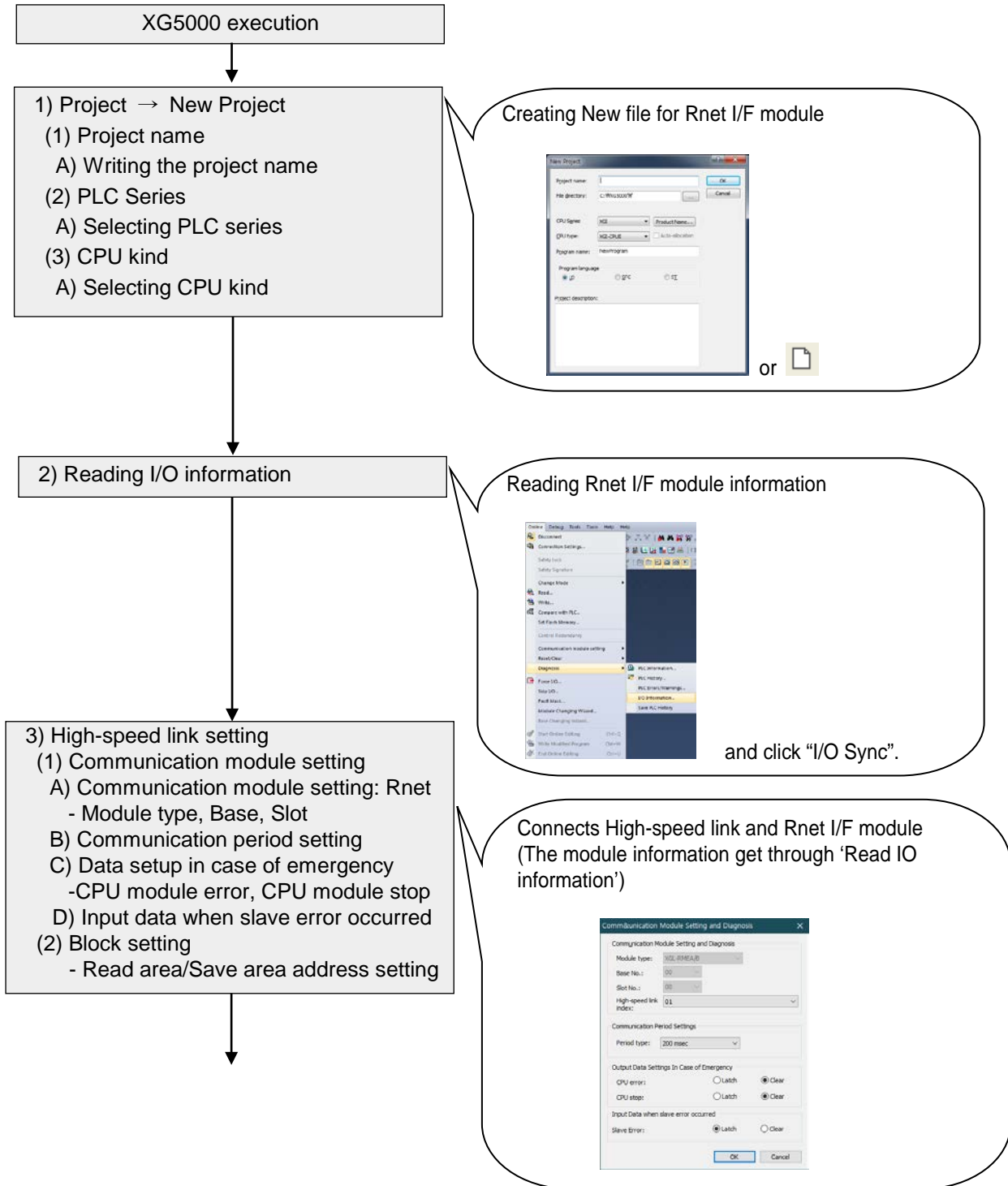
Description		High-speed Link			
Communication module setting	Communication module setting	Module type	Rnet		
		Base no.	Max.: 0 ~ 7 Setting range is different from CPU module.		
		Slot no.	Max.: 0 ~ 11 Setting range is different from Base type.		
	Communication period setting (Period type)	Select among 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s. - Default setting: 200 ms			
	Output data setup in case of emergency	CPU error	Latch	Keep the previous output status.	
			Clear	Clear the output.	
		CPU stop	Latch	Keep the previous output status.	
			Clear	Clear the output.	
Input data when slave error occurred	Slave error	Latch	Keep the previous input data		
		Clear	Clear the input data		
High-speed link block setting	Station type **	Slave			
	Block type **	Send: Data is transmitted from master module to slave module. Receive: Data is transmitted from slave module to master module.			
	Station No. **	Slave station number (Range: 0 ~ 63)			
	Block No. **	It is not used with Rnet I/F module.			
	Read area (From Master to Slave module)	Address	XGK	<b>Head address of the sending device</b> Usable device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR	
			XGI	<b>Head address of the sending device</b> Usable device: A, M, I, Q, R, W, F, K, L, N, U	
	/XGR		Usable device: A, M, I, Q, R, W, F, K, L, N, U		
	Size (Byte)	Input/Output point of slave module is displayed Byte. - If input module point is less than 8 bit, it is processed 1 Byte.			
	Save area (From Slave to Master module)	Address	XGK	<b>Head address of the receiving device</b> Usable device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR	
			XGI	<b>Head address of the receiving device</b> Usable device: A, M, I, Q, R, W, F, K, L, N, U	
/XGR			Usable device: A, M, I, Q, R, W, F, K, L, N, U		
Size (Byte)	Input/Output point of slave module is displayed in Byte. - If input module point is less than 8 bit, it is dealt with 1 Byte.				
PLC connection	RS-232C or USB Port of CPU module				
Control condition	It can control regardless of position of Run mode switch (Run, Stop) of CPU module.				
Max. communication point	29760 points (31 blocks * 120 bytes)				
Max. block number	63 (Setting Range : 0~62)				
Max. point per block	120 bytes (960 points)				
Number of High-speed link setting	Up to 12				

### Note

- ▶ When High-speed link is edited, parameter has to download again.
- ▶ High-speed link is used per a communication module.
- ▶ CPU module saves the written parameter (Standard, High-speed link, P2P).  
When CPU module is exchanged, parameter in XG5000 has to back-up and then the parameter has to write in CPU module again.
- ▶ Input data setting is available for XGL-RMEB O/S version V5.4 or above.  
Other O/S versions and XGL-RMEA operate as latch setting. (default)

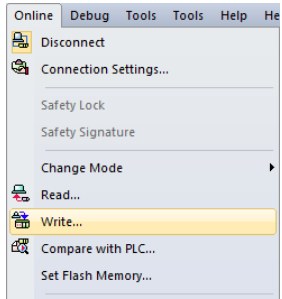
## 5.2 How to use XG5000

XG5000 usage for Rnet I/F module is as shown below.



4) Write Parameter  
(Standard Settings, HS Link, P2P)

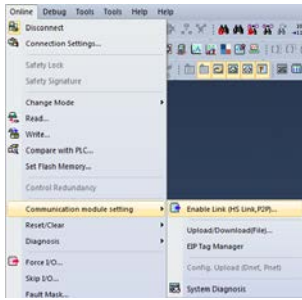
Write of High-speed link parameter value of installed Rnet I/F module.



The screenshot shows a software menu with the following items: Disconnect, Connection Settings..., Safety Lock, Safety Signature, Change Mode, Read..., Write... (highlighted), Compare with PLC..., and Set Flash Memory... To the right of the menu is a small icon of a PLC with a blue arrow pointing to it, preceded by the word 'OR'.

5) Enable Link (HS Link, P2P)

Communication permission of installed Rnet I/F module.



The screenshot shows a software menu with the following items: Disconnect, Connection Settings..., Safety Lock, Safety Signature, Change Mode, Read..., Write..., Compare with PLC..., Set Flash Memory..., Control Redundancy, Communication module setting (highlighted), Reset/Clear, Diagnose, Force I/O..., Skip I/O..., and Fault Mask... The 'Communication module setting' sub-menu is open, showing: Enable Link (HS Link, P2P... (highlighted), Upload/Download Files..., EP Tag Manager, Config. Upload (Over, Port), and System Diagnosis. To the right of the menu is a small icon of a PLC with a blue arrow pointing to it, preceded by the word 'OR'.

