T-solution Leader in Electrics & Automation

User Manual

GM&MK Dnet I/F Module

Programmable Logic Controller

G4L-DUEA
G6L-DUEA
G0L-DSQA
G0L-DSIA

Safety Instructions

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

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Chapter 1 Introduction

1.1 How to use this manual

This manual presents the method about general specification, performance and programming techniques for Dnet I/F module of GLOFA-GM communication. It explains about general things like as consists of system and operating method.

When you are to prepare communication program through Dnet I/F module, please refer to following publications

- GLOFA PLC commands for GLOFA PLC
- Instruction for GLOFA PLC
- GLOFA-GM Fnet(Fieldbus) / Mnet(Mini-MAP) : Communication program
- Operating manual of other makers related to DeviceNet

Please be aware of CPU module and version when you are going to consist GLOFA-GM Dnet system.
For the normal Dnet communication you must use the like following version.

- GLOFA PLC GMWIN : Equivelent or higher than Ver 3.3
- GLOFA GM4 CPU : Equivelent or higher than Ver 2.3
- GLOFA GM6 CPU : Equivelent or higher than Ver 1.3

1.2 Precautions

Please be aware to following items when you install this equipment for reliability and safety as a kind of system.

Item	Category	Contents
Temperature	Requirement	• By the reason of device handling temperature, environment temperature must be kept as 0 to 55 °C. • Do not be exposed on light directly.
	Countermeasure	• When the temperature is higher than place fan and airconditioner, contrary, if it is lower temperature please make it stable
Dewing	Requirement	• Dew should be protected from mew caused by rapid temperature change. • Please be placed inside control box where capable of waterproofing and protecting vibration.
	Countmeasure	• By the reason of temperature change there could be mewd caused by frequent power On/Off. In this case please be set to power on status while night time.
Shock	Requirement	• Please be set on shock and vibration free zone.
	Countmeasure	• If it is on heavy shock and vibrating area then be prepared with resolving plan like as to place vibration protecting rubber in order not to be impacted to the equipment by shock and vibration.
Gas	Requirement	• Please set on corrosive gas free area
	Countmeasure	• If corrosive gas is leaking from out side, then prepare air filtering system in control room.
Noise environment.	Requirement	• Please be prepared on no trouble zone against electric and magnetic field
	Countmeasure	• Please lay out correct path when doing wiring works • Please check whether the control room is set with soundproofing. • Fluorescent lighting is prohibited and using incandescent is recommended. • When you install power module, keep in mind to ground it on basic electric potential.

1.3. Overview

This operationg manual explanes technically about master module(G4L-DUEA/G6L-DUEA) and slave module(GOL–DSQA/GOL-DSIA) which are Dnet I/F module of GLOFA PLC system. It was created for making needs possible replacing analog 2-40mA standard which requires high cost with simple digital standard. It is a kind of communication links connecting several kinds of industrial devices like as limite switch, photo electronic sensor, motor controller, invertor, barcode reader, panel display and so on.

It shows low cost , easy installation, excellent compatability with other vendor's devices and has powerful application ability on network application like as Master/Slave, Multiple master, Peer-to-peer etc… Dnet uses CAN(Controller Area Network) protocol as itself is thus it makes system response time short, gives high reliability. For the reason of these it gives us lower production cost why because you can use lower price CAN chip as itself is.

GLOFA-GM Dnet I/F module has characteristics like following.

GLOFA-GM Dnet Characteristics :

- Capable of real time control through communicating with all the lowest input/output equipment on network system.
- One master module can cover to control 63 sets slave module to maximum 2,048 points of I/O control.
- Multi drop and T trunk line connection makes network installation flexible.
- Capable of connection between your company's master module and all kinds of other companys' slave module
- Reverse connection to the above sequence is possible also.
- Setting MAC Address by Hardware is possible
- It's possible to set comm. speed with hardware(125/250/500kbps).
- Install two sets of master module is possible on GLOFA-GM4 and GM6.
  If you do Predefined Master/Slave Connection communication with using of Scanlist then you can do communicate without any configuration tool
- It makes possible to do connection with several slave I/O
  General I/O, Actuator, Nearby switch, wide switch, valve, Invertor, A/D, D/A module, position control etc..

Chapter 2 Glossary

Words	Description
Busoff	When the power has problem on network, this gives us error.
CAN (Controller Area Network)	The communication protocol designed only for automobile communication. Device network adopts CAN technology.
Scanlist	Before master module does communicating with slave module you must know all informations about slave modules like as station, selecting message(Poll, Strobe, etc.) for setting. We call that Scanlist. Dnet I/F module of GLOFA-GM PLC can set it easily through setting high speed parameter on GMWIN.
ODVA (Open DeviceNet Vendor Association)	Stands for Association established for spread out delivery Dnet communication
Connection	The meaning of logical connection by Dnet between master and slave. It also be using for sustaining and control all communications.
Profile	It gives us the information about device configuration data.(Printed data sheet, EDS ; Electronic Data Sheet and so on)
Master/ Slave	The module for sending and receiving data is called master module, and slave module is responding to received data from master module
Packet	It's the package of the units which for sending data through network. And in addition we can add informations about destination to where this package would be sent and other required informations by attaching head(Message identifier) on front of it.

Chapter 3 General specification

3.1 General specification

General specifcation of GLOFA-GM series is like following.

[Table 3.1] General specification

<table>
<tr><th>No.</th><th>Item</th><th colspan="5">Specification</th><th>Related spec.</th></tr>
<tr><td>1</td><td>Using temp</td><td colspan="5">0℃ ～+55℃</td><td></td></tr>
<tr><td>2</td><td>Keep temp</td><td colspan="5">-25℃ ～+70℃</td><td></td></tr>
<tr><td>3</td><td>Using hum</td><td colspan="5">5～95%RH, should not be frosted</td><td></td></tr>
<tr><td>4</td><td>Using hum</td><td colspan="5">5～95%RH, should not be frosted</td><td></td></tr>
<tr><td rowspan="8">5</td><td rowspan="8">Anti-vibration</td><td colspan="4">If discrete vibration exists</td><td></td><td></td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Frequencies</td><td rowspan="7">IEC 61131-2[1)]</td></tr>
<tr><td>10≤f< 57 Hz</td><td>-</td><td>0.075mm</td><td rowspan="6">10 times in each direction for X,Y,Z</td></tr>
<tr><td>57≤f≤150 Hz</td><td>9.8 ㎧(1G)</td><td>-</td></tr>
<tr><td colspan="3">If consecutive vibration exist</td></tr>
<tr><td>Frequency</td><td>Accel. speed</td><td>Freq. width</td></tr>
<tr><td>10≤f< 57 Hz</td><td>-</td><td>0.035mm</td></tr>
<tr><td>57≤f≤150 Hz</td><td>4.9 ㎧(0.5G)</td><td>-</td></tr>
<tr><td>6</td><td>Anti-shock</td><td colspan="5">* Max. shock accel.:147 ㎧(15G)
* Duration time :11 ㎳
Pulse wave : half sine wave pulse(3 times in each of X,Y,Z direction)</td><td>IEC 61131-2</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Anti-noise</td><td>Square wave impulse noise</td><td colspan="4">±1,500V</td><td>LG industrial Internal testing spec.</td></tr>
<tr><td>Discharge ESD</td><td colspan="4">Volt. : 4kV(Contacting discharge)</td><td>IEC 61131-2,
IEC 1000-4-2</td></tr>
<tr><td>Radiated electronic noise</td><td colspan="4">27~500 MHz, 10V/m</td><td>IEC 61131-2,
IEC 1000-4-3</td></tr>
<tr><td rowspan="2">Fast transient /Burst noise</td><td>Item</td><td>Power module</td><td>Digital Input/output Over 24V)</td><td>Digital input/output(less than 24) Analog comm. interface</td><td rowspan="2">IEC 61131-2,
IEC 1000-4-4</td></tr>
<tr><td>Volt</td><td>2kV</td><td>1kV</td><td>0.25kV</td></tr>
</table>

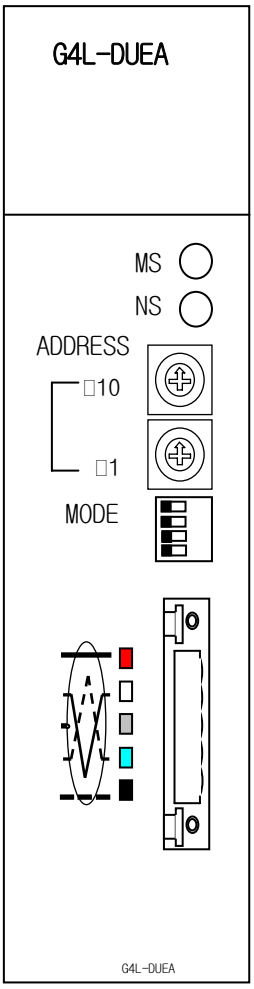
No.	Item	Specification	Related spec.
8	Environ. temp	Should not be corrosive gas and particle	
9	Altitude for use	Below 2000m	
10	Pollution rate[2)]	Below 2	
11	Cooling method	Cooling by ambient air	

Remark

1) IEC(International Electrotechnical Commission): International non-governmental organization, which promote international cooperation, establish international standard, and administer valuation system to its suitableness for international standards of electric and electronic tech fields.
2) Pollution rate : Indicator of polluted rate which can shows the capability of power saving, pollution rate 2 stands for the status of non-conductive pollution taking place. But at the time frosted then it shows conductive

3.2 Part name and Structure

3.2.1 G4L-DUEA



LED display section	
7-Segment	Displays the status of comm. module

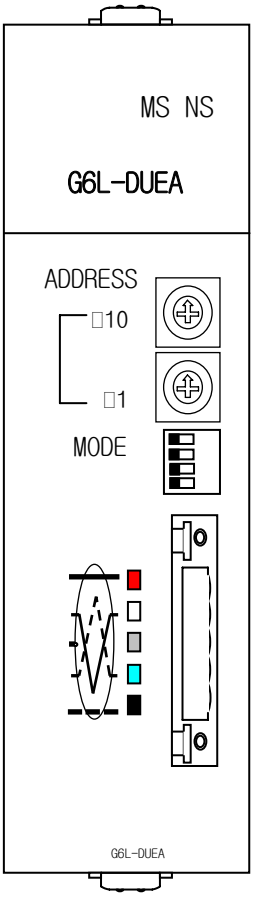
LED display section	
MS	Displays the status of interface between Comm. module and CPU module
NS	Displays the status of network of comm. module

