

User Manual

LS Programmable Logic Controller

Rnet I/F Module

GLOFA-GM

MASTER-K

G3L – RUEA

G4L – RUEA

G6L – RUEA

G7L – RUEA

G3L – RREA

G4L – RREA

G6L – RREA

G0L – GWRA



Safety Instructions

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

SAFETY PRECAUTIONS

- ▶ Read this manual thoroughly before using LGIS equipment. Also, pay careful attention to safety and handle the module properly.
- ▶ Safety precautions are for using the product safely and correctly in order to prevent the accidents and danger, so make sure to follow all directions in safety precautions.
- ▶ The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meaning is represented as follows



Warning

If violated instructions, it can cause death, fatal injury or a considerable loss of property.



Caution

If violated instructions, it can cause a slight injury or a slight loss of products.

- ▶ The symbols which are indicated in the PLC and User's Manual mean as follows;



This symbol means paying attention because of danger of injury, fire, or malfunction.



This symbol means paying attention because of danger of electric shock.

- ▶ Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

SAFETY PRECAUTIONS

Design Precautions



Warning

- ▶ Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, serious trouble could result from erroneous output or erroneous operation.
 - Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operation.

When the PLC detects the following problems, it will stop calculation and turn off all output in the case of watchdog timer error, module interface error, or other hardware errors.

However, one or more outputs could be turned on when there are problems that the PLC CPU cannot detect, such as malfunction of output device (relay, transistor, etc.) itself or I/O controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. Also, build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.
- ▶ Make sure all external load connected to output does NOT exceed the rating of output module.

Overcurrent exceeding the rating of output module could cause fire, damage or erroneous operation.
- ▶ Build a circuit that turns on the external power supply when the PLC main module power is turned on.

If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

SAFETY PRECAUTIONS

Design Precautions



Caution

- ▶ Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100mm (3.94inch) or more from each other.
Not doing so could result in noise that would cause erroneous operation.

Installation Precautions



Caution

- ▶ Use the PLC in an environment that meets the general specification contained in this manual or datasheet.
Using the PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- ▶ Completely turn off the power supply before loading or unloading the module.
Not doing so could result in electric shock or damage to the product.
- ▶ Make sure all modules are loaded correctly and securely.
Not doing so could cause a malfunction, failure or drop.
- ▶ Make sure I/O and extension connector are installed correctly.
Poor connection could cause an input or output failure.
- ▶ When install the PLC in environment of much vibration, be sure to insulate the PLC from direct vibration.
Not doing so could cause electric shock, fire, and erroneous operation.
- ▶ Be sure to there are no foreign substances such as conductive debris inside the module.
Conductive debris could cause fires, damage, or erroneous operation.

SAFETY PRECAUTIONS

Wiring Precautions



Warning

- ▶ Completely turn off the external power supply when installing or placing wiring.
Not doing so could cause electric shock or damage to the product.
- ▶ Make sure that all terminal covers are correctly attached.
Not attaching the terminal cover could result in electric shock.



Caution

- ▶ Be sure that wiring is done correctly by checking the product's rated voltage and the terminal layout.
Incorrect wiring could result in fire, damage, or erroneous operation.
- ▶ Tighten the terminal screws with the specified torque.
If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
- ▶ Be sure to ground the FG or LG terminal to the protective ground conductor.
Not doing so could result in erroneous operation.
- ▶ Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
Such debris could cause fire, damage, or erroneous operation.

SAFETY PRECAUTIONS

Startup and Maintenance Precautions



Warning

- ▶ Do not touch the terminals while power is on.
Doing so could cause electric shock or erroneous operation.
- ▶ Switch all phases of the external power supply off when cleaning the module or retightening the terminal or module mounting screws.
Not doing so could result in electric shock or erroneous operation.
- ▶ Do not charge, disassemble, heat, place in fire, short circuit, or solder the battery.
Mishandling of battery can cause overheating or cracks which could result in injury and fires.



Caution

- ▶ Do not disassemble or modify the modules.
Doing so could cause trouble, erroneous operation, injury, or fire.
- ▶ Switch all phases of the external power supply off before mounting or removing the module.
Not doing so could cause failure or malfunction of the module.
- ▶ Use a cellular phone or walky-talky more than 30cm (11.81 inch) away from the PLC
Not doing so can cause a malfunction.

Disposal Precaution



Caution

- ▶ When disposing of this product, treat it as industrial waste.
Not doing so could cause poisonous pollution or explosion.

REVISION HISTORY

Issue Date	Manual No.	Revised content
'04.04	10310000474	First edition issued

※ User's Manual no. is marked on the right bottom side of the back cover.

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CHAPTER 1 OVERVIEW

1.1 Overview

This user's manual describes Rnet network of GLOFA, MASTER-K PLC system in technical details. The major features of Rnet network are a cost-effective installation/maintenance, diversification of system configuration, simplicity of maintenance & repair, easy change of system etc. This network supports the electric network (twisted pair cable) that is low-priced and easy to install for the diversification of configuration.

And also this network provides the repeater option module in order to configure the network for its purpose. Rnet I/F module is available to use in common with GLOFA series and MASTER-K series and apply variously according to system application.

Point

- 1) The program of this user's manual is prepared based on GMWIN V3.0/KGL-WIN V2.0.
- 2) But, in order to use GM7-Rnet, GMWIN V3.42/GM7 CPU O/S more than V1.4 are required.

CHAPTER 1 OVERVIEW

1.2 Rnet I/F Module Type

Rnet I/F module is divided as shown on [Table 1.1] according to network type
Refer to the table for network configuration.

[Table 1.1] Rnet I/F Module Type

Network	Module	Connecting cable type	Communication module name		Installation base
Rnet	Master module (RMM)	Twisted pair (Electric)	Interface	G3L-RUEA	GM2-CPUB, GM3/K1000S
				G4L-RUEA	GM4/K300S
				G6L-RUEA	GM6/K200S
				G7L-RUEA	GM7/K80S
	Slave module (RSM)	Twisted pair (Electric)	Remote I/O	G3L-RREA	GM3/K1000S
				G4L-RREA	GM4/K300S
				G6L-RREA	GM6/K200S
				GRL-D22A	Smart I/O
				GRL-D24A	Smart I/O
				GRL-TR2A	Smart I/O
				GRL-TR4A	Smart I/O
				GRL-DT4A	Smart I/O
				GRL-RY2A	Smart I/O

CHAPTER 2 TERMINOLOGY

2.1 Terminology

- Master Module (RMM : Rnet Master Module)

Rnet I/F module to be installed in I/O position of main base.

- Slave module (RSM : Rnet Slave Module)

Rnet I/F module or single module to be installed in CPU position of main base

※ Rnet I/F module and Fnet I/F module are using the same communication mode and thus, RMM and FMM, RSM and FSM are the same.

- Local station

The station that GMWIN/KGLWIN is connected directly by the user for program downloading, monitoring/ debugging within the same network including CPU

- Remote station

The opposite station to communicate with local station

- Remote I/O station

I/O area to refresh I/O module installed in remote station by the remote communication module receiving I/O data instead CPU of PLC from master station.

- Rnet

Fieldbus is the lowest network that connects control device and instrument device and the standard that selects 3 Layers among 7 Layers of OSI. 3 Layers are composed of Physical Layer that contains H2(1Mbps Electric), H1(31.23Kbbs Electric), Light, Wireless etc., Data Link Layer that selected Scheduled and Circulated Token bus, and Application Layer that is responsible for application. Rnet is the standard that selected User Layer additionally with 3 Layers.

- Token

The right to send the data of local station by the access right control for the Physical Medium.

- Rnet station no.

Station no. of communication module that adopts Rnet standard (i.g.G3L-RUEA..etc.). The station no. used in Rnet will be set by the switch added to the front of communication module and used as station no. of all service including high speed link service.

CHAPTER 2 TERMINOLOGY

- Repeater

This is used when extending the cable distance in the electric communication network and enables to extend the communication distance by regeneration or amplification of electric communication signal.

- Manchester Biphase-L

Data modulation mode used in Rnet. Data is sent by Encoding by Manchester-I Code and the received data as encoded by Manchester is converted by Decoding.

- CRC(Cyclic Redundancy Check)

This is one of error detection method (cyclic code) used frequently the most in synchronous transmission.

- End resistance

This is the resistance to meet the mutual impedance of sending and receiving side on Physical Layer and the end resistance of Rnet is $110\Omega, 1/2 W$.

- High speed link (HS Link)

This is the communication mode only used between Rnet I/F modules that the user uses in order to send/receive the data in high speed and the communication is executed by setting high speed link parameter in GMWIN/KGL-WIN.

- GMWIN(GLOFA PLC Programming And Debugging Tool)

This is software that the user enables to execute programming to be suitable for the system, as well as download, run, stop and debugging in GLOFA PLC CPU module.

- KGL-WIN(MASTER-K PLC Programming And Debugging Tool)

This is software that the user enables to execute programming to be suitable for the system, as well as download, run, stop and debug in MASTER-K PLC CPU module.

- FAM(FA Manager)

As a kind of MMI(Man Machine Interface), this is a software package designed to control and monitor the processing by computer graphic.

- Segment

This is local network connecting all stations by using the same token without using any other connection device (Gateway, EOC, repeater).

- Network

This is a Whole communication system that is composed of more than one segment and uses the same Token.

CHAPTER 3 GENERAL SPECIFICATION

CHAPTER 3 GENERAL SPECIFICATION

3.1 General Specification

The general specification of Rnet master and slave communication module is as follows.

[Table 3.1] General specification

No.	Items	Specification					Reference
1	Use Temperature	0 ~ 55 °C					
2	Storage Temp.	-25 ~ +70 °C					
3	Use humidity	5 ~ 95%RH, no dew					
4	Storage humidity	5 ~ 95%RH, no dew					
5	Vibration-resistant	In case of Intermittent vibration				-	IEC61131-2 [Note1]
		Frequency	Acceleration	Amplitude	Times		
		10 ≤ f < 57Hz	—	0.075mm	X, Y, Z 10 times each direction		
		57 ≤ f ≤ 150Hz	9.8m/s ² {1G}	—			
		In case of Continuous vibration					
		Frequency	Acceleration	Amplitude			
		10 ≤ f < 57Hz	—	0.035mm			
		57 ≤ f ≤ 150Hz	4.9m/s ² {0.5G}	—			
6	Impact-proof	● Max. impact acceleration : 147 m/s ² {15G} ● Application time : 11ms ● Pulse wave type : semi-sine wave pulse (3 times each direction X,Y,Z)					IEC61131-2
7	Noise-resistant	Square wave impulse noise	± 1,500 V				LGIS internal test standard
		Electrostatic discharge	Voltage : 4kV (Touch discharge)				IEC61131-2 IEC1000-4-2
		Radiant electromagnetic field noise	27 ~ 500 MHz, 10 V/m				IEC1131-2, IEC1000-4-3
		Fast transient / Bust noise	Classi- fication	Power module	Digital I/O (more than 24V)	Digital I/O (less than 24V) Analog I/O Communication interface	IEC1131-2 IEC1000-4-4
			Voltage	2kV	1kV	0.25kV	
8	Surrounding environment	No corrosive gas, no dust					
9	Use altitude	Less than 2,000m					
10	Pollution	Less than 2					
11	Cooling method	Natural air-conditioning					

Point

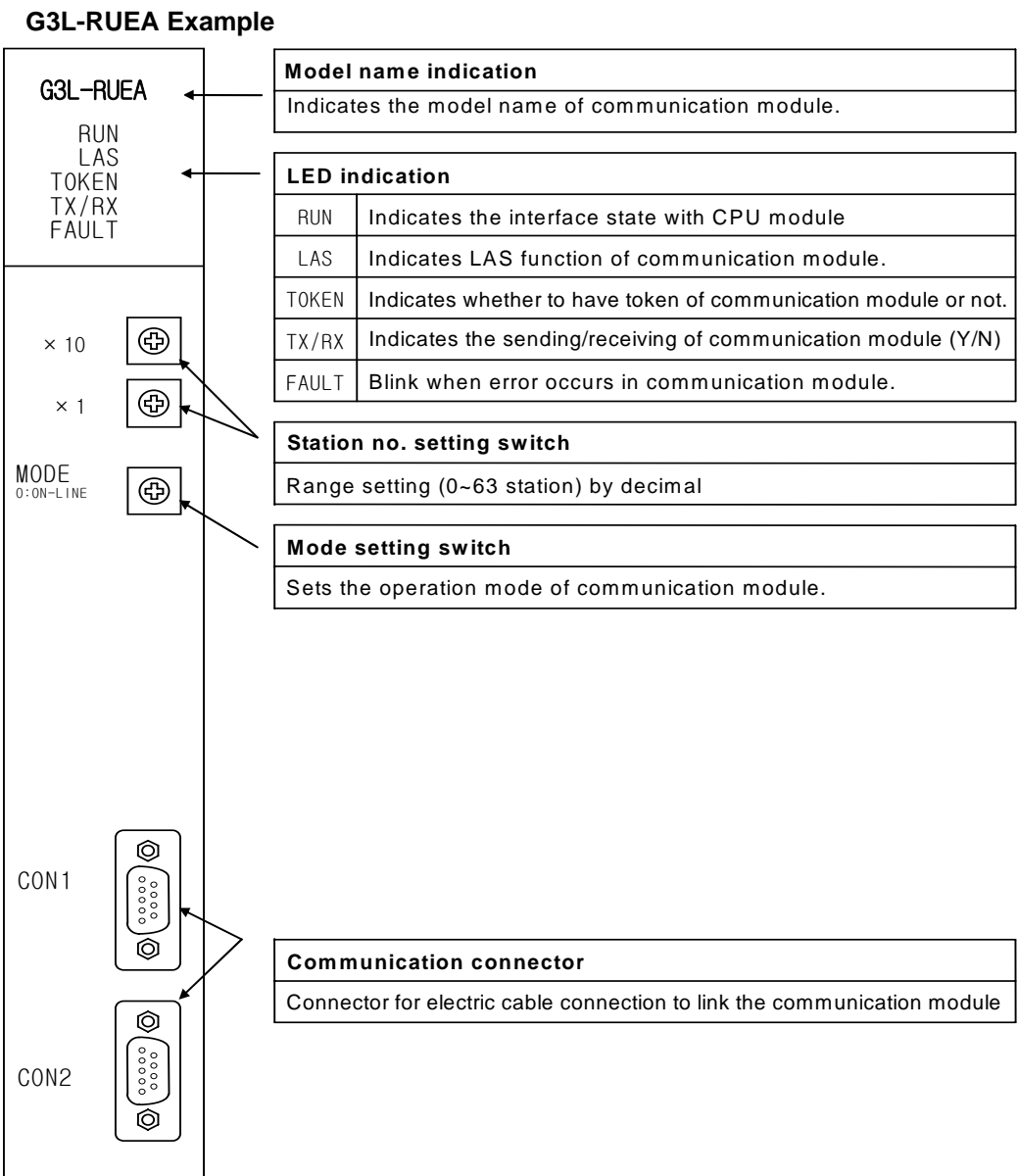
- 1) IEC(International Electrotechnical Commission) : International civil community that promotes international cooperation for standardization of electric/electro technology, publishes international standard and operates suitability assessment system related to the above.
- 2) Pollution Degree : An index to indicates the pollution degree of used environment that determines the insulation performance of the device. For example, pollution degree 2 means the state to occur the pollution of non-electric conductivity generally, but the state to occur temporary electric conduction according to the formation of dew.

3.2 Structure and Configuration

Here describes the structure and configuration of representative model of Rnet module.

3.2.1 Master module structure : G3L-RUEA, G4L-RUEA, G6L-RUEA

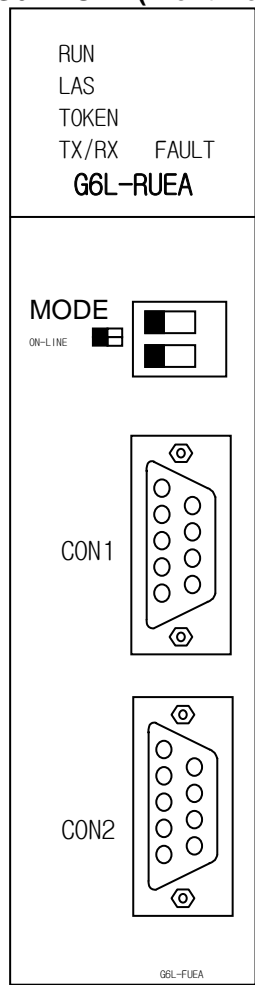
1) G3L-RUEA, G4L-RUEA



Point

1) For mode setting switch, refer to 3.2.6 Rnet mode setting.

2) G6L-RUEA (Front view)



LED indication

RUN	Indicates the interface state with CPU module
LAS	Indicates LAS function of communication module.
TOKEN	Indicates whether to have token of communication module or not.
TX/RX	Indicates the sending/receiving of communication module (Y/N)
FAULT	Blink when error occurs in communication module.

Model name indication

Indicates the model name of communication module.

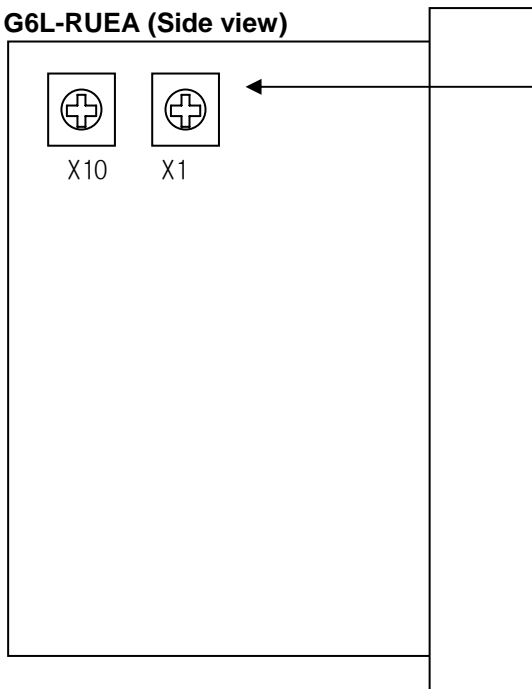
Mode setting switch

Sets the operation mode of communication module.

Communication connector

Connector for electric cable connection to link the communication module

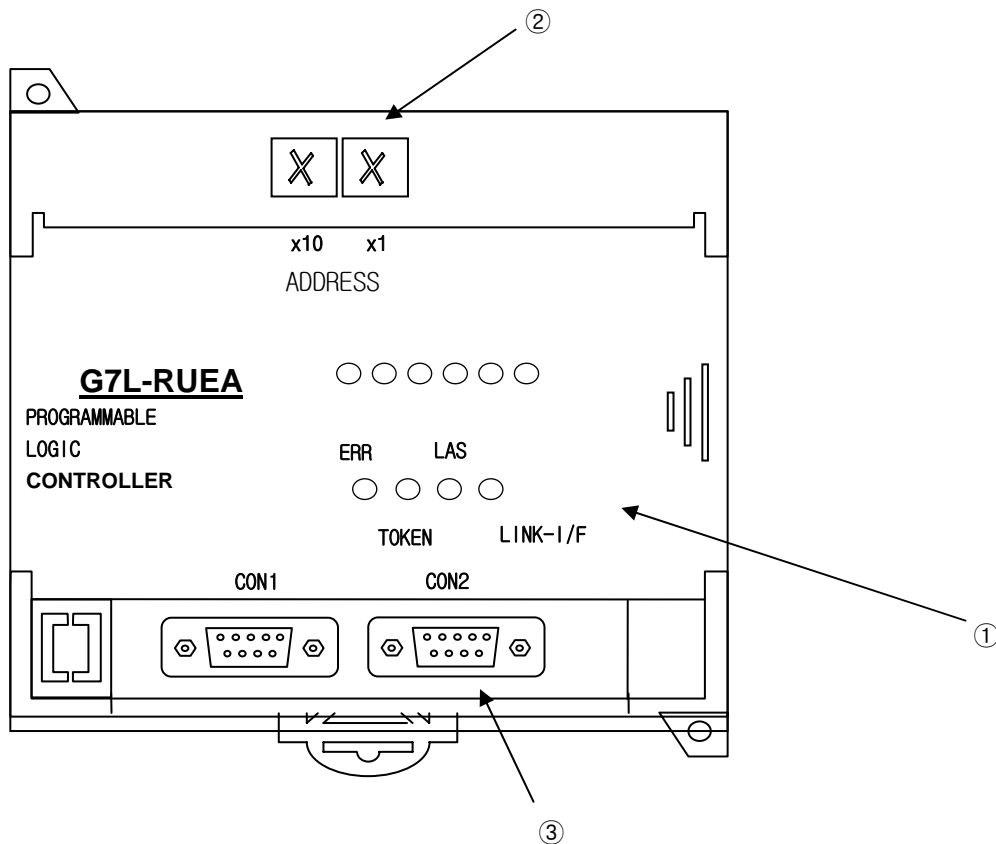
G6L-RUEA (Side view)



Local station no. setting switch

Range setting (0~63 station) by decimal

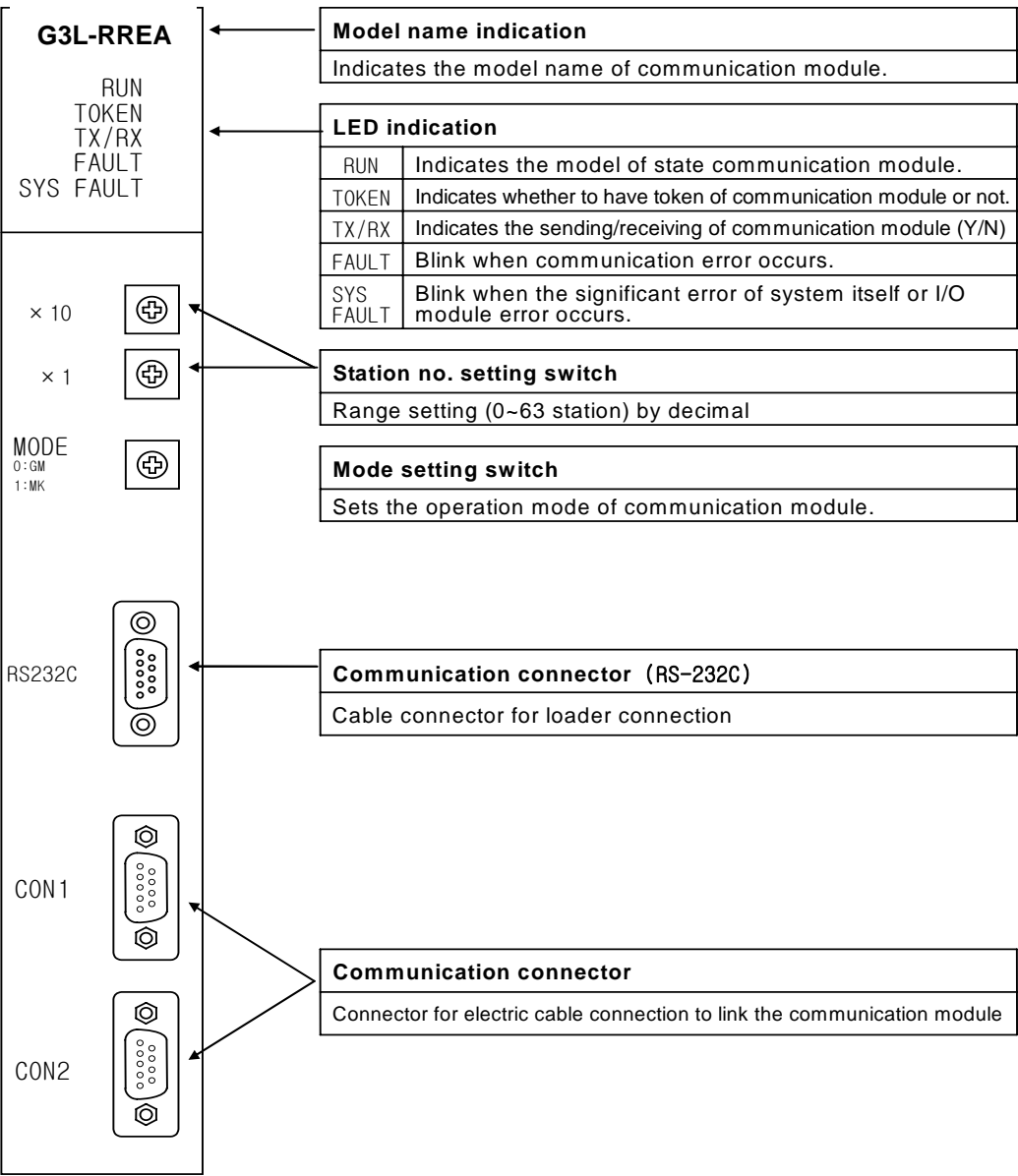
3) G7L-RUEA



Classification	Description
① LED indication	<p>ERR : indicates system error (normal : OFF)</p> <p>TOKEN : indicates whether to have communication token</p> <p>LAS : executes LAS function (corresponds to master module)</p> <p>LINK-I/F : indicates sending/receiving data (Y/N)</p>
② Station no. setting (existed inside)	<p>Station no.(0~63): decimal indication</p> <p>X10 : 10 unit of station no.(0~6)</p> <p>X1 : 1 unit of station no. (0~9)</p>
③ Connector connection	<p>CON1/2 : Field bus cable connector (9pin plug type)</p>

3.2.2 Slave module structure : G3L-RREA,G4L-RREA,G6L-RREA

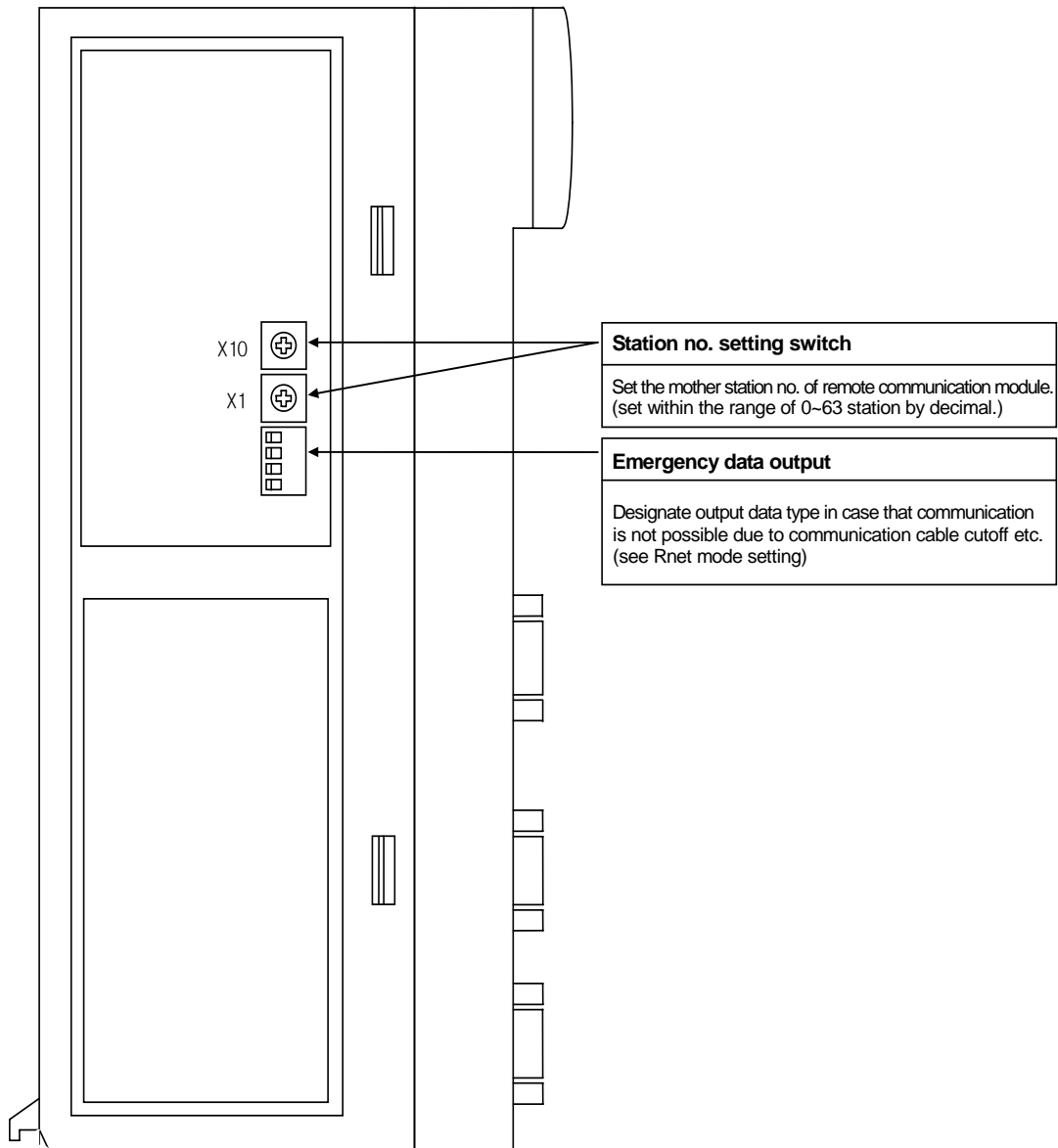
1) Front view (G3L-RREA Example)



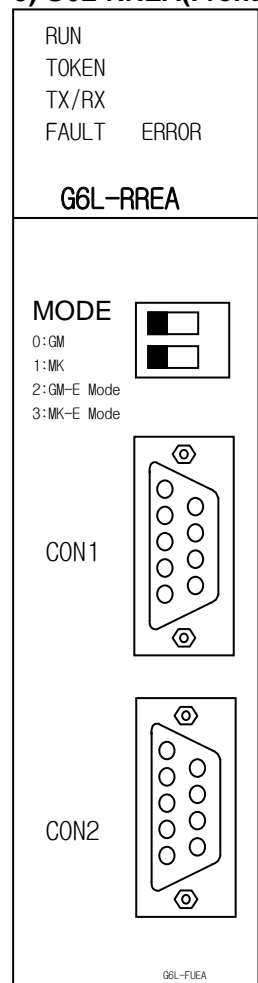
Point

1) There is no RS-232C port in G4L-PREA.

2) Side view (G3L-RREA Example)



3) G6L-RREA(Front view)

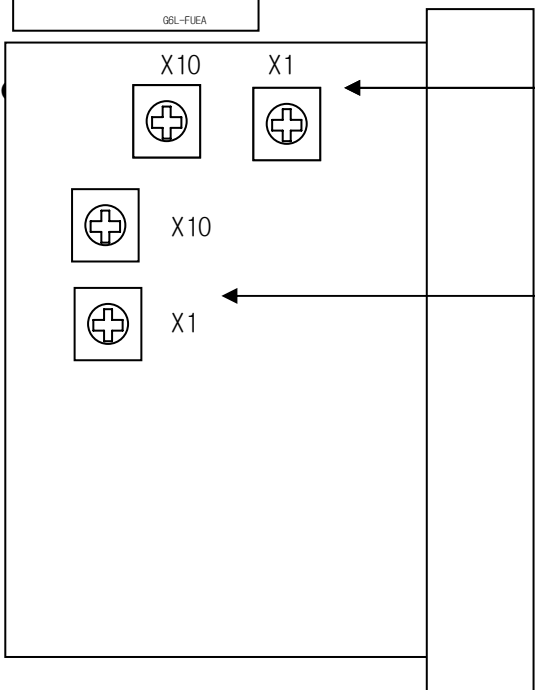


LED indication	
RUN	Indicates the interface state with CPU module.
TOKEN	Indicates whether to have token of communication module (Y/N)
TX/RX	Indicates the sending/receiving of communication module (Y/S)
FAULT	Blink when error occurs in communication module
ERROR	Blink when the fault of system itself occurs or I/O error occurs.