\* Enable Link through flag

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

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

Flag list related with “Enable Link”

-XGR

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

-XGI

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

-XGK

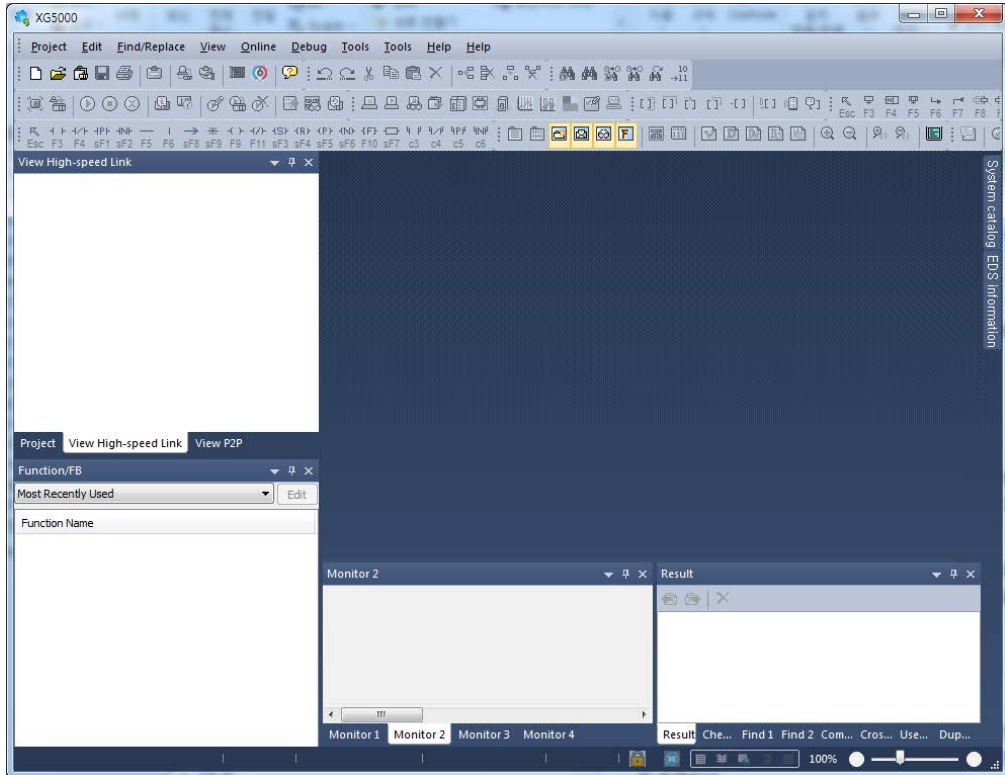
Flag	Data type	Device	Description
_HS1_ENABLE_STATE	BIT	F09600	HS link 1 enable/disable current state
_HS2_ENABLE_STATE	BIT	F09601	HS link 2 enable/disable current state
_HS3_ENABLE_STATE	BIT	F09602	HS link 3 enable/disable current state
_HS4_ENABLE_STATE	BIT	F09603	HS link 4 enable/disable current state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

Flag	Data type	Device	Description
_HS9_REQ	BIT	F10308	HS link 9 enable/disable request
_HS10_REQ	BIT	F10309	HS link 10 enable/disable request
_HS11_REQ	BIT	F1030A	HS link 11 enable/disable request
_HS12_REQ	BIT	F1030B	HS link 12 enable/disable request
_HS1_REQ_NUM	BIT	F10310	HS link 1 enable/disable setting
_HS2_REQ_NUM	BIT	F10311	HS link 2 enable/disable setting
_HS3_REQ_NUM	BIT	F10312	HS link 3 enable/disable setting
_HS4_REQ_NUM	BIT	F10313	HS link 4 enable/disable setting
_HS5_REQ_NUM	BIT	F10314	HS link 5 enable/disable setting
_HS6_REQ_NUM	BIT	F10315	HS link 6 enable/disable setting
_HS7_REQ_NUM	BIT	F10316	HS link 7 enable/disable setting
_HS8_REQ_NUM	BIT	F10317	HS link 8 enable/disable setting
_HS9_REQ_NUM	BIT	F10318	HS link 9 enable/disable setting
_HS10_REQ_NUM	BIT	F10319	HS link 10 enable/disable setting
_HS11_REQ_NUM	BIT	F1031A	HS link 11 enable/disable setting
_HS12_REQ_NUM	BIT	F1031B	HS link 12 enable/disable setting
_P2P1_ENABLE_STATE	BIT	F09620	P2P1 enable/disable current state
_P2P2_ENABLE_STATE	BIT	F09621	P2P2 enable/disable current state
_P2P3_ENABLE_STATE	BIT	F09622	P2P3 enable/disable current state
_P2P4_ENABLE_STATE	BIT	F09623	P2P4 enable/disable current state
_P2P5_ENABLE_STATE	BIT	F09624	P2P5 enable/disable current state
_P2P6_ENABLE_STATE	BIT	F09625	P2P6 enable/disable current state
_P2P7_ENABLE_STATE	BIT	F09626	P2P7 enable/disable current state
_P2P8_ENABLE_STATE	BIT	F09627	P2P8 enable/disable current state
_P2P1_REQ	BIT	F10320	P2P1 enable/disable request
_P2P2_REQ	BIT	F10321	P2P2 enable/disable request
_P2P3_REQ	BIT	F10322	P2P3 enable/disable request
_P2P4_REQ	BIT	F10323	P2P4 enable/disable request
_P2P5_REQ	BIT	F10324	P2P5 enable/disable request
_P2P6_REQ	BIT	F10325	P2P6 enable/disable request
_P2P7_REQ	BIT	F10326	P2P7 enable/disable request
_P2P8_REQ	BIT	F10327	P2P8 enable/disable request
_P2P1_REQ_NUM	BIT	F10330	P2P1 enable/disable setting
_P2P2_REQ_NUM	BIT	F10331	P2P2 enable/disable setting
_P2P3_REQ_NUM	BIT	F10332	P2P3 enable/disable setting
_P2P4_REQ_NUM	BIT	F10333	P2P4 enable/disable setting
_P2P5_REQ_NUM	BIT	F10334	P2P5 enable/disable setting
_P2P6_REQ_NUM	BIT	F10335	P2P6 enable/disable setting
_P2P7_REQ_NUM	BIT	F10336	P2P7 enable/disable setting
_P2P8_REQ_NUM	BIT	F10337	P2P8 enable/disable setting

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

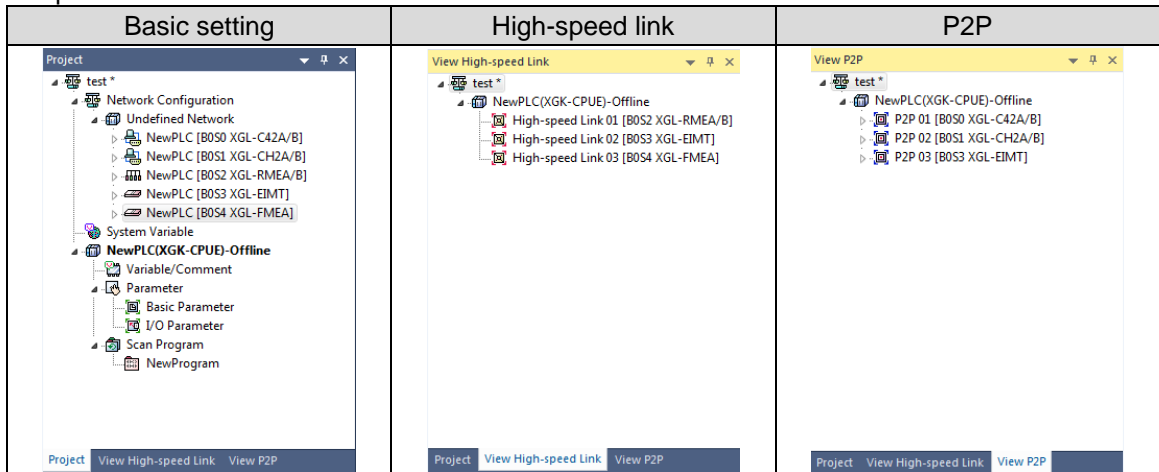
### 5.3 High-speed Link Editing

XG5000 is executed as shown below.



[Standard window]

The parameter in XG5000 is as shown below.