Station switch
Displays station number of itself on comm. module

Mode selecting switch
Operating mode selecting of communication module

Communication connector
Connector for connecting with communication module

3.2.2 G6L-DUEA



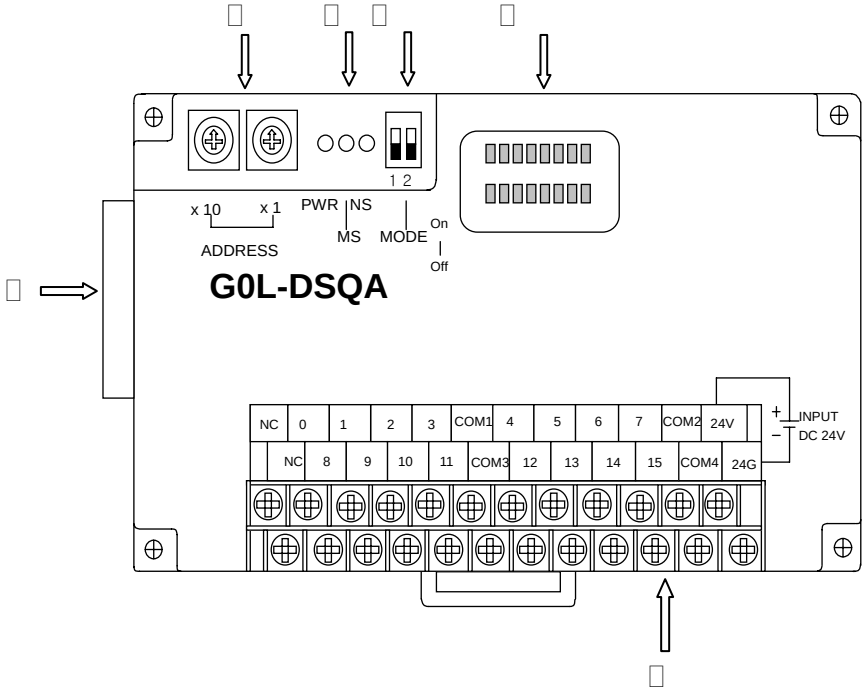
LED display	
MS	Displays the status of interface between Comm. module and CPU module
NS	Displays the status of network of comm. module

Station switch
Displays station number of itself on comm. module

Mode selecting switch
Operation mode selecting of communication module

Communication connector
Connector for connecting with communication module

3.2.3 G0L-DSQA



Station switch	0 ~ 63 (Decimal)
× 10	Set 10 digit of station number
× 1	Set 1 digit of station number

LED display	Displays communications status
PWR	Displays power status
MS	Displays the status of interface with CPU module
NS	Displays network status of comm. module

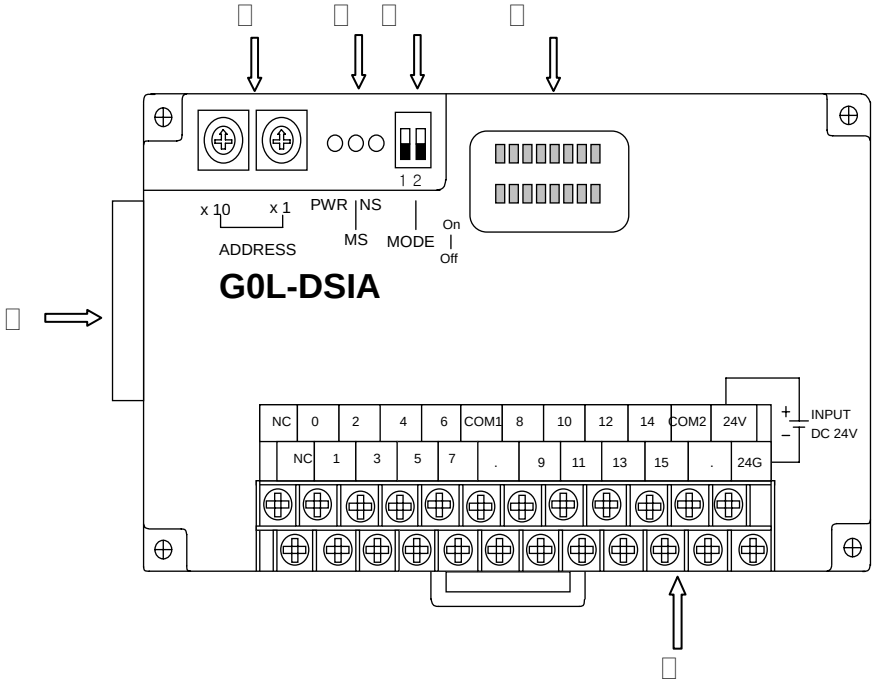
Mode switch	Setting of communication speed
1:Off/2:Off	125 kbyte
1:Off/2:On	250 kbyte
1:On/2:On(Off)	500 kbyte

LED Display	Displays output
G0L-DSQA	Displays 16 points output value

Communication connector	5-Pin type connector
CON1	Connector for connecting with communication cable

Terminal block		Contact point and power input
G0L-DSQA	0 ~ 15	Output terminal
	COM1 ~ COM4	Common terminal(4 point per COM)
	NC	No connection
	24V	DC 24V(+) Power input terminal
	24G	DC 24V(-) Power input terminal

3.2.4 G0L-DSIA



Station switch	0 ~ 63 (Decimal)
× 10	Set 10 digit of station number
× 1	Set 1 digit of station number

LED display	Display communication status
PWR	Displays power status
MS	Displays the status of interface with CPU module
NS	Displays network status of communication module

Mode switch	Setting of communication speed
1:Off/2:Off	125 kbyte
1:Off/2:On	250 kbyte
1:On/2:On(Off)	500 kbyte

LED Display	Displays input values
G0L-DSIA	Displays 16 points input value

Communication connector	5-Pin type connector
CON1	Communication cable connection connector

Bus band		Contact point and power input
G0L-SMIA	0 ~ 15	Input terminal
	COM1 ~ COM2	Common terminal(8 point per COM)
	NC	No connection
	24V	DC 24V(+) power input terminal
	24G	DC 24V(-) power input terminal

3.2.5 LED signal and display contents

MODEL	LED status	LED display contents
G4L-DUEA G6L-DUEA	Green blinker	On line status
	Green lighting	Completed connection setting and normal comm. is on going status
	Red blinker	In case recoverable error takes place
	Red lighting	In case critical error takes place

Model	LED sign		LED Combination
	MS	NS	
G4L-DUEA G6L-DUEA	Green On	Off	Share Ram initiate OK and LINK_IF OK and DUP_MAC_FRAME sending
	Green On	Red On	DUP_MAC Error or Network power error.
	Green On	Green blink	DUP_MAC Ok and Network power Ok and no connection
	Green On	Green On	Communication after establishment of normal connection with all stations
	Green On	Red blink	Error while normal communication
	Off	None	Interface error with CPU(Neglect NS LED)

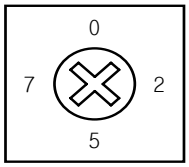
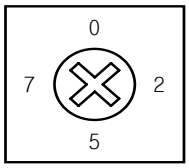
Green On Red On Green blink Red blink None Off

Model	7-Segment	LED display contents
G4L-DUEA	'Station On'	If the station is normal, it displays it's station number.
	'A1' blinkling	Duplicated station number is detected on network
	'A2' blinkling	Abnormal network power on communication module modem.
	'A3' blinkling	Error in comm. Module when higespeed link communication with Scanlist is set
	'B1' blinkling	Error in CPU module
	'B2' blinkling	Error in share RAM
	'B3' blinkling	Error in slave module on normal(regular) communication.

Model	LED Name	LED Display contents	LED On	LED Off
G0L-DSQA G0L-DSIA	PWR	Power On	Power On	PowerOff
	MS	Displays Interface status between comm. module and master module.	Normal	Abnormal
	NS	Displays network status of comm. module	Normal	abnormal

3.2.6 Setting of Station number

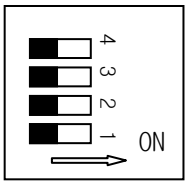
1) Self station number setting

Model	Station number switch schemetic	Contents
G4L-DUEA G6L-DUEA G0L-DSQA G0L-DSIA	× 10  × 1 	(1) Station no. is applicable 0 to 63(10 decimal scale) (2) Setting of station number. (Initial setting value is 0 when factory out) * Switch Setting X10 : Setting 10 digit of station number X1 : Setting 1 digit of station number

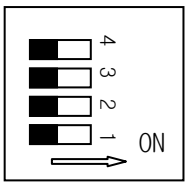
3.2.7 Setting of Mode switch

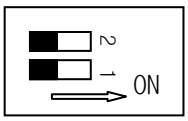
You can set operation mode(Master/Slave) of communication module with Dip switch and it selects communication speed.

1) Operation Mode

Model	Switch	Switch number		Operation status	Remark
		1	2		
G4L-DUEA G6L-DUEA		Off	Off	Master mode	Setting S/W as 1 and 2
		On	Off	Slave mode	

2) Communication Speed

Model	Switch	Switch number		Comm. Speed	Remark
		3	4		
G4L-DUEA G6L-DUEA		Off	Off	125 kbps	Setting S/W as 3 and 4
		On	Off	250 kbps	
		Off	On	500 kbps	
		On	On		

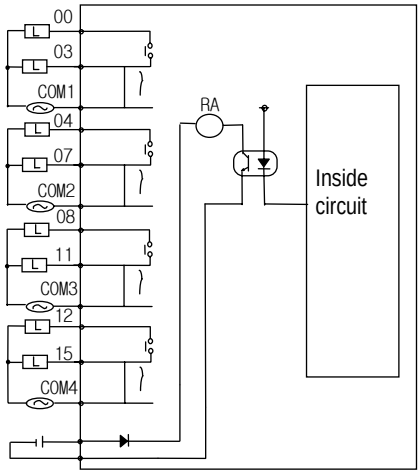
Model	Switch	Switch number		Comm. Speed	Remark
		1	2		
G0L-DSQA G0L-DSIA		Off	Off	125 kbps	Setting S/W as 1 and 2
		On	Off	250 kbps	
		On	On	500 kbps	
		Off	On		

3.3 G0L-DSQA Specification

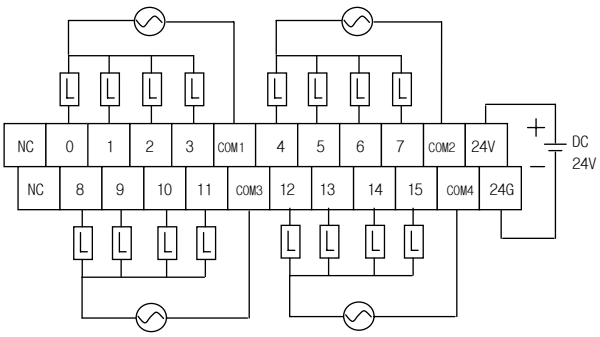
Item		Relay output module
Number of output point		16points
Rated On-Off Volt/Ampere		1A/points, 2A/4points
Min. On-Off Load		DC 5V/1mA
Max. On-Off Volt/Frequency		AC 250V DC 150V, 3,600회/시간
Response Time	Off ⇒On	Less than 10㎳
	On ⇒Off	Less than 12㎳
Life Time	Mechanical	Over 20 million times
	Electrical	Over 100 thousand of rated On-Off Volt/Ampere load
		Over 200 thousand of AC 200V/1.5A,AC 240V/1A(COS ϕ =0.7)
		Over 200 thousand of AC 200V/1A,AC 240V/0.5A(COS ϕ =0.35)
		Over 200 thousand of DC 24V/1A,DC 100V/0.1A(L/R=7ms)
Power from outside		DC 24V±10%(Riffle Voltage 24V,On at the same time) (Current: Less than 150mA)
Comm.Type		4points/COM
Operation status display		When Output is On status LED is ligh on
Outside connection type		24points terminal block (M3 x 6screw)
Insulation type		Insulation of photo coupler