Model name indication
Indicates the model name of communication module.

Mode setting switch
Sets the operation mode of communication module.

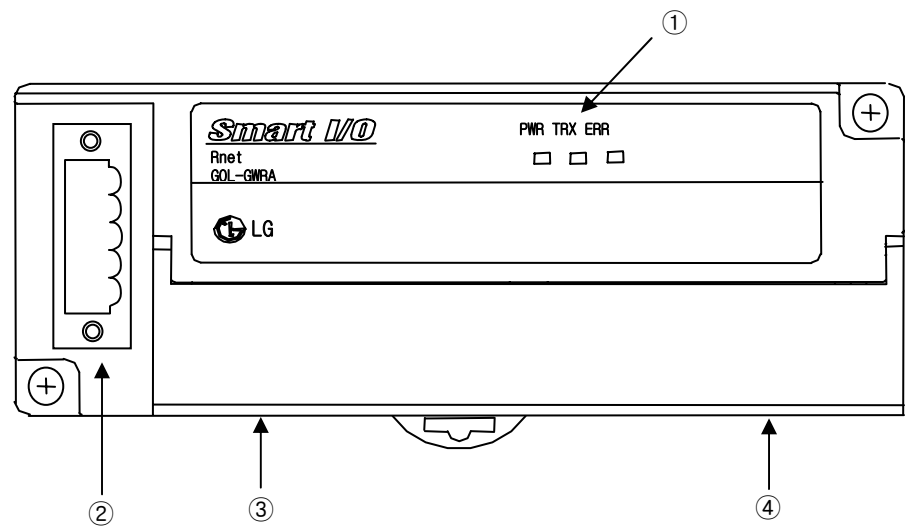
Communication connector
Connector for electric cable connection to link communication module



Local station no. setting switch
Range setting (0~63station) by decimal

Mother station no. setting switch
Range setting (0~63 station) by decimal

3.2.3 G0L-GWRAModule Structure



Classification	Description
① LED indication	PWR : indicates power ON/OFF (normal : ON) TRX : indicates GMWIN/KGLWIN connection (normal : ON) ERR : indicates error (normal : OFF)
② Communication connector	5Pin field bus cable connector
③ 9Pin connector	GMWIN/KGLWIN connection connector (inside cover)
④ Power	DC 24V power and FG terminal (inside cover)

Point

1) G0L-GWRA sets station no. as 63 station automatically when configuring Rnet system.

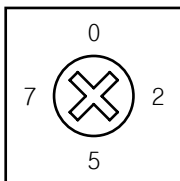
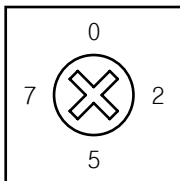
3.2.4 Rnet LED signal name and indication

Model	LED name	LED indication contents	LED ON	LED OFF
G3L-RUEA G4L-RUEA G6L-RUEA G7L-RUEA	RUN	Interface state with CPU module	Normal	Abnormal
	LAS	Communication module is performing the LAS function	Function performing	
	TOKEN	Whether to have token of communication module or not	Yes	No
	TX/RX	Sending/receiving of communication module (Y/N)	Blink during communication	
	LINK-I/F	Whether to have sending/receiving data (Y/N)	Communication	Communication OFF
	FAULT	Communication module state	Abnormal	Normal
G3L-RREA G4L-RREA G6L-RREA	RUN	Communication module state	Normal	Abnormal
	TOKEN	Whether to have token of communication module	Yes	No
	TX/RX	Sending/receiving of communication module (Y/N)	In communication	Blink
	FAULT	Communication error (Y/N)	Abnormal	Normal
	SYS FAULT	System fault or I/O module error (Y/N)	Abnormal	Normal

※ For detailed information for LED, refer to 7.1 LED diagnosis function

3.2.5 Rnet station no. setting

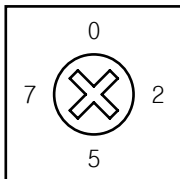
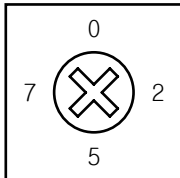
1) Local station no. setting

Model	Station no. switch detail drawing	Description						
G3L-RUEA G3L-RREA G4L-RUEA G4L-RREA G6L-RUEA G6L-RREA G7L-RUEA	<div><div>× 10</div><div></div></div> <div><div>× 1</div><div></div></div>	<p>(1) Station no. available from 0~63. (10 decimal).</p> <p>(2) Station no. setting. (at release in factory, set as '0')</p> <table><tr><th>Switch</th><th>Setting</th></tr><tr><td>× 10</td><td>Sets the station no. by 10 units.</td></tr><tr><td>× 1</td><td>Sets the station no. by 1 units.</td></tr></table> <p>(3) For GM6, local station no. setting switch exists inside PCB.</p>	Switch	Setting	× 10	Sets the station no. by 10 units.	× 1	Sets the station no. by 1 units.
Switch	Setting							
× 10	Sets the station no. by 10 units.							
× 1	Sets the station no. by 1 units.							

CHAPTER 3 GENERAL SPECIFICATION

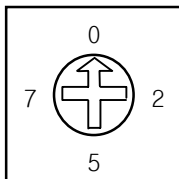
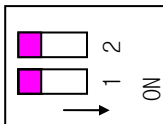
2) Mother station no. setting

This is to designate the station no. of Rnet master module to send/receive high speed link data in Rnet slave module. (station no. switch is located inside the case.)

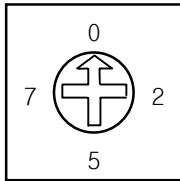
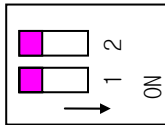
Model	Station no. switch detail diagram	Description						
G3L-RREA G4L-RREA G6L-RREA	<div><div>× 10</div><div></div></div> <div><div>× 1</div><div></div></div>	<div>(1) Station no. available from 0 ~ 63(decimal).</div> <div>(2) Station no. setting. (At the release from factory, set as '0'.)</div> <table><tr><th>Switch</th><th>Setting</th></tr><tr><td>× 10</td><td>Sets the station no. by 10 units.</td></tr><tr><td>× 1</td><td>Sets the station no. by 1 units.</td></tr></table>	Switch	Setting	× 10	Sets the station no. by 10 units.	× 1	Sets the station no. by 1 units.
Switch	Setting							
× 10	Sets the station no. by 10 units.							
× 1	Sets the station no. by 1 units.							

3.2.6 Rnet mode setting

1) Master module mode

MODE: MODE0 MODE1		
Model	Mode switch detail diagram	Description
G3L-RUEA	<div>MODE 0:ON LINE</div> 	Mode uses only '0' and the rest is for reservation
G4L-RUEA G6L-RUEA	<div>MODE 0:ON-LINE</div> 	

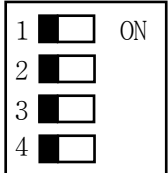
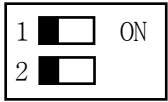
2) Slave module mode (GM/MK mode: except GM6 model)

Model	Mode switch detail diagram	Description						
G3L-RREA	<div>MODE 0:GM 1:MK</div> 	<p>Mode uses only '0','1' and the rest is for reservation</p> <table><tr><th>Mode</th><th>Description</th></tr><tr><td>0</td><td>Operated as GLOFA mode (default mode)</td></tr><tr><td>1</td><td>Operated as MASTER-K mode</td></tr></table>	Mode	Description	0	Operated as GLOFA mode (default mode)	1	Operated as MASTER-K mode
Mode	Description							
0	Operated as GLOFA mode (default mode)							
1	Operated as MASTER-K mode							
G4L-RREA	<div>MODE 0:GM 1:MK</div> 	<ul style="list-style-type: none">The reason divided into GLOFA/MASTER-K mode in slave is that the address for I/O is different. Acc.to model of master station, verify and set the mode GLOFA or MASTER-K correctly before using.						

*At the release from factory, set the GM mode as '0'. Verify it acc.to use model before using.

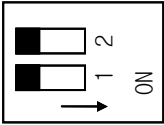
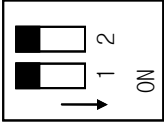
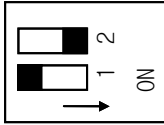
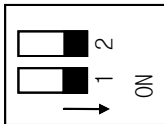
3) Emergency data output setting (except GM6 model)

Rnet slave module does not support emergency data output.

Model	Emergency data switch	Description
G3L-RREA		Not available switch
G4L-RREA		Not available switch

CHAPTER 3 GENERAL SPECIFICATION

4) GM6 slave mode setting (GM/MK)

Model	Mode switch detail diagram	Description
G6L-RREA	MODE : 0 (GM MODE) 	Not available switch
	MODE : 1 (MK MODE) 	Not available switch
	MODE : 2 (GM-E MODE) 	Not available switch
	MODE : 3 (MK E-MODE) 	Not available switch

Point

- 1) In case of communication shutdown, the identifier data input is carried out by GMWIN function block program in GLOFA and by KGL-WIN or KLD-150S for MASTER-K.

CHAPTER 4 TRANSMISSION SPECIFICATION

4.1 Transmission Specification

4.1.1 Master module transmission specification

Master module product : G3L-RUEA,G4L-RUEA,G6L-RUEA,G7L-RUEA

[Table 4.1.1] master module transmission specification.

Items		Specification
Transmission speed		1Mbps (Rnet module in common)
Encoding mode		Manchester Biphase-L
Electric	Transmission distance (per segment)	Max. 750m
	Transmission distance (in case of using repeater)	Max. 750m * (6 repeaters+1) = 5.25km
	Transmission line	Twisted pair shield cable
Max. connection station number		Master + slave = 64 stations (Master should be connected more than one.)
Max. protocol size		256 byte
Communication area access mode		Circulated Token Passing
Communication mode		Connection Oriented service Connectionless service
Frame error check		$CRC\ 16 = X^{15} + X^{14} + X^{13} + \dots + X^2 + X + 1$

4.1.2 Slave module transmission specification

Slave module product : **G3L-RREA, G4L-RREA, G6L-RREA**

[Table 4.1.2] slave module transmission specification.

Items		Specification
Transmission speed		1Mbps
Encoding mode		Manchester Biphase-L
Electric	Transmission distance (per segment)	Max. 750m
	Transmission distance (in case of using repeater)	Max. 750m * (6 repeaters + 1) = 5.25km
	Transmission line	Twisted pair shield cable
Max. connection station number		Link Master Class + Remote Slave Class = 64
Max. protocol size		256 byte
Communication area access mode		Circulated Token Passing
Communication mode		Connection Oriented service Connectionless service

4.2 Cable Specification

4.2.1 Twisted pair cable

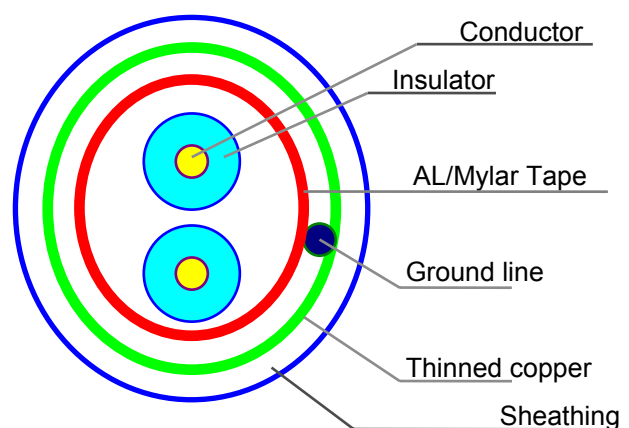
Product model name : GOC-T□□□ (□□□ indicates cable length, unit:m)

Ex) twisted pair cable 10m : GOC-T010

[Table 4.2.1] Fnet twisted pair cable specification

Description			
Product name		Low Capacitance Lan Interface Cable	
Model name		LIREV-AMESB	
Specification		2*0.64 mm 22AWG	
Manufacturer		LGIS	
Electric characteristic			
Items	Unit	Characteristics	Test condition
Conductor resistant	Ω/km	≤59	Ambient temp.
Voltage-resistant(DC)	V/min	1min stands at 500V	In the air
Insulation resistant	MEGA Ω-km	≥1,000	Ambient temp.
Capacitance	pF/m	≤45	1 kHz
Impedance	Ω	120 ± 12	10MHz
Appearance characteristics.			
Conductor	심 선 수	CORE	2
	Spec.	AWG	18
	Configuration	NO./mm	1/1.0
	Outer diameter	mm	1.0
Insulator	Thickness	mm	0.9
	Outer diameter	mm	2.8

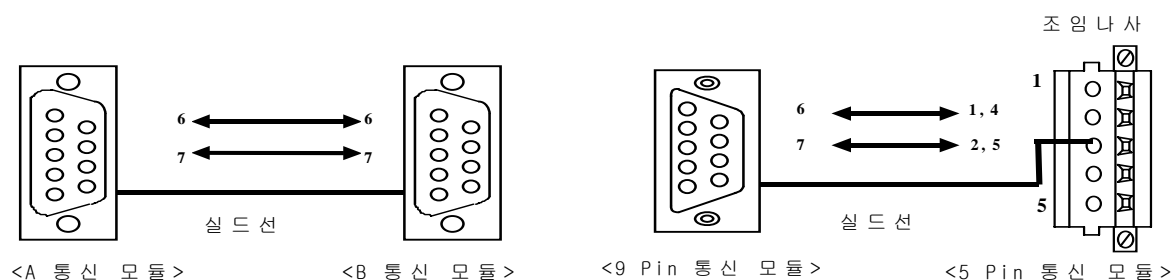
● Structure diagram



4.3 Communication cable connection method

4.3.1 Electric (twisted pair) cable

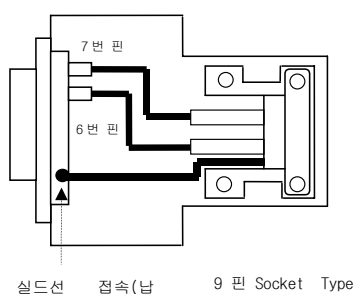
Cable signal cable for electric network connection uses no.6 and no.7 in connector pin and no.6 signal of A communication module connector is connected to no.6 of B communication connector and no.7 for no.7. As Connector body is connected with other module by shield cable and bypasses the noise outside, **the connector body of both sides should be connected by shield cable**, and is not allowed to contact with high voltage, high current cable.



[Figure 4.3.1] Rnet (electric) cable connection method

4.3.2 Electric (twisted pair) cable connector connection

The connector as a spare part to connect electric network of field bus module (only limited to electric module) should be connected as shown on [Figure 4.3.2(A)]. Here, please be noted that shield cable of cable should be connected on the connector metal part with same method of soldering and if not connected, it is not possible to send/receive the data.



[Figure 4.3.2(A)] Rnet connector connection

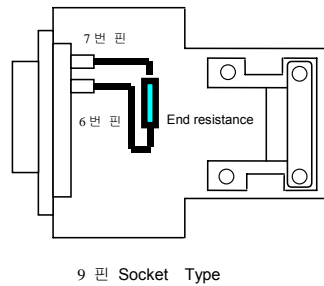
In case of soldering of shield cable to 9 pin connector body, heat the connector body sufficiently by iron to attach tightly without taking off.

In case of soldering, if there are too much solder(lead) attached on the soldering part, it may cause to make the connector case assembling difficult. A suitable amount of soldering is required.다.

4.4 End resistance

4.4.1 Electric network end resistance

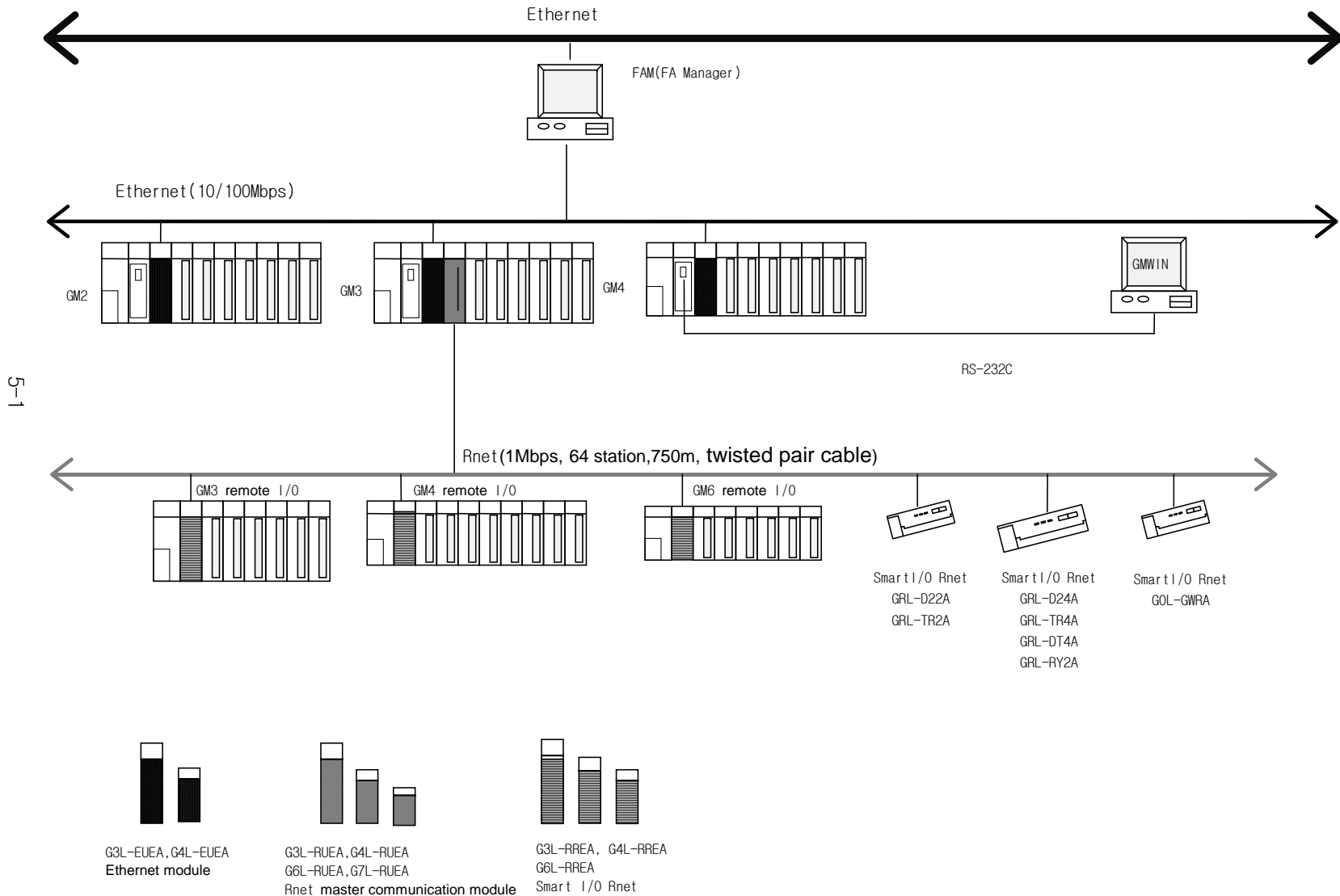
- Resistance value : $110\ \Omega$, $1/2\ W$



- End resistance ($110\ \Omega$, $1/2W$) as a spare part should be attached on the start and end of network. (limited only for electric module).
- As end resistance is attached inside repeater (GOL-FREB/FREC) to be installed in the end of electric network, it is not allowed to connect end resistance from outside separately.
- It is not allowed to contact the connector case and end resistance each other.(in case that connector case is metal.)

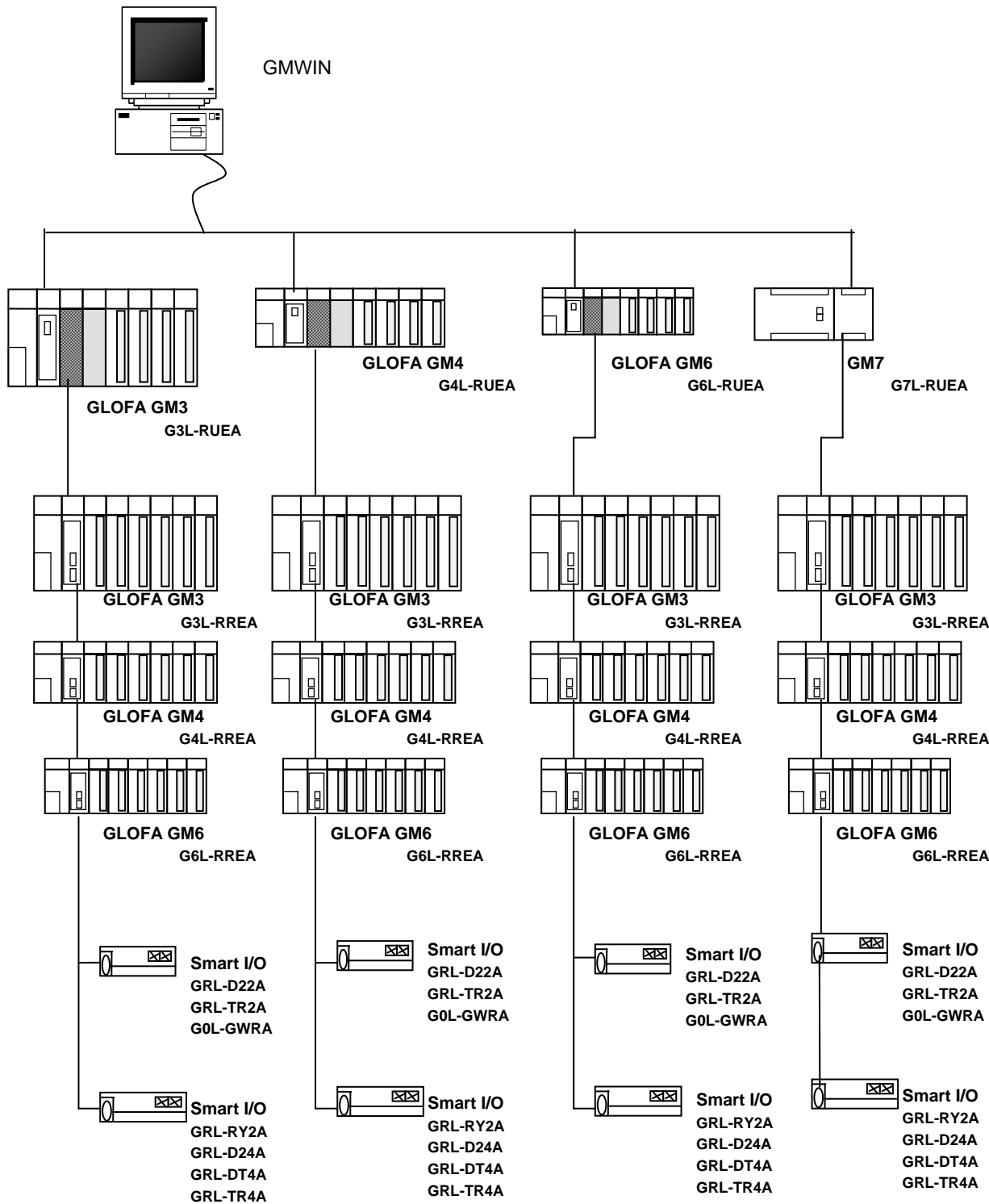
CHAPTER 5 SYSTEM CONFIGURATION

5.1 GLOFA / MASTER-K PLC Network System



5.2 Rnet Network System

5.2.1 Rnet system configuration example (master/slave)



CHAPTER 6 COMMUNICATION FUNCTION

6.1 Communication Function

6.1.1 Overview

This is a programming method of Rnet I/F module that enables to communicate with Smart I/O module, remote Rnet(GxL-RREA)/I/F module through high speed link service.

High speed link

High speed link service through RnetI/F module enables to use all existing function and communicate just by simply setting the parameter. For GLOFA series, it is available to set parameter in GMWIN and for MASTER-K, in KGLWIN. From Rnet V1.0, it is available to set min. communication period every scan.

1) Setting range of Rnet I/F module

Max. high speed link score per communication model (based on Rnet master)

Classification		Max. communication score	Max. sending score	Max. block no.	Max. score per block
Rnet I/F module	G3L-RUEA	3,840 word	1,920 word	2 ea (0-1)	60 word
	G4L-RUEA	3,840 word	1,920 word	2 ea (0-1)	60 word
	G6L-RUEA	3,840 word	1,920 word	2 ea (0-1)	60 word
	G7L-RUEA	3,840 word	1,920word	2 ea (0-1)	60 word

Communication setting in case of communication with Slave module

High speed link block setting		Sending/receiving period	Address area		High speed link information
Sending	Receiving		GLOFA-GM	MASTER-K	
1ea	1ea	20ms ~ 10s	%QW, %IW	P area	Ref. to 6.1.2

6.1.2 High speed link communication state flag

1) High speed link information function

This is available to verify the reliability of sending/receiving data from remote station through high speed link and the user can combine the above information with high speed link sending/receiving data by keyword type when preparing the program and apply it in the aspect of emergency or maintenance/repair.

High speed link information

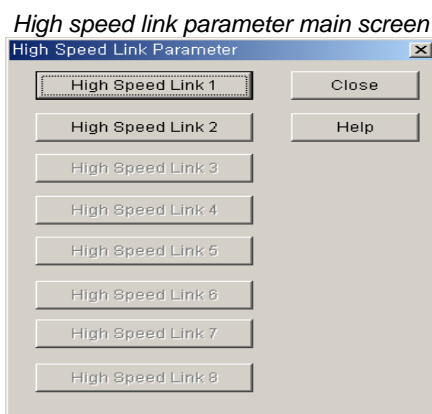
Classification	Run link RUN-LINK	Link trouble LINK_ TROUBLE	Sending/recei ving state TRX_MODE	Operation mode DEV_MODE	Error DEV_ERROR	High speed link state HS_STATE
Information type	Whole information	Whole information	Individual information	Individual information	Individual information	Individual information
Keyword name (□=high speed link no.1,2,3,4)	_HS□RLINK	_HS□LTRBL	_HS□TRX[n] (n=individual parameter no.0~63)	_HS□MOD[n] (n=individual parameter no. 0~63)	_HS□ERR[n] (n=individual parameter no. 0~63)	_HS□STATE[n] (n=individual parameter no.0~63)
Data type	BIT	BIT	BIT-ARRAY	BIT-ARRAY	BIT-ARRAY	BIT-ARRAY
Monitoring	Yes	Yes	Yes	Yes	Yes	Yes
Program use	Yes	Yes	Yes	Yes	Yes	Yes

(But, if GRL-TR4A module is connected, the high flag does not operate. Please pay attention to the program.)

6.1.3 High speed link setting in GMWIN

1) GMWIN project and link parameter

From GMWIN project main screen, select high speed link parameter and enter into high speed link parameter main screen to select the relevant items.



If you select [parameter]-[high speed link parameter] from project screen, the above menu appears.

CHAPTER 6 COMMUNICATION FUNCTION

High speed link parameter main screen through GM7 master

For GM7 Rnet, select [parameter]-[high speed link parameter] from project screen.

2) Setting function

High speed link 1~4 items means max. installation number of communication module acc.to PLC CPU type. It is available to install communication module max. 8 for GLOFA GM2-CPUB/GM4-CPUC, max.4 for GM4-CPUB, max. 2 for GLOFA GM4-CPUA/GM6 and max.1 for GM7.

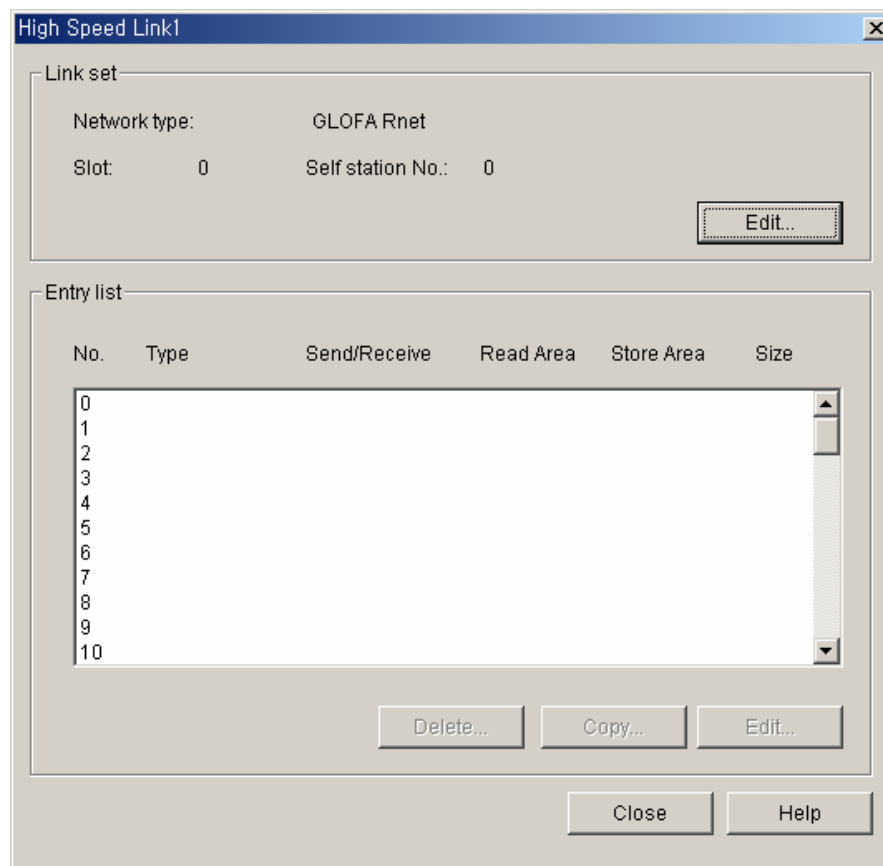
Communication module installation relation per CPU type

Classification	Installable communication module	Max. installation number
GLOFA-GM2-CPUB	G3L-RUEA	8 ea
GLOFA-GM3	G3L-RUEA	4 ea
GLOFA-GM4-CPUA	G4L-RUEA	2 ea
GLOFA-GM4-CPUB	G4L-RUEA	4 ea
GLOFA-GM4-CPUC	G4L-RUEA	8 ea
GLOFA-GM6	G6L-RUEA	2 ea
GLOFA-GM7	G7L-RUEA	1 ea

3) Link parameter setting

If you select the relevant parameter from parameter setting main screen, high speed link parameter setting window appears as shown on the figure and in case of first setting of parameter, the initial value is indicated as shown on the figure.

Parameter setting initial screen



The image shows a software window titled "High Speed Link1". It is divided into two main sections: "Link set" and "Entry list".

Link set section:

- Network type: GLOFA Rnet
- Slot: 0
- Self station No.: 0
- An "Edit..." button is located to the right of these fields.

Entry list section:

No.	Type	Send/Receive	Read Area	Store Area	Size
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Below the table are three buttons: "Delete...", "Copy...", and "Edit...".

At the bottom of the window are two buttons: "Close" and "Help".