[Parameter window]

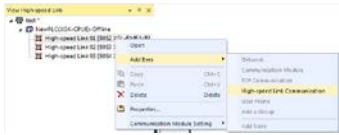
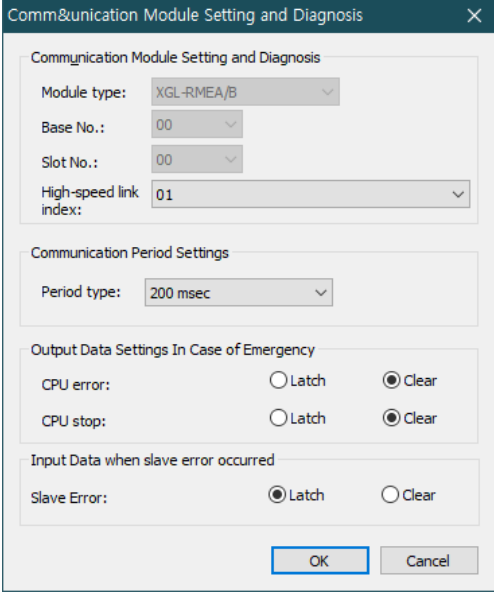
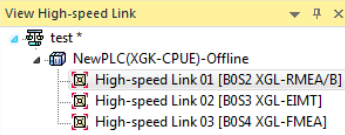
Rnet I/F module is set in High-speed link window.

It can use the High-speed link up to maximum 12.

A High-speed link is available per an Rnet I/F module.

1) How to use High-speed link window

Parameter is specified at High-speed link window as shown below. There are 2 kinds of parameter setting, Communication module setting and High-speed link block setting.

High-speed link	Parameter setting																																																																																																																																																																																																																								
	<p>Communication module setting</p> 																																																																																																																																																																																																																								
	<p>High-speed link block setting</p> <table border="1" data-bbox="719 1308 1445 1570"> <thead> <tr> <th>Index</th> <th>Module type</th> <th>Mode</th> <th>Station number</th> <th>Read area</th> <th>variable name</th> <th>variable name constant</th> <th>Sending data (Byte)</th> <th>Save area</th> <th>variable name</th> <th>variable name constant</th> <th>Receiving data (Byte)</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></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></tr> <tr><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>12</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>13</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>16</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	Index	Module type	Mode	Station number	Read area	variable name	variable name constant	Sending data (Byte)	Save area	variable name	variable name constant	Receiving data (Byte)	0												1												2												3												4												5												6												7												8												9												10												11												12												13												14												15												16											
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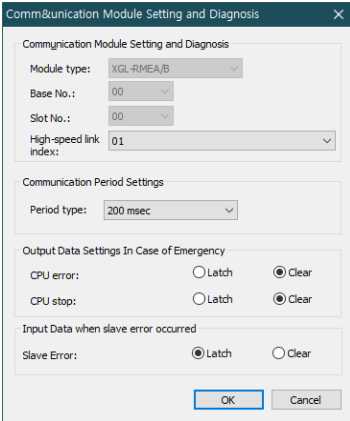
**Remark**


High-speed link1 [B0S0 Rnet] is as shown below.

- 1) High-speed link1: It is a serial number of High-speed link.
- 2) B0: It means Base number 0. (Example: Expansion base 2 stage - B2, Expansion base 5 stage - B5)
- 3) S0: It means Slot number 0. (Example: Slot number 5 - S5, Slot number 11 - S11)

2) Communication module setting parameter

Communication module parameter setting is as shown below.

Parameter	Setting item		Description	
	Communication module Setting	Module type	Rnet	
		Base no.	Setting range: 0 ~ 7 It is different from CPU module.	
		Slot no	Setting range: 0 ~ 11 It is different from type of base.	
	Communication period settings (Period type)	Select among the 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s. - Default: 200ms - It is only for transmission data. - Received data is processed every end of scan program.		
	Output data setting in case of emergency	CPU error	Latch	Keep the output status. (But, P device's data is cleared.)
			Clear	Clear all of the output.
		CPU stop	Latch	Keep the output status. (But, P device's data is cleared.)
			Clear	Clear all of the output.
	Input data when slave error occurred	Slave error	Latch	Keep the previous input data
			Clear	Clear the input data

Click  button after the setting is finished.

**Remark**

1) Cautions of communication period setting

- Setting value of communication period is applicable to transmission data (CPU module's data → Rnet I/F module). If communication period is longer than the time of changing data at scan program, it might be different from the data which is transmitted to slave module.

2) Input data when slave error occurred

- Input data setting is available for XGL-RMEB O/S version V5.4 or above.  
Other O/S versions and XGL-RMEA operate as latch setting. (default)

3) Parameter of High-speed link block setting

High-speed link block setting parameter is as shown below.

Block window											
Index	Module type	Mode	Station number	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name	Receiving data (Byte)
0											
1											
2											
3											
4											
5											
6											
7											
8											

Select by mouse then module type setting screen is opened as shown below.

-	Item	Description	
	Module type	1.DC input 16points	GRL-D22A/D22A(N)
		2.DC input 32points	GRL-D24A/D24A(N)
		3.TR output 16points	GRL-TR2A/TR2A(N)
		4.TR output 32points	GRL-TR4A/TR4A(N)
		5.Relay output 16points	GRL-RY2A/RY2A(N)
		6.DC input 16 points/output 16points	GRL-DT4A/DT4A(N)
		7.GM3,GM4,GM6,PMU	GM3/4/6L-RREA, PMU
	Station type	Auto-setting when module type is set.	
	Mode	Auto-setting when module type is set.	
	Station No.	Slave station number (range: 0 ~ 63)	
-	Read area (Master module → Slave module)	Address	XGK Head address of transmitting device. Usable device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR
			XGI Head address of transmitting device. Usable device: A, M, I, Q, R, W, F, K, L, N, U
	Size(Byte)	Input/Output point of slave module is displayed in Byte. - If input module point is less than 8 bit, it is dealt with 1 Byte.	
-	Save area (Slave module → Master module)	Address	XGK Head address of receiving device. Usable device: P, M, K, F, T, C, U, Z, L, N, D, R, ZR
			XGI Head address of transmitting device. Usable device: A, M, I, Q, R, W, F, K, L, N, U
	Size(Byte)	Input/Output point of slave module is displayed in Byte. - If input module point is less than 8 bit, it is dealt with 1 Byte.	

The priority order of data is the slave module which has lowest station number.

**Remark**

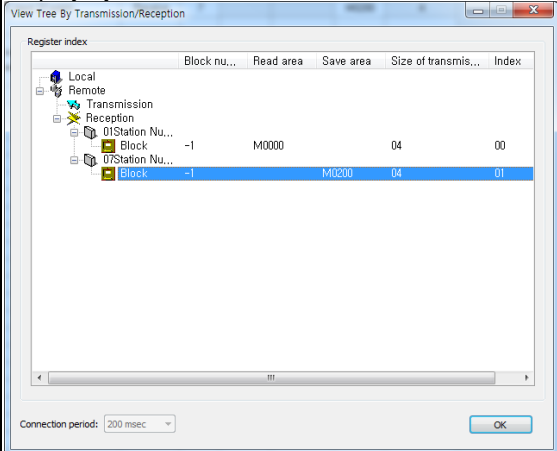
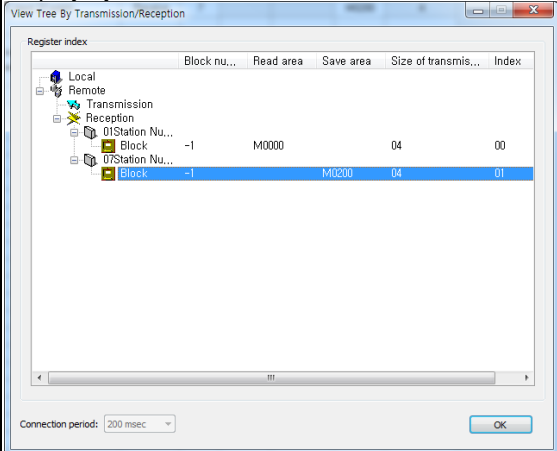
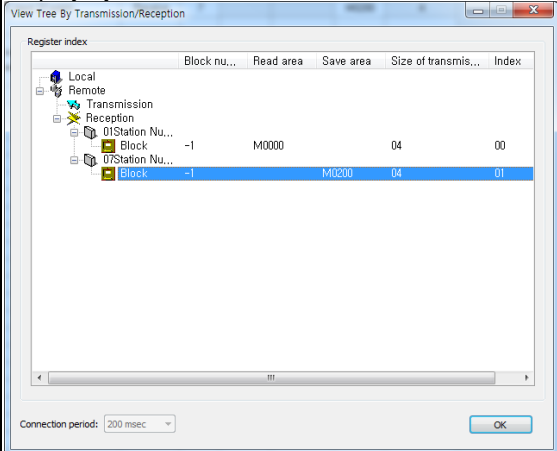
Unit of address setting is Word. But slave module's unit size is Byte. Less than 8 point module is processed by 1 Word when address is specified.