Circuit schemetic and outside connection drawing

Circuit layout



Wiring

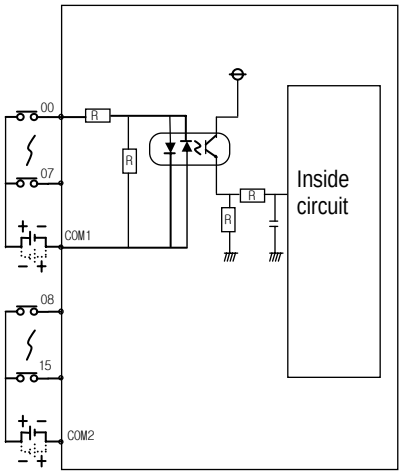


3.4 G0L-DSIA Specification

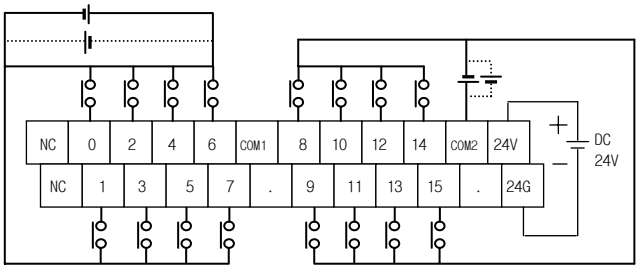
Item		DC Input module
Rated Input Ampere		7±2mA/Point
Using volt range		DC 24V(Riffle rate Less than 5%)
Max. simultaneous input point		100% (8point/COM)On at the same time
On Voltage		Over DC 19V
Off Voltage		Less than DC 6V
Respond Time	Off ⇒On	Less than 10㎳
	On ⇒Off	Less than10㎳
Comm. type		8points/COM
Operation display		When Input On, LED is light on
Outside connection type		24point terminal block (M3 x 6screw)
Insulation type		Insulation of photo coupler

Circuit layout and external connection diagram

Circuit layout



Wiring



Chapter 4 Performance specification

4.1 Performance Specification

Following presents performance specification of GLOFA Dnet I/F module

Item			Performance Spec.
Transmission spec.	Comm. speed		125/250/500kbps
	Comm. Distance(Thick)[1]		500/250/100m
	Max. Drop length	125 kbps	6m(Max. extension 156m)
		250 kbps	6m(Max. extension 78m)
		500 kbps	6m(Max. extension 39m)
	Data Packet		0~8 Byte
	Network Structure		• Trunk/Drop Line • Power/Signal line in the network
	Bus type [2]		• Multi slave/Multi casting • Peer-to-Peer type • Poll, Strobe, COS/Cyclic type
	Max. Node number		Maximum 64 Identifier of MAC ID/MAC Respectively 32 I/O per node (Max. 2,048 points)
	System type		Node insert/remove on the status of power on is possible
	Rated Voltage		DC 24V
	Diagnosis function		Check duplicated station/Detect abnormal station / Check CRC error/Using of ScanList
Basic Spec.	Internal power consumption		Less than G4L-DUEA:285mA / Less thanG6L-DUEA:230mA Less than G0L-DSQA:240mA / Less than G0L-DSIA:160mA
	Weight		G4L-DUEA:203g / G6L-DUEA:92g G0L-DSQA:380g / G0L-DSIA:310g

Remark

1) Transmission distance of Dnet I/F module is in inverse proportion to data transmission rate, when you use Thin cable, transmission distance is limited to 100m without any relation with data transmission rate..
2) The type of Strove, COS/Cyclic on Bus type will be served later.
3) Please discuss about production and installation of cable with professional maker.

4.2 Cable Specification

4.2.1 Cable Specification (ex:Allen-Bradley product)

● Cable Specification

Item	Class 2 Thick/Thin Cable	
Maker	Allen-Bradley	Dual use of Trunk/Drop
Type of Cable	Round	
Std. output voltage	30V/100VA	
Max. Ampere tolerance Ampere Tolerance	100VA/24V or 4A	
Out diameter	12.2mm/6.9mm	
The number of core wire	5 wires	

Class 2 Thick/Thin Cable	
Spool Size	50m/150m/300m/500m

● Signal name of Cable

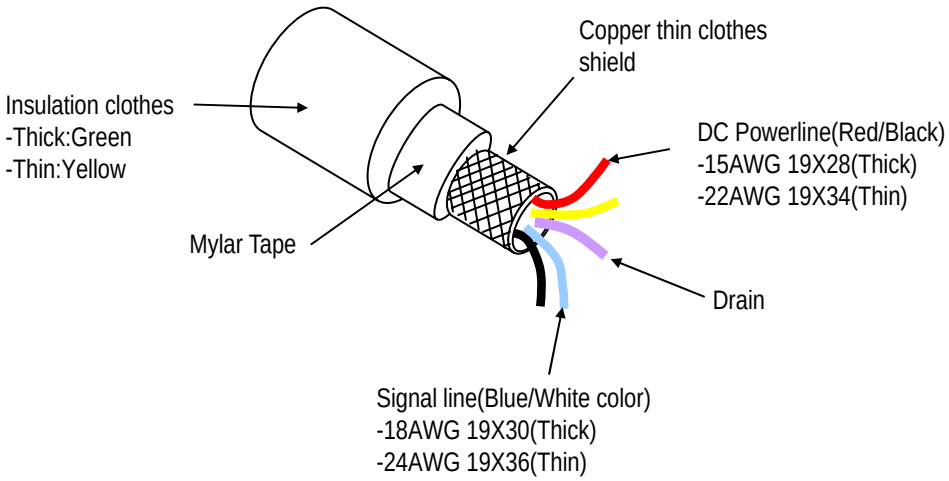
Dnet I/F module of cable has 5 wires like following. It consists of Twist pair cable for supplying of DC 24V power, Twist Pair cable for signal line, and shield line, etc.. Both thick or thin cable can be used for trunk/drop line.

Line Color	Signal Name	Contents
White	CAN_H	Signal
Blue	CAN_L	Signal
Bare	Drain	Shield
Black	V-	Power
Red	V+	Power

● Maximum Transmission distance based upon the type of cable

Transmission speed	Max. Distance	
	Thick cable	Thin cable
125kbps	500m	100m
250kbps	250m	100m
500kbps	100m	100m

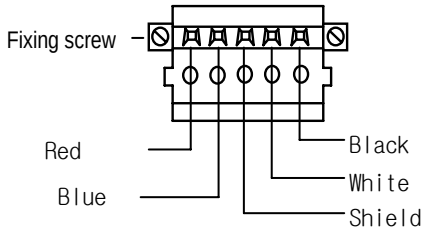
- Figure


Copper thin clothes
shield
Insulation clothes
-Thick:Green
-Thin:Yellow
DC Powerline(Red/Black)
-15AWG 19X28(Thick)
-22AWG 19X34(Thin)
Mylar Tape
Drain
Signal line(Blue/White color)
-18AWG 19X30(Thick)
-24AWG 19X36(Thin)

4.3 Connector Specification

4.3.1 Example of Connector Specification

● 5-PIN Connector(for outside connection)

Color	Signal name	Purpose	5-Pin Plug
White	CAN_H	Signal line	
Blue	CAN_L	Signal line	
Bare	Drain	Shield line	
Black	24V(-)	Power line	
Red	24V(+)	Power line	

* Product example

Maker : PHOENIX CONTACT

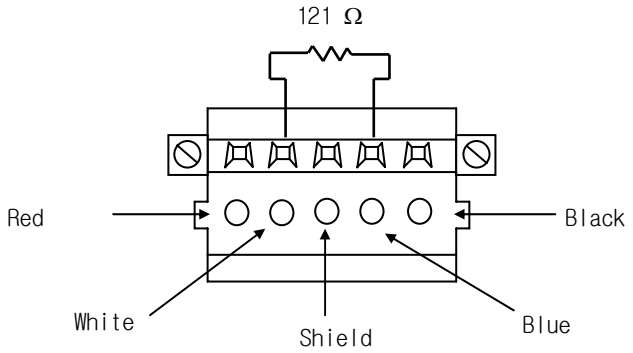
TYPE : MSTB 2.5 / 5-STF - 5.08

4.4 Terminal Resister

4.4.1 Terminal Resister

● Terminal Resister

- Attach 121Ω, 1%, 1/4W resister on both ends of network.
- Connect to CAN_H and CAN_L signal line of connector.



Remark

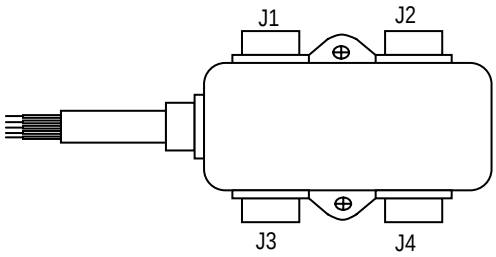
1) Terminal resister must be attached on both ends side of Trunk line of Network necessarily, attach it on both ends side of tab in case consisted with device port tab. If terminal resister is missing then it does not work communication normally.
2) You do not needed to attach additional terminal resister on port tab if there is already terminal resister exist.

4.5 Tab/Distributor

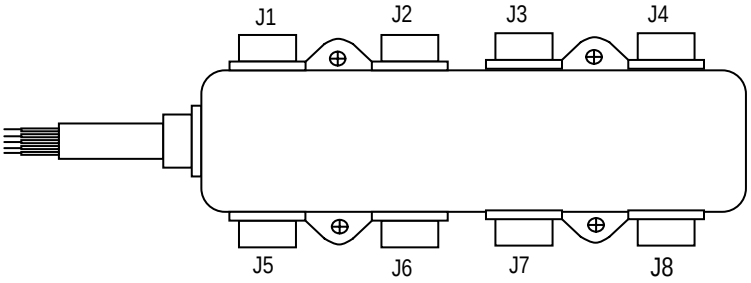
4.5.1 Specification of Tab/Distributor

● 4-Port/8-Port Tab (ex.:Allen-Bradley product)

- Maximum 4 to 8 number of it is possible to connect and disconnect through connecting to trunk line of device port tab.