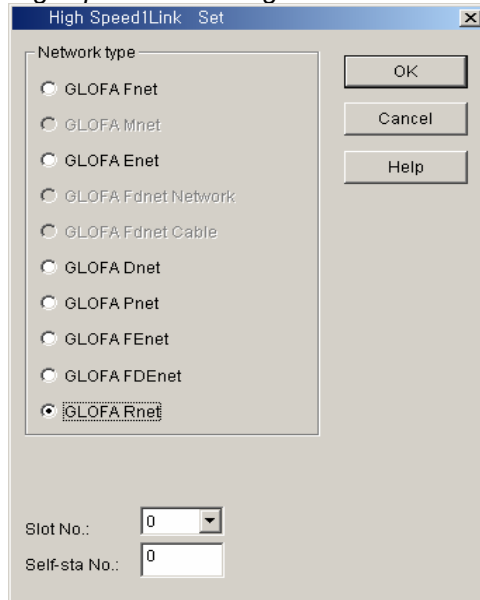
Parameter setting initial screen is composed of two items as 'link setting' and 'registration list' and the setting method and function of each item is as follows.

CHAPTER 6 COMMUNICATION FUNCTION

(1) Link setting

Link setting is the item to set the basic requirement of communication module to perform high speed link.

High speed link setting screen

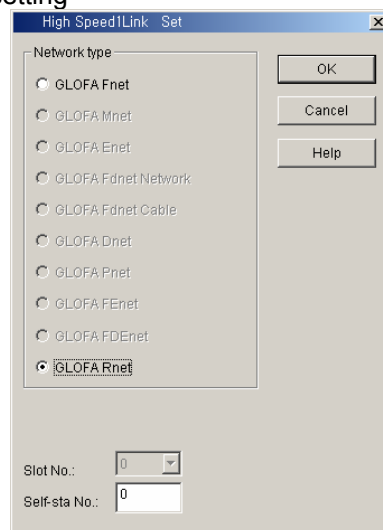


Network type : Rnet setting by selecting the installed communication module.

Slot no. : Set one of slot no.0~7 that the communication module desired to set is installed.

Local station no. : Enter local station no. set in the station no. switch in front of communication module. Rnet local station no. is set always as station '0' for use.

(2) G7L-RUEA link setting



Network type : Set GLOFA Rnet.

Slot no. : Not activated.

Local station no. : Local station no. is set always as station 0 for use.

CHAPTER 6 COMMUNICATION FUNCTION

(3) Registration list setting

Registration list is the area to register actual data sending/receiving information.

Point

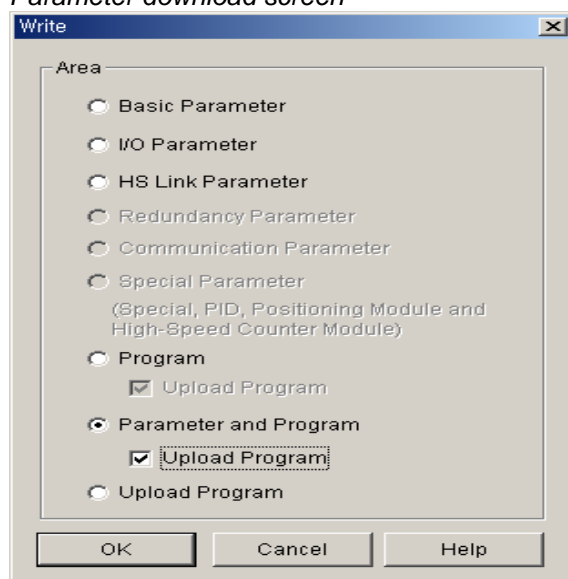
Among Smart I/O module, GRL-DT4A has input and output. Thus, in case of using registration list, please be noted that two lists are required. In this case, the sending/receiving station no. should be set the same but block no. should be set differently.

4) High speed link operation

If high speed link parameter setting is completed, execute 'make' from compile menu of GMWIN and select parameter write by PLC CPU and if you run high speed link service, the high speed link service by parameter setting starts. The procedure to start high speed link is as follows.

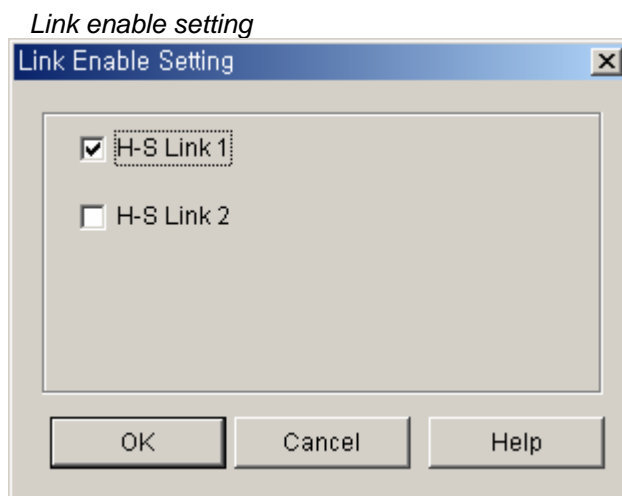
(1) Parameter write

Parameter download screen



After saving high speed link parameter prepared by the user in GMWIN project file and connecting to PLC through 'online connect' from GMWIN main menu, if you select 'write', you can download high speed link parameter or parameter and program.

(2) High speed link start



(3) G7L-RUEA high speed link start



After parameter write, the user sets the link enable and then execute high speed link. Link enable setting is available only in STOP mode of PLC. If high speed link enable setting starts, it performs high speed link regardless of PLC operation mode and the parameter and link enable information shall be battery backup in PLC CPU and preserved despite of power shutdown.

CHAPTER 6 COMMUNICATION FUNCTION

(4) High speed link information monitor

It is available to monitor the current high speed link state by using monitoring function after GMWIN online connection and there are 2 ways of monitoring : One is to select the variable monitor from the monitor menu and another one is by high speed link parameter monitor.

- Variable monitor

This is the function to select the necessary items for monitoring by using GMWIN flag monitor function and the procedure is as follows.

- ① Select **variable monitor** from online monitor items.
- ② Select **flag** from variable registration screen on the figure.
- ③ **Variable, flag list** selects high speed link information flag desired to monitor directly from list screen and registers. (As `_HSxSTATE[n]`, `_HSxERR[n]`, `_HSxMOD[n]`, `_HSxTRX[n]` is ARRAY flag, the user should enter the registration no. of parameter desired to monitor directly.)

Point

'x' means high speed link no. and it has 1~4 range in GM1/GM2/GM3/GM4-CPUB PLC, and 1~2 is effective for GM4-CPUA, GM6 PLC and 1 for GM7. [n] is individual parameter no.(0~63).

If you register the variable in the menu and select 'close', the relevant monitor screen appears and starts to monitor.

High speed link information variable registration screen

Flag	Type	Comments
_H_BCK_ER	BOOL	Hot restart unable error
_HS1ERR	ARRAY[64]...	Station status information of k da...
_HS1LTRBL	BOOL	Abnormal information of HS(Link...
_HS1MOD	ARRAY[64]...	Station mode information of k da...
_HS1RLINK	BOOL	HS RUN_LINK information
_HS1STATE	ARRAY[64]...	General communication status i...
_HS1TRX	ARRAY[64]...	Communication status informati...
_HS2ERR	ARRAY[64]...	Station status information of k da...
_HS2LTRBL	BOOL	Abnormal information of HS(Link...
_HS2MOD	ARRAY[64]...	Station mode information of k da...
_HS2RLINK	BOOL	HS RUN_LINK information
_HS2STATE	ARRAY[64]...	General communication status i...
_HS2TRX	ARRAY[64]...	Communication status informati...

High speed link information monitor screen (variable registration)

Parameter Number

Run_Link: 1 Link_Trouble: 0 HS Link 1

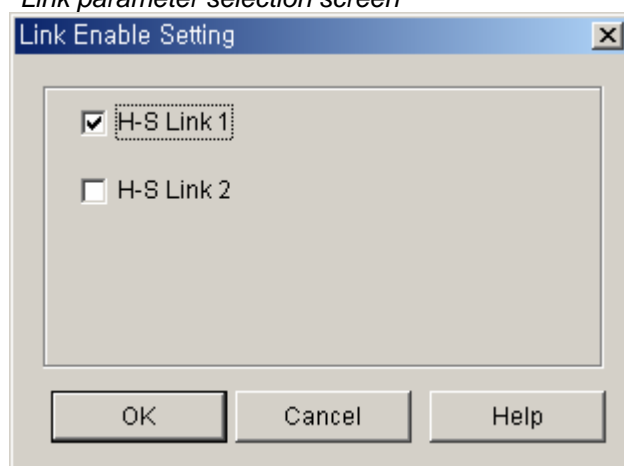
No	Type	Class	From Area	To Area	S Mode	Trx	Error
0	Remote28.Send0	A(20ms)	%MW100	%QW0.0.0	1	1	0
1					0	0	0
2					0	0	0
3					0	0	0

The detail information of relevant flag is shown on 'communication module flag application' and it is available to execute Rnet network state diagnosis by relevant flag monitor.

- High speed link parameter monitor

This is the function to monitor high speed link communication state by selecting link parameter item from GMWIN online connection monitor menu as shown on the figure below.

Link parameter selection screen



Link parameter monitor is displayed as shown on the Figure below that the general information of RUN-LINK, LINK-TROUBLE is displayed on the upper side of the screen and the individual information such as mode (operation mode), communication (sending/ receiving state), error are displayed per setting parameter item.

CHAPTER 6 COMMUNICATION FUNCTION

High speed link parameter monitor screen (Example)

Run_Link: 1 Link_Trouble: 0 HS Link 1

No	Type	Class	From Area	To Area	S Mode	Trx	Error
0	Remote28.Send0	A(20ms)	%MW100	%QW0.0.0	1	1	0
1	Remote27.Send0	A(20ms)	%MW101	%QW0.0.0	1	1	0
2					0	0	0
3					0	0	0
4					0	0	0
5					0	0	0
6					0	0	0
7					0	0	0
8					0	0	0
9					0	0	0
10					0	0	0
11					0	0	0
12					0	0	0
13					0	0	0
14					0	0	0
15					0	0	0
16					0	0	0
17					0	0	0
18					0	0	0
19					0	0	0
20					0	0	0
21					0	0	0
22					0	0	0
23					0	0	0
24					0	0	0
25					0	0	0

For meaning of value monitored in Figure, refer to 'APPENDIX'.

Point

1) RUN link monitoring

In case that GRL-TR4A among Smart I/O is set in parameter, RUN-LINK is always displayed as '0'.

6.1.4 High speed link setting in KGLWIN

1) KGLWIN project and link parameter

High speed link parameter selects the parameter from KGLWIN project screen and set the relevant items. The setting procedure and the function of each item are as follows.

(1) Project setting in KGLWIN

If you select the parameter window, the parameter main screen appears as follows.

KGLWIN parameter main screen (in case of K200S)

(2) Link parameter basic setting

If you select link 1 from KGLWIN parameter main screen, the following high speed link1 parameter main screen appears.

Link parameter main screen

(3) K80S project and link parameter basic setting

This is the parameter main screen that appears when selecting parameter window of K80S.

CHAPTER 6 COMMUNICATION FUNCTION

KGLWIN parameter main screen(in case of K80S)

Parameter [New Project1]

Basic Interrupt Comm. PID(TUN) PID(CAL) Pulse Out Analog

Latch Area

L: *** - ***

M: **** - ****

100 msec T: 144 - 191

10 msec T: 240 - 255

C: 192 - 255

D: 3500 - 4500

S: 80 - 99

Timer Boundary

100 msec T: 000 - 191

10 msec T: 192 - 255

Watchdog Time: 20 * 10msec

PLC Operation Mode

☒ Blown Fuse

☒ Operation Error

☐ Output during Debugging

☒ Remote Access Control

Input Setting

Input Filter Time: 8

Pulse Catch Set (P000X)

☐ 0 ☐ 1 ☐ 2 ☐ 3

☐ 4 ☐ 5 ☐ 6 ☐ 7

If you select 'communication' from KGLWIN parameter main screen on the above, the communication parameter setting screen appears on the following figure and if you select FIELDBUS menu on the right bottom as master and press 'registration list', high speed link parameter main screen appears.

Communication parameter setting screen

Parameter [New Project1]

Basic Interrupt Comm. PID(TUN) PID(CAL) Pulse Out Analog

Communication: Disable

Communication Method

Station Number: 0

Baud Rate: 19200 Data Bit: 8

Parity Bit: None Stop Bit: 1

Communication Channel

☒ RS232C Null Modem or RS422/485

☐ RS232C Modem(Dedicated Line) Init Command:

☐ RS232C Dial-up Modem ATZ

Protocol and Mode

Timeout in Master Mode: 500 ms

Dedicated

☐ Master ☐ Read Status of Slave PLC List

☐ Slave

Modbus

☐ Master Transmission ASCII

☐ Slave

User Defined

☐ Master List

☐ Slave

FIELDBUS

☒ Master List

☐ Slave

CHAPTER 6 COMMUNICATION FUNCTION

Link parameter main screen

◎ **link 1** : as a kind of high speed link, it is available to install communication module max. 4 for K1000S CPU, max.2 for K300S/K200S, max. 1 for K80S. High speed link no. is not related with the installed slot no. and available to set one high speed link parameter for one communication module. The figure below shows communication model and max. number available to install per CPU model.

Communication module installation relation per CPU model

Classification	Communication module	Max. no. of installation	Remarks
K1000S	G3L-RUEA	4 ea	Each communication module is installed by mixing.
K300S(< v2.2)	G4L-RUEA	2 ea	
K300S(≥v2.2)	G4L-RUEA	4 ea	
K200S	G6L-RUEA	2 ea	
K80S	G7L-RUEA	1 ea	

- ◎ **Link** : to set whether to execute link of communication module.(enable/disable)
- ◎ **Local station no.** : Local station should be set always as '0' for use.
- ◎ **Slot** : to set the slot no. From the range of 0~7 that communication module is installed.
- ◎ **Registration no.** : Registration no. is a serial no. indicating the procedure that individual parameter is registered and available to set from '0' to '63' but total 63 is available to register regardless of sending/receiving procedure. But, max. 32 for sending and 32 for receiving is available to register, respectively.

(4) Link parameter detail setting

If you double click in the state high speed link registration No.0 is selected, link parameter setting screen appears as shown on the figure.

Link parameter modification screen (in case that registration no. of high speed link 1 is '0')

- ◎ **Station no.** : When sending/receiving the data of setting item, it is required to set the remote station no. The following table shows how to set the station no.

Station no. setting method

Communication type	Station no.	Station no. range
Remote sending	Opposite(remote) station no.	1~63
Remote receiving		

- ◎ **Block no.** : This is a setting parameter to send/receive lots of data of several area and enables to distinguish the data of several blocks. If you set 32 stations for Smart I/O output module, you have to set the input up to 31 station and if you set 32 station for the input, you need to set 31 station for output. Because it supports up to 64 stations including master station. RNET max. connection station number is 64 stations including master but it is available to set one sending/receiving block for one station.

- ◎ **Communication type** : Remote sending, remote receiving

Remote sending : when sending the data of local station to remote station

Remote receiving : when receiving the data of remote station into local station

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- ◎ **Sending/receiving device:** This means sending/receiving area and in case of remote sending, this means to send the data to remote station and thus it is required to set sending area of local station for sending device and receiving area (P area) of remote station for receiving device. As remote receiving means to receive the data from remote station, it is required to set sending area (P area) of remote station for sending device and receiving area of local station for receiving device.

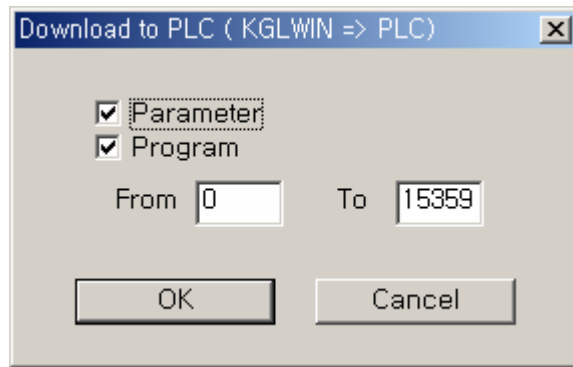
Sending/receiving device setting area acc.to communication type

Communication type	Device	Setting available area	Remarks
Remote sending	Sending	P,M,L,K,F,D,T,C all area	Sending area of local station
	Receiving	P area	Receiving area of remote station
Remote receiving	Sending	P area	Sending area of remote station
	Receiving	P,M,L,K,D,T,C area	Receiving area of local station

- ◎ **Size :** Data size to send/receive [unit: 1 word(16point)], available to set max. 60word but for this Rnet, it is set as 2word at present as the current max.point of Smart I/O is 2word(32point).
- ◎ **Communication period :** High speed link is the service to execute send/receive at the point that PLC program ends by the user setting parameter. Thus, if PLC program scan time is short within several ms, communication module sends the data acc.to program scan which results in the increase of communication capacity that may cause the loss of communication efficiency of whole communication system. In order to prevent this, it is designed for the user to set the sending/receiving period and the setting range is min.20ms (Rnet V1.0 : from every scan) to max. 10sec. The sending/receiving period indicates the sending period in case that the relevant block is set as sending and in case that it is set as receiving, it means the period to check the data receiving of relevant block.

(5) High speed link operation

After high speed link parameter setting is completed, if you click 'verify' button from download menu to execute parameter download, high speed link service starts. In this case, the relevant link of link parameter main screen should be 'enable' state.



Parameter download screen

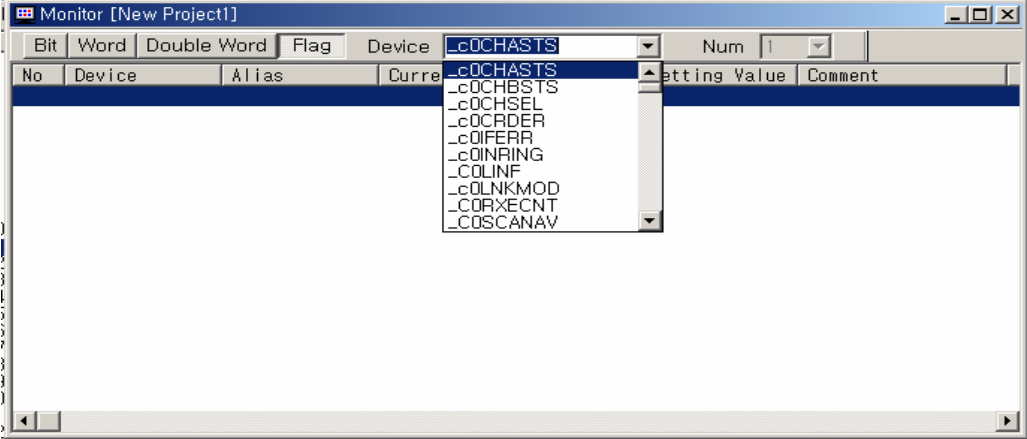
2) High speed link information monitor

It is available to monitor high speed link information by using monitoring window and information read menu after KGLWIN online connection. There are 2 ways of monitoring : one is to select the flag to monitor from flag monitor menu of monitoring window and monitor individual or whole information and the other is to select high speed link parameter from online-information read menu and monitor whole information.

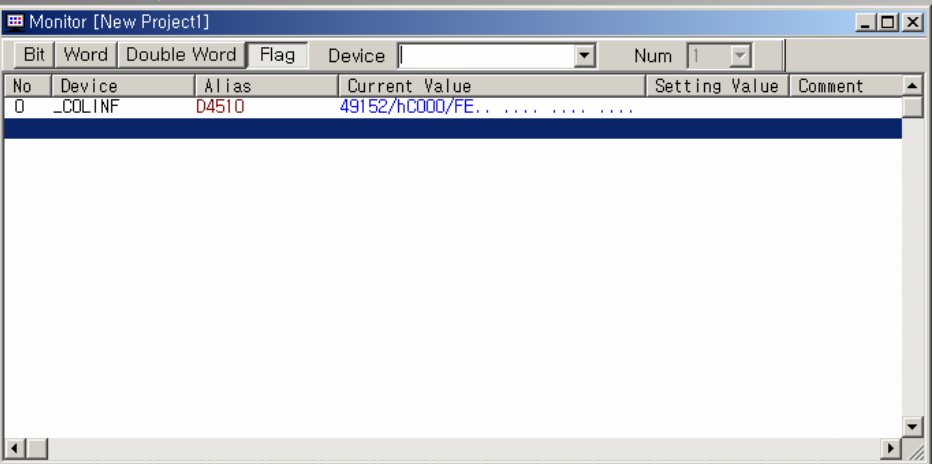
- Flag monitor

Flag monitor is the function to select and monitor the necessary flag by using KGLWIN [project]→[monitoring] flag monitor menu. First if you select flag monitor button from monitoring window, the flag monitor screen of the figure appears and if you press 'register' button(▼), flag registration screen appears. Select the flag registration high speed link information flag desired to monitor one by one from flag registration screen and register it. If flag registration is completed, it starts to monitor from monitor screen. If monitoring does not work, please check if monitor start mode is correct again.

Flag monitor screen and flag registration screen



Flag monitor screen (the state that flag is registered.)

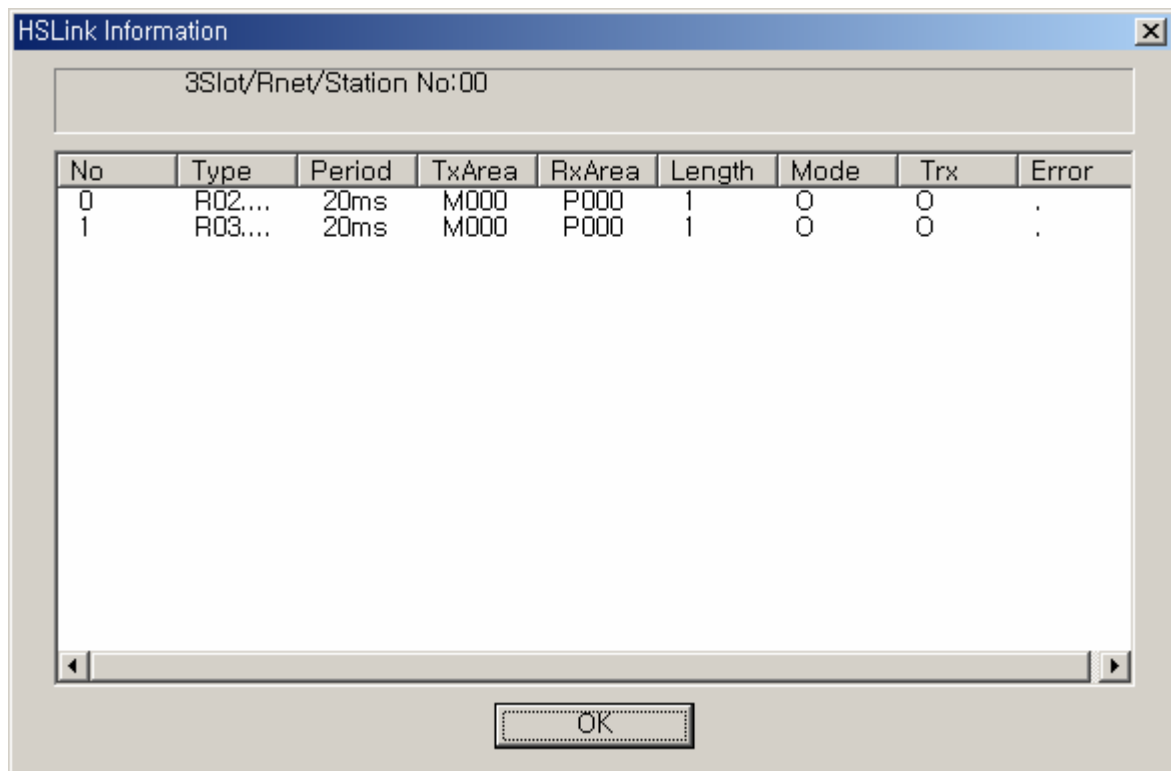


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- High speed link parameter monitor from information read

If you select high speed link parameter from menu [online]-[information read], the detail information for high speed link parameter appears as shown on the figure.

High speed link parameter monitor



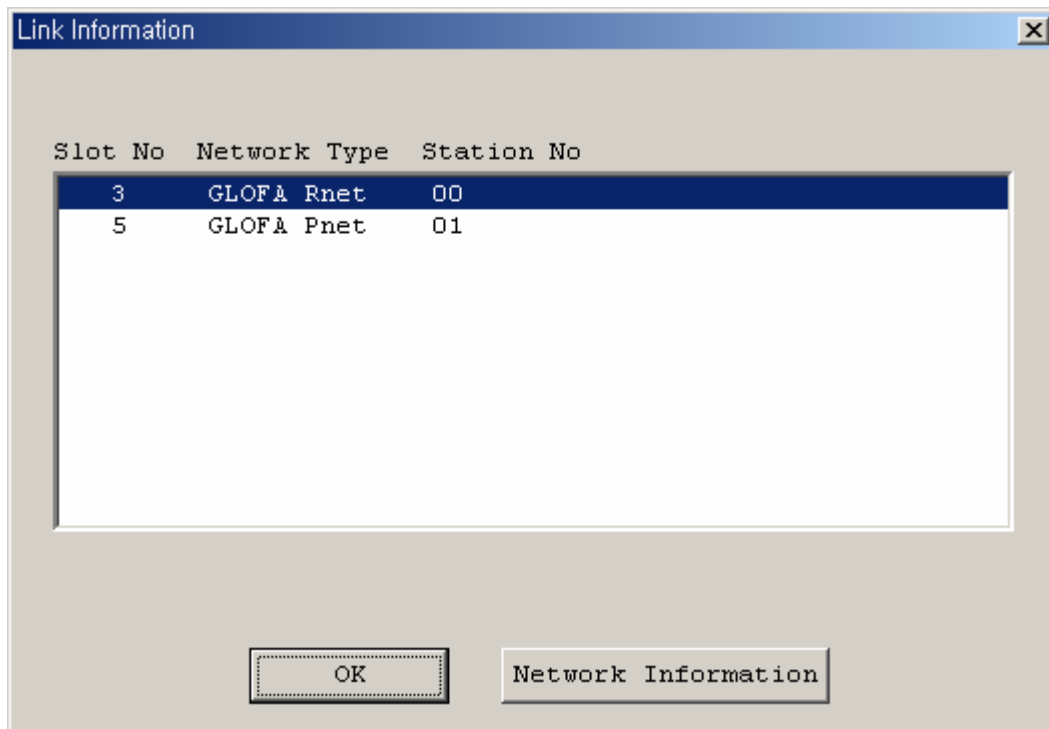
No	Type	Period	TxArea	RxArea	Length	Mode	Trx	Error
0	R02...	20ms	M000	P000	1	0	0	.
1	R03...	20ms	M000	P000	1	0	0	.

From 'type' item, R02.R03 means remote (Smart I/O) station 2 and station 3 and SOO,S01 means block no. which is parameter to transmit the data (M000) of local station to remote (Smart I/O) station 2(P000) through block no.0. R03 is also a parameter to transmit the data(M000) of local station to remote (Smart I/O) station 3(P000) through block no.1.

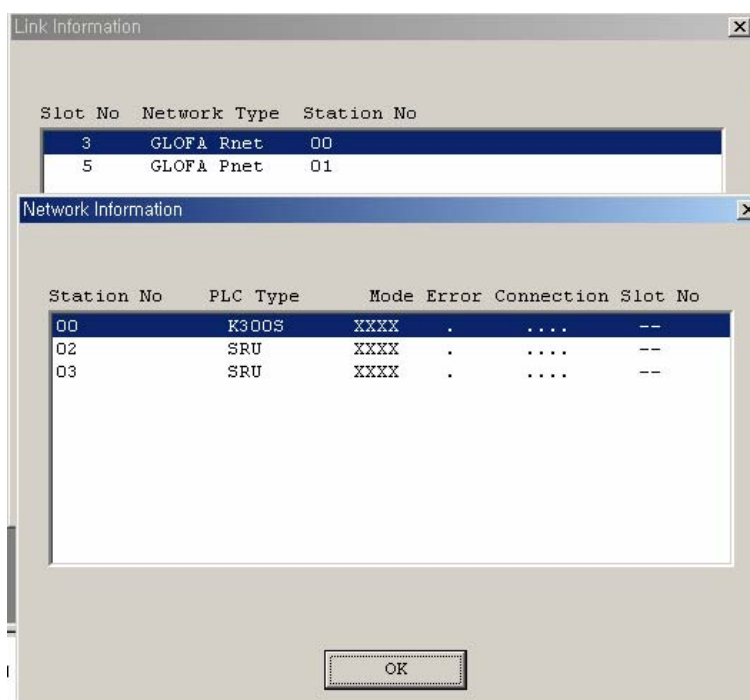
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- Link information monitor from information read

If you select menu [online]-[information read]-[link information], you can monitor link state of communication module that is installed per slot.



If you select the module desired to monitor and click 'verify' button, you can monitor the connection state of all RNET network connected to the relevant module.(except K80S)



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3) Flag

L area list in case of using data link module (the case installed in slot no. 0)

x : slot no., n : remote station no.

Keyword	Address		Description
_NETx_LIV[n]	L0001 ~ L003F	L0001~L000F(1~15 station)	The flag indicating that the power of remote station is normal and the data is sending/receiving with the remote station normally through communication cable, as alive information of remote station (read only)
		L0010~L001F(16~31 station)	
		L0020~L002F(32~47 station)	
		L0030~L003F(48~63 station)	
		L0050~L005F(16~31 station)	
		L0060~L006F(32~47 station)	
		L0070~L007F(48~63 station)	

High speed link detail flag

x : K1000S=9, K300S/K200S=4 m : high speed link no.

Keyword	Type	Bit position	Contents	Description
_HSmRLINK	Bit	Dx600.0	RUN_LINK information of high speed link	Indicates that all station is operating normally as set in high speed link parameter setting and shall be ON under the following condition. 1. All station set in the parameter is RUN mode and no error, 2. All data block set in the parameter is communicated normally, 3. The parameter set in each station itself set in the parameter is communicated normally. Once RUN_link is ON, it maintains 'ON' until it stops by Link Disable.
_HSmLTRBL	Bit	Dx600.1	Abnormal information of high speed link (LINK_TROUBLE)	This flag is ON when the communication state of the station set in the parameter and the data block is as follows in the state that _HSmRLINK is ON. 1. The station set in parameter is not RUN mode, 2. There is an error in the station set in parameter, 3. The communication state of data block set in parameter is not smooth. LINK TROUBLE is ON under the above 1,2,3 condition and if the condition recovers normally, it becomes OFF again.
_HSmSTATE [k] (k=0~63)	Bit Array	Dx601.0 ~ Dx604.15	General communication state information of k data block set in high speed link parameter	Indicates general state of communication information for each data block of setting parameter. _HSmSTATE[k] = _HSmMOD[k] & _HSmTRX[k] & _HSmERR[k]

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Keyword	Type	Bit position	Contents	Description
_HSmMOD[k] (k=0~63)	Bit Array	Dx605.0 ~ Dx608.15	Mode information (RUN = 1, others = 0)	Indicates operation mode of the station set in k data block of the parameter
_HSmTRX[k] (k=0~63)	Bit Array	Dx609.0 ~ Dx612.15	State information (normal=1, abnormal=0)	Indicates whether the communication state of k data block of parameter is smooth as set in or not
_HSmERR[k] (k=0~63)	Bit Array	Dx613.0 ~ Dx616.15	State information of the station set in k data block of high speed link parameter (normal=1, abnormal=0)	Indicates whether the error occurs in the station set in k data block of parameter or no.