(3) How to use High-speed link block editing tool

The editing tool and usage of High-speed link block is as shown below.

Index	Module type	Mode	Station number	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)
0	TR output 32 points	Send	1	%MW0			4				
1	DC input 32 points	Receive	7					%MW200			4
2											
3											
4											
5											
6											
7											
8											

Screen 1: click right mouse button of a selected area.

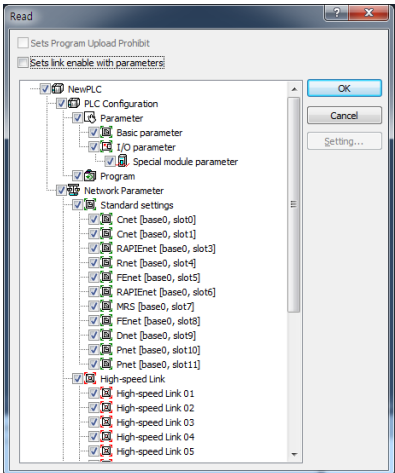
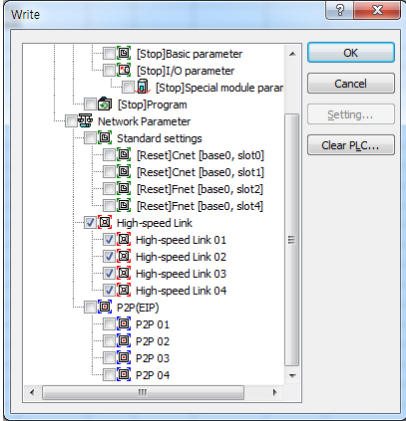
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Undo</td><td>Ctrl+Z</td></tr> <tr><td>Redo</td><td>Ctrl+R</td></tr> <tr><td colspan="2"> </td></tr> <tr><td>Cut</td><td>Ctrl+X</td></tr> <tr><td>Copy</td><td>Ctrl+C</td></tr> <tr><td>Paste</td><td>Ctrl+V</td></tr> <tr><td>Delete</td><td>Delete</td></tr> <tr><td colspan="2">View tree by Transmission/Reception</td></tr> </table> <p style="text-align: center;">[Screen 1]</p>	Undo	Ctrl+Z	Redo	Ctrl+R			Cut	Ctrl+X	Copy	Ctrl+C	Paste	Ctrl+V	Delete	Delete	View tree by Transmission/Reception		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Edit Block</td><td>Changes the edited index block.</td></tr> <tr><td>Copy Block</td><td>Copies the edited index block.</td></tr> <tr><td>Paste Block</td><td>Pastes the copied index block.</td></tr> <tr><td>Delete Block</td><td>Deletes the edited index block.</td></tr> <tr><td>Lump Setup</td><td>Read/Save area is specified in a lump when the slave module's data size is regular.</td></tr> <tr><td>View Tree by Transmission/Reception</td><td> <p>Display by Tree structure.</p>  </td></tr> </table>	Edit Block	Changes the edited index block.	Copy Block	Copies the edited index block.	Paste Block	Pastes the copied index block.	Delete Block	Deletes the edited index block.	Lump Setup	Read/Save area is specified in a lump when the slave module's data size is regular.	View Tree by Transmission/Reception	<p>Display by Tree structure.</p> 
Undo	Ctrl+Z																												
Redo	Ctrl+R																												
Cut	Ctrl+X																												
Copy	Ctrl+C																												
Paste	Ctrl+V																												
Delete	Delete																												
View tree by Transmission/Reception																													
Edit Block	Changes the edited index block.																												
Copy Block	Copies the edited index block.																												
Paste Block	Pastes the copied index block.																												
Delete Block	Deletes the edited index block.																												
Lump Setup	Read/Save area is specified in a lump when the slave module's data size is regular.																												
View Tree by Transmission/Reception	<p>Display by Tree structure.</p> 																												

Screen 1: Click the right mouse (right click) button of a selected area.

## 5.4 Read and Write of High-speed Link

The screen is used for read/write of High-speed link's parameter.

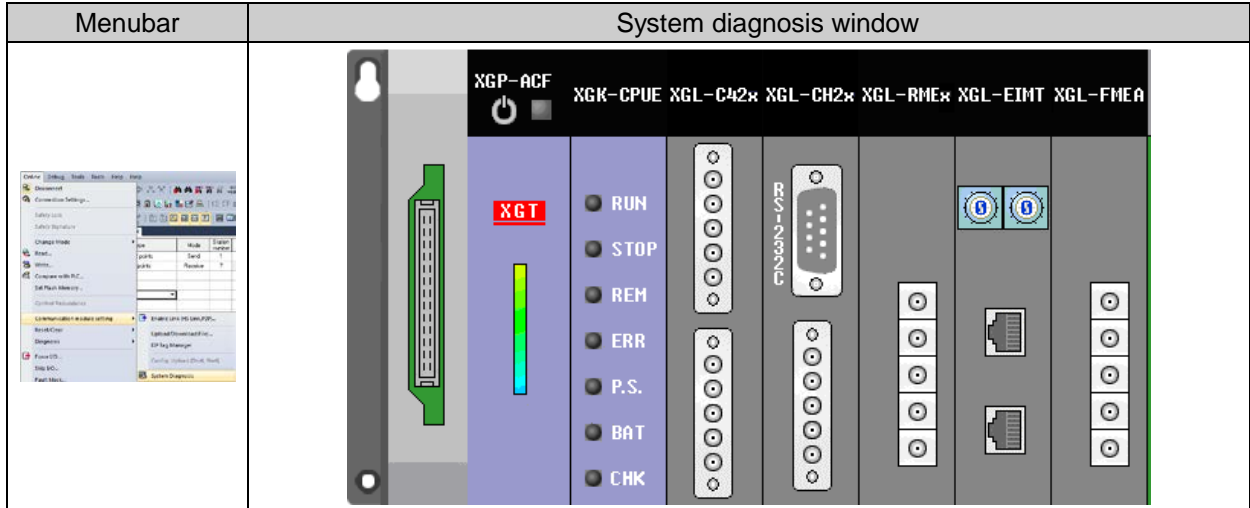
(Online menu → Read or Write)

Configuration	Description
 	<ol style="list-style-type: none"> <li>1) High-speed link is available up to 12 for installed Rnet I/F module. <ul style="list-style-type: none"> <li>- It can be used up to 12 with the other communication module which use High-speed link.</li> </ul> </li> <li>2) It can read/write for each High-speed parameter. <ul style="list-style-type: none"> <li>- Check the box to set the High-speed link.</li> </ul> </li> <li>3) Read/Write of High-speed link parameter is not affected to CPU's Run mode.</li> </ol>

If a High-speed link parameter is written to a CPU module, the CPU module saves the data. If CPU module is exchanged, the High-speed link parameter has to backup from the CPU module. The parameter has to re-write in exchanged CPU module.

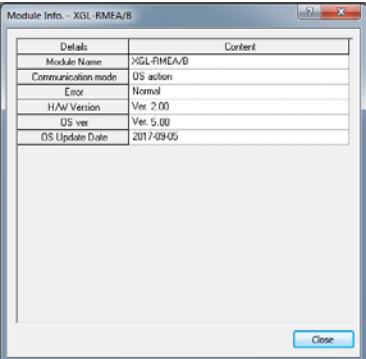
## 5.5 System Diagnosis

System diagnosis provides the information of Rnet I/F module system. The System diagnosis screen is as shown below.