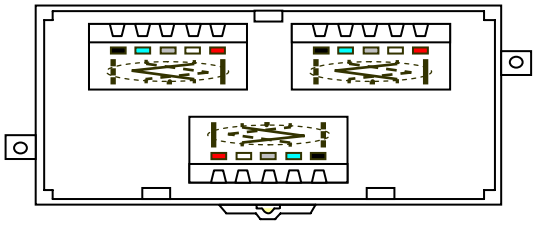


4-Port Tab

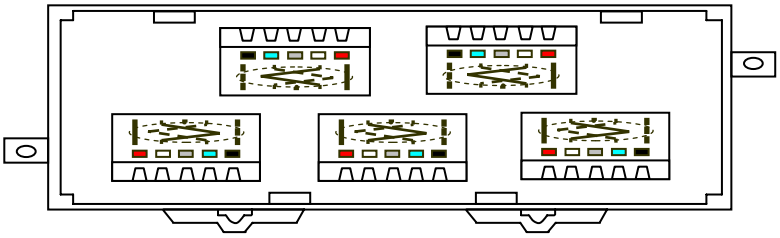


8-Port Tab

● 1trunk(Ttrunk)/3trunk tab (ex.:OMRON product)



1 trunk tab

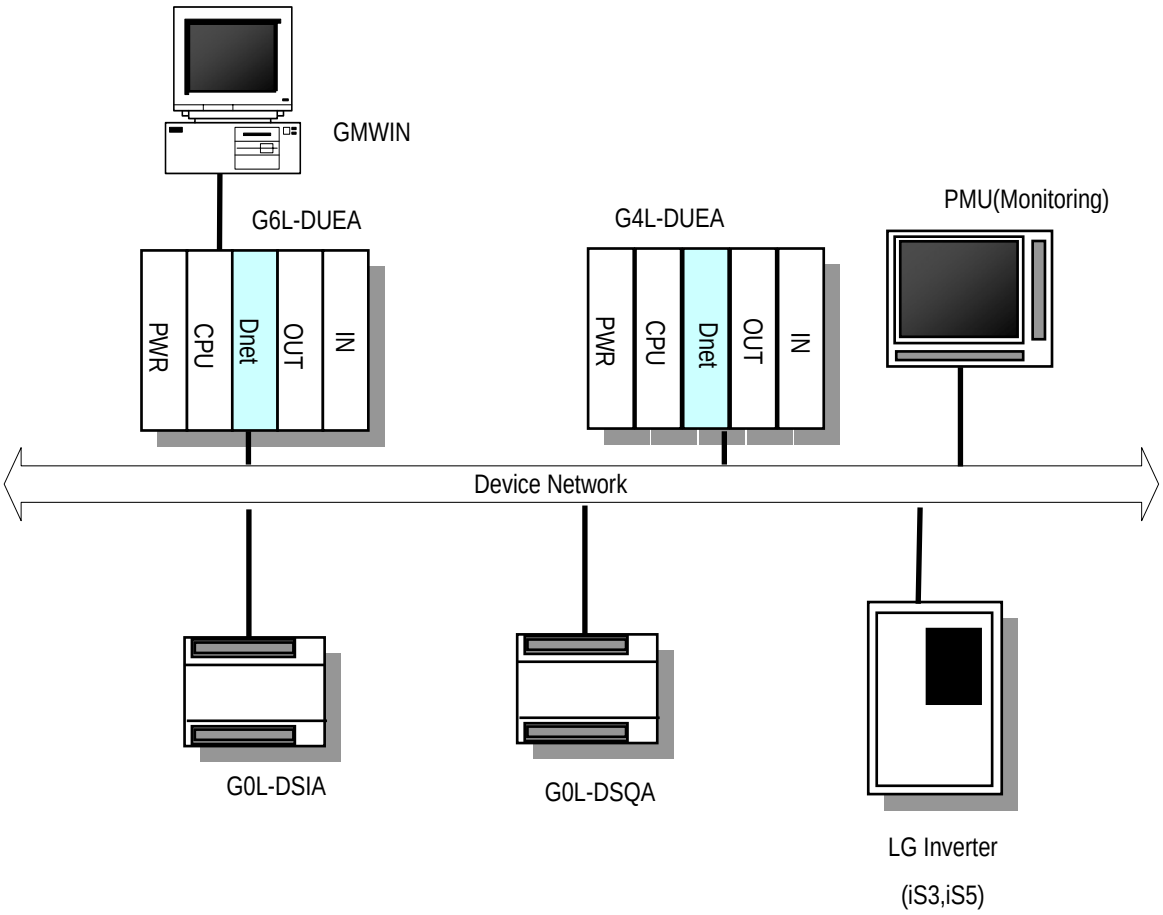


3 trunk tab

Chapter 5 System structure

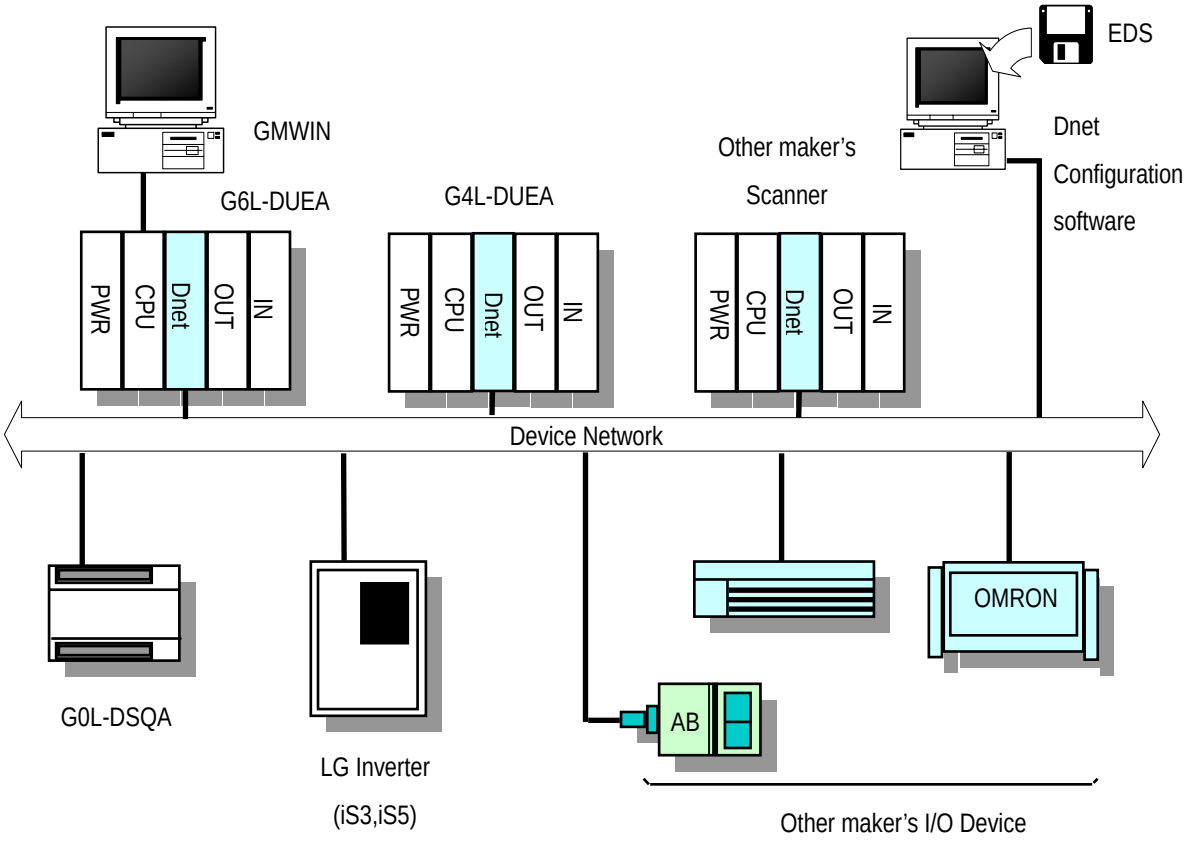
5.1 System construction using LGIS's products

You can construct communication system between own Dnet I/F module like following. Even though the system has both master and slave module at the same time You should set one of both module G4L-DUEA, G6L-DUEA as master and others will be operated as slave module. For the purpose of connecting with LG Inverter and PMU(Monitoring device), Dnet I/F module must be attached on the product for communication.



5.2 System construction with mixed LGIS's and other products

When you are using with other maker's scanner(master) you should set parameter by Dnet configuration software tool supplied from the maker and set your own G4L-DUEA, G6L-DUEA as slave with using of GMWIN.



Chapter 6 Communication program

Generally, when we are going to communicate, then master module sets slave station as the opposite and sets something like as station number, communication method, data size, communication cycle to communicate with the slaves. It is called SCANLIST file and with this file master module can communicate with slave module. Therefore you set SCANLIST file like as the type of service, communication speed, station number and Dnet I/F module receives SCANLIST file from CPU for communication.

User can set the aboves with using of GMWIN but just only the slave module which set on *High speed link* parameter can communicate just only through connecting with master module. At this time if you want to set slave module then refer to slave product maker's instruction and must be set by users themselves.

High speed link communication function is a method of communication between master module and slave module. It is used for exchanging data or informations with the opposite stations periodically at specific time. It can be efficiently using for both user himself and the opposite for referring to changing data and they can refer to them periodically for their operating systems, and through just setting parameter simply they can do communication. You can set parameter through setting yourself station and the opposite station area you are to communicate,data size, type of message, initiate station number on high speed parameter of GMWIN. The data size is from 1 byte to 256 byte(2,048 points) allowable for communication, setting communication period is possible from 5ms to 10 sec according to communication contents. You can use it easily because through simple setting the parameter you can communicate with the opposite station. In addition internal data accessing speed is very high, thus you can treat a lot of data simultaneously and periodically