High speed link detail flag when m=1~3

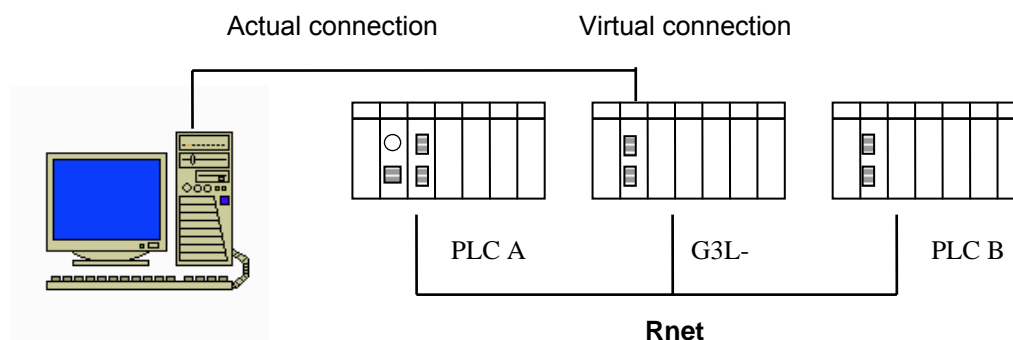
High speed link type	D area address	Remarks
High Speed Link2 (m=1)	Dx620 ~ Dx633	Comparing with [Table A1.2] m=0, D area address when m=1~3, is as follows. Formula : D area address when m=1~3 = address no. of [Table A3.3] + 20 × m
High Speed Link3 (m=2)	Dx640 ~ Dx653	
High Speed Link4 (m=3)	Dx660 ~ Dx673	

6.2 REMOTE CONNECTION SERVICE

6.2.1 Overview

This is the function that PLC enables to carry out the physical connection of program tool (GMWIN/KGL-WIN) such as program prepare, user program download, program debugging, monitor etc. in the network system connected to RnetI/F module by remote without moving.

Especially, if the devices connected to the network are far apart, it is available to access each device easily and conveniently at one place without moving the place. Communication service function generates the path to achieve the purpose as follows.



[Figure 6.6.1] remote connection network example

This assumes the network that RS-232C cable is connected to G3L-PREA module in computer program tool (GMWIN/KGL-WIN) and PLC A to master, PLC C to Rnet remote I/F module. On the above Figure, in order to access the content in PLC A station, select communication module station no. of PLC A (remote station no. desired to connect), slot no. of G3L-RREA (slot no. of communication module of PREA connected at present) from remote step 1 connection of program tool and connect each other, remote connection by RS-232C and Rnet is completed.

This state is regarded as the same that is connected by moving RS-232C cable to PLC A station and it is available to perform the function such as program prepare, download, debugging and monitor etc. If the user use this remote communication service, it is available to connect easily without moving the PLC position far apart and maintain/repair easily and efficiently.

Point

- 1) The Rnet module that enables remote step 1 connection is G3L-RREA, G0L-GWRA.

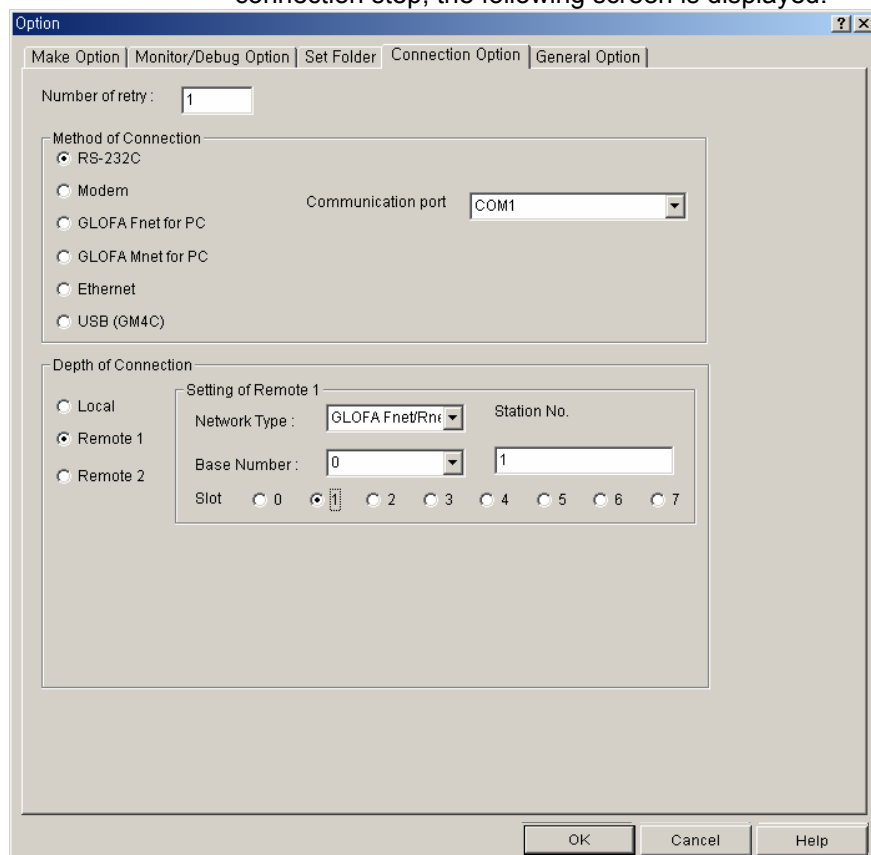
6.2.2 GMWIN remote connection

The remote connection between PLCs connected to GLOFA RnetI/F module is available by remote step 1.

The remote connection between PLCs by using G3L-RREA, G0L-GWRA is also available by remote step 1.

Remote step 1 connection : For remote step 1 connection, GMWIN should be offline state.

In this state, select Project(P)→Option(Q)...→Connection option menu from the upper menu of project and select 'remote step 1' from connection step, the following screen is displayed.



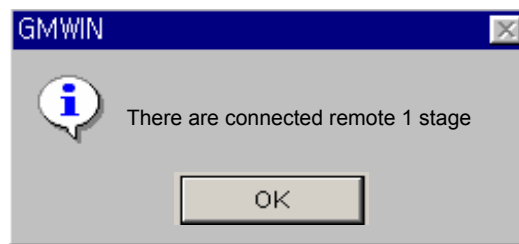
Network type setting : Select the type acc.to network available for step 1 connection. As remote step 1 connection is connected to Rnet, select GLOFA Fnet/Rnet.

Station no. setting : Designates the station no. of communication module installed in the remote station PLC that step 1 connection will be arranged. Station no. is marked in front of module case or inside module.

Slot no. setting : Selects the slot no. of communication module installed in local station PLC to carry out step 1 connection with remote station. After setting is completed, press 'verify' to exit from option screen and then execute [online] [connection].

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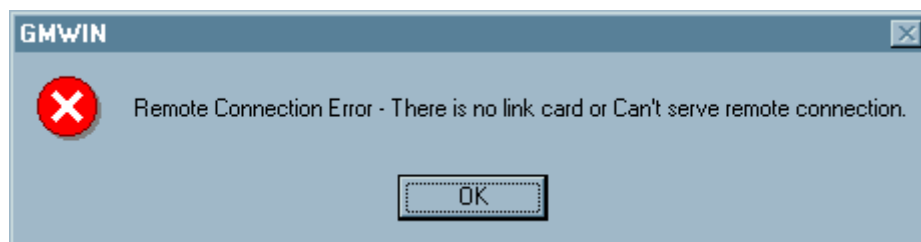
If step 1 connection is completed normally, the following message is displayed,



If connection is failed, the following message is displayed..

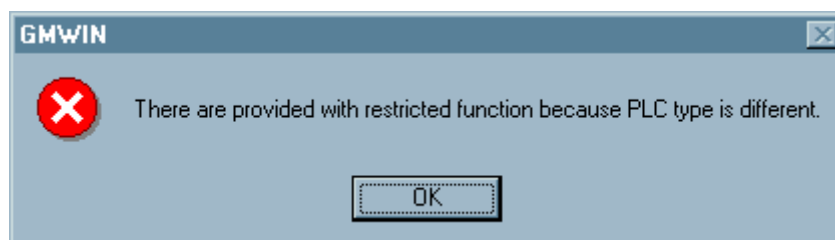


(In case of communication line error / internal protocol error)

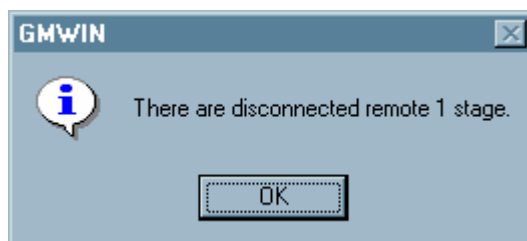


(In case that the setting value for remote connection is not suitable.)

If CPU type of step 1 connection PLC and currently open project is different, the following message is displayed and the online menu selection is limited.



The state that step 1 connection is completed, is logical connection state same as it is connected by moving RS-232C cable. Here it is available to use all online menu. (But except the case that CPU type of PLC and currently open project is not matched.). If you finish the work in the step 1 connection state and disconnect, the following message is displayed.



For GM3 remote I/O(G3L-RREA,G0L-GWRA), the connector for RS-232C connection is arranged. That is, it is available to connect GMWIN by GM1~GM7 PLC in GM3 remote I/O station, G0L-GWRA. GM4,GM6 remote I/O does not have the above function and for G0L-GWRA, station no. is always designated by 63 stations. (in case of using G0L-GWRA, cares should be taken not to have double station no. of 63 stations in Rnet network.)

Notices for GMWIN step 1 connection

- 1) If in GMWIN, the currently open project and the step 1 connection CPU type is different, it is not available to perform the following items.
 - (1) Program and each parameter write
 - (2) Program and each parameter read
 - (3) Monitor
 - (4) Flash memory
 - (5) Link enable setting.
 - (6) I/O information.
 - (7) Forced I/O information.
 - (8) I/O SKIP

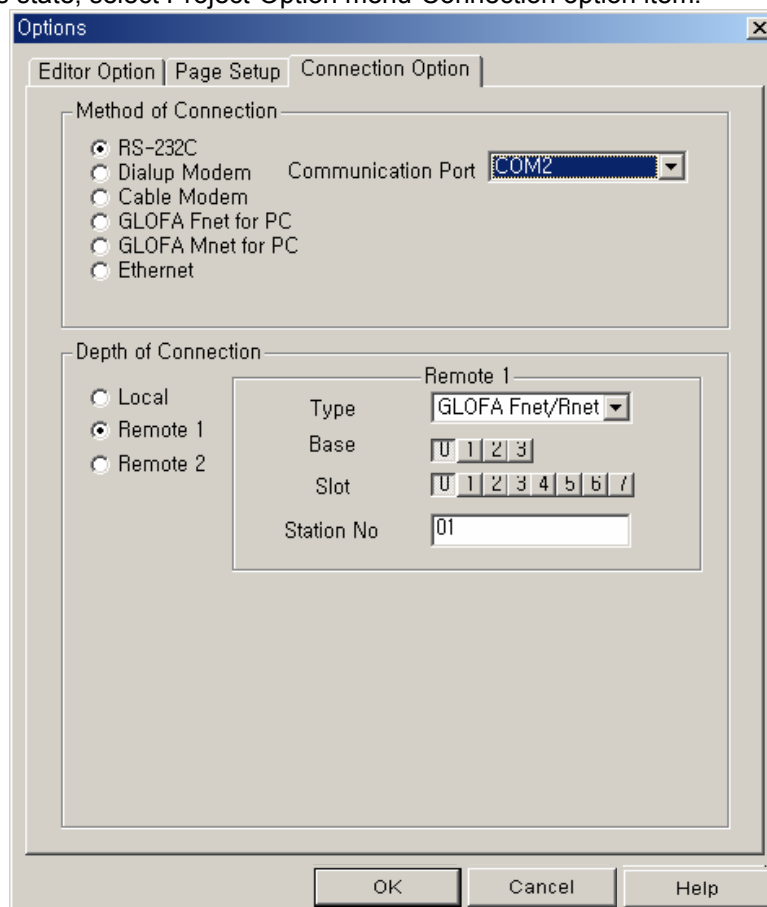
- 2) In case of programming GMWIN by remote step 1 connection, open the relevant project of station to connect and carry out remote connection.

- 3) If remote connection is done with GM3/GM4 remote I/O station, it is not available to perform the following items.
- (1) Program and each parameter write
 - (2) Program and each parameter read
 - (3) The work to perform related to program directly.
 - * Time chart monitoring of monitor
 - * Link parameter of monitor
 - * High speed link monitor.
 - * Forced I/O information.
 - * Link enable setting.
 - * Flash memory
 - * Link information.
 - * Mode conversion.
 - (4) Flash memory
 - (5) Link enable setting.
 - (6) I/O SKIP
- 4) Rnet remote connection supports only step 1 and not possible more than step 1.
- 5) Remote step 1 connection from master to slave is available and it is available to verify I/O information of remote PLC.

6.2.3 KGL-WIN remote connection

All PLC (K1000S remote I/O station and K300S/K200S remote I/O station) connected by MK network enables to connect by KGL-WIN communication service. KGL-WIN remote connection is composed of step 1 connection. Here describes step 1 connection method in the system composed of two networks.

- (A) Remote step 1 connection : For remote step 1 connection, KGL-WIN should be offline state and select. In this state, select Project-Option menu-Connection option item.



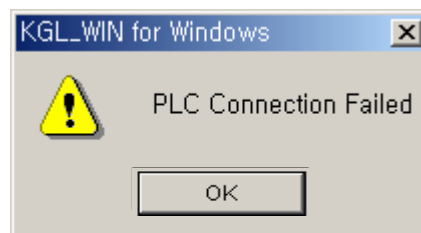
Connection mode : Set communication port of RS-232C and computer.

Connection step : Select remote step 1, Fnet/Rnet type.

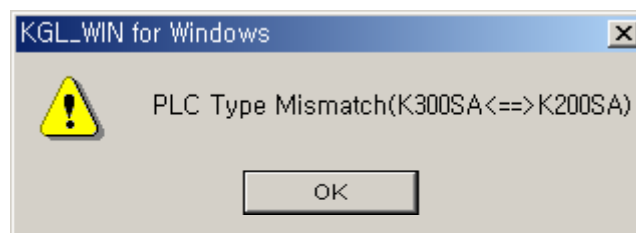
Slot no. setting : Enter the slot no. of communication module installed in local station LC to arrange the connection.

Station no. setting : Write the station no. of remote station communication module installed in step 1 connection PLC and if it is filled in by decimal, write '1' of decimal without 'h' .

In this state, click 'verify' button and complete the setting and then if you select online-connection menu and remote step 1 connection is done normally, the PLC model and connection state is displayed on the bottom of KGL-WIN screen. If connection is failed, the following message is displayed. In case of connection failure, this means that there is an error in communication line or internal protocol error, or the setting value of remote connection is not suitable. Check if the setting is completed correctly and retry to connect.



If step 1 connection PLC and the CPU type of currently open project is different, the following message is displayed and remote connection is failed. In this case, if you change the PLC type, you can do remote connection. The state that step 1 connection is completed, is the same as local connection state that is connected by moving RS232C cable. Here it is available to use all menu of online menu.



As there is a connector to connect RS-232C in K1000S remote module, G0L-GWRA module, it is available to connect KGL-WIN by K1000S ~ K200S PLC in K1000S remote module. For K300S/K200S remote, there is no remote connection connector.

• Notices in KGL-WIN remote step 1 connection

- 1) If in KGL-WIN, the currently open project and the step 1 connection CPU type is different, remote connection is not available.
- 2) In case of programming KGL-WIN by remote step 1 connection, open the relevant project of station to connect and carry out remote connection.
- 3) Remote connection support only step 1. Not possible more than step 1.

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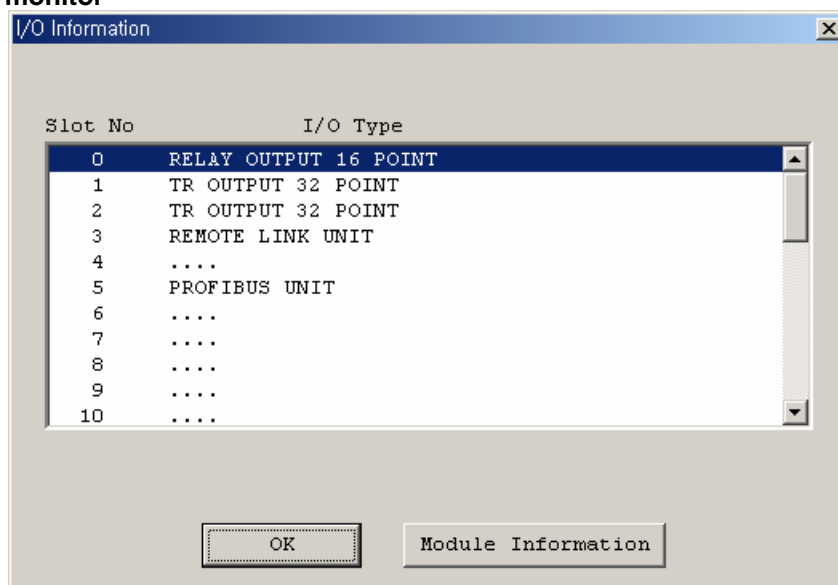
6.2.4 KGL-WIN remote I/O station connection

Here describes the function to use by connecting KGL-WIN to remote I/O station. In case that remote connection is done by remote I/O station, it is available to select only limited menu.

Function list available for KGL-WIN remote I/O station connection.

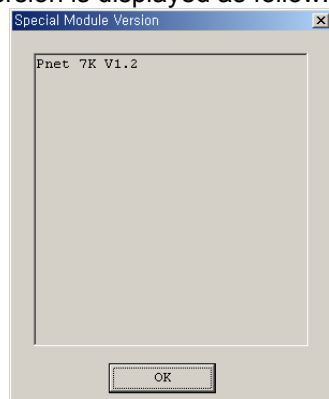
* I/O information monitor from online menu (verify remote PLC I/O information).

(A) I/O monitor



I/O monitor function is to provide the information for the module installed in the slot of Rnet remote I/F module and if you select information read--I/O information from online menu, the dialogue box appears as follows.

Here if you want to monitor the information of special module except I/O module, place the cursor on the special module desired to monitor as shown on the figure and select module information, the link interface module version is displayed as follow.



(B) If remote connection is done with K1000S/K300S/K200S remote I/O station, it is not available to perform the following items.

- 1) Program and each parameter write
- 2) Program and each parameter read
- 3) The work to perform related to program directly
 - * Time chart monitoring of monitor
 - * Link parameter of monitor
 - * High speed link monitor.
 - * Forced I/O information.
 - * Link enable setting.
 - * Flash memory
 - * Link information.
 - * Mode conversion.
- 4) Link enable setting.
- 5) Rnet parameter, Rnet information

6.2.5 System flag for remote module

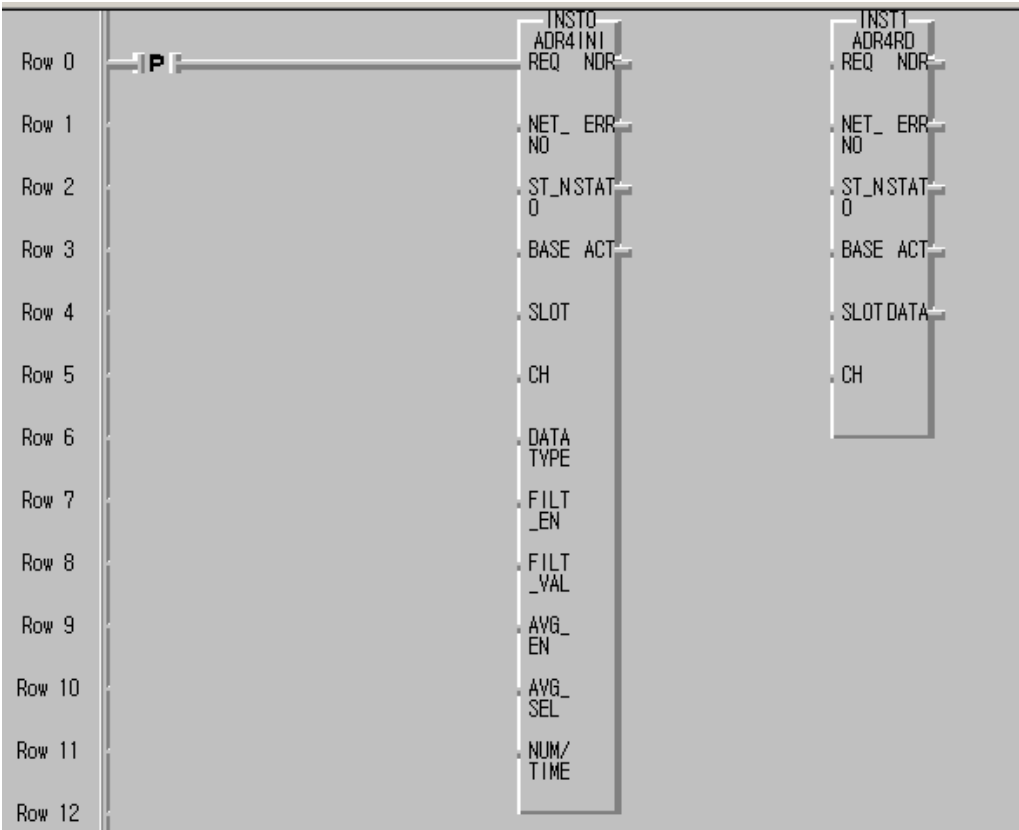
It is available to monitor the information saved in internal memory of remote module through RSM flag monitor and get to know the performing information of high speed link and communication command through flag easily.

6.3 Function Block Service only for Slave

Slave (Rnet Slave Module) is remote I/O control device equipped with communication function and I/O control function of PLC CPU and also is the module used to control remote I/O of CPU through communication but does not have the ability to perform the independent program. Thus, this provides the communication function such as high speed link service, function block service and remote connection service and this clause describes the slave control method by function block service.

6.3.1 Slave special module function block

Slave can be used by installing special module and the special modules available to install are D/A conversion module, A/D conversion module, temperature conversion module, high speed counter module. The module type is shown on [Table 8.1.2] of Chapter 8 Installation and Startup. The special module function block of slave is function block to control special module installed in the slave. For the existing special function block, NET_NO and ST_NO are added for input and ERR, NDR value for output. [Figure 6.3.1(A)] shows the example of A/D conversion module initialization function block and describes the difference between CPU AD initialization function block and slave AD initialization function block.



(A) Slave special module function block (B) CPU special module function block

[Figure 6.3.1(A)] AD initialization function block example

In [Figure6.3.1(A)], CPU special module function block means the function block for module initialization when special module is installed in CPU, and slave special module function block means the slave function block for initialization of special module installed in slave. In the Figure, I/O added in slave function block are communication I/O for the communication with slave and [Table 6.3.1(A)] describes I/O contents added in slave function block and I/O used in slave function block in common.

[Table 6.3.1(A)] Slave special module function block I/O

Name	Description	Classi.
REQ (Input)	Input contact to run function block. Function block runs at the point that input value is changed from '0' to '1'.	Rising edge(Bool)
NET_NO (Input)	Slot no. of communication module to perform function block service among communication modules installed in local station PLC. It shows mother station master installation position of slave.	0 ~ 7
ST_NO (Input)	Station no. of remote station. This sets the station no. of slave installed in special module.	0 ~ 63
NDR (Output)	Shows the result of function block operation. It's ON when performing normally and maintains 'ON' until next scan is performed.	On/Off
ERR (Output)	Shows the result of function block operation. ON when error occurs.	On/Off
BASE (Input)	The input to set the installation position of special module installed in slave. This means the installed base no.	0 ~ 3
SLOT (Input)	The input to set the installation position of special module installed in slave. This means the installed slot no.	0 ~ 7

I/O except those described in [Table 6.3.1(A)] are I/O variable that is different each other acc.to special module and have the same I/O characteristics as function block of the using special module. Please refer to the User's Manual of the relevant special module.

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[Table 6.3.1(B)] Slave special module function block type

CPU type Function block name		GM1, GM2	GM3	GM4	GM6	Remarks
ADRxINI (x= 2,4)	ADR2INI	X	X	0	X	4channel
	ADR4INI	O	O	X	X	16channel
ADRxRD (x= 2,4)	ADR2RD	X	X	0	X	4channel
	ADR4RD	O	O	X	X	16channel
DARxINI (x= 1,4)	DAR1INI	X	X	0	X	2channel
	DAR4INI	O	O	X	X	16channel
DARxWR (x= 1,2,4)	DAR1WR	X	X	0	X	2channel
	DAR2WR	X	X	X	X	4channel
	DAR4WR	O	O	X	X	16channel
HSCRx_RD (x= 0,1)	HSCR0RD	X	X	0	X	1channel
	HSCR1RD	O	O	X	X	2channel
HSCRx_SET (x= 0,1)	HSCR0SET	X	X	0	X	1channel
	HSCR1SET	O	O	X	X	2channel
HSCRx_WR (x= 0,1)	HSCR0WR	X	X	0	X	1channel
	HSCR1WR	O	O	X	X	2channel
RTDxINI (x= 2,3)	RTDR2INI	X	X	0	X	4channel
	RTDR3INI	O	O	X	X	8channel
RTDxRD (x= 2,3)	RTDR2RD	X	X	0	X	4channel
	RTDR3RD	O	O	X	X	8channel
TCRxINI (x= 2,4)	TCR2INI	X	X	0	X	4channel
	TCR4INI	O	O	X	X	16channel
TCRxRD (x= 2,4)	TCR2RD	X	X	0	X	4channel
	TCR4RD	O	O	X	X	16channel

Point

- 1) CPU type shows CPU model possible to use slave special module function block.
- 2) In function block name, 'R' of special module name ADRxINI, ADRxRD means 'remote block (slave)' and 'x' is the channel number of special module which is determined by the value of x square of 2.

6.3.2 How to use special module function block

1) Mother station setting

Slave is remote I/O device that has not its own user program and uses the user program and communication function of PLC CPU. As slave send/receives the data by master station for operation, it is required to set mother station of slave before configuring the system. For slave mother station, it is required to set the same value as master station no. by using the decimal switch inside slave and mother station acts as master station when performing high speed link and slave special module access function block service.

[Table 6.3.2] shows operation state of slave service acc.to mother station PLC mode of slave. As shown on the Table, as slave operates acc.to mother station mode, if it accesses the special module of slave by other station except mother station, it may cause the operation error. Thus, it is required to access special module only by mother station.

[Table 6.3.2] slave operation acc.to mother station PLC mode

CPU MODE	Slave high speed link [Point]	Slave special module access	Slave I/O refresh
RUN	○	○	○
STOP	○	X	○
PAUSE	○	○	○
DEBUG	○	○	○

Point

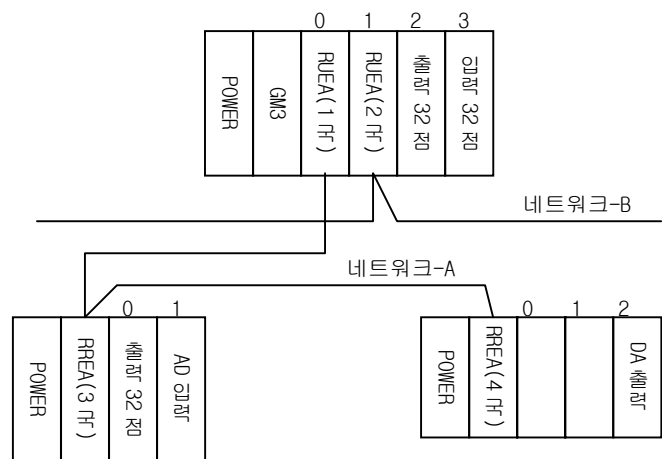
High speed link determines the operation acc.to link enable of mother station.

2) Program

Special module control by slave uses the communication function of master and slave other than in PLC. Thus, special module function block program of slave needs to prepare the program considering the reliability of communication, other than PLC special module function block access program.

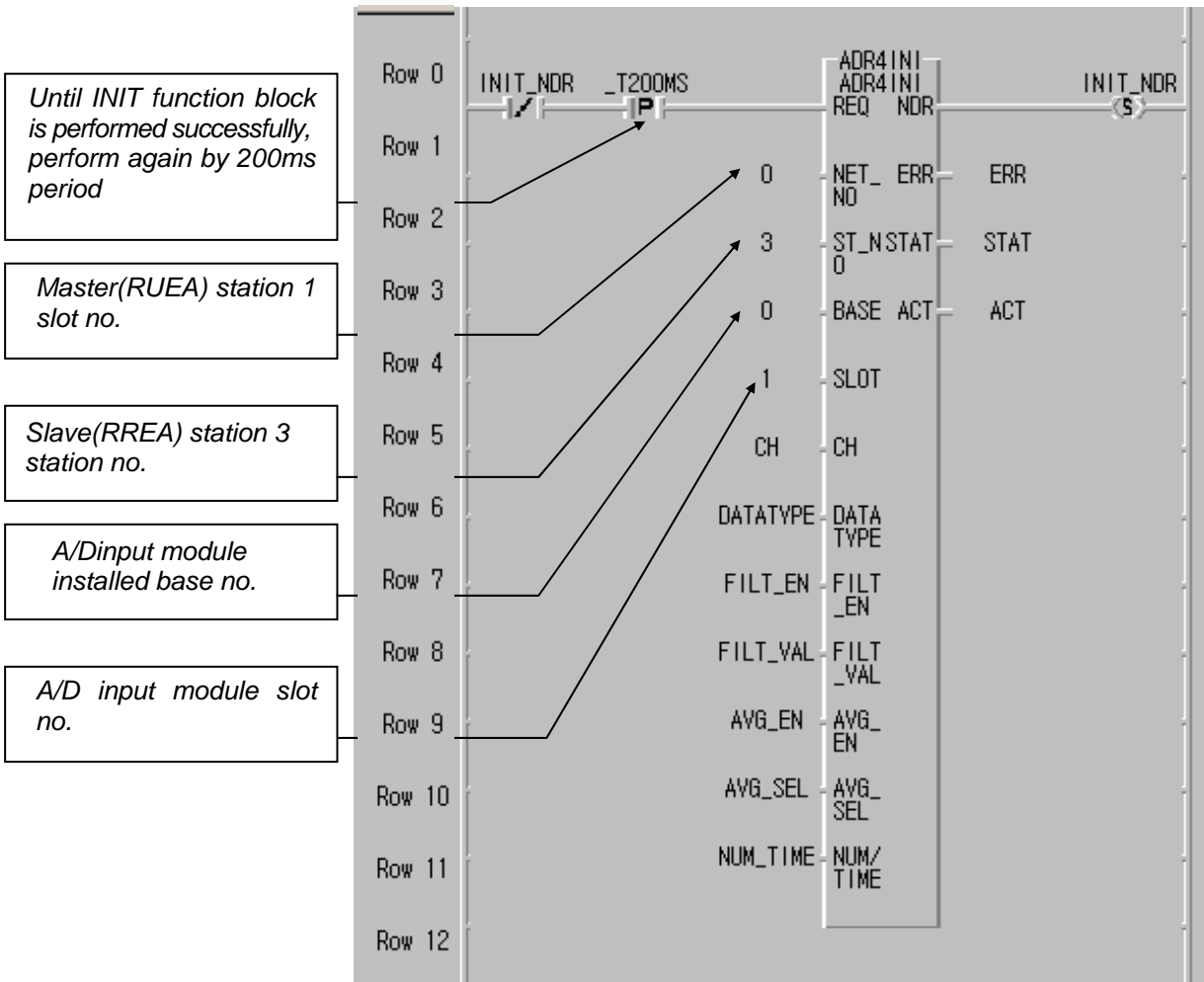
[Figure 6.3.2] shows the system configuration assuming that two masters are installed in GM3 CPU and special module of slave station 2 is accessed through one master. In the Figure, A/D input module (4channel) is installed in slot no.1 of slave station 3 and slave 4station slot D/A output module (2channel) is installed in slot no.2 of slave station 4.