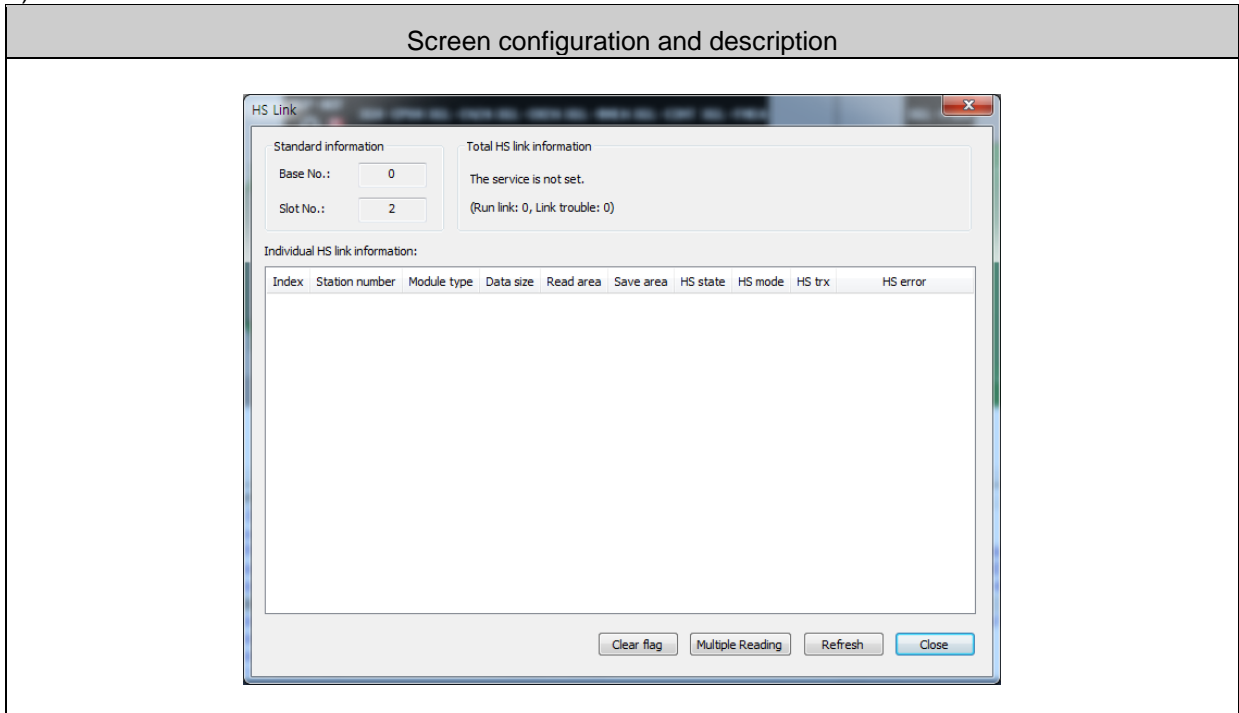


It describes the menu of system diagnosis.

### 1) Communication module information

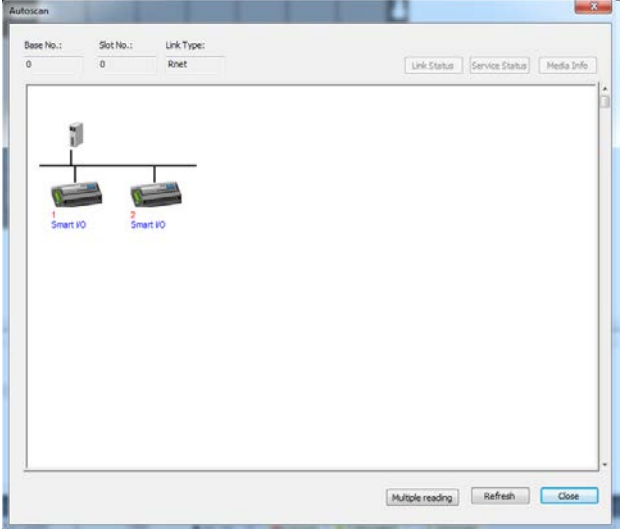


Screen configuration and description	
	Module kind Communication module type.
	Base Number Base number of communication module which is connected with High-speed link.
	Slot Number Slot number of communication module which is connected with High-speed link.
	Station No. Station number of master module.
	Hardware Error Hardware status of communication module.
	Hardware Version Hardware version of communication module.
	O/S Version Software version of communication module.
	High-speed link Enable/disable status of high-speed link.
	Remote Connection status of local/remote.

2) HS link



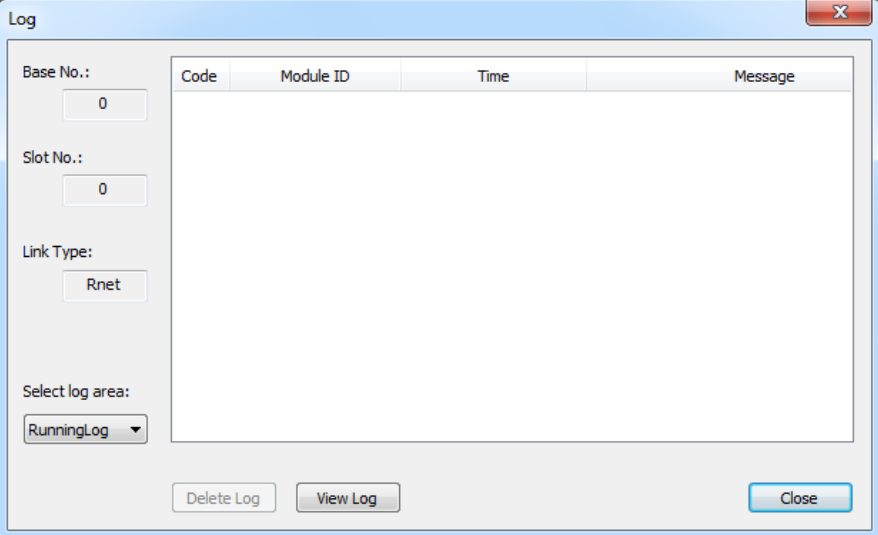
Standard information	Base no.	Base number of communication module which is connected with High-speed link.
	Slot no.	Slot number of communication module which is connected with High-speed link.
Total HS link information	Run link	1: High-speed link parameters are communicate normally after power on. 0: High-speed link parameters are communicate abnormally after power on.
	Link trouble	1: Error is occurred in slave station after Run link becomes normal status. 0: Error is not occurred in slave station after Run link becomes normal status.
Individual HS link information	Index	Serial number.
	Station number	Slave module's station number which is existed in network.
	Module type	Module type which is used for setting up of high-speed parameter.
	Data size	Data size of transmitting data from master module to slave module.
	Read area	A device to transmit data from master to slave module.
	Save area	A device to transmit data from slave to master module.
	HsState	Display of communication status between master and slave module.
	HsMode	RUN: Normal communication status between master and slave module. STOP: Abnormal communication status between master and slave module.
	HsTrx	Transmission/reception information between master and slave module.
HsError	Error is displayed while High-speed link data is processed.	

3) Auto-scan

Menu	Screen configuration and description
Auto-scan	
	<p>Communication status of the slave module is displayed as shown below.</p> <p>1) Connected communication : </p> <p>2) Disconnected communication: </p> <p>But, it is not shown about GRL-TR4A which was produced before dated 2007 year during auto-scan.</p>