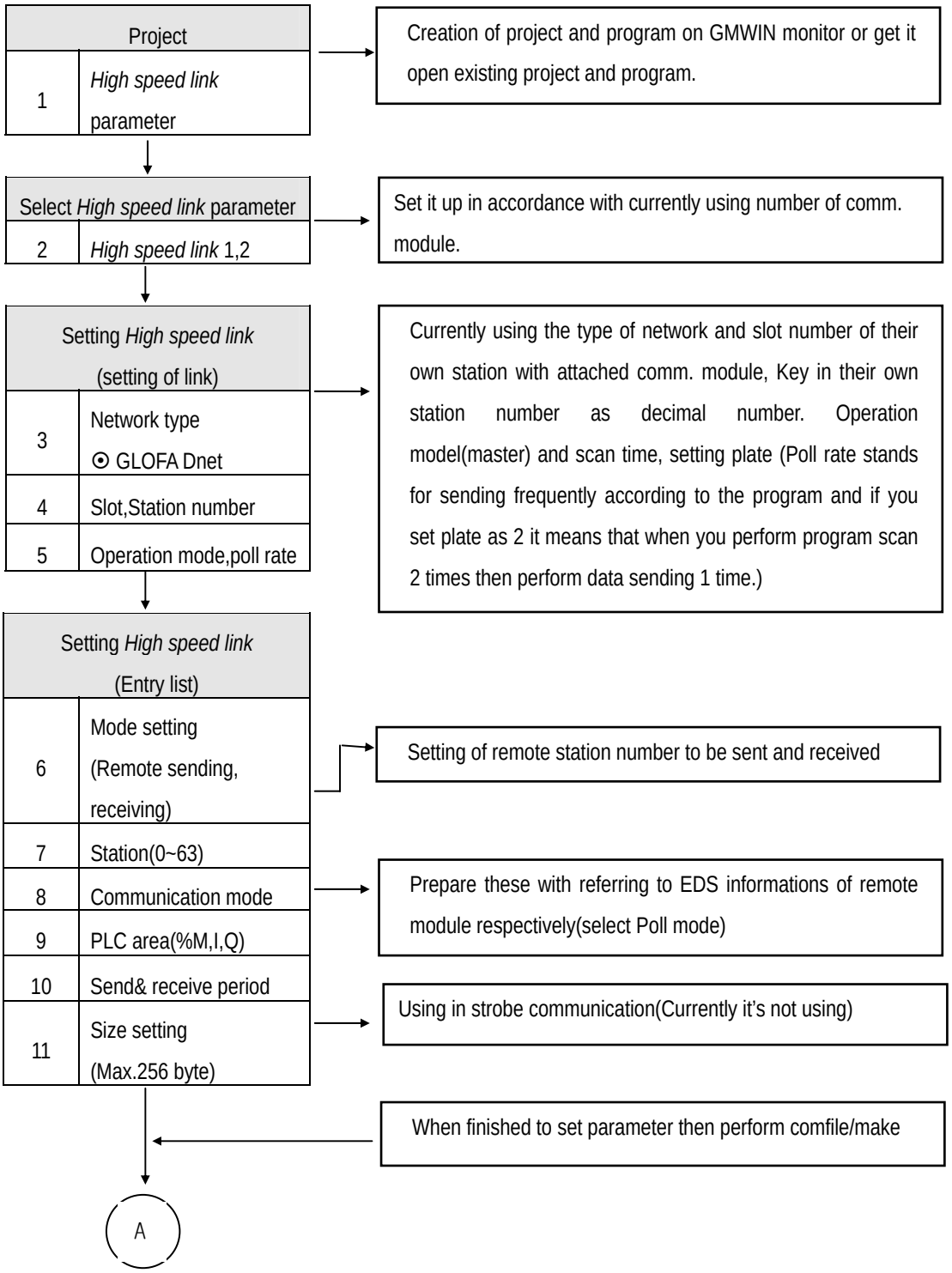
[Table 6.1] represents point number of *High speed link* of individual communication models.

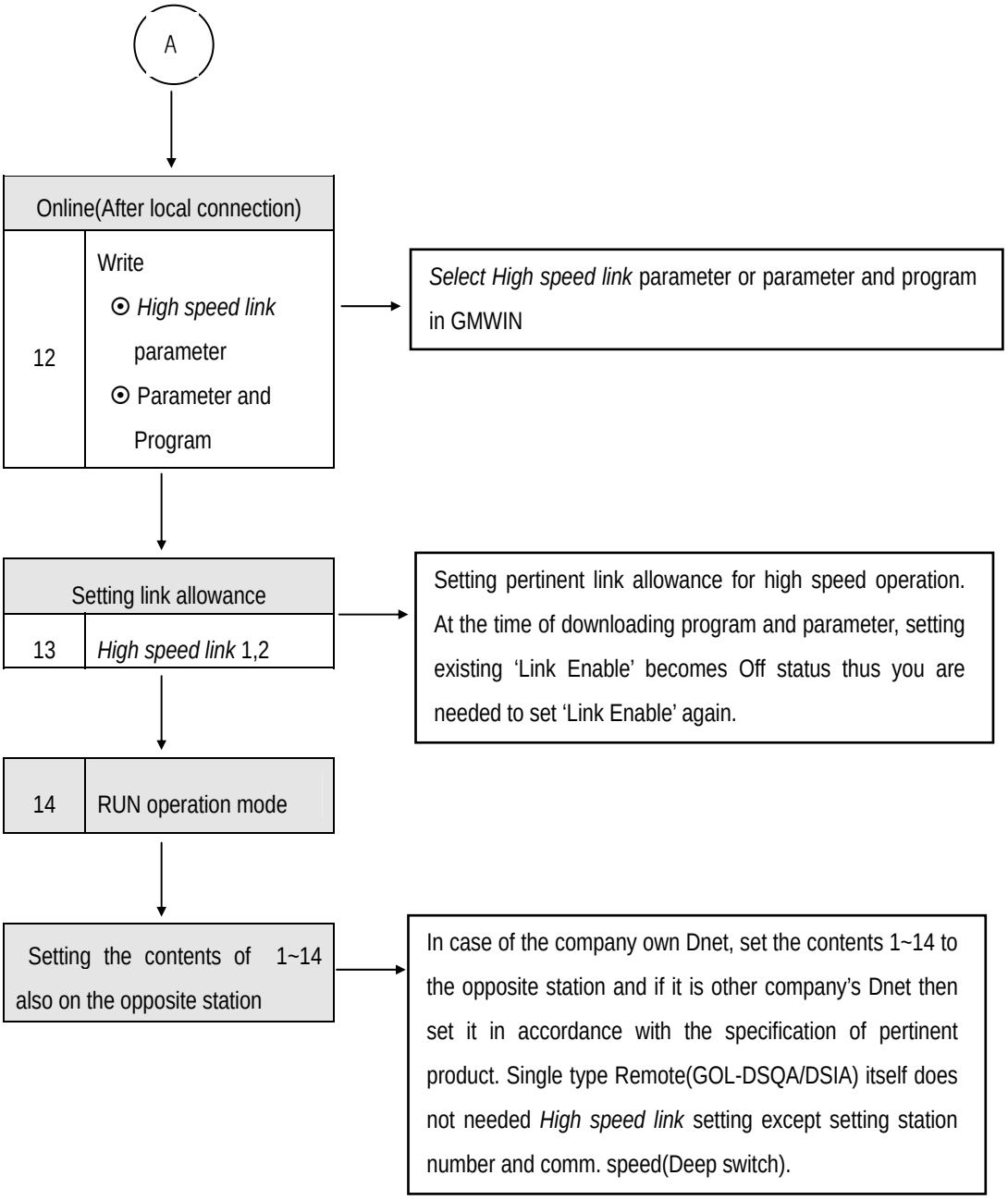
[Table 6.1] Maximum communication points of individual models

Model		Max. comm. point	Max. block number	Point of individual block number
Dnet I/F module	G4L-DUEA	2,048 points	64 blocks (0-63)	2,048 points
	G6L-DUEA	2,048 points	64 blocks(among 0-63)	2,048 points
	G0L-DSQA	16 points	1 blocks(among 0-63)	16 points
	G0L-DSIA	16 points	1 blocks(among 0-63)	16 points

* [Table 6.1] Basic point is 1 bit unit

6.1 Operation sequence by means of *High speed link*




A
Online(After local connection)
12
Write
⦿ *High speed link* parameter
⦿ Parameter and Program
Select High speed link parameter or parameter and program in GMWIN
Setting link allowance
13
High speed link 1,2
Setting pertinent link allowance for high speed operation. At the time of downloading program and parameter, setting existing 'Link Enable' becomes Off status thus you are needed to set 'Link Enable' again.
14
RUN operation mode
Setting the contents of 1~14 also on the opposite station
In case of the company own Dnet, set the contents 1~14 to the opposite station and if it is other company's Dnet then set it in accordance with the specification of pertinent product. Single type Remote(GOL-DSQA/DSIA) itself does not needed *High speed link* setting except setting station number and comm. speed(Deep switch).

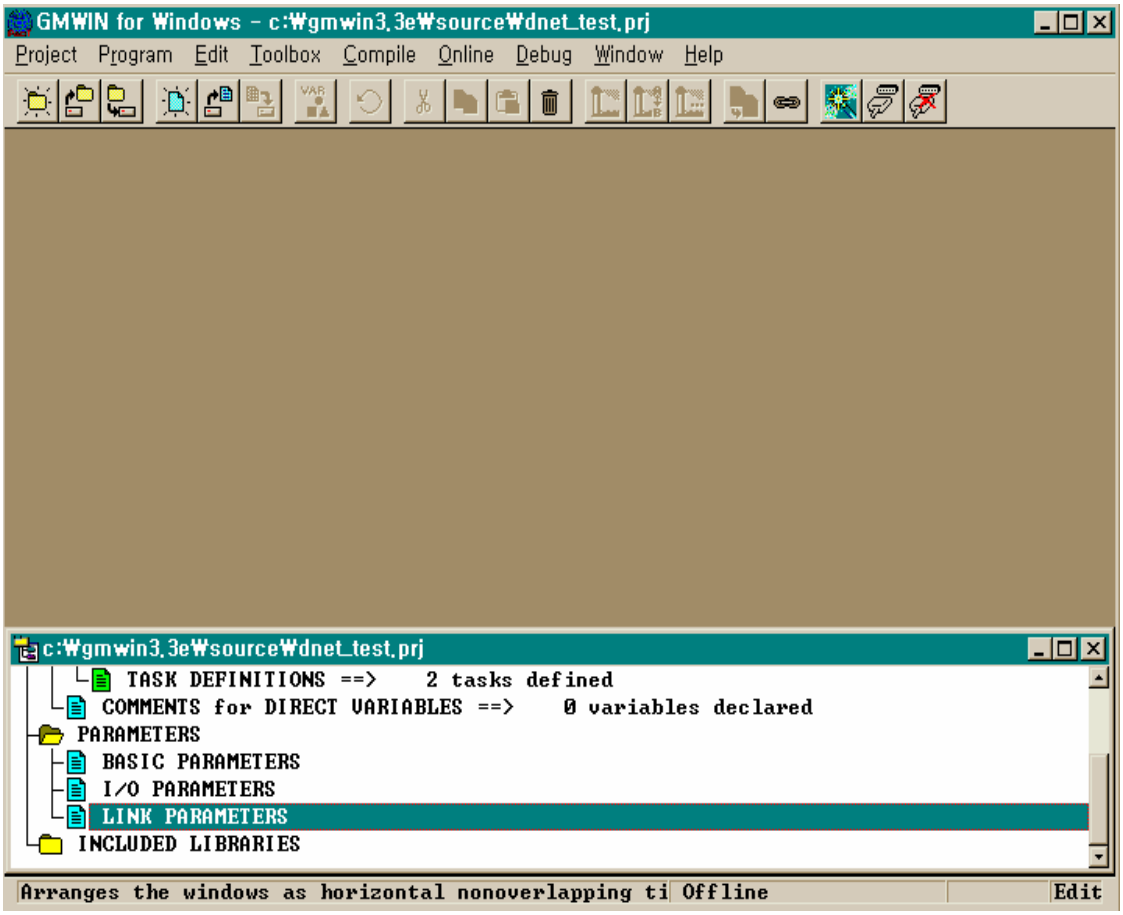
6.2 *High speed link* service

6.2.1 Master communication using master module(G4L-DUEA,G6L-DUEA)

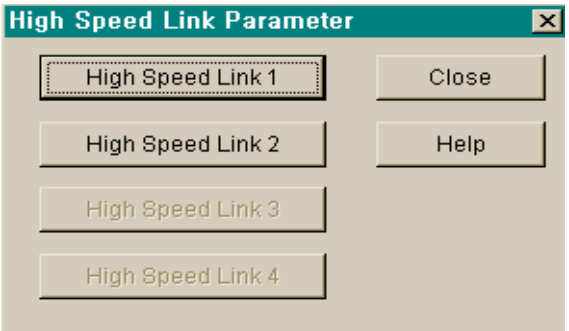
SCANLIST represents a kind of communication information data that has to be set by user for programmed communication with slave module whenever power on. Therefore user has to set information about Dnet I/F module and slave module with which you want to communicate through using *High speed link*