CHAPTER 6 COMMUNICATION PROGRAM

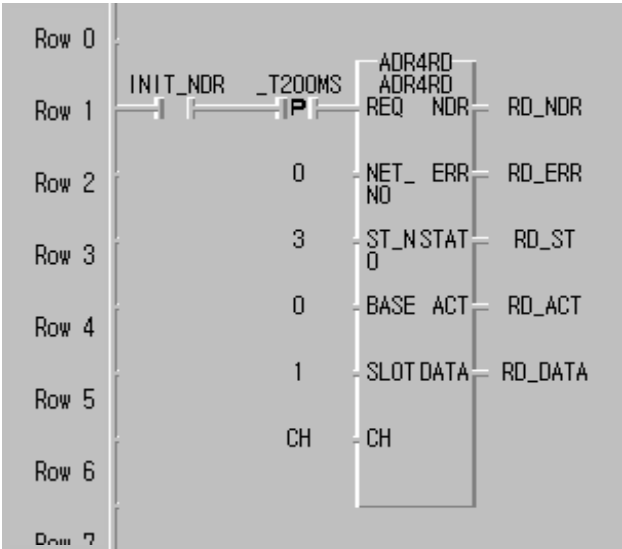


[Figure 6.3.2] slave special module access system configuration diagram

In order to access special module of slave in the system of [Figure 6.3.2], adjust mother station setting switch of os slave station 3 and slave station 4 as station 1 and set mother station. After setting mother station, prepare slave special module function block service program by using GMWIN program. [Figure6.3.2(A)] and [Figure6.3.2(B)] shows the example of program preparation.

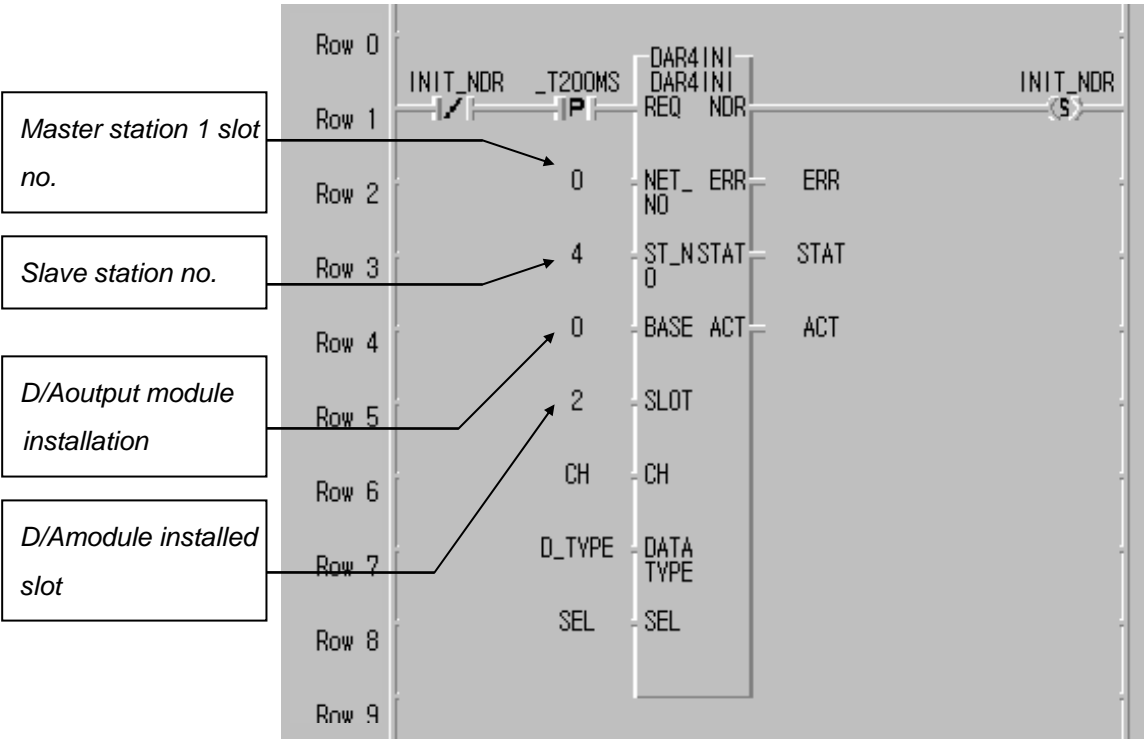


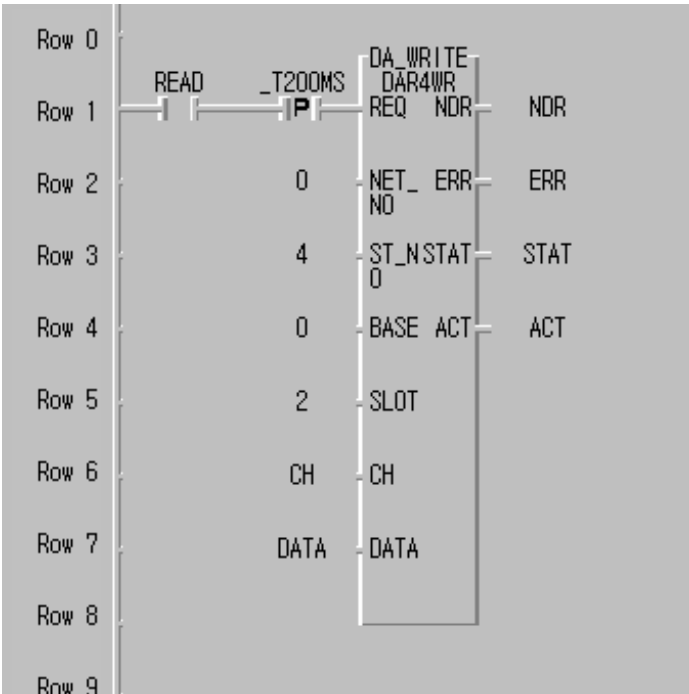
CHAPTER 6 COMMUNICATION PROGRAM



[Figure 6.3.2(A)] Slave A/D input access program example

In the Figure, AD_INIT function block is reperformed until NDR is ON by 200ms period. This is because special module initialization can not be completed by 1 scan other than function block of CPU (because the error occurs due to the late power input of slave or trouble in communication line). Thus, as shown on the example, after confirming the performing result of function block by using NDR output contact, prepare the program to be able to perform the next operation. This is also applied same for other special module access program.





[Figure 6.3.2(B)] Slave D/A output access program example

The above Figure shows D/A output module access program. In the Figure, initialization function block re performs by 200ms period until NDR contact is ON and ST_NO, BASE, SLOT no. is set in D/A module position and station no. of slave station 4.

3) Status information

The result that performed special module function block through slave is shown through output contact of NDR, ERR as described on the above. If the result is normal, NDR output is ON and ERR output is OFF, but if the result is abnormal, ERR output contact is ON and NDR is OFF. In this case, error type is shown through STAT output value.

(For further information of slave special module access, please refer to Appendix A1)

6. 4 Communication Module Flag Application

6.4.1 Flag type

1) Flag to verify that the current communication with remote station is normal

(1) _NETx_LIV[n] (range n = 0~63 : remote station no.)

This is a flag to indicate that the remote station power is normal and the data sending/receiving with remote station through communication cable is normal, as Alive information of remote station.

(2) _NETx_RST[n]

This is a flag to indicate that remote station is restored in case that remote station is shutdown on communication network due to electric shutdown or cable adding/removing and then restored, as a power restore information.

Point

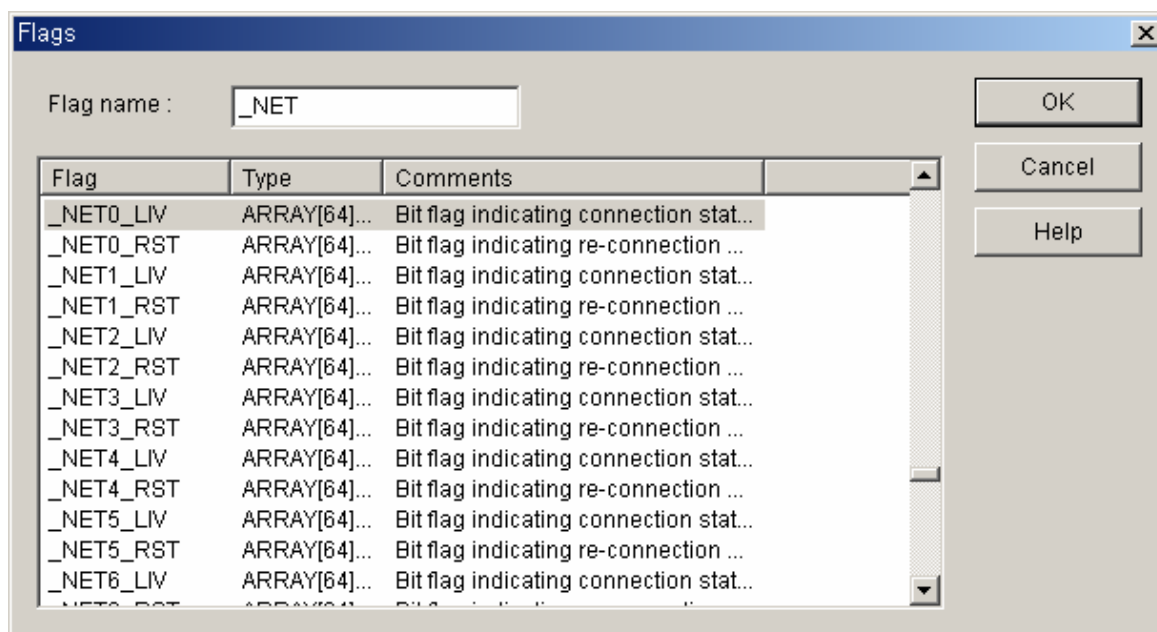
'x' used in the flag is the slot no. that communicationmodule(FMM) is installed. (range : 0 ~ 7)

6.4.2 Major flag type used in Rnet

Classification	Data type	Access enable	Remarks
_NETx_LIV[n] (range n = 0 ~ 63)	USINT	Read only	FSM FMM
_NETx_RST[n] (range n = 0 ~ 63)	USINT	Read/write available	Common flag

6.4.3 How to use flag in GMWIN

Flag list GMWIN screen for RSM/RM



6.4.4 Special module access using _NETx_LIV[n], _NETx_RST[n]

Here describes how to control special module of remote I/O station using _NETx_LIV[n], _NETx_RST[n] in remote system of [Figure 6.4.1(A)].

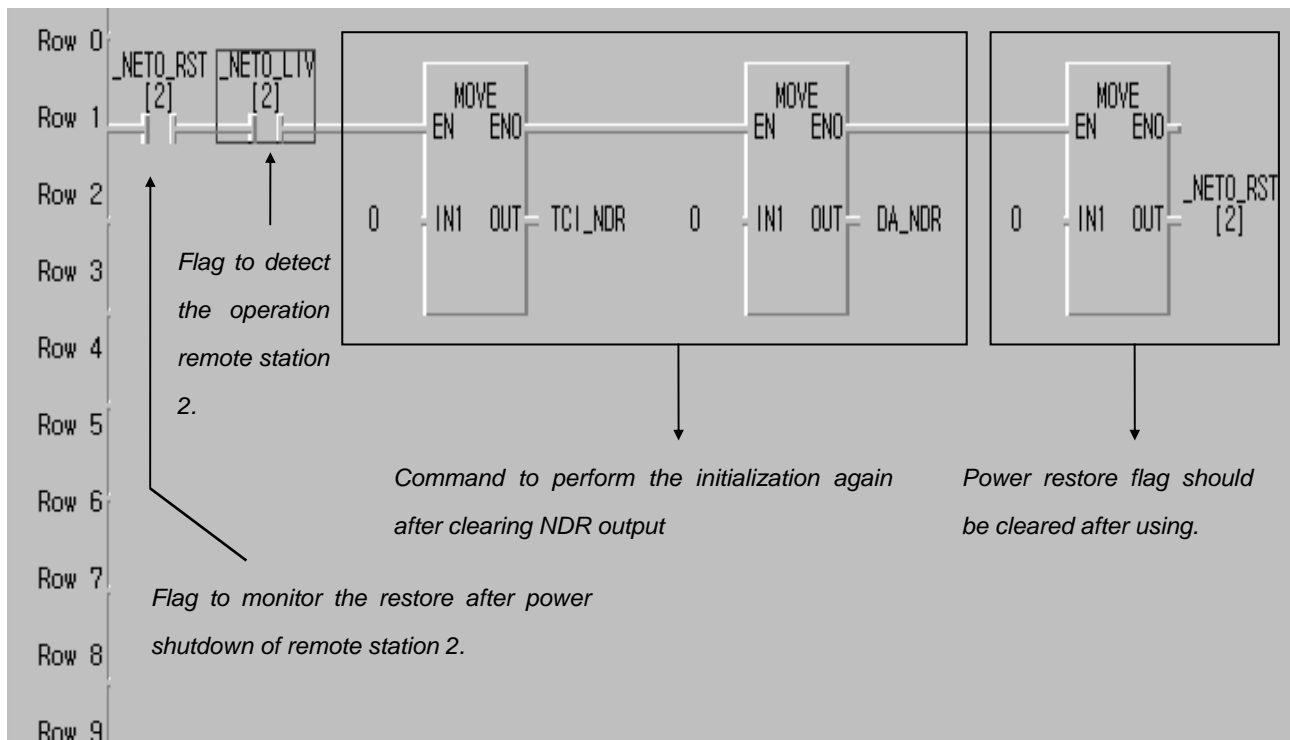
There are some differences between special module control of remote I/O and the special module installed in CPU as follows.

- 1) As initialization function block is performed through communication, the initialization may not be performed at one time due to communication error or other reasons. Thus the program is needed to retry until the initialization is completed.
- 2) As we need to perform the initialization again in case that the power of remote station is shutdown on the way and restored, the power detection program is needed.
- 3) As special module read/write function block is performed in the rising edge of Requestinput, it is required to make the rising input.
- 4) As it may happen that the communication is impossible due to power shutdown of remote station/communication cable add/remove, if you can use the flag to detect the operation of remote station, the program can be performed efficiently.

CHAPTER 6 COMMUNICATION PROGRAM

And as NDR output was used as an initialization Request condition by B contact not to perform the initialization function after the initialization is completed, this enables to perform the initialization one time successfully. It is available to detect operation state of slot no.0 FMM and remote station 2 by using `_NET0_LIV[2]` flag and initialize only during normal operation. If `_NET0_LIV[2]` flag is used as Request input in special module read/write function block after completing the initialization, it is available to perform the program efficiently.

[Figure 6.4.1(B)] shows the program example to initialize the special module of remote station again in case that the power of remote I/O station is shutdown and then restored and this should be used together with program of [Figure 6.4.1(A)].



[Figure 6.4.1(B)] Rerun program after electric shutdown is restored

[Figure 6.4.1(B)] shows that `_NET0_RST[2]` and `_NET0_LIV[2]` flag is connected in serial in order to monitor when the power of remote station is shutdown and restored, and in this case NDR output of function block is cleared respectively in order to perform the initialization program in [Figure 6.4.1(A)]. As `_NET0_RST[2]` flag maintains the final value until the user clears it, you should clear the value after using as shown on [Figure 6.4.1(B)] to reinitialize once again and reuse in next restore of electric shutdown. .

CHAPTER 7 DIAGNOSIS FUNCTION

7.1 LED Diagnosis Function

7.1.1 Overview

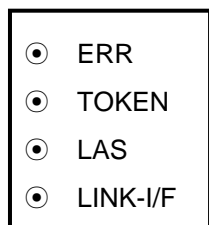
For the error occurred during system installation or normal operation, it is available to verify the error type through LED in front of product. The user can take proper actions to recover the error according to the error type and if there is a significant error in hardware, please contact to LGIS A/S Center.

7.1.2 Rnet I/F master module LED indication

1) **Relevant model** : G3L-RUEA, G4L-RUEA, G6L-RUEA



G7L-RUEA



2) LED indication description

(1) **RUN** : Indicates that the interface with PLC CPU module is going well.

- On : Normal interface with PLC.
- Off : Interface error or interface shutdown.

In case of normal, it seems to be 'On' but the blinking period changes acc.to PLC Scan. Thus, in case that user program scan takes long (more than 200ms) or more than 2 communication modules is installed in PLC to exchange lots of data, it becomes 'ON' intermittently or 'ON' once in 1 or 2 seconds that looks 'OFF' when we see with the naked eye. This happens because lots of communication capacity made the data processing speed down but does not mean the operation error of communication module.

(2) LAS : LED is ON in the station that distributes token to each station in order to send/receive the data with connected communication module.

The communication module the power is supplied first among several communication station becomes to have LAS and for only one station among all station connected by single network, LAS LED shall be 'ON'.

- On : On the way of performing the function by link Active Scheduler(LAS).
- Off : Performing the function by link master (LM).

(3) TOKEN : Indicates to receive the circulating Token from LAS and transmit the sending data. In case that there are lots of stations connected to the network and there are a great amount of sending per station, this blinks in slow speed.

- On : Holding the circulating token at present.
- Off : Not holding the Token.


(4) TX/RX : Indicates to receive the data from other station or transmit its own data to other station.

- On : indicates 'in sending' or 'in receiving'
- Off: indicates there is no sending/receiving frame.

(5) FAULT(ERR) : Indicates whether the error occurs in communication module or no. In case of normal operation, it is 'OFF' and if the error not possible to operate normally occurs, this blinks by 1 second interval and indicates 5 types of error LED 0(RUN) ~ LED 4(FAULT).

(6) LINK-I/F : Interface LED. This is ON when sending/receiving between Fnet and PLC CPU.

In case of normal operation after making high speed link RUN, it seems to be ON but if high speed link is Disable, this blinks by 2 second interval. This blinks depending on the time that information exchange protocol data between PLC CPU and LINK is exchanged by 2 second interval.

 If LED blinks intermittently, this means that there must be a problem in the communication module connected to network, communication cable, end resistance, connection state, double station no. etc. and it is required to check the following items.

- ① Is end resistance connected correct ?
- ② Is the cable connected tightly ?
- ③ Is the shield cable of communication cable connected with connector body ? (it should be connected.)
- ④ Is the cable and end resistance suitable for the spec. of product ?
- ⑤ Is total length of cable less than 750m ?
- ⑥ Is there any double station no. ?

CHAPTER 7 DIAGNOSIS FUNCTION

[Table 7.1.2]. Rnet I/F master module LED indication

Classifi.	Error type	LED state	Error Description
RMM_00	When power ON	● ○ ○ ○ ○	Internal memory 1 self diagnosis
RMM_01		○ ● ○ ○ ○	Internal memory 2 self diagnosis
RMM_02		○ ○ ● ○ ○	Communication itself diagnosis
RMM_03		○ ○ ○ ● ○	CPU and interface diagnosis
RMM_04	Normal communication	● ○ ● ● ○	In case that module is not LAS
RMM_05		● ● ● ● ○	In case that module is LAS
RMM_06	Hardware error	● ○ ○ ○ ●	Internal memory 1 self diagnosis error
RMM_07		○ ○ ○ ● ●	Internal memory 2 self diagnosis error
RMM_08		○ ○ ● ○ ●	Communication itself diagnosis error
RMM_09		○ ○ ● ● ●	Error during interface chip diagnosis
RMM_10		○ ● ○ ○ ●	Error during interface RAM diagnosis
RMM_11		○ ● ○ ● ●	Error 1 during CPU& interface diagnosis
RMM_12		○ ● ● ○ ●	Error 2 during CPU& interface diagnosis
RMM_13		○ ● ● ● ●	Error 3 during CPU& interface diagnosis
RMM_14	Sys.operation error	● ○ ○ ○ ●	System error during operation
RMM_15		● ○ ○ ● ●	
RMM_16	Abnormal communication	● ● ○ ○ ●	Network configuration state error
RMM_17		● ● ○ ● ●	Double station no., end resist. error
RMM_18		● ● ● ● ●	Cable cutoff/short circuit
RMM_19		● ● ○ ● ●	Unsuitable cable length or hardware error of this module
RMM_20		● ○ ● ● ●	
RMM_21		● ○ ○ ○ ●	Network configuration state error
RMM_22	Interface error	○ ● ● ● ○	In case interface error(STOP) is LAS
RMM_23		○ ○ ● ● ○	In case interface error(STOP) not LAS
RMM_24	Unrecoverable error	● ● ● ● ●	Hardware error of communication module
RMM_25		● ○ ○ ○ ○	
RMM_26		○ ○ ○ ○ ○	
RMM_27		○ ○ ○ ○ ●	

※ The order of LED position is RUN, LAS, TOKEN, TX/RX, FAULT signal from left.

ON ●, OFF ○, Blink for 1sec. ●, Non-periodic blink or OFF ●, Non-periodic blink ●

G7L-RUEA

Error type	LED state	Error Description
Normal communication	○ ● ○ ●	In case that module is not LAS
	○ ● ● ●	In case that module is LAS.
Rnet communication error	⦶ ● ● ●	End resistance, poor contact, distance out of regulation etc.
	⦶ ● ● ●	
System error	⦶ ● ● ●	Hardware error of Rnet Module

※ The order of LED position is ERR, TOKEN, LAS, LINK-I/F signal.

ON ●, OFF ○, Non-periodic blink ⦶, Blink for 1sec ⦶

7.1.3 Rnet I/F slave module LED indication

1) Relevant model : G3L-RREA, G4L-RREA, G6L-RREA

● RUN
● TOKEN
● TX/RX
● FAULT
● SYS
FAULT

2) LED indication description

(1) RUN : RUN state LED. This indicates that I/O check, I/O refresh operation is being performed normally. This is OFF in case of power error of extended base or when the error occurs for I/O refresh, special module access.

- On : Normal operation of slave.
- Off : Slave operation error.

(2) TOKEN : Indicates to receive the circulating token from LAS and transmit the sending data. In case of normal operation, this blinks. In case that there are lots of stations connected to the network and there are a great amount of sending per station, this blinks in slow speed.


- On : Holding the circulating token at present.
- Off : Not holding the token.

(3) TX/RX : Indicates the state to receive the data from other station or transmit its own data to other station. This blinks in case of normal operation.

- On : Indicates 'in sending' or 'in receiving'.
- Off : Indicates there is no sending/receiving frame.

(4) FAULT

- Blink : When communication error/service error occurs in link module.
- Off : Indicated 'normal operation'.

 If LED blinks intermittently, this means that there must be a problem in the communication cable and it is required to check the following items.

- ① Is end resistance connected correct ?
- ② Is the cable connected tightly ?
- ③ Is the shield cable of communication cable connected with connector body ? (it should be connected.)
- ④ Is the cable and end resistance suitable for the spec. of product ?
- ⑤ Is total length of cable less than 750m ?
- ⑥ Is there any double station no. ?

(5) SYS FAULT : LED to indicate whether the error occurs in communication module or not. In case of normal operation, this is 'OFF' and if the error not possible to operate normally occurs, this blinks by 1 second interval and indicates 5 types of error LED 0 ~ LED 4.

[Table 7.1.3]. Slave group LED indication specification

Classifi.	Error type	LED state	Error description
RSM_00	When power ON	● ○ ○ ○ ○	Internal memory 1 self diagnosis
RSM_01		○ ● ○ ○ ○	Internal memory 2 self diagnosis
RSM_02		○ ○ ● ○ ○	Communication itself diagnosis
RSM_03		○ ○ ○ ● ○	Special module common ram memory diagnosis
RSM_04	Normal	● ● ● ○ ○	In case that module communication is
RSM_05	Hardware error	○ ○ ○ ○ ●	Internal memory 1 self diagnosis error
RSM_06		○ ○ ○ ● ●	Internal memory 2 self diagnosis error
RSM_07		○ ○ ● ○ ●	Communication itself diagnosis error
RSM_08		○ ○ ● ● ●	Special module read/write error
RSM_09		○ ● ○ ○ ●	I/O module read/write error
RSM_10		○ ● ○ ● ●	Module add/remove error, fuse error
RSM_11	Sys.operation error	● ○ ○ ○ ●	System error during operation
RSM_12		● ○ ○ ● ●	
RSM_13	Abnormal communication	● ● ● ● ○	① Cable cutoff, short circuit ② Unsuitable cable length ③ Hardware error of this module ④ Network configuration state error
RSM_14		● ● ● ● ○	
RSM_15		● ○ ○ ● ●	
RSM_16		● ○ ○ ● ●	
RSM_17	Unrecoverable error	● ● ● ● ●	Hardware error of communication module
RSM_18		● ○ ● ○ ●	
RSM_19		○ ○ ○ ○ ○	
RSM_20		○ ○ ○ ○ ●	

※ The order of LED position is RUN, TOKEN, TX/RX, FAULT, SYS FAULT signal from the left.

- ON
- OFF
- Blink for 1 second interval
- Non-periodic blink or OFF
- Non-periodic blink

CHAPTER 8 INSTALLATION AND STARTUP

8.1 Installation and Startup

The communication module should be installed suitable for PLC CPU model and the available communication module and number for installation is shown on the following table.

[Table 8.1] Communication module available for CPU model

CPU type	Available model	Max. available number	Installation position (Slot)	Remarks
GM2	G3L-RUEA	4	Main base I/O	
GM3 K1000S	G3L-RUEA	4	Main base I/O	
	G3L-RREA	1	Main base CPU	Remote I/O
GM4 K300S	G4L-RUEA	2	Main base I/O	
	G4L-RREA	1	Main base CPU	Remote I/O
GM6 K200S	G6L-RUEA	2	I/O	
	G6L-RREA	1	Main base CPU	Remote I/O
GM7	G7L-RUEA	1	Main base I/O	

8.1.1 Rnet I/F master module installation

- 1) Master type includes electric communication module such as G3L-RUEA, G4L-RUEA, G6L-RUEA, G7L-RUEA. It is available to install **max. 4** communication modules for GM1, GM2, GM3 CPU only in main base. In case of mixing other communication module, it is max. 4 including Rnet, Enet(Ethernet) but in case of Cnet(computer link) module, they are included in max.4.
- 2) It is available to install **max. 2 (inclu. Enet, exclu. Cnet)** communication modules for GM4, GM6 CPU in main base and 4 for GM4-CPUB and 8 for GM4-CPUC. (Not possible in extended base)
- 3) For GM7 CPU, **max. 1(exclu. Cnet, Profibus)** communication module is available for installation in main base.

8.1.2 Rnet I/F slave module installation

Slave type includes electric communication modules such as G3L-RREA, G4L-RREA, G6L-RREA.

There is no extended base for GLOFA GM3/GM4 and MASTER- K K1000S/K300S but available to used only in main base. Slave configuration is not available for GMR/GM1/GM2.

[Table 8.1.2] shows the module list available/not available to use with slave and the relevant module can be applied for all slot.

[Table 8.1.2] slave available model

Available module name	Not available module name	
Product name	Product name	Model name
All model of I/O module	Coordinator module	GM1-CORA
	Interface module	All model
A/D, D/A conversion module	Interrupt input module	G <input type="checkbox"/> F-INTA
Temperature conversion (TC,RTD) module	Fnet, Enet, Dnet, Pnet module	G <input type="checkbox"/> L-FUEA/FUOA
		G <input type="checkbox"/> L-EUEA/DUEA
High speed counter module (in case of application of GLOFA network)	PID control module	G <input type="checkbox"/> F-PIDA
	Analog timer	G <input type="checkbox"/> F-AT <input type="checkbox"/> A
	Computer communication module	G <input type="checkbox"/> L-CUEA
	High speed counter module (in case of application of MASTER -K network)	G <input type="checkbox"/> F-HSCA

- ※ In model name, 3,4,6 is corresponded to ☐ .
- ※ High speed counter module is available when communicating the relevant data to network through GLOFA CPU but not available if CPU is MASTER-K.
- ※ For installation of base module, please refer to the manual for installation method per CPU type.

8.1.3 Rnet I/F module installation Procedure

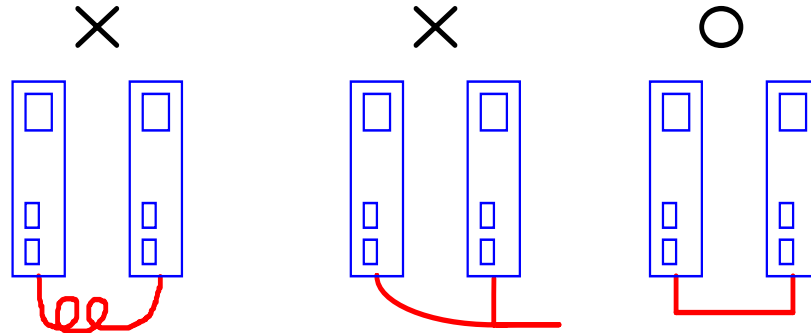
- 1) Install the basic configuration necessary for system configuration and select communication module suitable for the model.
- 2) Install this communication module in the state that PLC power is not applied.
- 3) When installing this communication module, check if there is a foreign material in the base to install the module and check if connector pin of this module is normal.
- 4) All communication module can not be installed in extended base but only in main base.
- 5) For GM2-CPUB, GM3, K1000S model, it is available to install by mixing Rnet master module. But in case of mixing configuration, the number available for installation should be max. 8 (GM2-CPUB), less than GM3/K1000S (inclu. Enet/Dnet, exclu. Cnet).
- 6) When installing this module, insert the protruded part of the module bottom to base board groove correctly in the state that communication cable is not connected, and then apply the sufficient force until the upper part is locked with locking device of base board. If Lock device is not locked, the interface error with CPU may occur.
- 7) In the state that power is not applied, set the station no. and operation mode by using front switch of communication module. In this case, there must be no double station no. in the same network.
- 8) Connect the communication cable after installing electric module, and if this module is final end, install the end resistance in CON1 or CON2. (end resistance value : 110Ω)
- 9) Tighten the cable connector tightly by using tightening screw for complete electric module cable connection. If the installed station is not vertical, it does not matter to connect the both ends of cable to either CON1 or CON2.
- 10) After communication cable connection is completed, apply the power and check if LEDG is operating normally and if normal, download the relevant program by GMWIN for GLOFA series and by KGL-WIN for MASTER-K and execute it.