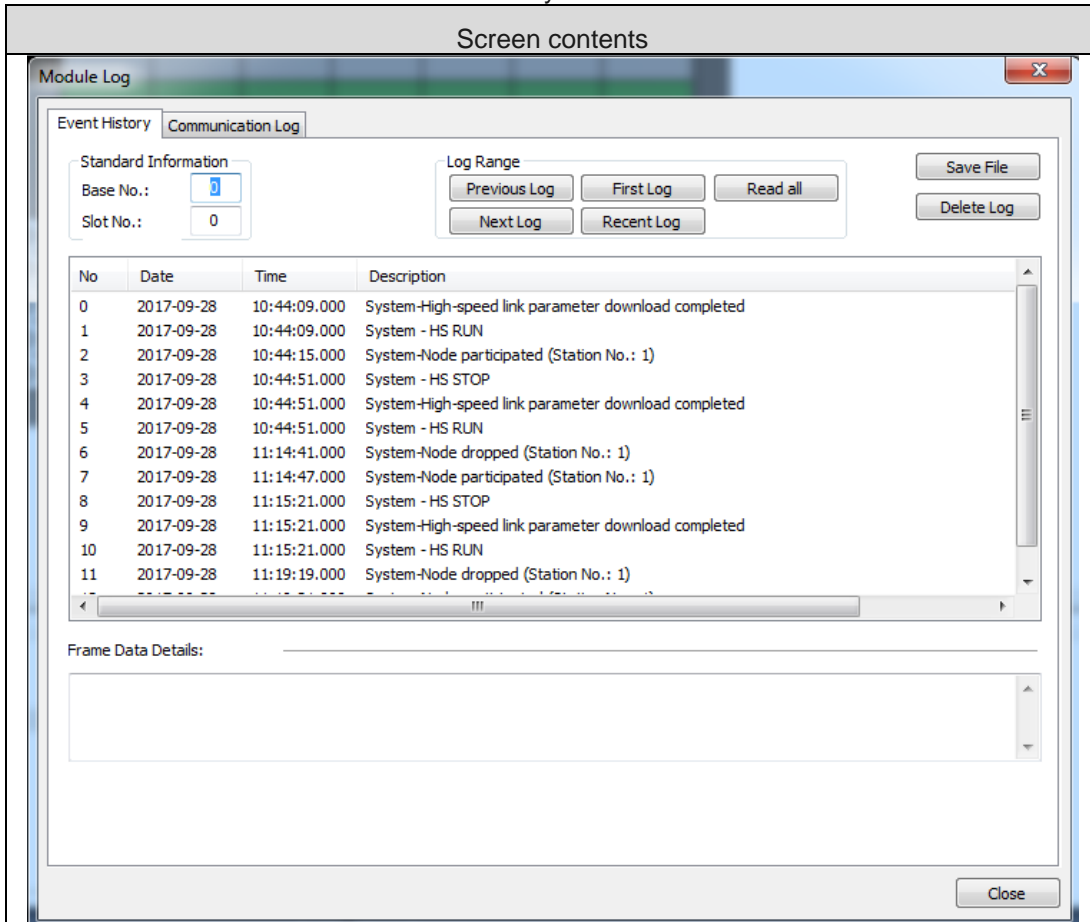
4) System Log

Shows updated log information.

Screen contents	
	
Base No.	Base number of communication module
Slot No.	Slot number of communication module
Link Type	Display network type of connected communication module
Select log area	Select RunningLog or SystemLog

5) View Communication Module Log

Indicates event and communication history occurred in communication module



History mode	Even History	Display all event history information related to communication module
	Comm log	Main communication history information related to communication module
Basic Information	Base No.	Base number of communication module
	Slot No.	Slot number of communication module
Log range		Provides previous, first, next, recent log and reading all for the history
Frame Data Details		Provide additional explanation and action for history

## 5.6 High-speed Link Information

High-speed link swaps the data among master module and all slave modules.

It provides the flag of High-speed link operation status classified by individual station or total station.

It is useful when checking the reliability of Transmission/Reception data and finding cause of error. Flag kinds and usage is as shown below.

Classification	Run-Link	Link-Trouble	Transmission /Reception status	Operation mode	Error	High-speed link status
Information type	All		Respectively			
Flag name (x=High-speed link number)	_HSxRLINK	_HSxLTRBL	_HSxTRX[n] (n=0..63)	_HSxMOD[n] (n=0..63)	_HSxERR[n] (n=0..63)	_HSxSTATE[n] (n=0..63)
Data type	Bit	Bit	Bit Array	Bit Array	Bit Array	Bit Array
Monitoring	Available	Available	Availability	Availability	Availability	Availability
Program use	Available	Availability	Availability	Availability	Availability	Availability

[Table] Function of High-speed link information

The way of selecting flag is as shown below.

Setting sequence																																									
How to use	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th></th> <th>Variable</th> <th>Type</th> <th>Device</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>_HS1_RLINK</td> <td>BIT</td> <td>L000000</td> <td>Setting of HS link 1-block -514159431</td> </tr> <tr> <td>2</td> <td>_HS1_LTRBL</td> <td>BIT</td> <td>L000001</td> <td>Service is normal in P2P 1-block -514159431</td> </tr> <tr> <td>3</td> <td>_HS1_STATE00</td> <td>BIT</td> <td>L000020</td> <td>Service is error in P2P 1-block 00</td> </tr> <tr> <td>4</td> <td>_HS1_MOD000</td> <td>BIT</td> <td>L000100</td> <td>Error code in P2P 1-block 00</td> </tr> <tr> <td>5</td> <td>_HS1_TRX000</td> <td>BIT</td> <td>L000180</td> <td>Normal service count in P2P 1-block 00</td> </tr> <tr> <td>6</td> <td>_HS1_ERR000</td> <td>BIT</td> <td>L000260</td> <td>Error service count in P2P 1-block 00</td> </tr> <tr> <td>7</td> <td>_HS1_SETBLOC</td> <td>BIT</td> <td>L000340</td> <td>PID Output Select (0:Auto, 1:Manual)</td> </tr> </tbody> </table>		Variable	Type	Device	Comment	1	_HS1_RLINK	BIT	L000000	Setting of HS link 1-block -514159431	2	_HS1_LTRBL	BIT	L000001	Service is normal in P2P 1-block -514159431	3	_HS1_STATE00	BIT	L000020	Service is error in P2P 1-block 00	4	_HS1_MOD000	BIT	L000100	Error code in P2P 1-block 00	5	_HS1_TRX000	BIT	L000180	Normal service count in P2P 1-block 00	6	_HS1_ERR000	BIT	L000260	Error service count in P2P 1-block 00	7	_HS1_SETBLOC	BIT	L000340	PID Output Select (0:Auto, 1:Manual)
	Variable	Type	Device	Comment																																					
1	_HS1_RLINK	BIT	L000000	Setting of HS link 1-block -514159431																																					
2	_HS1_LTRBL	BIT	L000001	Service is normal in P2P 1-block -514159431																																					
3	_HS1_STATE00	BIT	L000020	Service is error in P2P 1-block 00																																					
4	_HS1_MOD000	BIT	L000100	Error code in P2P 1-block 00																																					
5	_HS1_TRX000	BIT	L000180	Normal service count in P2P 1-block 00																																					
6	_HS1_ERR000	BIT	L000260	Error service count in P2P 1-block 00																																					
7	_HS1_SETBLOC	BIT	L000340	PID Output Select (0:Auto, 1:Manual)																																					
	<table border="1" style="width: 100%;"> <tr> <td style="width: 15%;">Flag kind</td> <td colspan="2">Select among the System/High-speed link/P2P/PID.</td> </tr> <tr> <td rowspan="3">Select list</td> <td>All</td> <td>It is showed the list of all High-speed links.</td> </tr> <tr> <td>Parameter number</td> <td>It means High-speed link number. The selected number is only displayed in List.</td> </tr> <tr> <td>Block index</td> <td>It is index number of High-speed link block.</td> </tr> </table>	Flag kind	Select among the System/High-speed link/P2P/PID.		Select list	All	It is showed the list of all High-speed links.	Parameter number	It means High-speed link number. The selected number is only displayed in List.	Block index	It is index number of High-speed link block.																														
Flag kind	Select among the System/High-speed link/P2P/PID.																																								
Select list	All	It is showed the list of all High-speed links.																																							
	Parameter number	It means High-speed link number. The selected number is only displayed in List.																																							
	Block index	It is index number of High-speed link block.																																							

Monitoring of flag and device's value is as shown below.

Setting sequence

XG5000 → Project window → Global/Direct Variable

	Variable	Type	Address	Comment
1	_HS1_RLINK	BOOL	%LX0	All stations are OK in HS link 1
2	_HS1_LTRBL	BOOL	%LX1	Trouble after _HS 1 RLINK on
3	_HS1_STATE000	BOOL	%LX32	Total states of HS link 1-block 000
4	_HS1_MOD000	BOOL	%LX160	Operation mode of HS link 1-block 000
5	_HS1_TRX000	BOOL	%LX288	Normal communication with HS link 1-block 000
6	_HS1_ERR000	BOOL	%LX416	Error mode of HS link 1-block 000
7	_HS1_SETBLOCK000	BOOL	%LX544	Setting of HS link 1-block 000

How to use

XG5000 → Monitor tap

	PLC	Program	Variable/Device	Value	Type	Device/Variable	Comment
1	NewPLC	<GLOBAL>	%LX0	10	BOOL	_HS1_RLINK	All stations are OK in HS link 1
2	NewPLC	<GLOBAL>	%LX1	10	BOOL	_HS1_LTRBL	Trouble after _HS 1 RLINK on
3	NewPLC	<GLOBAL>	%LX32	10	BOOL	_HS1_STATE000	Total states of HS link 1-block 000
4	NewPLC	<GLOBAL>	%LX160	10	BOOL	_HS1_MOD000	Operation mode of HS link 1-block 000
5	NewPLC	<GLOBAL>	%LX288	10	BOOL	_HS1_TRX000	Normal communication with HS link 1-block 000
6	NewPLC	<GLOBAL>	%LX416	10	BOOL	_HS1_ERR000	Error mode of HS link 1-block 000
7	NewPLC	<GLOBAL>	%LX544	10	BOOL	_HS1_SETBLOCK000	Setting of HS link 1-block 000
8							

Monitor 1   Monitor 2   Monitor 3   Monitor 4

- Select variable in Variable/Comment screen and then Drag/Drop the variable to Variable Monitoring Window. The value is appeared in variable Monitoring Window.