Now, setting method of SCANLIST is explained here with using of *High speed link* parameter for Dnet communication. At first select project file according to CPU type by using GMWIN, select *High speed link* parameter in project files and next select '*High speed link* 1' (Refer to [Fig 6.1] and [Fig.6.2])

[Fig. 6.1] Setting of project on GMWIN

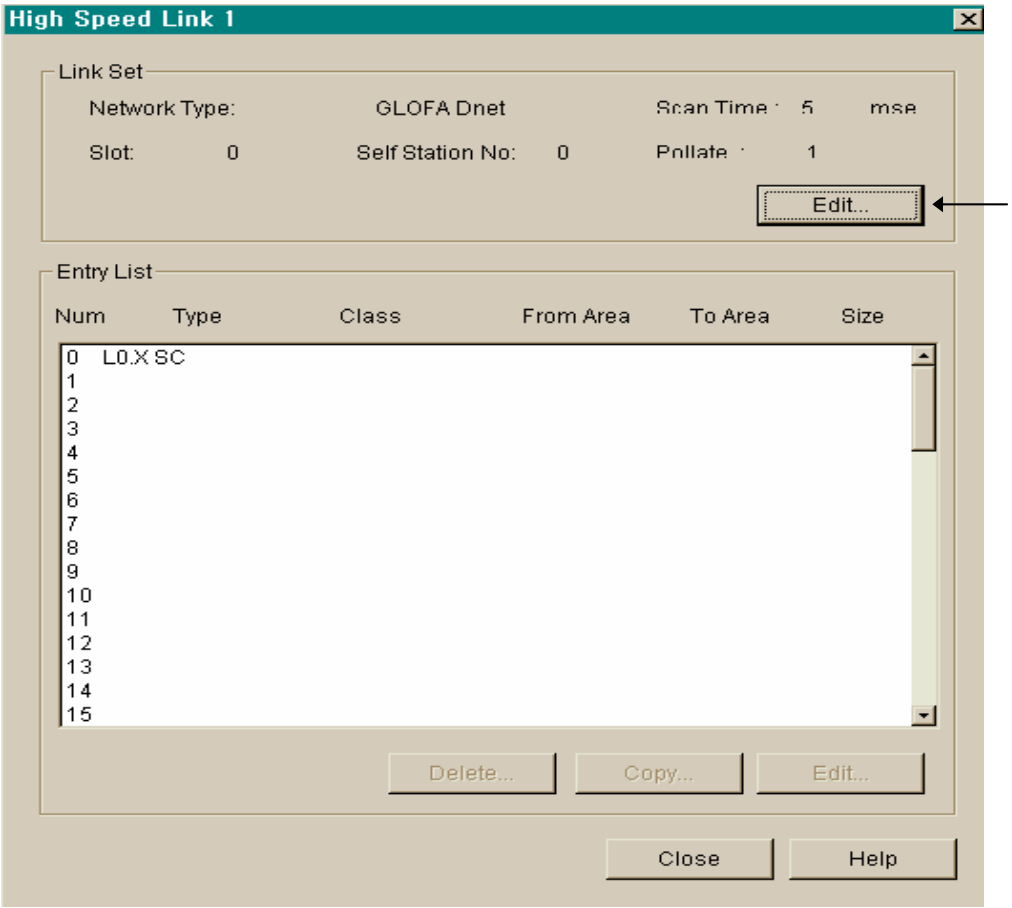


[Fig. 6.2] Display for selecting *High speed link* parameter

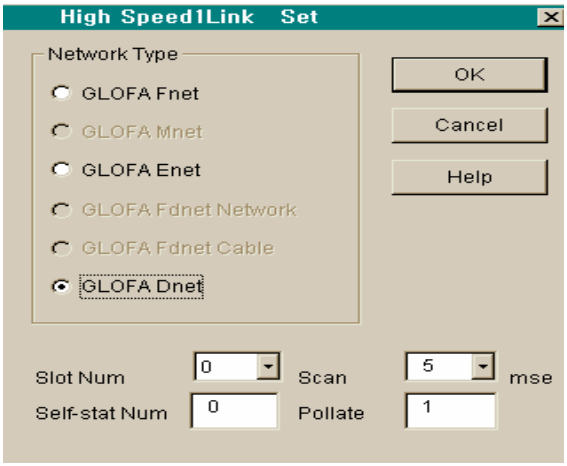


If you select '*High speed link* 1' [Fig.6.3] will be shown. And then select '→' symbol on [Fig.6.3] display to set slot position where Dnet I/F module is attached and station number, operation mode, scan time and pollate.

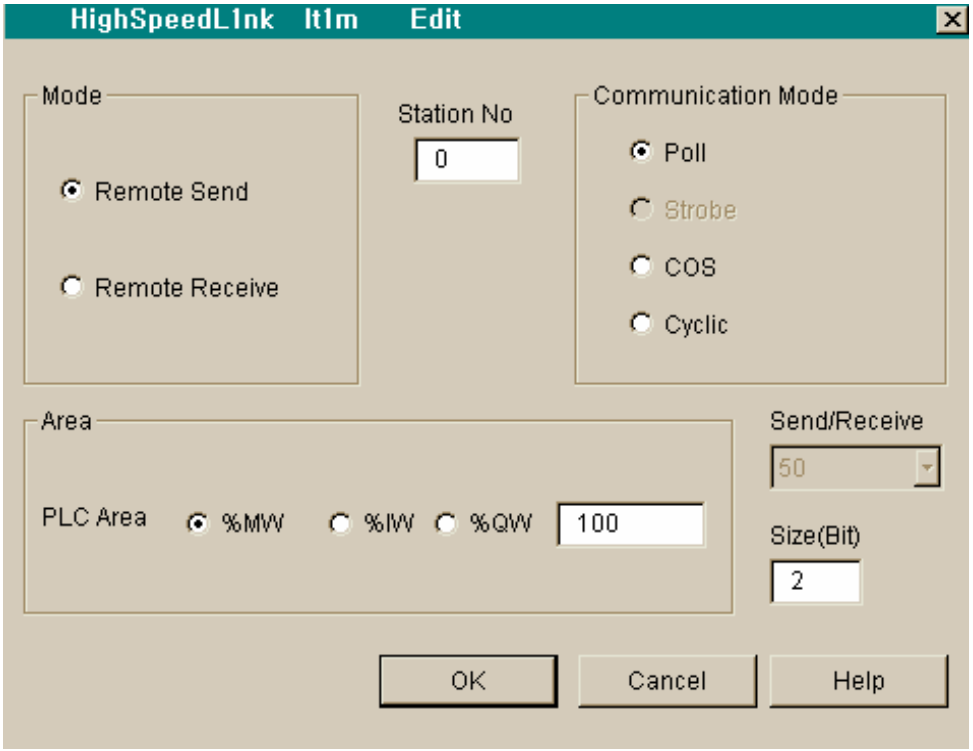
[Fig 6.3] Initial display for setting parameter



[Fig 6.4] Display for setting of *High speed link*



[Fig 6.5] Display for setting mode and comm. Area(sending)



If you set network type, slot number, station number, delay scan time, pollate etc..on [Fig. 6.4] display then like as [Fig. 6.3] display will be shown up. And number 0 as one of Entry list on [Fig 6.3] will be set automatically and 1 to 63 registration number will be selected for user's communications module.

[Table 6.2] Contents for setting link

Item	Contents
Network type	This is for setting of module type and it can be set by GLOFA Dnet.
Slot number	Select one number among 0-7 for slot number on which you want to attach communication module (The right side of CPU is 0 slot)
Station number	Key set station number into station switch where the front side of communication module. You can set 0 to 63 as decimal scale, and do not use station number as duplicated, their own station number is specific number for classifying communication module on the same network
Scan time	It's the delayed scan time(msec) from after scanning all slave module by Dnet I/F to next scan.
Pollate	It's the ratio of scanning slave module by Dnet I/F module. As it is, if the value is '2' this means that after scanning Dnet I/F module 2 times it performs 1 poll against set station module on parameter.

Among GLOFA Dnet remote module if you want to communicate with only output module(GOL-DSQA) you are just only required to set sending like as [Fig 6.5]. There is no receiving setting (refer to column 6.2.3 'Communication with single I/F module)

[Table 6.3] Contents of *High speed link* parameter(Entry list)

Item		Contents
Mode	Remote sending	To send their own station data to programmed station.
	Remote receiving	To receive data from programmed station.
Station number		To set the opposite station number for communicating.
Comm. Mode 1)	Poll	Perform Poll service
	Strobe	Reserved(Not in use)
	COS	Reserved(Not in use)
	Cyclic	Reserved(Not in use)

Item		Contents
Area	In case Remote sending mode	To set an area of their own station's data which will be sent to the opposite station
	In case remote receiving mode	To set an area of their own station's data storage that is received from the opposite station.(%IW area is Disable)
Cycle of sending/receiving(msec)		To set the cycle of data sending and receiving
Size(Byte) 2),3)		It sets the size of data to be sent or received. 2 byte unit when you want to communicate with your own company internally as it is, only by word size you can communicate. If you are to communicate among the other company's and you, you must set byte value according to pertinent module requires