8.1.4 Notices in Rnet I/F module installation

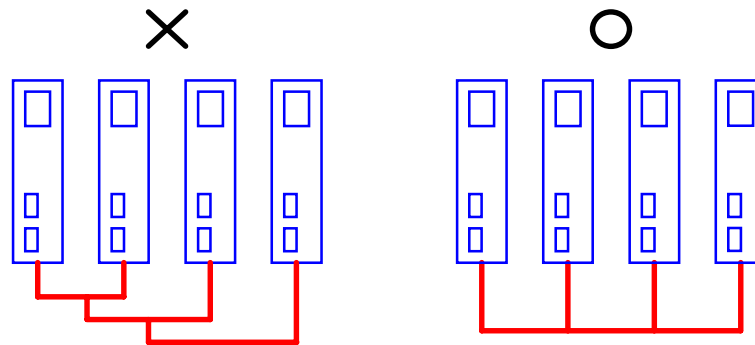
- 1) The station no. of all other station including this module should be different each other. If connected by double station no., it may cause the error in communication which results in preventing the normal communication.
- 2) In case of operating the normal communication, mode switch should be RUN mode. In the state that all other stations connected to network are in communication, if mode switch of this module is changed, it may cause significant obstacle in communication with other stations and cares should be taken for this.
- 3) Use the specified cable for communication cable. If the cable not specified is used, it may cause significant communication obstacle.
- 4) Check if the communication cable is cutoff or short circuited before using for installation.

CHAPTER 8 INSTALLATION AND STARTUP

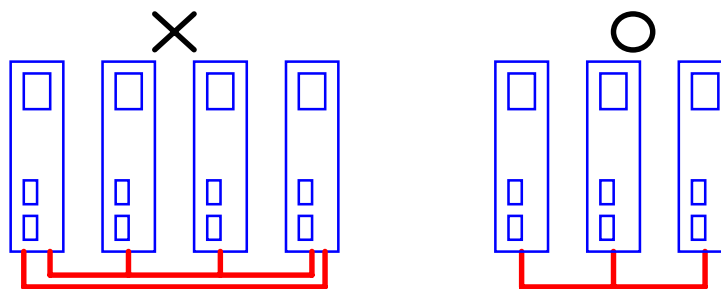
- 5) Tighten communication cable connector to fix the cable connection tightly. If cable connection is not complete, it may cause significant communication obstacle.
- 6) If communication cable is twisted or connected not correctly as shown on the figure, it may cause the communication obstacle.



- 7) It is not allowed to branch the cable off.



- 8) Connect the network connected by communication cable not to be closed circuit.



- 9) In case of connecting communication cable in long distance, cares should be taken for wiring so that cable is far apart from power line or inducing noise.
- 10) Communication cable (twisted pair) shield cable should be connected with 9 pin connector body on both sides completely. (refer to 4.4.1 Electric (twisted pair) cable wiring).
- 11) If LED operation is abnormal, refer to 'Chapter 9 Trouble shooting' of this manual and verify the error cause and if the error continues to occur after taking the action, please contact A/S center.

8.1.5 Rnet I/F module startup preparation

Here describes the contents to verify before startup of Rnet I/F module.

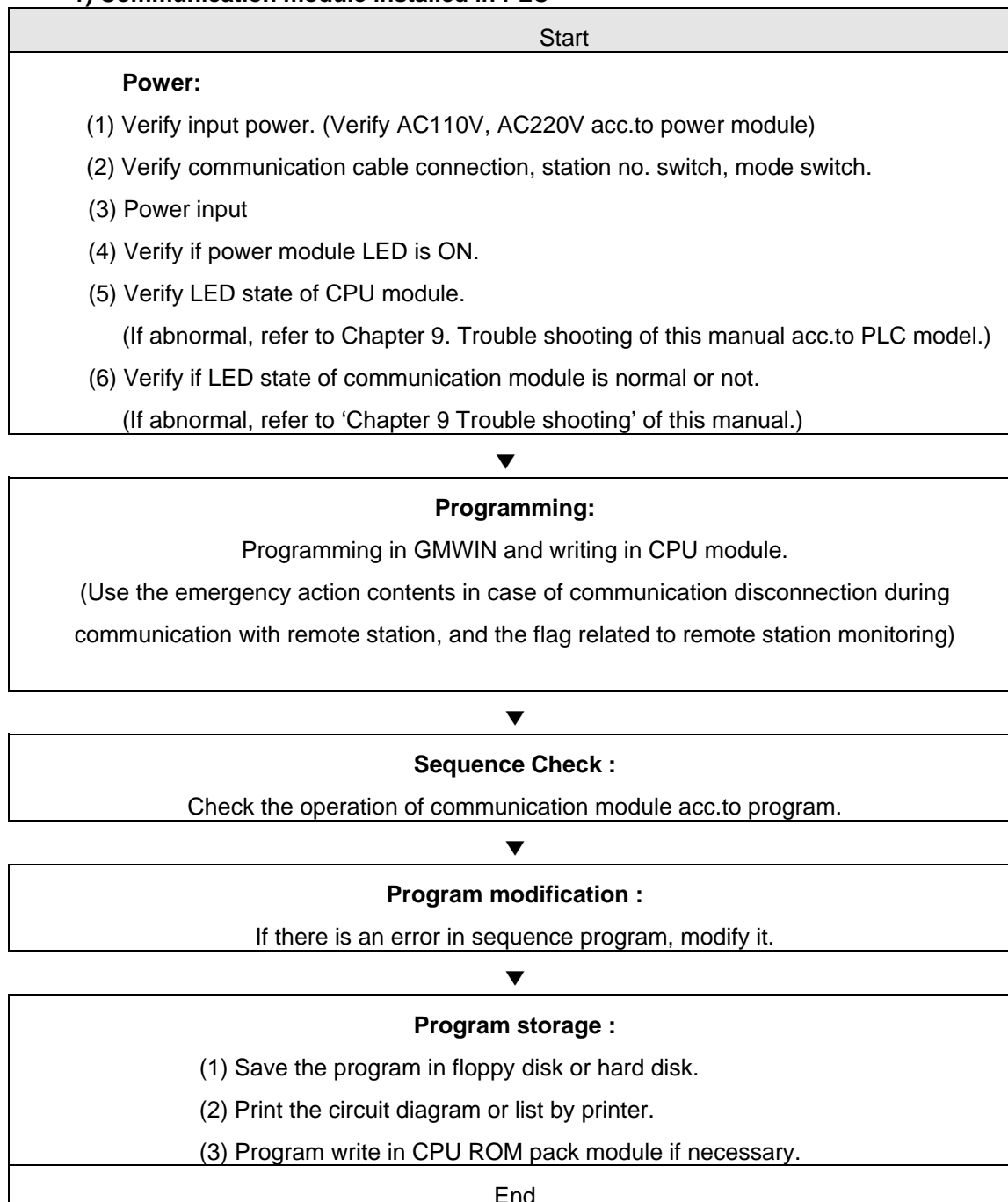
1) Communication module installed to PLC

Checklist	Description
Basic module installation checking	<ul style="list-style-type: none">- Is the voltage of power module suitable for power module spec.?- Is the battery of CPU module connected well?- Is whole basic module installed good? (refer to product manual acc.to each PLC model.)
Communication cable connection state	<ul style="list-style-type: none">- Is connection state of communication cable good?- Is the connection of each cable open loop type?
Module installation	<ul style="list-style-type: none">- Is installation state of communication module connected to main base goodn module?
Switch checking	<ul style="list-style-type: none">- Is mode switch in On-Line (switch value 0) state?- Is station no.switch set correct?- Is mother station no. switch correct? (for slave module)- In case of communication disconnection, is emergency output option switch set as desired? (for slave module)

8.1.6 Rnet I/F module startup procedure

Here describes the procedure from PLC installation completion to startup.

1) Communication module installed in PLC



8.2 Maintenance & Checking

Carry out the daily checking and regular checking in order to maintain communication module in the optimal condition.

8.2.1 Daily checking

1) Rnet I/F master module

[Table 8.4.1(A)] Daily checking items.

Checking items		Description	Judgment criteria	Action
Cable connection state		Cable loosening	No loosening	Tighten the cable
Module connection state		Screw loosening	No loosening	Tighten module screw
Indication LED	RUN LED	Blink	Blink (OFF is to stop interface with CPU)	Refer to Appendix
	LAS LED	'ON' check	One module LED of network whole module should be 'ON'. (if more than 2 is ON, error in network configuration)	Refer to Appendix
	TOKEN LED	Blink	OFF is abnormal (double station or cable error)	Refer to Appendix
	TX/RX LED	Blink	OFF is abnormal (hardware of module error)	Refer to Appendix
	FAULT LED	'OFF' check	Regular blink is system error. Intermittent blink is communication error.	Refer to Appendix

2) Rnet I/F slave module

[Table 8.4.1(B)] Daily checking items.

Checking items		Description	Judgment criteria	Action
Cable connection state		Cable loosening	No loosening	Tighten the cable
Terminal connection state		Terminal screw loosening	No loosening	Tighten terminal screw
		Near approach of compressed terminals	Proper interval	Correction
Indication LED	RUN LED	'ON' check	In case of OFF, power check	Refer to Appendix
	TOKEN LED	'OFF' check	OFF is abnormal. (double station or cable error)	Refer to Appendix
	TX/RX LED	Blink	OFF is abnormal (double station or cable error)	Refer to Appendix
	FAULT LED	'OFF' check	Intermittent blink is communication error (poor cable connection, or poor end resistance connection)	Refer to Appendix
	SYS FAULT LED	'OFF' check	Regular blink is system error (indicates error code by LED)	Refer to Appendix

CHAPTER 8 INSTALLATION AND STARTUP

8.2.2 Regular Checking

Check the following items once or twice within 6 months and take necessary actions as follows :

[Table 8.4.2] Regular checking items

Checking items		Checking method	Judgment criteria	Action
Surrounding environment	Temperature	Measured by thermometer/humidifier	0~55 ℃	Adjust acc. to general spec. (Ex: environment standard inside control panel if using it inside control panel)
	Humidity		5~95 %RH	
	Pollution	Measure the corrosive gas	No corrosive gas	
Module state	Loosening, shaking	Move the communication module.	Strong attachment	Screw tightening
	Dust, foreign materials	Visual examination	No attachment	
Connection state	Terminal screw loosening	Tightening by the driver	No loosening	Tightening
	Approach of compressed terminal	Visual examination	Proper interval	Correction
	Connector loosening	Visual examination	No loosening	Connector fixing screw tightening
Power voltage check		Measure the voltage between AC 110/220V terminal	AC 85~132V AC 170~264V	Change the supply power.

CHAPTER 9 TROUBLE SHOOTING

Here describes a variety of error occurring during system operation, the causes and actions. If the error occurs in communication module, the error contents are displayed by LED of communication module. In this case, read the error type acc.to relevant LED state from the Appendix (Ex:RMM_06) and carry out trouble shooting acc.to error code example (Ex:E00-01) for error indication.

9.1 Abnormal operation type

[Table 9.1(A)] communication module hardware related error

Error code	Error Indication (refer to LED contents)	Error description
E00-01	RMM_06 ~ RMM_10 RMM_24 ~ RMM_27 RSM_05 ~ RSM_10 RSM_32 MCM_06 ~ MCM_09	Hardware self diagnosis error among LED indication per each module
E00-02	RMM_11 ~ RMM_13 MCM_11	Interface diagnosis error with PLC among LED indication per each module
E00-03	FOU_41, FOU_42, FOU_43, FOU_44 FOU_51, FOU_52, FOU_61, FOU_62	FOU group power or hardware error
E00-04	RSM_08 ~ RSM_10	I/O, special module initialization error in slave group

[Table 9.1(B)] abnormal communication state of communication module

Error code	Error Indication	Error description
E01-01	RMM_16 ~ RMM_21 RSM_13 ~ RSM_16 RSM_31, RSM_33	Poor communication in Rnet master and slave group (communication is not smooth)
E01-03	FOU_41, FOU_42, FOU_43 FOU_51, FOU_61	Poor communication in Rnet FOU group (Communication is not smooth)

[Table 9.1(C)] abnormal interface operation with PLC of communication module

Error code	Error Indication	Error description
E02-01	RMM_22, RMM_23 MCM_11	Interface with PLC is not smooth normally in communication module group.
E02-02	RSM_08 ~ RSM_10	Interface error with I/O module in Rnet slave group

CHAPTER 9 TROUBLE SHOOTING

[Table 9.1(D)] abnormal operation of high speed link function

Error code	Error Indication	Error description
E03-01	High speed link parameter error inside error state dialog box	If high speed link parameter is not set or set wrong after online link enable setting, this error may occur in case that parameter is broken.
E03-02	High speed link communication is not available.	In case that the communication is not good as wanted even if high speed link parameter is normal after link enable setting.
E03-03	When performing high speed link, the contacts of _HSxRLNK, _HSxTRX are not ON.	In case that _HSxRLNK is not ON even if high speed link parameter is normal after link enable setting.
E03-04	When performing high speed link, the contact of _HSxLTRBL is ON	In case that _HSxLRLINK is ON by the problem of PLC and communication in the normal state after high speed link _HSxRLNK is ON after link enable setting.

[Table 9.1(E)] abnormal operation of communication command service function

Error code	Error Indication	Error description
E04-01	In case that service is performed by Rnet, ERR contact of communication command is ON and STATUS value is not '0'.	In case that ERR of communication command is ON or NDR/ERR of communication command is not '1'.

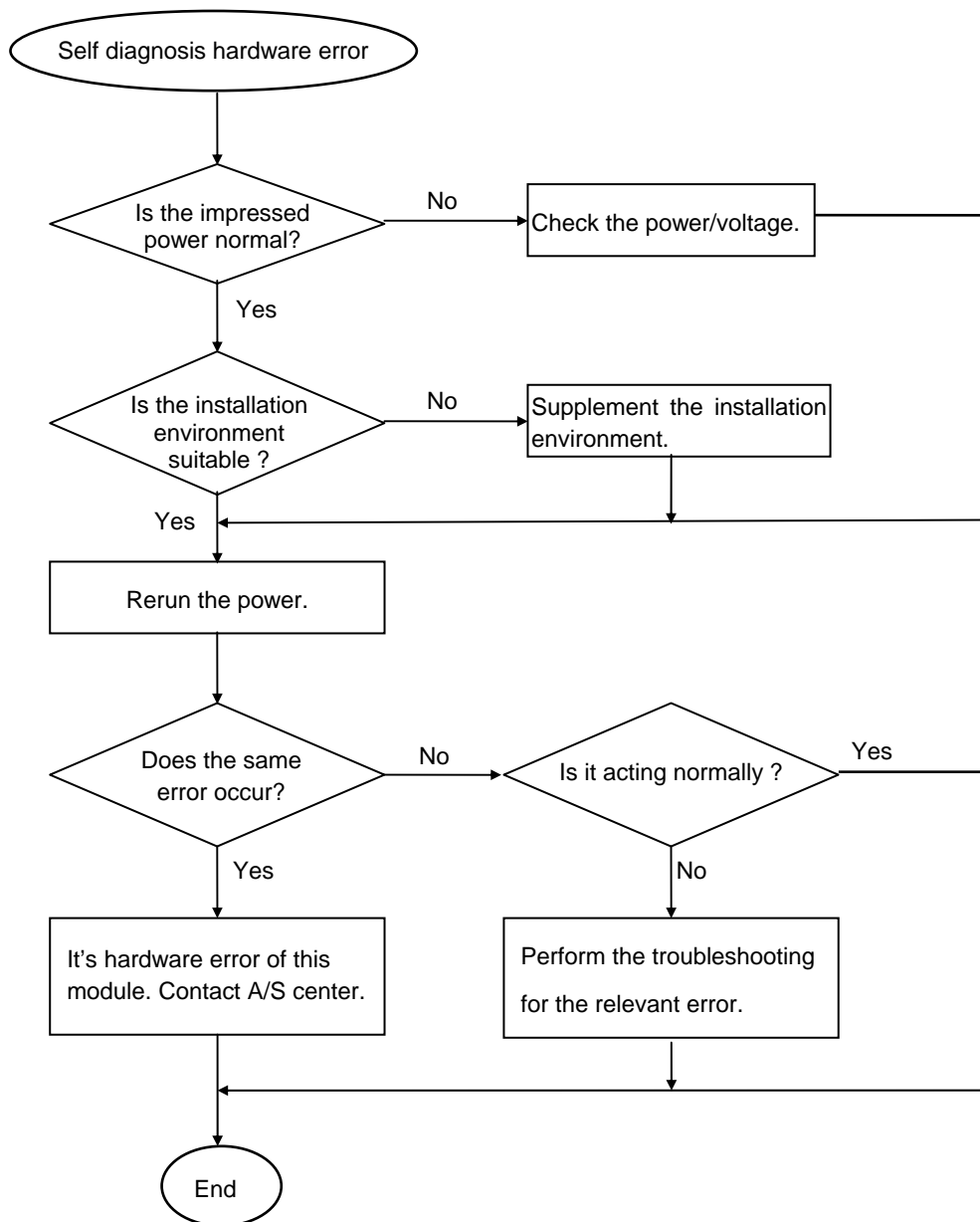
[Table 9.1(F)] operation error of GMWIN communication service function

Error code	Error Indication	Error description
E05-01	When requesting 'remote connect', the message 'no response' is indicated	RS-232C cable between GMWIN and PLC is not connected or PLC power is OFF.
E05-02	When requesting 'remote connect', other error message generates.	As the requested is not suitable, the service is not performed well

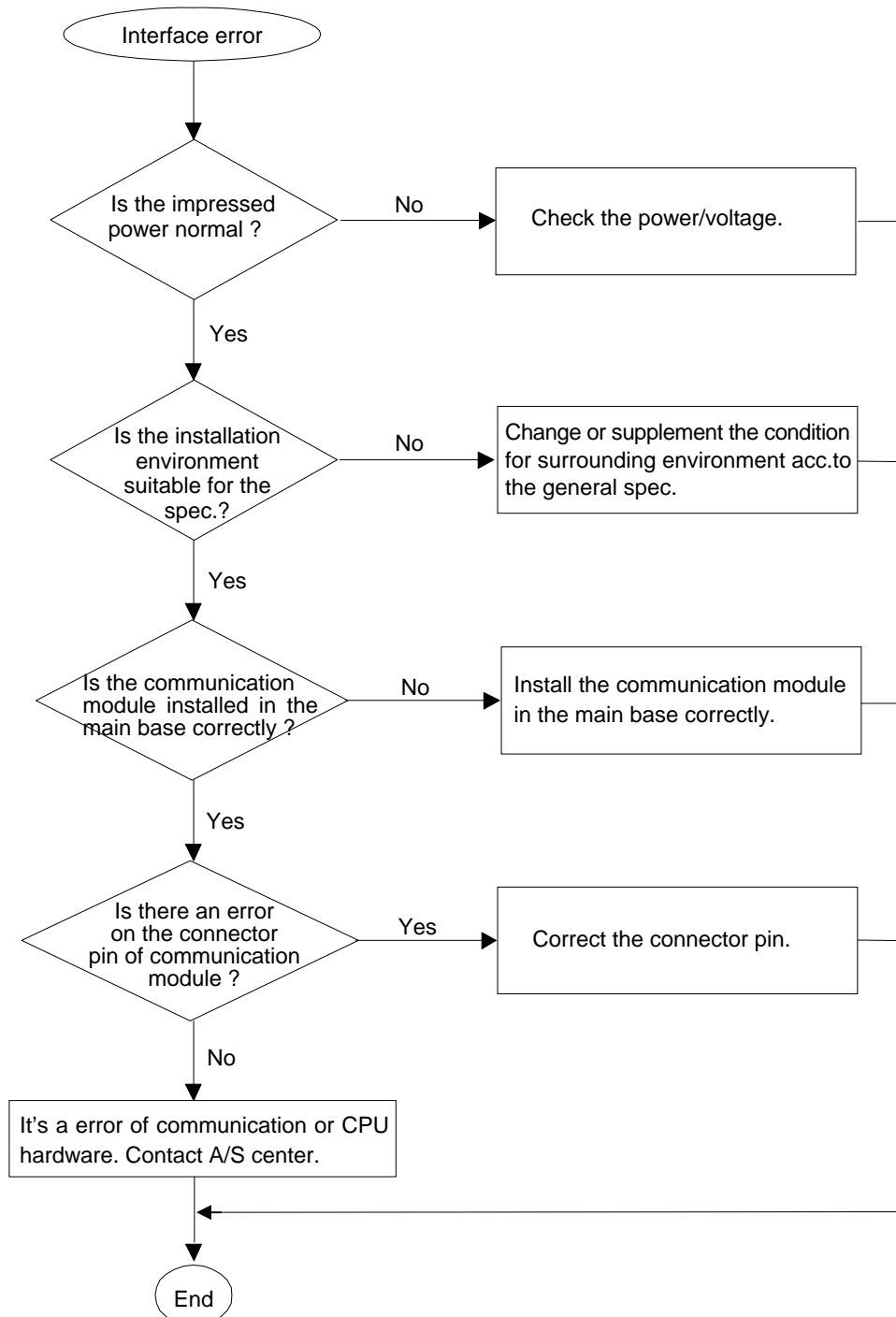
9. 2 Trouble shooting by Error Code

9.2.1 Error code E00-01 : hardware error

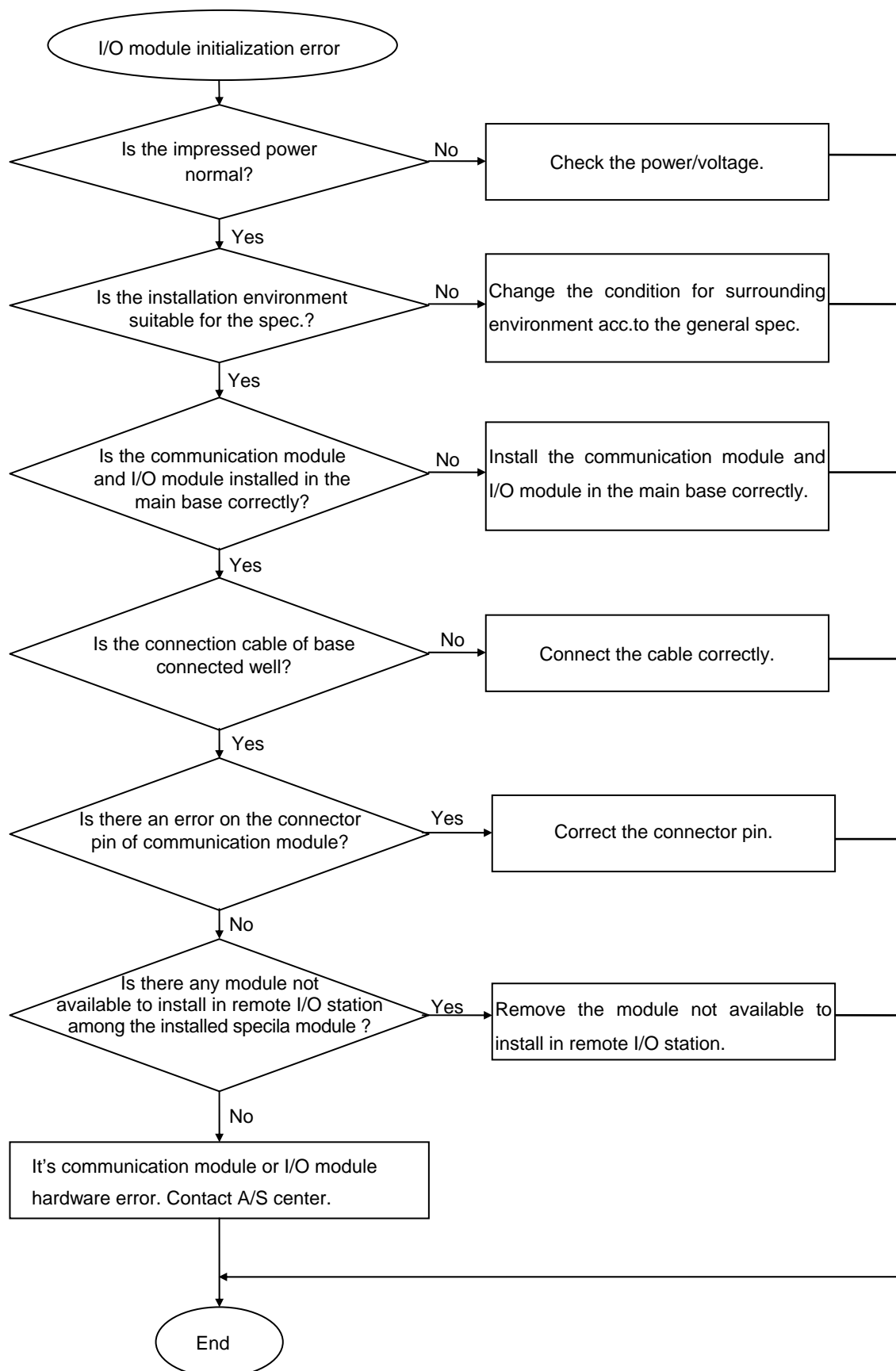
E00-03 : Option module hardware error



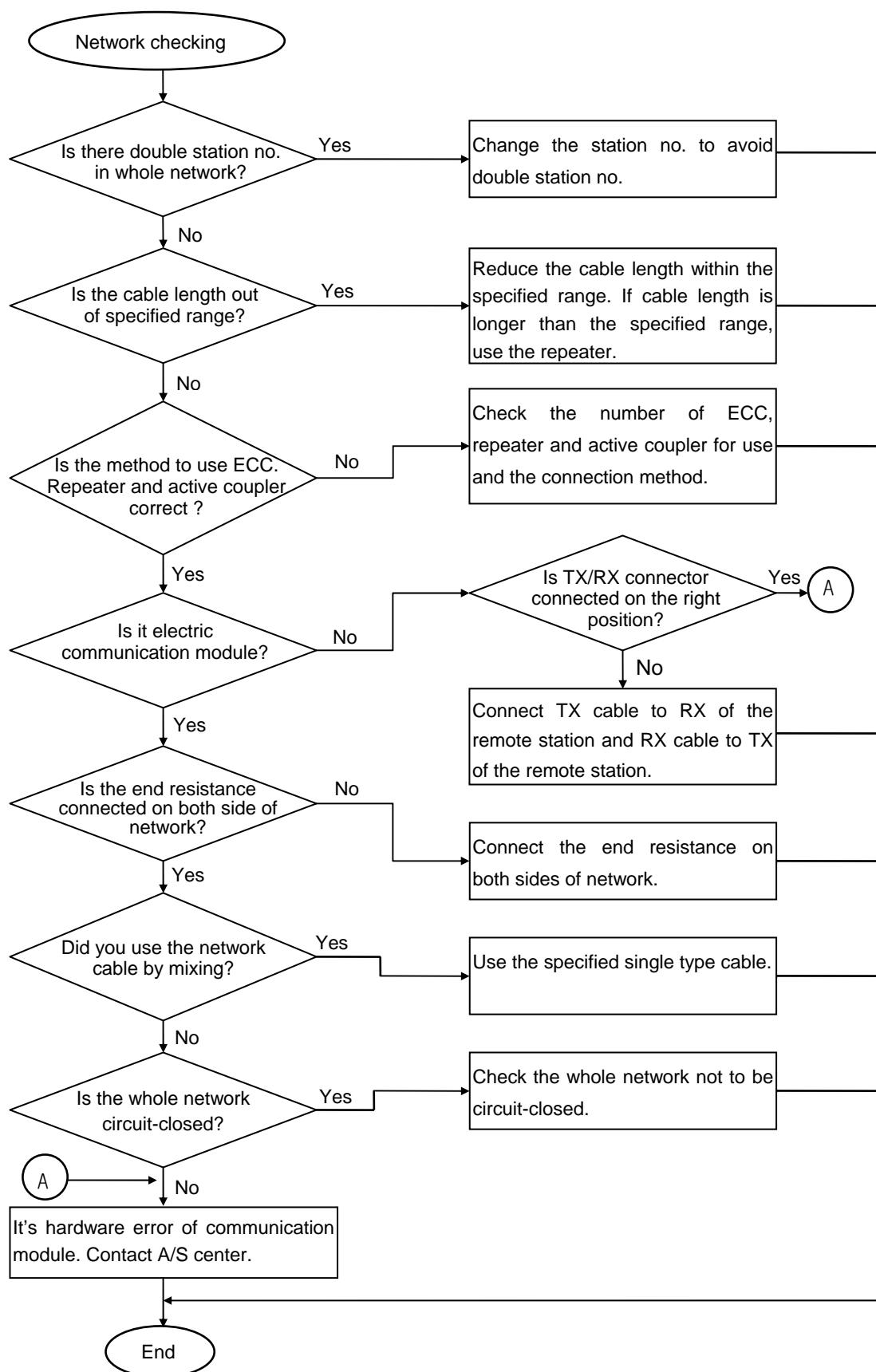
9.2.2 Error code E00-02 : interface error



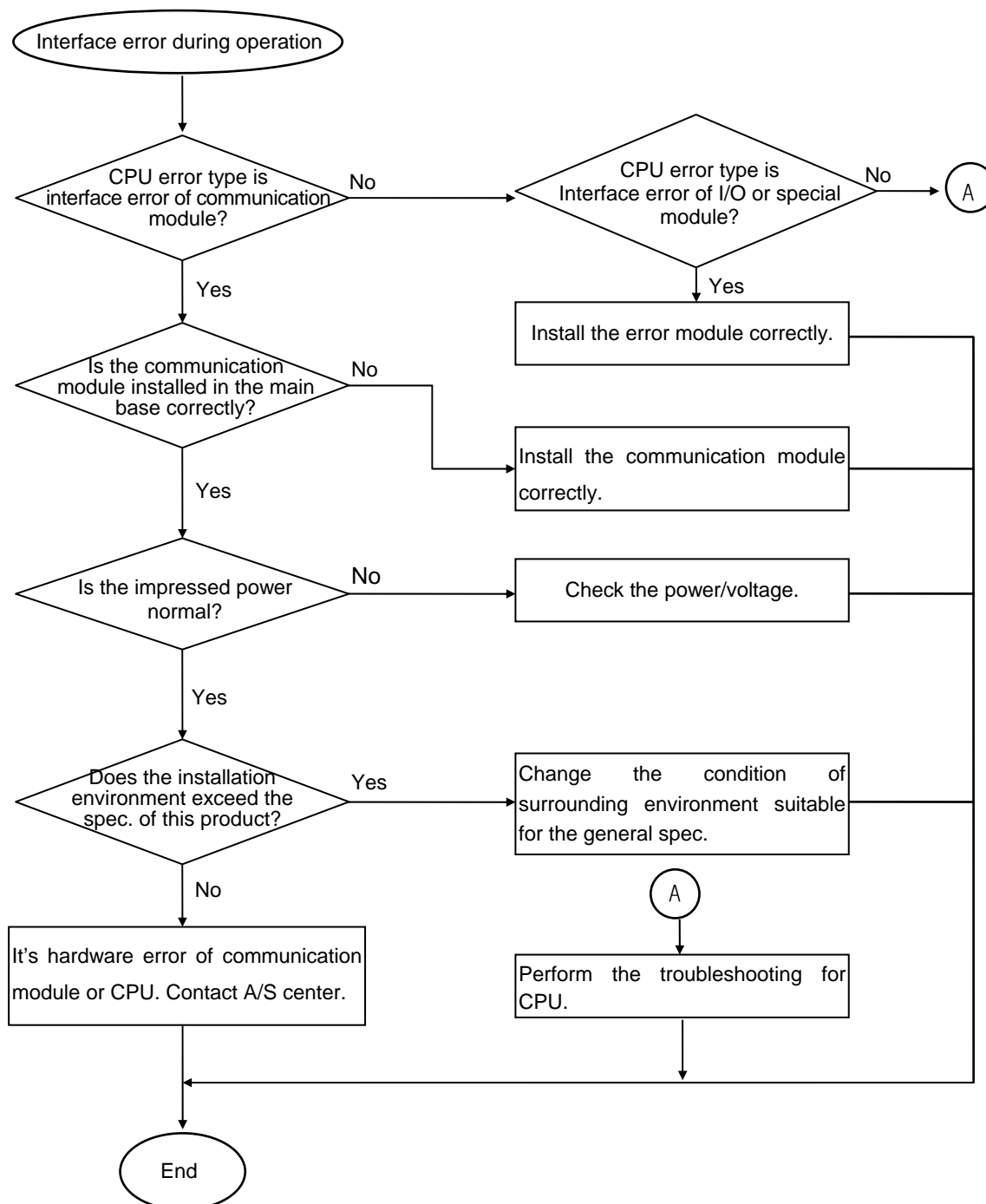
9.2.3 Error code E00-04: RSM(Rnet Slave Module) group I/O initialization error