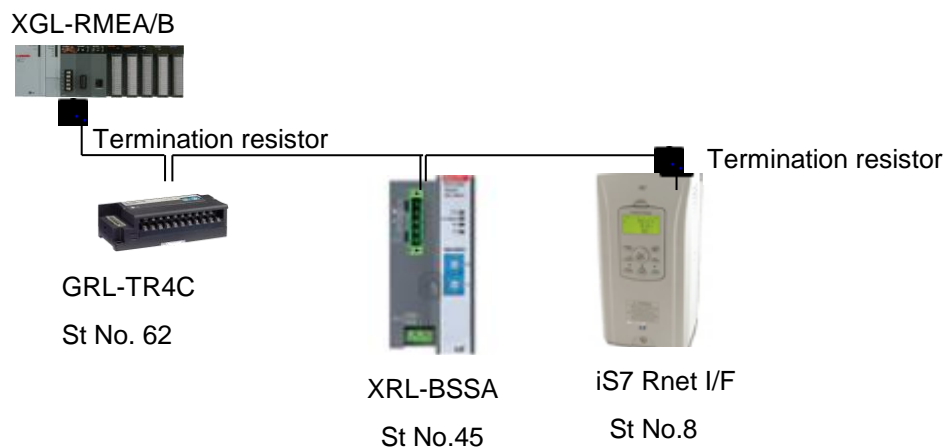
## Chapter 6 Program Example

### 6.1 XG5000 program

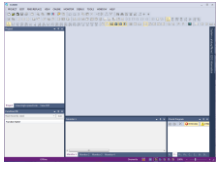
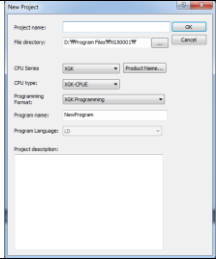
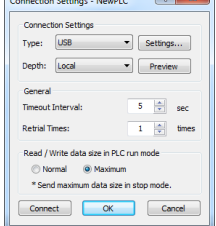
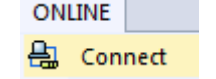
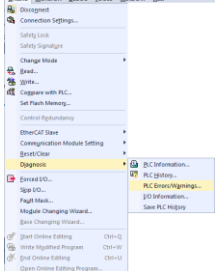
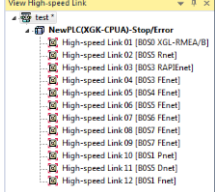
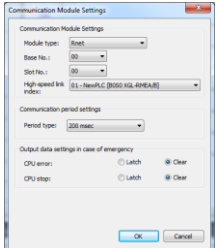
The basic configuration and setting values of the example are as follows.

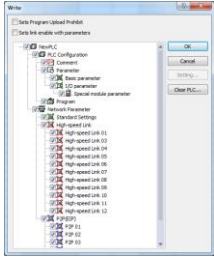
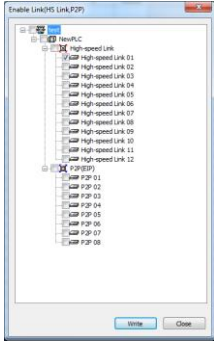
Setting items			Setting value				
System Configuration	Master	XGL-RMEA/B	Base No.	0			
			Slot No.	1			
			Station No.	0 (fixed)			
			Comm Speed	1Mbps (fixed)			
			High-Speed link setting	High-Speed link 02			
			Comm period setting	200ms			
			Read area	Slave 1	M100	16 bytes	
					M200	2 bytes	
				Slave 2	M300	2 bytes	
					M350	16bytes	
	Slave 3	M150		4 bytes			
		M250		2 bytes			
	Slave	XRL-BSSA	Station No.	45			
			Extendable I/O	Input: 4bytes	Output: 8bytes		
		GRL-DT4C	Station No.	62			
iS7		Station No.	8				
		Parameter	0x0005				

• System configuration



The high speed link parameter for the example system is set as follows.

No.	Used S/W	Action	Contents
1		XG5000 execute	XG5000 execute
2		Create New project	Project → New project Set project name, CPU type
3		XG5000 Connection setting	XG5000 → Online → Connection setting → Select connection driver
4		XG5000 Connection	XG5000 → Online → Connect
5		IO information read	XG5000 → Online → Diagnosis → I/O information → I/O Sync
6		Assigning High-speed link project	Assigning High-speed link project on XG5000
7		Comm module setting	PLC right click → Add item → High-speed link communication Set module type, base number, slot number, period type

<p>8</p>	<p>-</p>	<p>Set High-speed link block</p>	<p>Select modules</p> <table border="1"> <thead> <tr> <th>Index</th> <th>Module type</th> <th>Mode</th> <th>Station number</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>XRL_BSSA</td> <td>3. Send/Receive</td> <td>45</td> </tr> <tr> <td>1</td> <td>DC input 16 points/output 16 points</td> <td>3. Send/Receive</td> <td>62</td> </tr> <tr> <td>2</td> <td>Inverter</td> <td>3. Send/Receive</td> <td>8</td> </tr> </tbody> </table> <p>High speed link block after setting read area / save area</p> <table border="1"> <thead> <tr> <th>Read area</th> <th>Variable name</th> <th>Variable name comment</th> <th>Sending data (Byte)</th> <th>Save area</th> <th>Variable name</th> <th>Variable name comment</th> <th>Receiving data (Byte)</th> </tr> </thead> <tbody> <tr> <td>M0100</td> <td></td> <td></td> <td>16</td> <td>M0150</td> <td></td> <td></td> <td>4</td> </tr> <tr> <td>M0200</td> <td></td> <td></td> <td>2</td> <td>M0250</td> <td></td> <td></td> <td>2</td> </tr> <tr> <td>M0300</td> <td></td> <td></td> <td>2</td> <td>M0350</td> <td></td> <td></td> <td>16</td> </tr> </tbody> </table>	Index	Module type	Mode	Station number	0	XRL_BSSA	3. Send/Receive	45	1	DC input 16 points/output 16 points	3. Send/Receive	62	2	Inverter	3. Send/Receive	8	Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)	M0100			16	M0150			4	M0200			2	M0250			2	M0300			2	M0350			16
Index	Module type	Mode	Station number																																																
0	XRL_BSSA	3. Send/Receive	45																																																
1	DC input 16 points/output 16 points	3. Send/Receive	62																																																
2	Inverter	3. Send/Receive	8																																																
Read area	Variable name	Variable name comment	Sending data (Byte)	Save area	Variable name	Variable name comment	Receiving data (Byte)																																												
M0100			16	M0150			4																																												
M0200			2	M0250			2																																												
M0300			2	M0350			16																																												
<p>9</p>		<p>Write High-speed link blocks</p>	<p>Online → Write : Check high speed links and write</p>																																																
<p>10</p>		<p>Enable High-speed link</p>	<p>Online → Set communication module → Link enable : Enable High-speed link</p>																																																



## Appendix

### A.1 Terminology

**1) Master Module**

Rnet I/F module to be installed on I/O location of the basic base.

**2) Slave Module (RSM : Rnet Slave Module)**

Rnet I/F module to be installed on CPU location of the basic base or Smart I/O Rnet.

**3) Local Station**

Station directly connected with XG5000, XG5000 in the same network including CPU for user to download, monitoring and debug programs.

**4) Rnet**

Fieldbus, as the lowest network to connect control device with relay device has adopted 3 layers among OSI's 7 layers. The 3 layers are composed of physical layer configured with H2(1Mbps electric), H1 (31.23Kbbs electric), optic/wireless, etc., data link layer with Scheduled and Circulated Token bus and application layer in charge of application function where user layer is adopted additionally.

**5) Token**

It is a right to send data of self-station by access right control over Physical Medium.

**6) Repeater**

It is used to extend cable length in electric communication network, which extends communication distance by revival and amplification of electric communication signals.

**7) Manchester Biphase-L**

It is a data modulating method used in Rnet. Data is sent as encoded by Manchester-I Code and the data received as encoded by Manchester is converted as decoded.

**8) Reset Individual Module**

It is used to initialize if an error occurs on the communication module. It operates Reset operation selecting the [Online] → [Reset/Clear] → [Reset Individual Module] by XG5000. Then PLC do Restart operation to initialize.