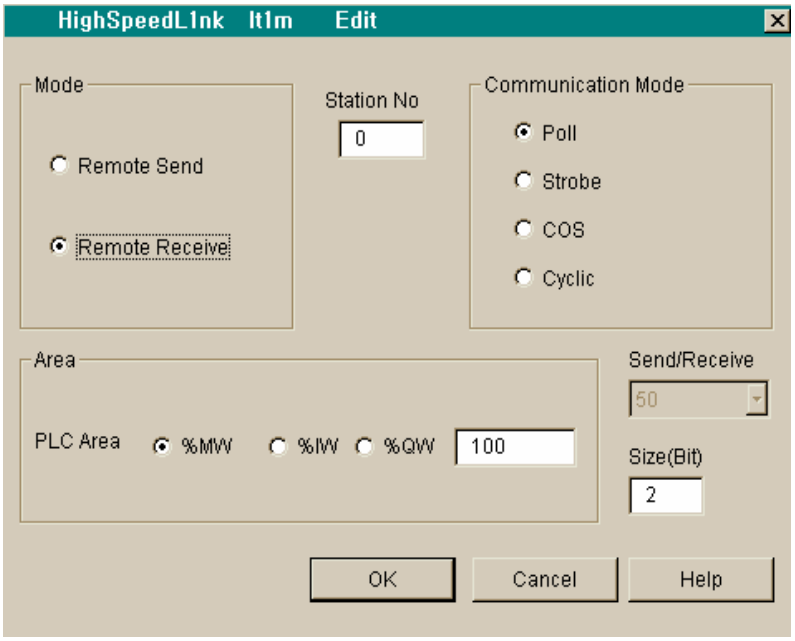
Remark

1) Select Poll on Communication mode box.(Others will be served later)
2) When sending/receiving data with the opposite(slave), always *High speed link* sending/receiving parameter should be set simultaneously. Data size must be set according to the value setting available by pertinent module. But in case sending only with slave module, you may set not only receiving parameter of *High speed link* but also set receiving parameter and data size inside receiving parameter as '0' and as the same way in case receiving only, key in sending data as '0' at setting parameter on *High speed link* and sending data size must be key in as '0'.
   (refer to Program example 1)
3) When communicating between master module and single type remote module, select sending/receiving according to data size on pertinent remote module.

[Fig 6.5],[Fig 6.6] are seen if you select 'Entry list' on [Fig 6.3]. At here required the opposite station number, service type(Comm. Mode), sending/receiving area, data size must be set.

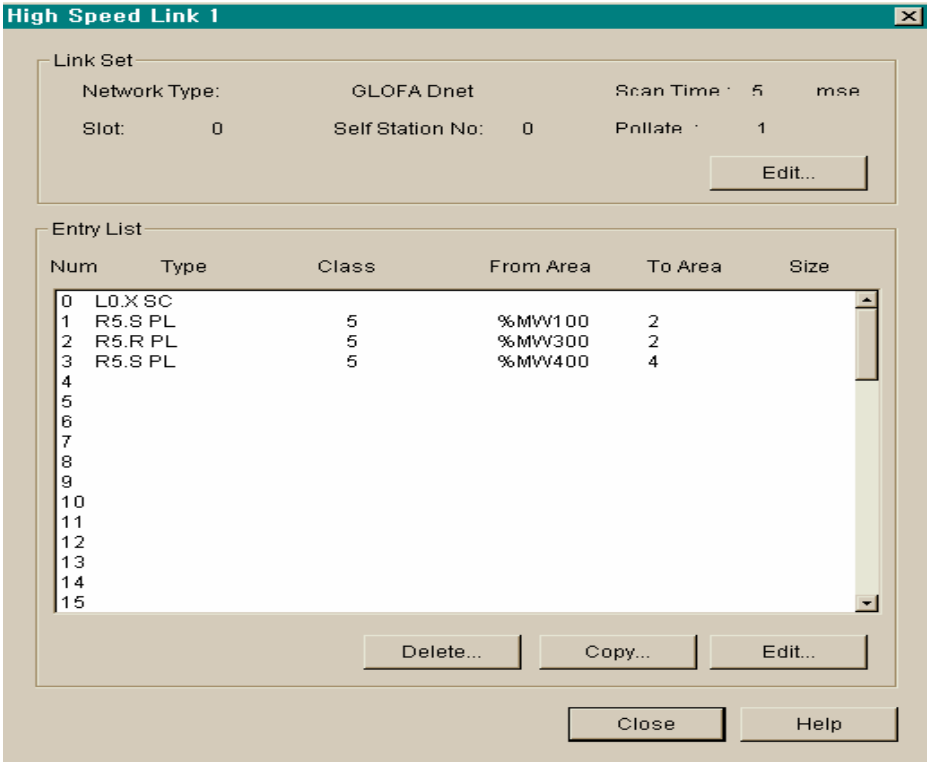
In order to communicate with input module(GOL-DSIA) on GLOFA Dnet I/F remote module you are only needed to set receiving like as [Fig 6.6]. There is no receiving setting.(refer to clause 6.2.3 communication with single I/F.

[Fig 6.6] Display of setting mode and communication area (receiving)



[Fig 6.7] shows setting for communicating with station number 5,7 with using of Poll service.

[Fig 6.7] setting of *High speed link* parameter sending/receiving

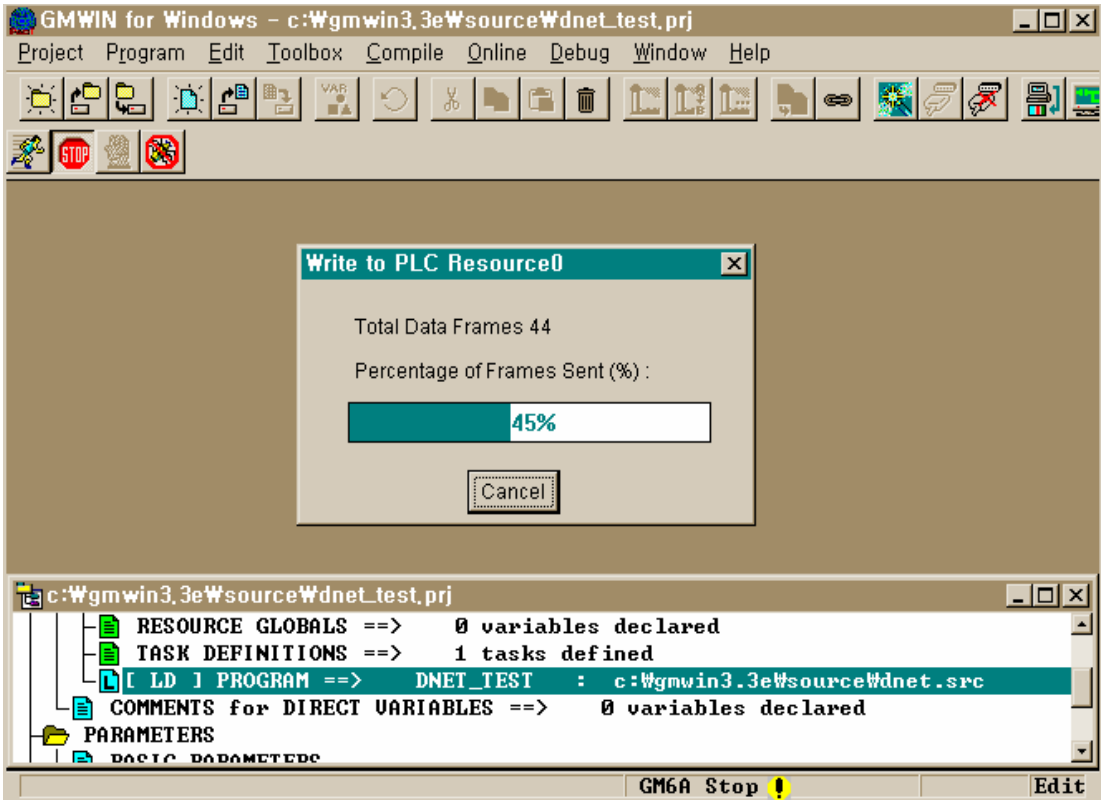


[Table 6.4] Meaning of setting Poll service

Scan type	Sending cycle	PLC area	size	Contents
R5.S PL	5×1 = 5msec	%MW100	2	Sending 2 byte data on %MW100 to station 5 with using of Poll Request in terms of every 5 msec.
R5.R PL	-	%MW300	2	Store 2 byte into %MW300 with using of Poll Response from station 5
R7.S PL	5×1 = 5msec	%MW 400	4	Sending 4 byte data on %MW400 to station 7 with using of Poll request in terms of every 5 msec.

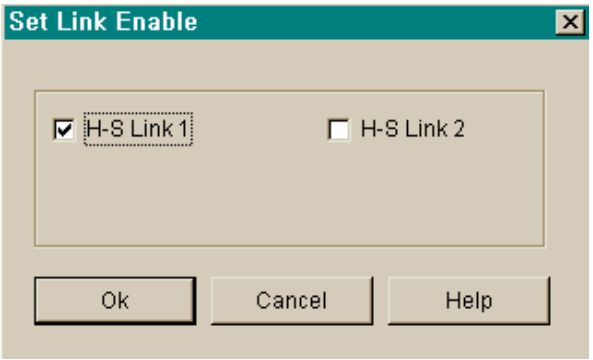
* Hereby, sending cycle stands for scan time x plate

[Fig 6.8] Writing program



As you see in the above, in order to communicate between master module and slave module, user must set *high speed link* parameter after figuring out informations about slave module. Therefore user should do download through GMWIN online connection after setting *high speed link* parameter.

[Fig 6.9] Setting of *high speed link* enable



When program download is completed, you must set 'Link Enable' on online. And then please change CPU mode into RUN. After CPU mode is just changed, it become to share all data and start to communicate.

6.2.2 Slave communication using master module(G4L-DUEA,G6L-DUEA)

GLOFA Dnet I/F module can play a role not only master function but also slave function. Therefore you can communicate with your own company's master module or other company's master module as a slave module against them. But communication mode can use only poll service and you must set your own station number to the station you want to communicate. And in order to act as slave role you may have to set all switche

Existing the front of Dnet I/F communication module to slave mode 1(Refer to 3.2.7 Mode switch setting), necessarily 1 master station acts as slave. Therefore we can't set against multiple of list and only 1 sending /receiving list should be set.

[Table 6.5] Contents of link setting

Item	Contents
Network type	This is for setting of module type and it can be set by GLOFA Dnet.
Slot number	Select one number among 0-7 for slot number on which you want to attach communication module (The right side of CPU is 0 slot)
Station number	Key set station number into station switch where the front side of communication module. You can set 0 to 63 as decimal scale, and do not use station number as duplicated, their own station number is specific number for classifying communication module on the same network
Scan time	It's the delayed scan time(msec) from after scanning all slave module by Dnet I/F to next scan.
Poll rate	It's the ratio of scanning slave module by Dnet I/F module. As it is, if the value is '2' this means that after scanning Dnet I/F module 2 times it performs 1 poll against set station module on parameter.

[Table 6.6] Contents of setting *high speed link* parameter(Entry list)

Item		Contents
Mode[1)]	Remote sending	To send their own station data to master module.
	Remote receiving	To receive data from master module.
Station number		To set it's own station number for communicating.