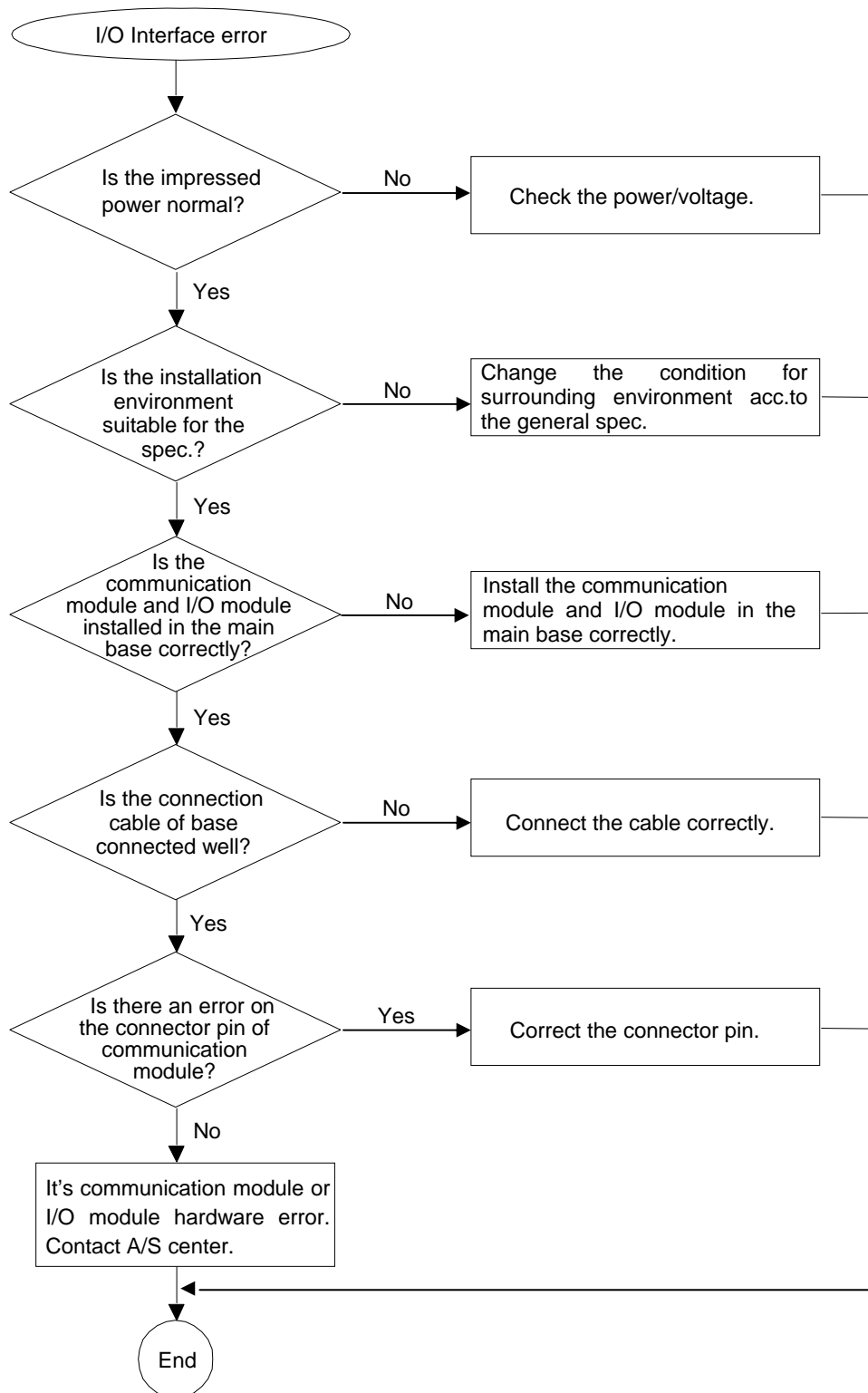
9.2.4 Error code E01-01: Rnet communication error, E01-03:FOU group communication error



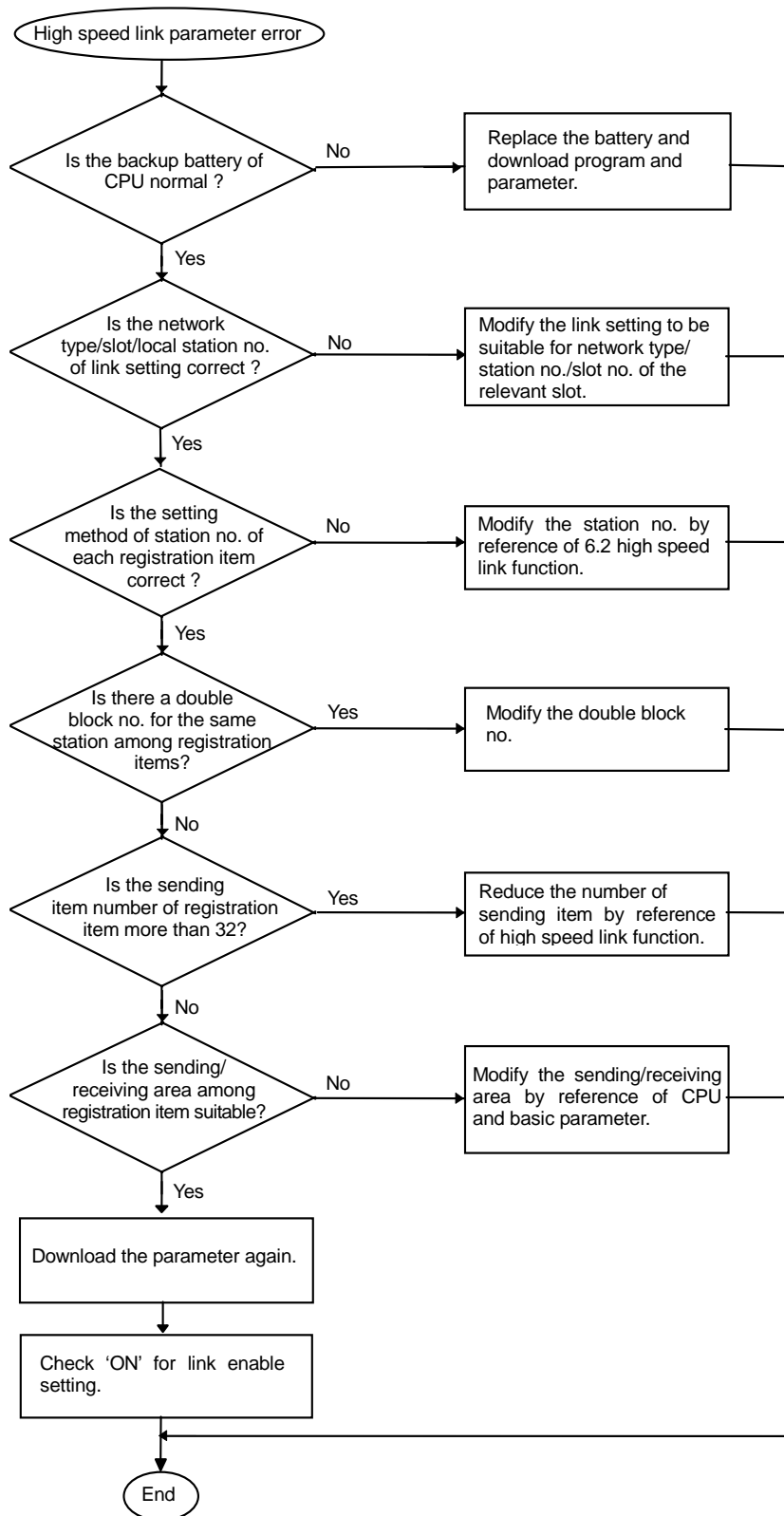
9.2.5 Error code E02-01 : PLC interface error during operation



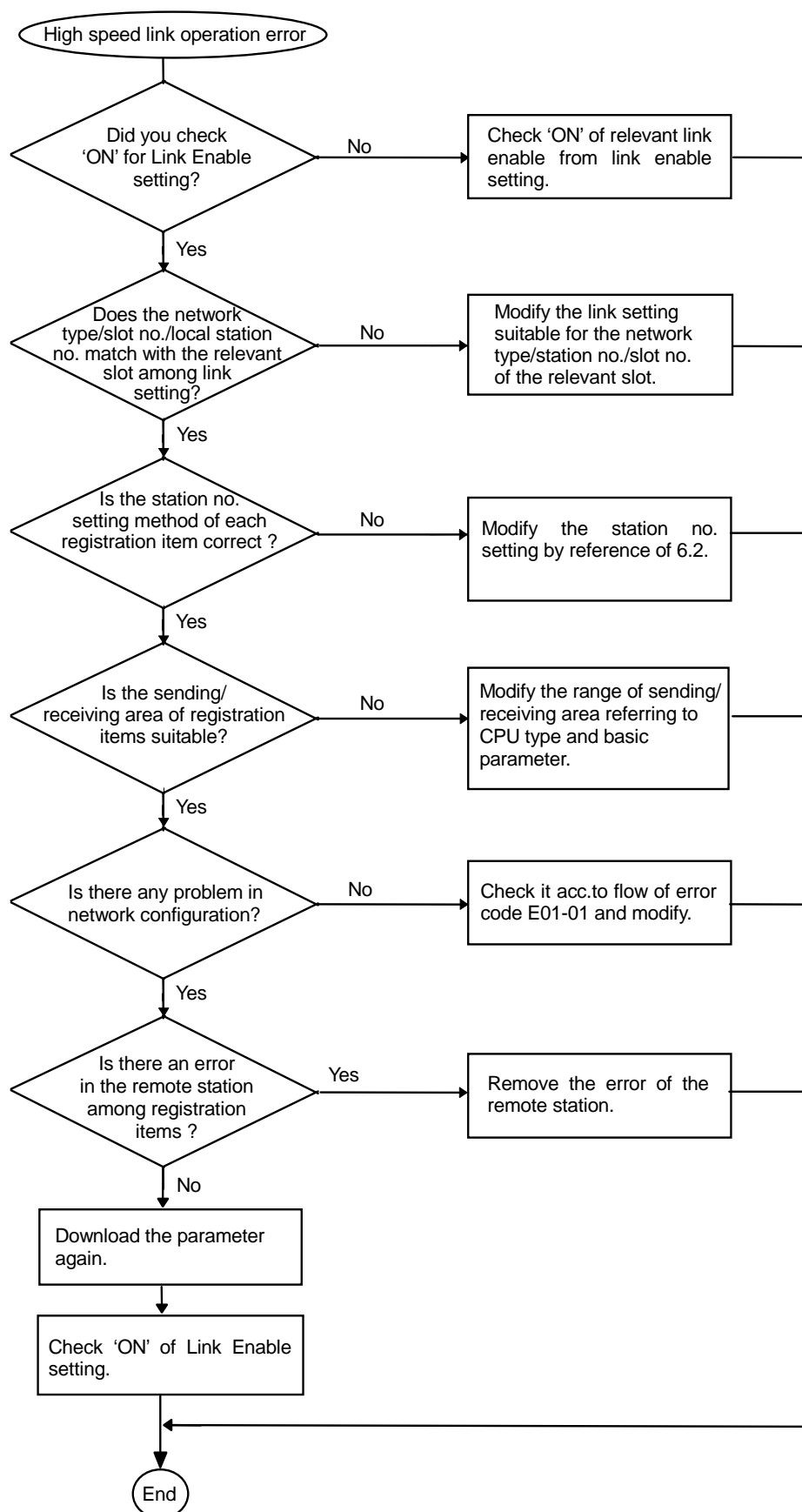
9.2.6 Error code E02-02 : slave add/remove and write interface error during operation



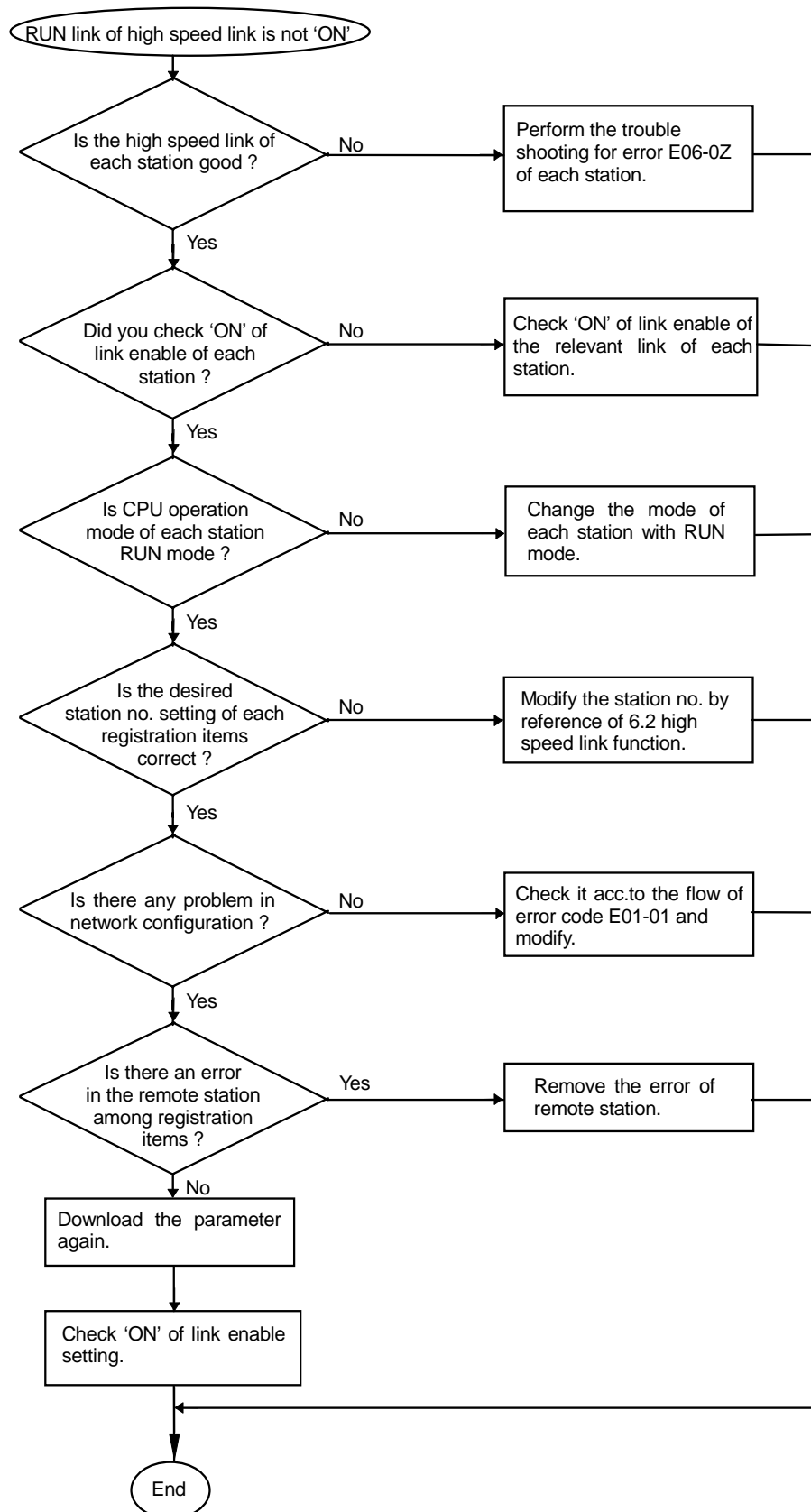
9.2.7 Error code E03-01 : high speed link parameter error



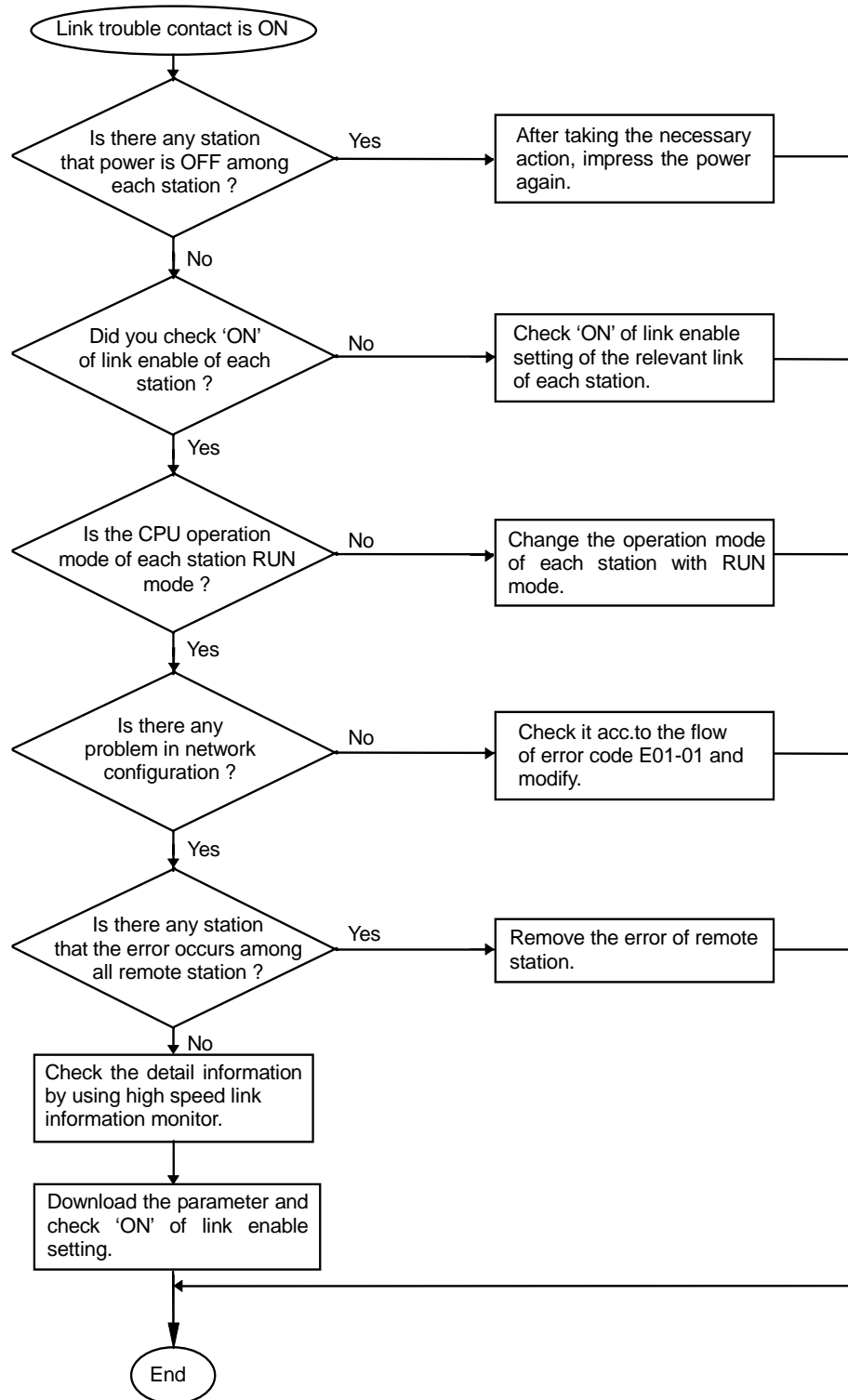
9.2.8 error code E03-02 : high speed link operation error



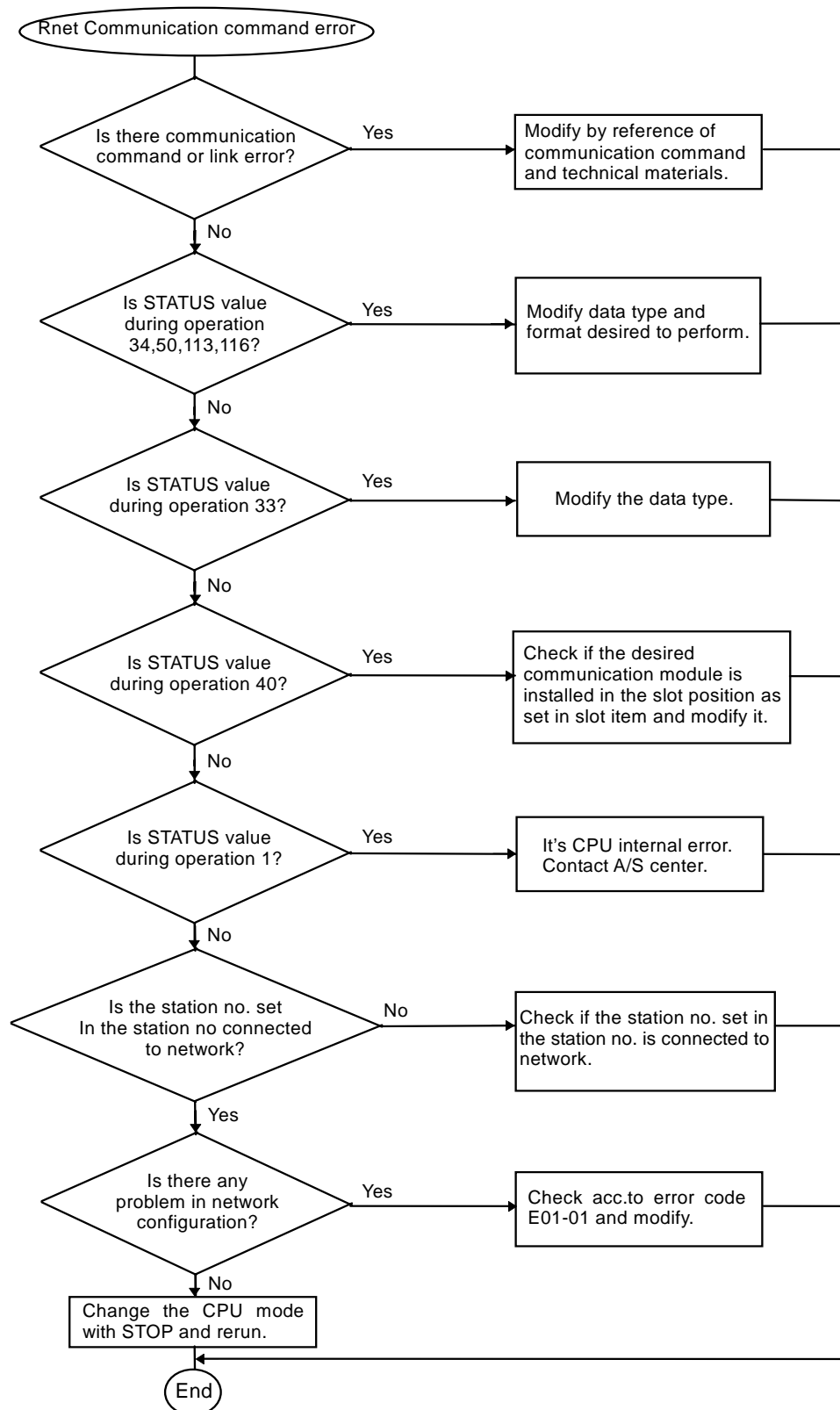
9.2.9 error code E03-03 : high speed link RN LINK contact is not ON



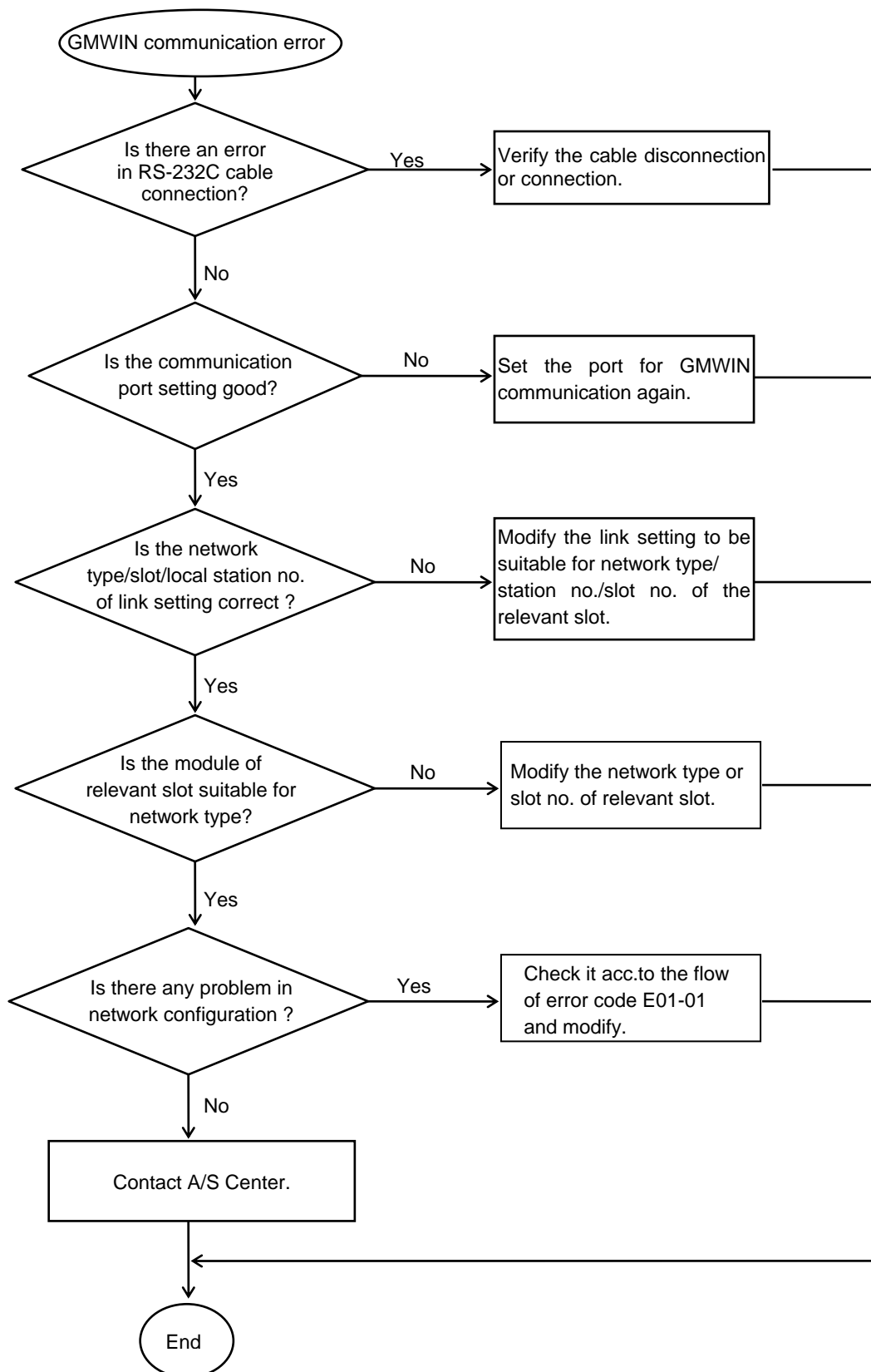
9.2.10 error code E03-04 : high speed link LINK TROUBLE contact is ON



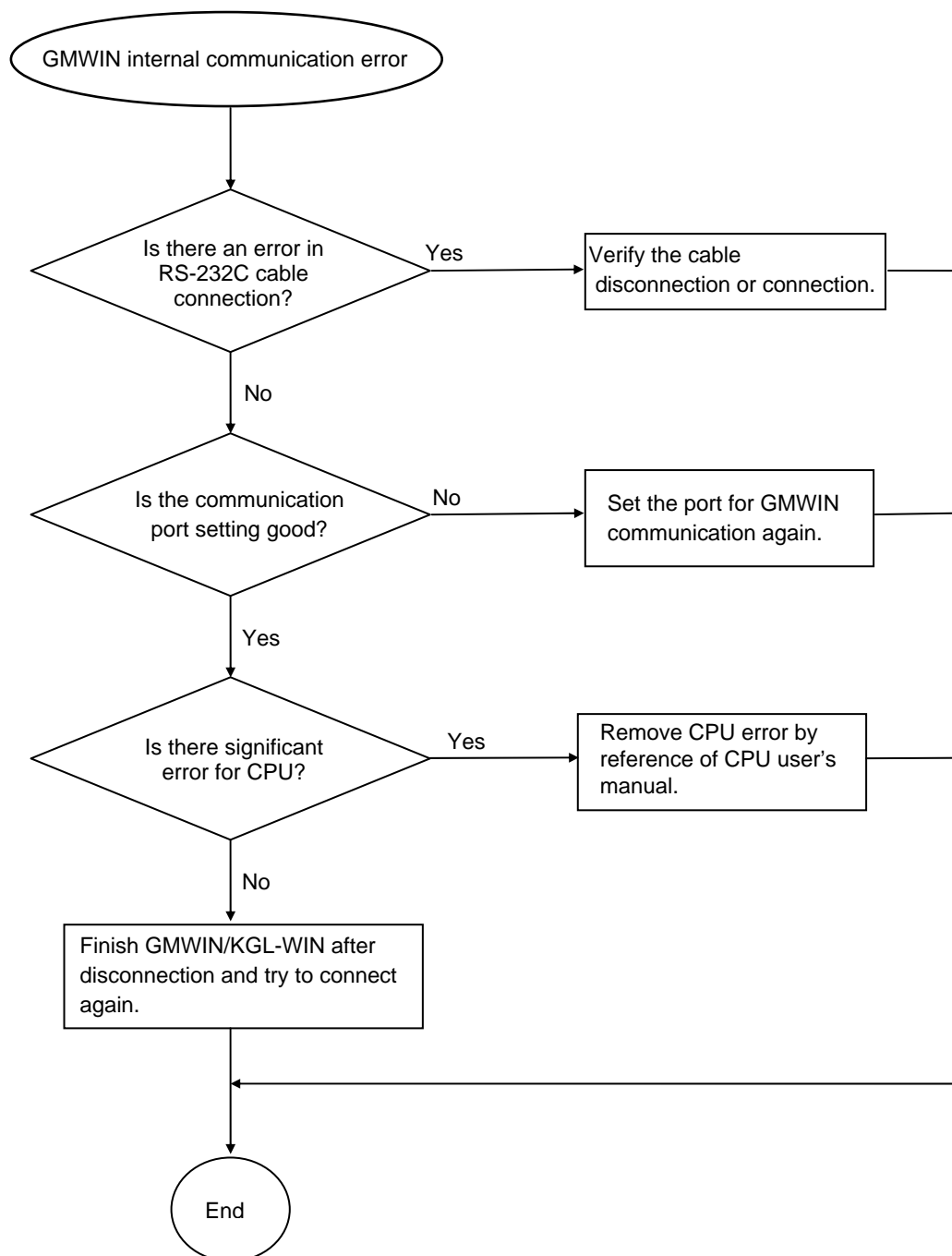
9.2.11 error code E04-01 : Rnet communication command execution error



9.2.12 error code E05-01 : GMWIN communication time out error



9.2.13 error code E05-02 : Rnet GMWIN communication internal error



APPENDIX

A1 Function Block(GLOFA)/Command(MK) STATUS Code Value and Description

A1.1 Error received from communication module

Error no.		Description
GLOFA (decimal)	MK (hexadecimal)	
0	H00	Normal (no error)
1	H01	Link side physical layer error(not available to sending/receiving) - Local station error or remote station power Off, remote station no. write error, failure etc.
3	H03	The identifier of function block to receive does not exist in communication channel. (the value not used in LGIS)
4	H04	Mismatch of data type
5	H05	Receiving 'reset' from other station (the value not used in LGIS)
6	H06	Communication command of remote station is not ready. (the value not used in LGIS)
7	H07	Device state of remote station is not the desired one. (the value not used in LGIS)
8	H08	Not possible to access the object the user wants.
9	H09	Not possible to process communication command of remote station due to too much receiving (the value not used in LGIS)
10	H0A	Response waiting time out - When the response is not received from remote station within the specified period.
11	H0B	Structure error
12	H0C	Abort(local/remote) : disconnection due to serious error
13	H0D	Reject(local/remote) - Error by the format not suitable for MMS or noise
15	H0F	High speed communication and connection service error
33	-	Not available to find variable identifier : it is not defined in the access variable area.
34	H22	Address error - Structure error and range error designated in communication module spec.
50	H23	Response error : in case that the response is not received as requested or remote station CPU error
113	H71	Object Access Unsupported - Violated VMD Specific and Symbolic Address or exceeds data max.length
187	HBB	Receiving by error code except the designated code (code value of other maker's communication) - Code receiving except the defined error code value.