## A.2 List of HS Link Flags

No.	Keyword	Type	Detail	Description
L000000	_HS1_RLINK	Bit	HS link parameter No.1's all stations normally operated	Displays all stations normally operated as specified in HS link parameter, which will be On if 1. There is no error with all stations specified in parameter in RUN mode 2. All data block is in normal communication as specified in parameter. 3. The parameter specified in each station itself is in normal communication. Run_link will be kept On if once On until stopped by link disable.
L000001	_HS1_LTRBL	Bit	After _HS1RLINK is ON, abnormal status displayed	This flag will be On if the station specified in parameter and the data block's communication status are as described below with _HSmRLINK flag On, 1. When the station specified in parameter is not in RUN mode, 2. When the station specified in parameter is in error, 3. When data block's communication status specified in parameter is unstable, The link trouble will be On if one of those conditions 1,2 and 3 above occurs. And if such a condition is back to normal, it will be Off.
L000020 ~ L00009F	_HS1_STATE[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k's general status displayed	Displays the general status of the communication information for the specified parameter's respective data blocks. _HS1_STATE[k]=_HS1_MOD[k]&_HS1_TRX[k]&(~_HSm_ERR[k])
L000100 ~ L00017F	_HS1_MOD[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k station's Run operation mode	Displays the operation mode of the station specified in parameter's data block k.
L000180 ~ L00025F	_HS1_TRX[k] (k=000~127)	Bit Array	Normal communication displayed with HS link parameter No.1, Block No.k station	Displays the communication status of parameter's data block k to check if normal as specified.
L000260 ~ L00033F	_HS1_ERR[k] (k=000~127)	Bit Array	HS link parameter No.1, Block No.k station's Run error mode	Displays the communication status of parameter's data block k to check for any error.
L000340 ~ L00041F	_HS1_SETBLO CK[k]	Bit Array	HS link parameter No.1, Block No.k setting displayed	Displays the setting status of parameter's data block k.

[Table 1] List of communication flags based on HS link number (HS link No. 1 ~ 12)

**Notes**

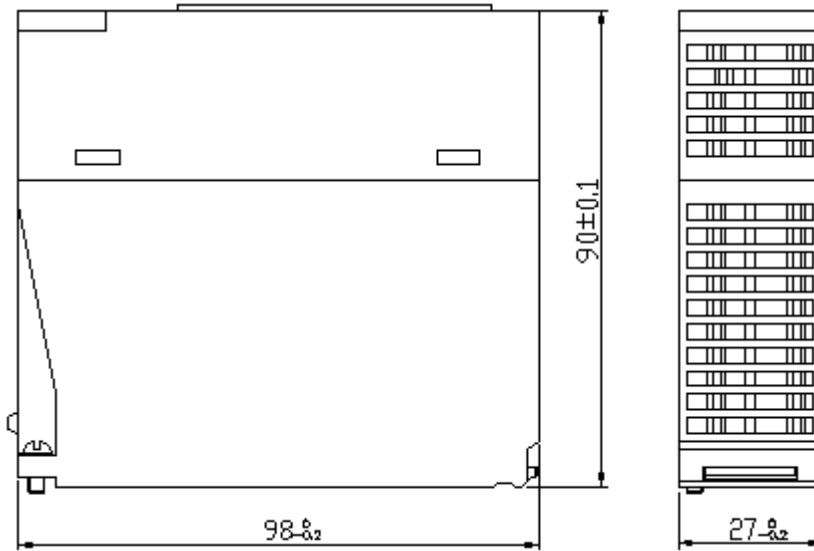
HS link No.	L area address	Remarks
2	L000500~L00099F	Compared with HS link of 1 in [Table 1], other HS link station number's flag address will be simply calculated as follows;  * Calculation formula: $\text{L area address} = \text{L000000} + 500 \times (\text{HS link No.} - 1)$ In order to use HS link flag for program and monitoring, use the flag map registered in XG5000 for convenient application.
3	L001000~L00149F	
4	L001500~L00199F	
5	L002000~L00249F	
6	L002500~L00299F	
7	L003000~L00349F	
8	L003500~L00399F	
9	L004000~L00449F	
10	L004500~L00499F	
11	L005000~L00549F	

Example) K as a block number is displayed through 8 words by 16 for 1 word for the information of 128 blocks from 000 to 127.  
 For example, block information of 16~31, 32~47, 48~63, 64~79, 80~95, 96~111, 112~127 will be displayed in L00011, L00012, L00013, L00014, L00015, L00016, L00017 from block 0 to block 15 for mode information (\_HS1\_MOD). Thus, the mode information of the block No. 55 will be displayed in L000137.

### A.3 External Dimensions

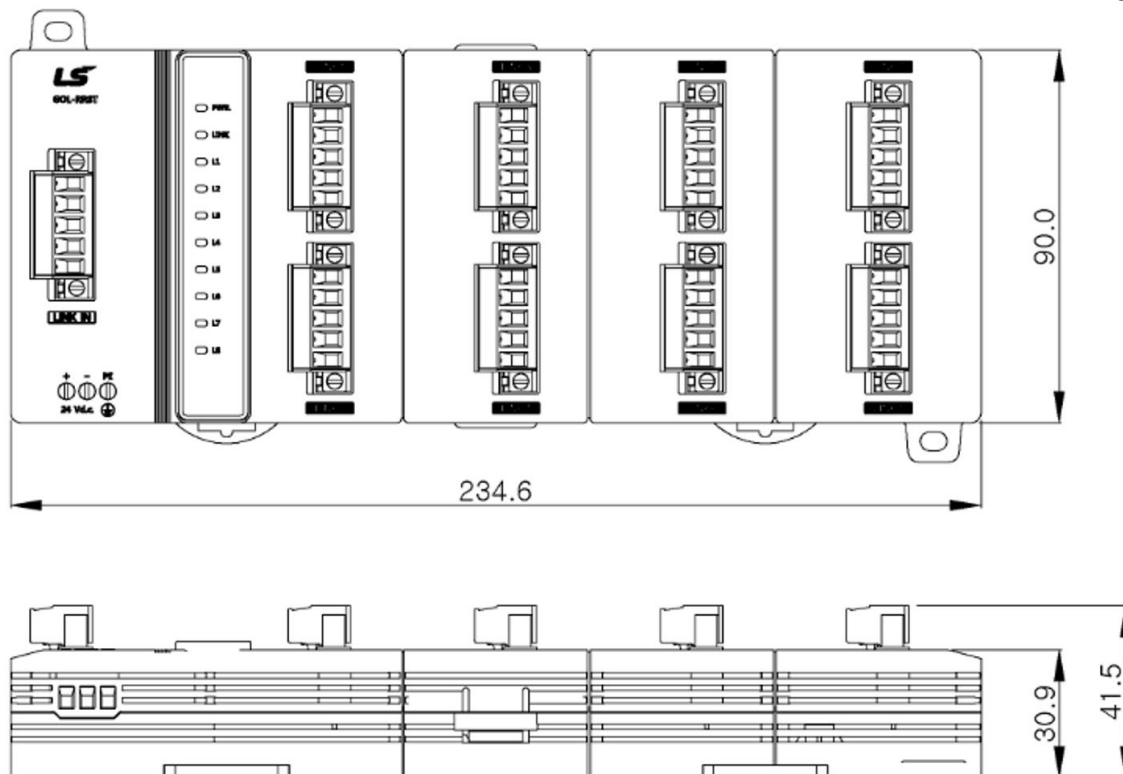
1) XGL-RMEA/B

Unit: mm



2) GOL-RR8T

Unit: mm



## Warranty

### 1. Warranty Period

The product you purchased will be guaranteed for 18 months from the date of manufacturing.

### 2. Scope of Warranty

Any trouble or defect occurring for the above-mentioned period will be partially replaced or repaired. However, please note the following cases will be excluded from the scope of warranty.

- (1) Any trouble attributable to unreasonable condition, environment or handling otherwise specified in the manual,
- (2) Any trouble attributable to others' products,
- (3) If the product is modified or repaired in any other place not designated by the company,
- (4) Due to unintended purposes
- (5) Owing to the reasons unexpected at the level of the contemporary science and technology when delivered.
- (6) Not attributable to the company; for instance, natural disasters or fire

### 3. Since the above warranty is limited to PLC unit only, make sure to use the product considering the safety for system configuration or applications.

## Environmental Policy

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

### Environmental Management

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

### About Disposal

LS ELECTRIC' PLC unit is designed to protect the environment. For the disposal, separate aluminum, iron and synthetic resin (cover) from the product as they are reusable.





[www.ls-electric.com](http://www.ls-electric.com)

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