A1.2 Status Value displayed in CPU

1) Error processed in function block

Error no.		Description
GLOFA (decimal)	MK (hexadecimal)	
16	H10	In case the computer communication module position is designated wrong
17	H11	Communication module initialization error installed in SLOT_NO
18	H12	Input parameter setting error
19	H13	Variable length error
20	H14	Receiving the wrong response from remote station
21	H15	In case that not received the response from computer communication module (waiting time exceeding-Time Out)

2) Remote (FSM) function block related STATUS error

Error no.		Description
GLOFA (decimal)	MK (hexadecimal)	
128	H80	FSM power error
129	H81	BASE(Rack) no. error
130	H82	Slot no. error
131	H83	Module information error
132	H84	Data range error(Invalid Range)
133	H85	Data type mismatch
136	H88	Access failure (bus access error)
137	H89	Error except designated code

APPENDIX

A2 Communication Flag

A2.1 Communication flag per slot (special data register)

[Table A2.1] shows the flag used in Rnet that enables to monitor by selecting keyword by flag monitor of KGL-WIN and used in the program by using the relevant device.

[Table A2.1] flag list (in case of installing in slot no.0) x:K1000S=9, K300S/K200S=4, n:0~7(slot position)

Add. No.	Keyword	Type	Contents	Remarks
Dx500 Dx502	_CnSTNOL _CnSTNOH	DWord	Station no. of communication module	Indicates the value set in station no. switch of communication module
Dx504	_CnTXECNT	Word	Communication frame transmission error	In case of transmitting communication frame, increased by one whenever sending error occurs. Communication network connection state is evaluated by this value.
Dx505	_CnRXECNT	Word	Communication frame receiving error	In case of receiving communication frame, increased by one whenever receiving error occurs. Communication network connection state is evaluated by this value.
Dx506	_CnSVCFCNT	Word	Communication service processing error	Increased by one whenever it fails to perform communication service. Communication network connection state is evaluated by this value and total network communication amount and program stability is evaluated.
Dx507	_CnSCANMX	Word	Communication scan time max.(1ms unit)	Indicates max. value among the required time that all station connected to network have the token and transmit the sending frame
Dx508	_CnSCANAV	Word	Communication scan time average (unit : 1ms)	Indicates average value among the required time that all station connected to network have the token and transmit the sending frame.
Dx509	_CnSCANMN	Word	Communication scan time min.(1ms unit)	Indicates min. value among the required time that all station connected to network have the token and transmit the sending frame.
Dx510	_CnLINF	Word	Communication module system information	Indicates communication module operation state by word
Dx510.0	_CnCRDER	Bit	System error (error=1)	Indicates hardware or system O/S error in communication module itself.
Dx510.1	_CnSVBSY	Bit	Common RAM shortage error (RAM shortage=1)	Indicates that service is not available due to shortage of common RAM of communication module
Dx510.2	_CnIFERR	Bit	Interface error(error=1)	Indicates that interface with communication module stops.
Dx510.3	_CnINRING	Bit	Communication (enable=1)	Indicates whether communication module is available to communicate with other station or not.
Dx510.4	_CnLNKMOD	Bit	Operation mode (normal=1)	Indicates whether operation mode is normal mode or test mode
Dx680	_CnVERNO	Word	Communication module versionNo.	Indicates O/S version no. of communication module.
Dx690	_FSMn_st_no	Word	Remote I/O station no.	Designate remote I/O station no. by high 8bit (refer to Point)
Dx690.0	_FSMn_reset	Bit	Remote I/O s/w Reset	_FSMn_st_no defined remote station special module and I/O module initialization
Dx690.1	_FSMn_io_reset	Bit	Remote I/O output Reset	_FSMn_st_no defined remote station I/O module output clear
Dx690.2	_FSMn_hs_reset	Bit	Remote I/O high speed link information initialization	_in case of instant electric interruption of FSMn_st_no defined remote station, operation mode bit of high speed link information shall be off and link trouble shall be 1. if bit is ON to clear this, operation mode bit shall be ON and link trouble shall be 0.

[Table A2.2] calculation of register address no. per slot no.

Slot no.	D area address no.	Remarks
1	Dx511 ~ Dx521	<p>Comparing with flag installed slot no.0 in [Table A4.1], the address no. of flag that slot no. is installed in 'n' is shown as follows.</p> <p>Formula : D area address no. when n=1~7 = [Table A4.1] address no. + 11 × n</p> <p>Ex) average address no. of communication scan time of communication module installed in slot no.6 = Dx508+11×6 = Dx574</p>
2	Dx522 ~ Dx532	
3	Dx533 ~ Dx543	
4	Dx544 ~ Dx554	
5	Dx555 ~ Dx565	
6	Dx566 ~ Dx576	
7	Dx577 ~ Dx587	

Point

- For Dx680, Dx690, as the information is indicated by high 8bit, O/S version no. of communication module installed in slot no.0~slot no.7 up to Dx680~Dx687 is indicated in order and remote I/O station no. of communication module installed in slot no.0~slot no.7 up to Dx690~Dx697 is indicated in order.
- If high 8 bit of _FSM3_st_no(Dx693) is designated as h10, _FSMn_reset, _FSMn_io_reset, _FSMn_hs_reset setting contents are applied only for station no.16 among remote station connected to communication module slot no.3. If designated as hFF, the setting contents are applied for all remote station connected to slot no.3.

APPENDIX

[Table A2.3] L area list in case of using data link module (in case that installed in slot no.0)

x : slot no., n : remote station no.

Keyword	Address no.		Description
_NETx_LIV[n]	L0000 ~ L003F	L0000 ~ L000F (0~15station)	This is the flag indicating that remote station power is normal and the data is sending/receiving with remote station normally through communication cable, as alive information of remote station (read only)
		L0010 ~ L001F (16~31station)	
		L0020 ~ L002F (32~47station)	
		L0030 ~ L003F (48~63station)	
_NETx_RST[n]	L0040 ~ L07F	L0040 ~ L004F (0~15station)	This is the flag indicating that remote station is restored in case that remote station is shutdown on communication network due to electric failure or cable add/remove etc. and then restored., as power restore information of remote station..(read/write available)
		L0050 ~ L005F (16~31station)	
		L0060 ~ L006F (32~47station)	
		L0070 ~ L007F (48~63station)	

Point

1) n means station no. of remote station (0 ~ 63) and x means slot no. that communication module is installed.

When slot no. is 'x', add 8x to the value when slot no. is '0'. L area address no. per slot no. are shown on the table below.

Slot no.	Address no.	Remarks
1	L0080 ~ L015F	*. Recognized 8 word per slot *. Low 4 word of 8word is Alive information and high 4 word is Reset information.
2	L0160 ~ L023F	
3	L0240 ~ L031F	
4	L0320 ~ L039F	
5	L0400 ~ L047F	
6	L0480 ~ L055F	
7	L0560 ~ L063F	

2) For L area, as the address no. is classified acc.to station no. that communication module or computer link module is installed, it is available to use L area of slot that communication module or computer link module is not installed, as internal relay.

APPENDIX

A2.2 High speed link detail flag

[Table A2.4] high speed link detail flag

x : K1000S=9, K300S/K200S=4 m : high speed link no.

Keyword	Type	Bit position	Contents	Description
_HSmRLINK	Bit	Dx600.0	RUN_LINK information of high speed link	Indicates that all station is operated normally as the parameter set in high speed link and this is ON under the following condition. 1. All station set in the parameter is RUN mode and no error 2. All data block set in the parameter is communicated normally 3. The parameter set in each station set in the parameter is communicated normally Once RUN_LINK link is ON, it maintains ON until it stops by LINK DISABLE.
_HSmLTRBL	Bit	Dx600.1	Abnormal information of high speed link (LINK_TROUBLE)	When the communication state of station and data block set in the parameter in the state that _HSmRLINK is ON, is as follows, this flag shall be ON. 1. Station set in the parameter is not RUN mode, 2. There is an error in the station set in the parameter, 3. The communication state of data block set in the parameter is not smooth. Link trouble is ON when the above 1,2,3 condition occurs and if the condition returns to normal state, this will be OFF again.
_HSmSTATE[k] (k=0~63)	Bit Array	Dx601.0 ~ Dx604.15	General communication state information of k data block set in high speed link parameter	Indicates general state of communication information for each data block of the setting parameter. _HSmSTATE[k] = _HSmMOD[k] & _HSmTRX[k] & _HSmERR[k]
_HSmMOD[k] (k=0~63)	Bit Array	Dx605.0 ~ Dx608.15	Mode information (RUN = 1, other = 0)	Indicates the operation mode of station set in k data block of parameter.
_HSmTRX[k] (k=0~63)	Bit Array	Dx609.0 ~ Dx612.15	State information (normal=1, abnormal=0)	Indicates whether the communication state of k data block of parameter is good as setting
_HSmERR[k] (k=0~63)	Bit Array	Dx613.0 ~ Dx616.15	State information of station set in k data block in high speed link parameter (normal=1, abnormal=0)	Indicates whether the error occurs in the station set in k data block of parameter.

[TableA2.5] high speed link detail flag when m=1~3

High speed link type	D area address	Remarks
High Speed Link2 (m=1)	Dx620 ~ Dx633	Comparing with [Table A4.3] when m=0, D area address when m=1~3 is as follows. Formula : D area address when m=1~3 = [Table A3.3] address no. + 20 × m
High Speed Link3 (m=2)	Dx640 ~ Dx653	
High Speed Link4 (m=3)	Dx660 ~ Dx673	

Point

'k' is shown through 4 word (16 for 1 word) for the information of 64 block (0~63) as block no. For example, for mode information(_HSmMOD), the information of block 0~15 is shown for Dx605, block 16~31, 32~47, 48~63 for Dx606, Dx607, Dx608, respectively. Thus, mode information for block no. 55 is shown on Dx608.7.

Ex) Dx600.1 = Dx600 no.1 bit

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Dx600																

A2.3 Salve system flag

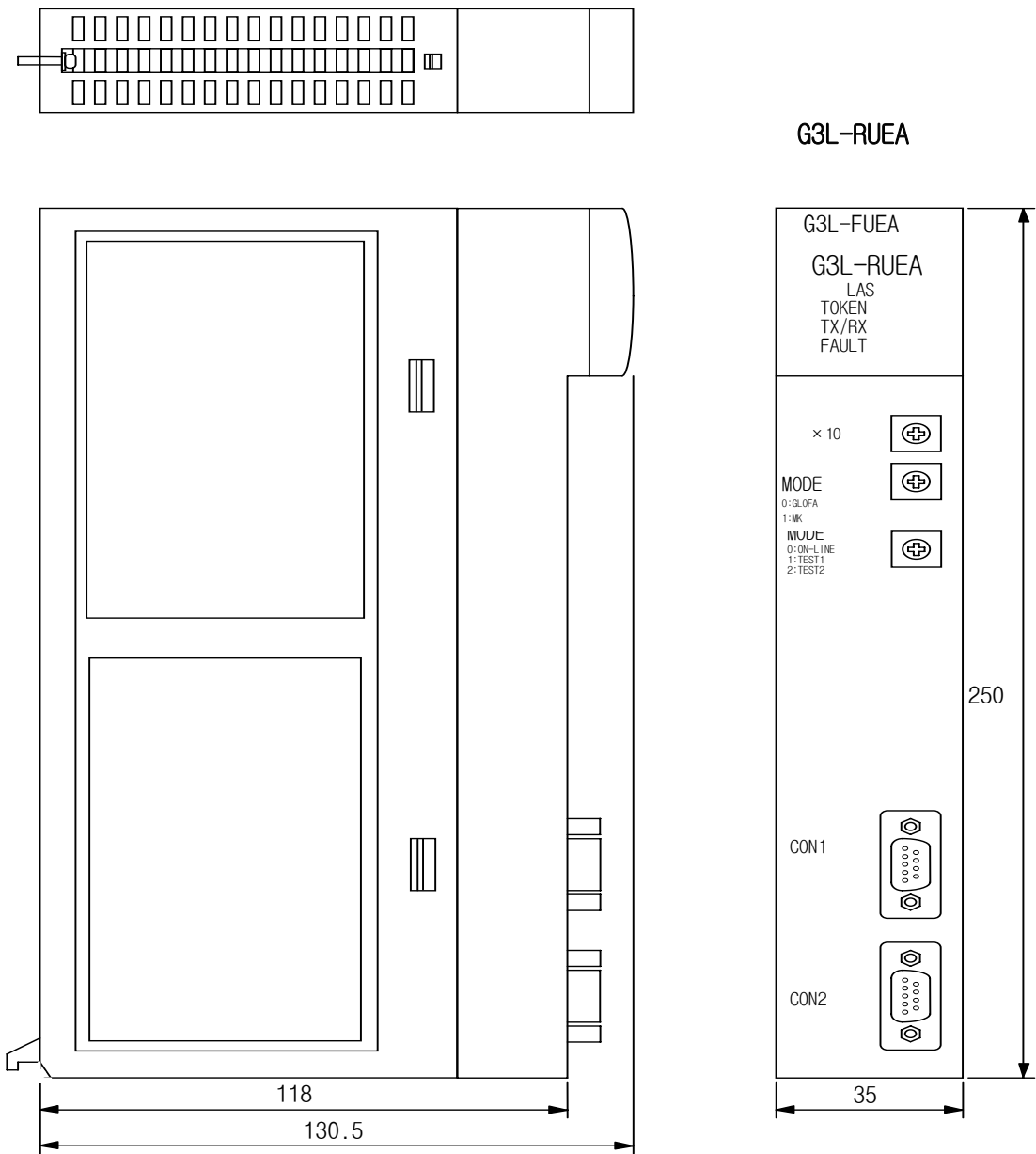
[Table A2.6] slave system flag

Key Word	Contents	Start address (hexadecimal)	Data type	Size	Remarks
_CPU_Type	Remote CPU Type	h0000	Word	2 Byte	
_VER_NUM	O/S Version Number	h0002	Word	2 Byte	
_SYS_STATE	System state	h0004	Word	2 Byte	
_FSMTXECNT	TX error count	h0006	Word	2 Byte	
_FSMRXECNT	RX error count	h0008	Word	2 Byte	
_FSMSVCFcnt	Service failure count	h000A	Word	2 Byte	
_FSMScanMX	Max.scan time	h000C	Word	2 Byte	
_FSMScanAV	Average scan time	h000E	Word	2 Byte	
_FSMScanMI	Min.scan time	h0010	Word	2 Byte	
_MOTHSTNO	Master station no.	h0012	Word	2 Byte	
_FSMVRcnt	Variable RD count	h0014	Word	2 Byte	
_FSMVWCNT	Variable WR count	h0016	Word	2 Byte	
_FSMHSTXCNT	High speed link TX count	h0018	Word	2 Byte	
_FSMHSRXCNT	High speed link RX count	h001A	Word	2 Byte	
_AC_Fail_CNT	Power Fail count	h001C	Word	2 Byte	
_CNF_ER d0 : _CPU_ER d1 : _IO_TYER d2 : _IO_DEER d3 : _FUSE_ER d4 : _IO_RWER d5 : _IP_IFER d6 : _PWR_ERR	Representative flag CPU H/W error Module setting error Module add/remove error Fuse cutoff error I/O access error I/P access error SUB POWER error	h001E	Word Byte 0 Byte 1 Byte 2 Byte 3 Byte 4 Byte 5 Byte 6	2 Byte	Byte information (d7 ~ d15 is reserved Byte)
_IO_TYER_N	Module setting error	h0020	Word	2 Byte	
_IO_DEER_N	Add/remove error	h0022	Word	2 Byte	
_FUSE_ER_N	Fuse error	h0024	Word	2 Byte	
_IO_RWER_N	I/O error	h0026	Word	2 Byte	
_IP_IFER_N	Special module error	h0028	Word	2 Byte	
_KGL_CNF d0 : local conn. d1 : remote con.	KGL-WIN connection state	h002A	Byte	1 Byte	
_E_DATA_OPTION	Emergency data output format	h002B	Byte	1 Byte	0 : output latch 1 : user definition

A3 External Dimension

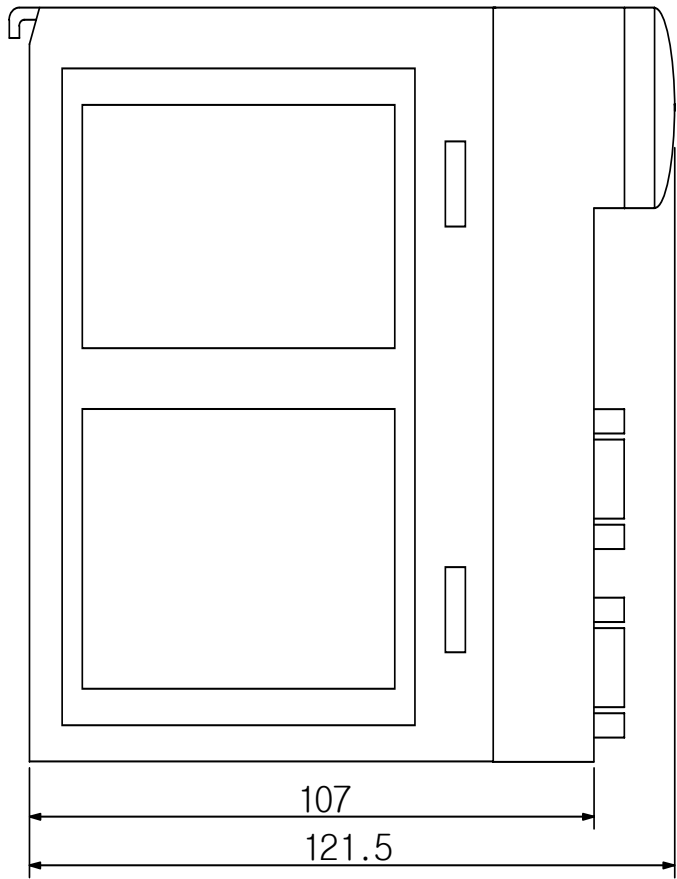
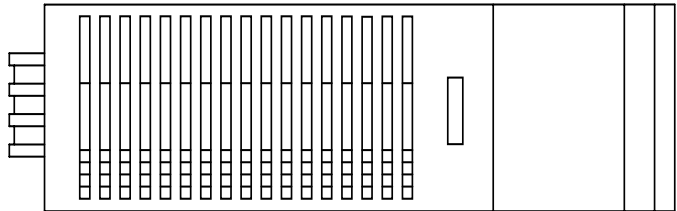
A3.1 For GM1/2/3 installation

Model: G3L-RUEA, G3L-RREA

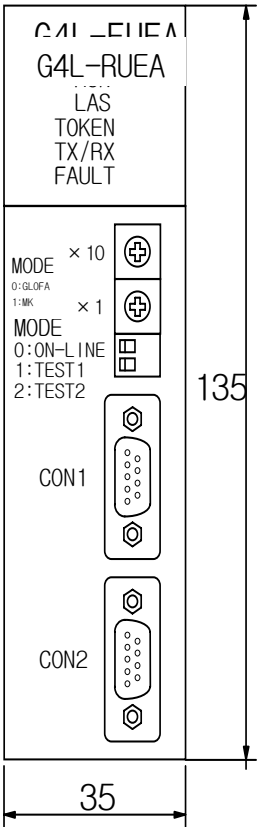


A3.2 For GM4 installation

Model : G4L-RUEA, G4L-RREA

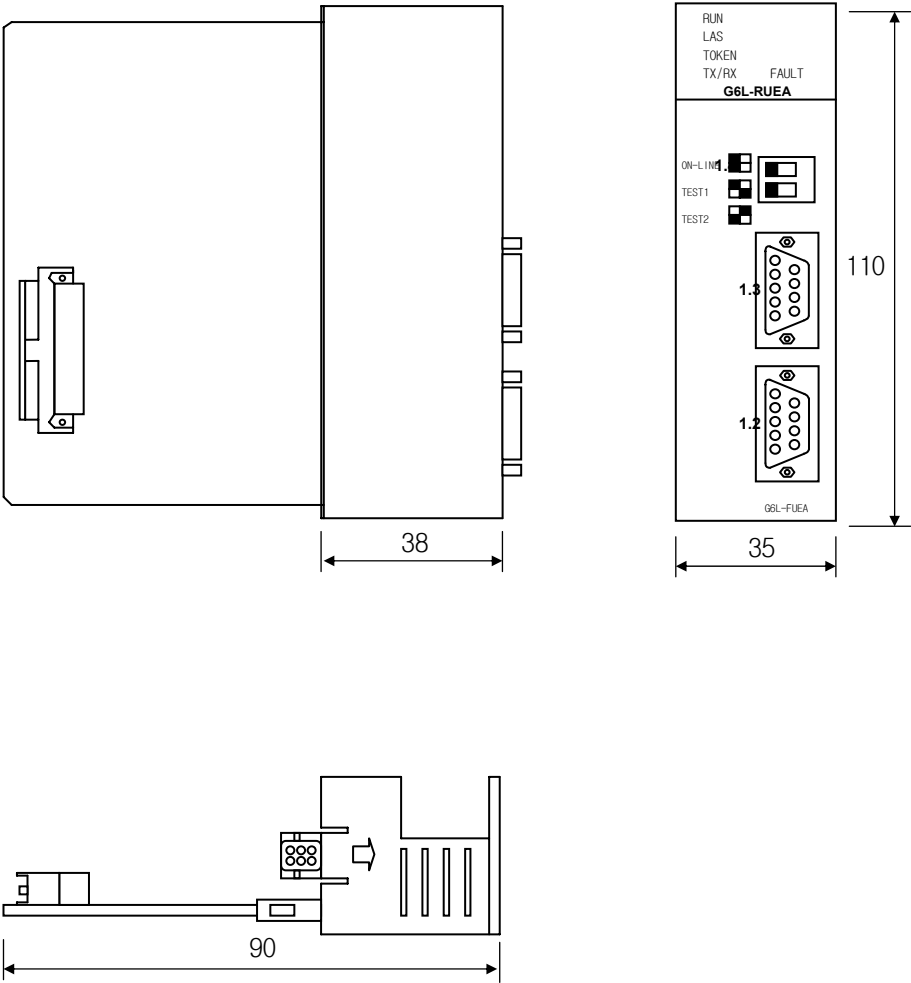


G4L-RUEA



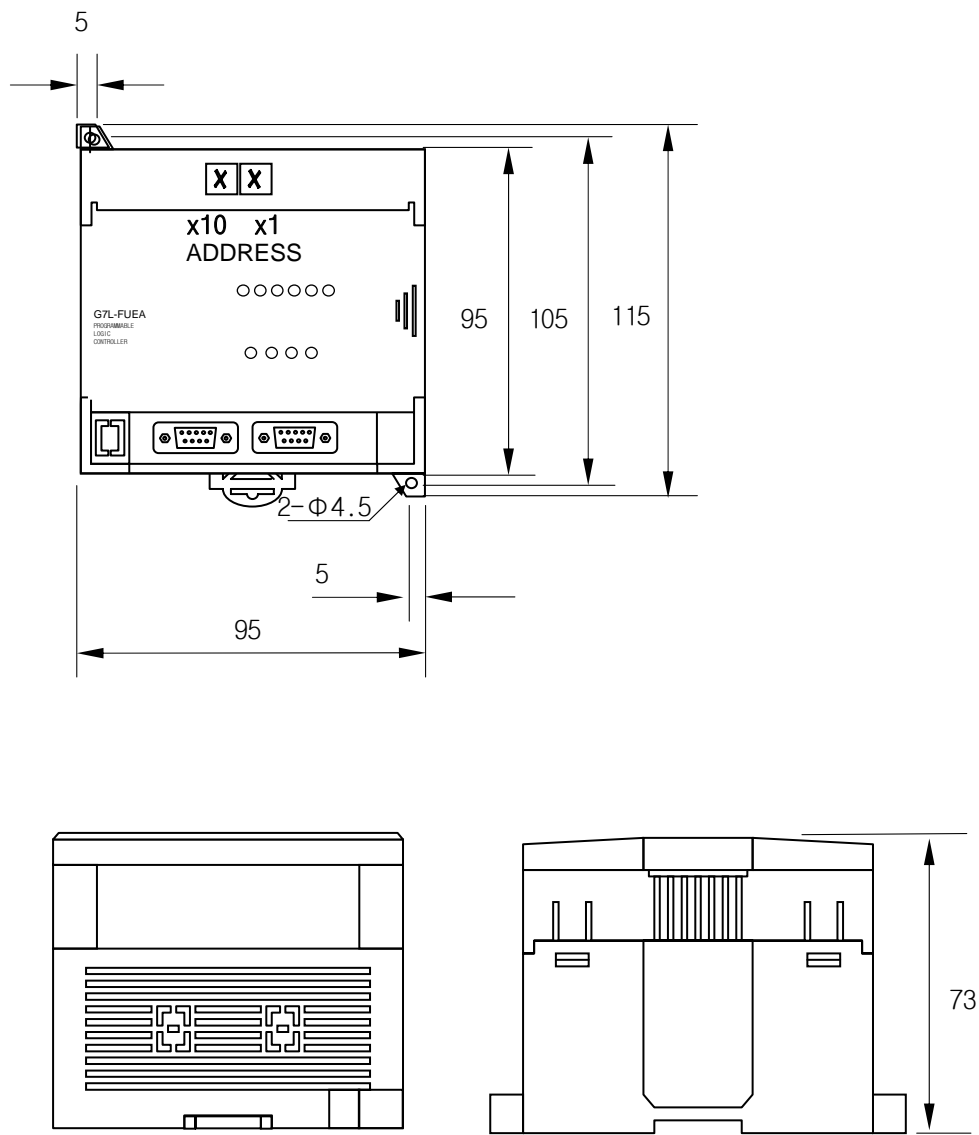
A3.3 For GM6 installation

Model : G6L-RUEA, G6L-RREA



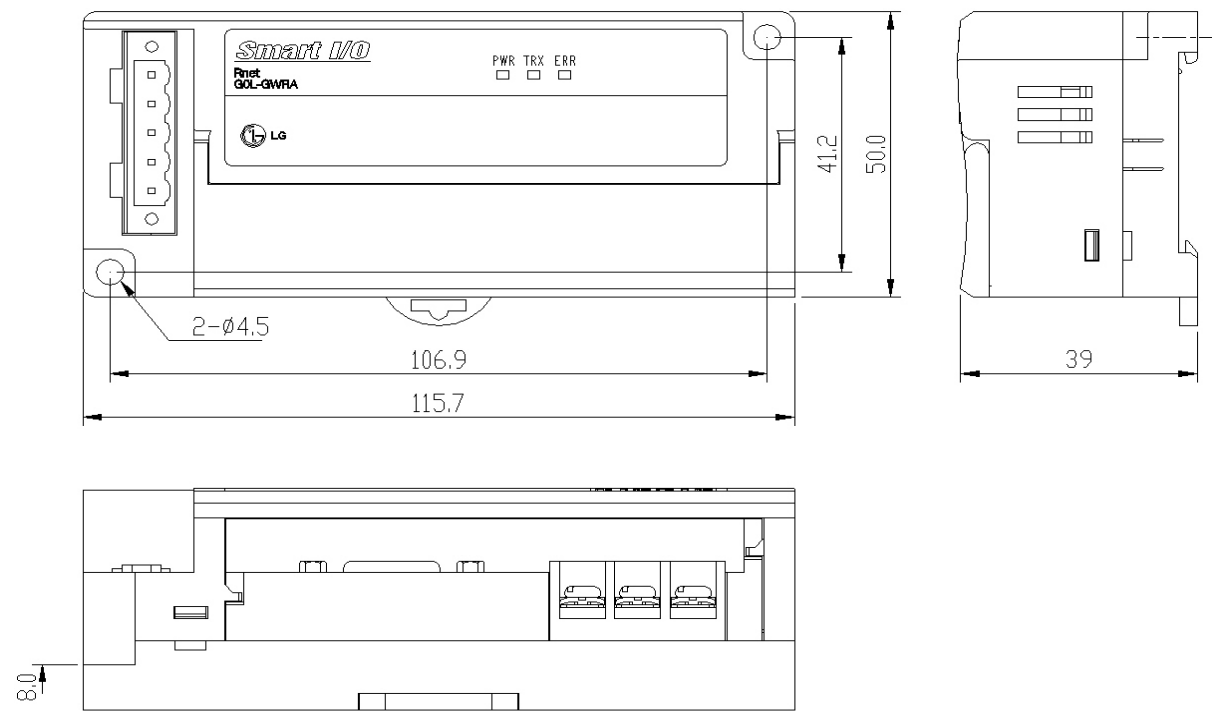
A3.4 For GM7 installation

Model : G7L-RUEA



A3.5 G0L-GWRA

Model: G0L-GWRA



Warranty

1. Terms of warranty

LSIS provides an 18-month warranty starting from the date of production.

2. Range of warranty

For problems within the terms of the warranty, LSIS will replace the entire PLC or repair the defective parts free of charge except for the following cases.

- (1) Problems caused by improper conditions, environment or treatment.
- (2) Problems caused by external devices.
- (3) Problems caused by the user remodeling or repairing the PLC.
- (4) Problems caused by improper use of the product.
- (5) Problems caused by circumstances where the expectations exceed that of the science and technology level when LSIS produced the product.
- (6) Problems caused by natural disaster.

3. This warranty is limited to the PLC itself only. It is not valid for the whole system which the PLC is attached to.