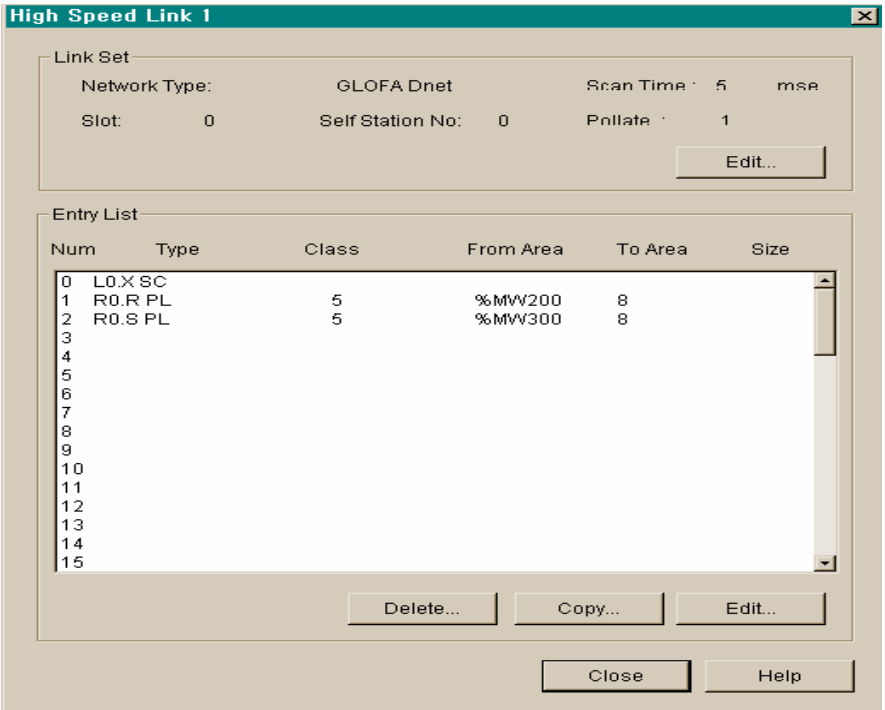
Item		Contents
Comm Mode 2)	Poll	Perform Poll service
	Strobe	Reserved(Not in use)
	COS	Reserved(Not in use)
	Cyclic	Reserved(Not in use)
Area	In case Remote sending mode	To set an area of its own station's data which will be sent to the opposite station
	In case remote receiving mode	To set an area of its own station's data storage that is received from the opposite station.(%IW area is Disable)
Cycle of sending/receiving(msec)		To set the cycle of data sending and receiving
Size(Byte) 2),3)		It sets the size of data to be sent or received. 2 byte unit when you want to communicate with your own company internally as it is, only by word size you can communicate. If you are to communicate between the other company and you, you must set byte value according to pertinent module requires

Remark

1) When communicates with slave module it's being done as Broadcast-Oriented type and it does not set the opposite station but just only by its own station setting it can communicate with master.
2) Select Poll on Communication mode box.(Others will be served later)
3) When sending/receiving data with the opposite(master), always *high speed link* sending/receiving parameter should be set simultaneously. Data size must be set according to the value setting available by pertinent module. But in case sending only with master module, you may set not only receiving parameter of *High speed link* but also set receiving parameter and data size inside receiving parameter as '0' and as the same way in case receiving only, key in sending data as '0' at setting parameter on *High speed link* and sending data size must be key in as '0'.
(refer to Program example 1)

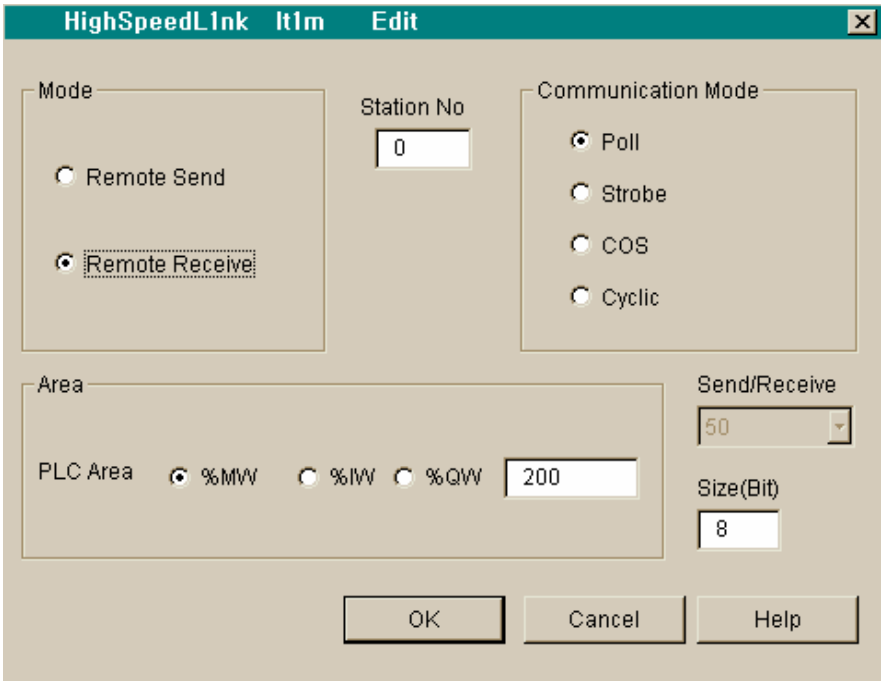
[Fig 6.10] represents a example for setting *high speed link* parameter of Dnet I/F module which moves as slave.

[Fig 6.10] Setting of *high speed link* parameter as slave function

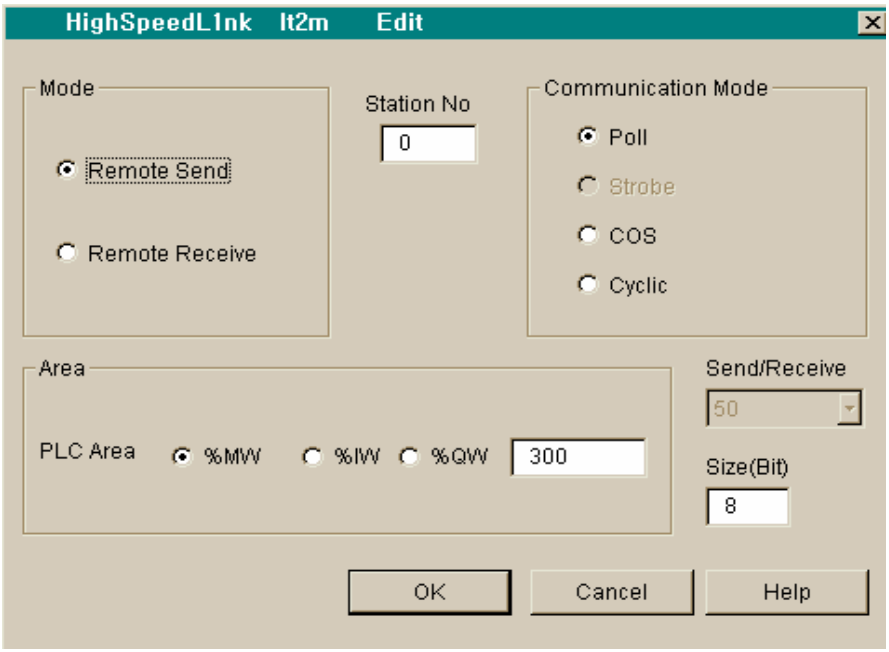


In link setting station number sets its own station number. Refer to clause 6.2.1 master communication for other settings.

[Fig 6.11] Setting of parameter as slave function



[Fig 6.12] Setting of sending parameter as slave function



[Fig 6.11] represents to store 8 byte received with using of Poll service from master station into %MW200 area. [Fig 6.12] represents sending and receiving with using of Poll service on master station through reading 8 byte data from %MW300.

6.2.3 Communication with single type remote module (G0L-DSQA,G0L-DSIA,other company's product)

GLOFA Dnet single-type remote module shows that it can communicate with long distance away master module without power module or CPU module. It can be set its own station number and communication speed for communicating with master module through using Dip switch. In order to control single remote module just only by setting of *high speed link* parameter with GMWIN on the module pertinent to master. And it's easy to interface among company own and other's module.

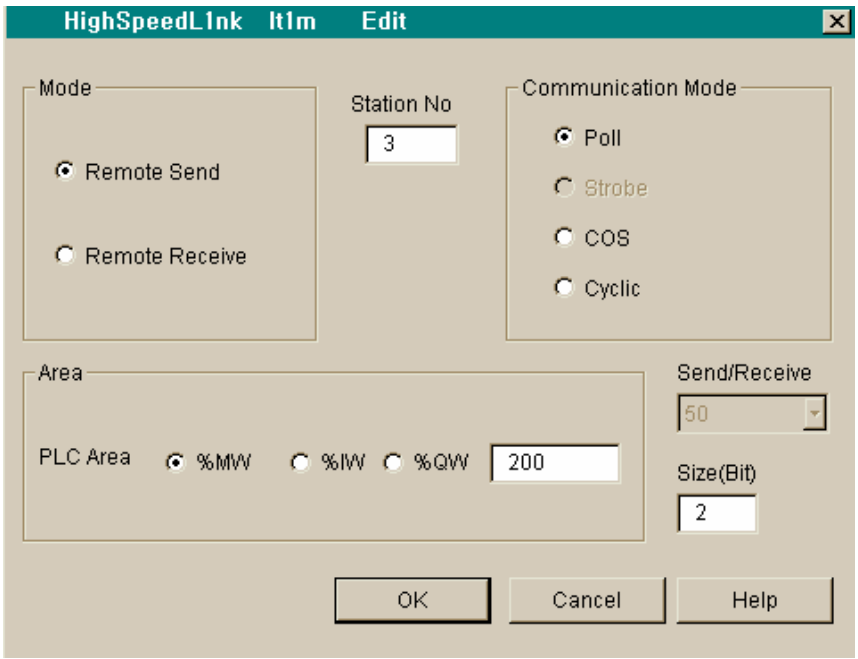
[Table 6.7] shows basic structure of single type remote modules.

[Table 6.7] Specifications of single type remote module

Module name			Contents	Service module
GLOFA-GM		G0L-DSQA	Relay output 16points	Poll service
		G0L-DSIA	DC 24V Input 16points	
Other company's products	OMRON	DRT1-OD08	TR output 8points	Poll service
	A.B	1794-OB16	TR output 16points	Poll service
		1794-OB16	DC 24V Input 16points	

[Fig 6.13] shows setting example for *high speed link* of GMWIN to control single type remote module.

[Fig 6.13] Setting *high speed link* parameter of G0L-DSQA



[Fig 6.13] shows setting method of sending data on single type I/F output module(G0L-DSQA). Mode among parameter sets alternative of data receiving or not, the opposite station number(G0L-DSQA), communication mode is poll, data area to be sent and the size should be set as 2. There is no additional setting on single type I/F module and it's being controlled on master module according to communication speed.

[Fig 6.14] Setting *high speed link* parameter on G0L-DSIA

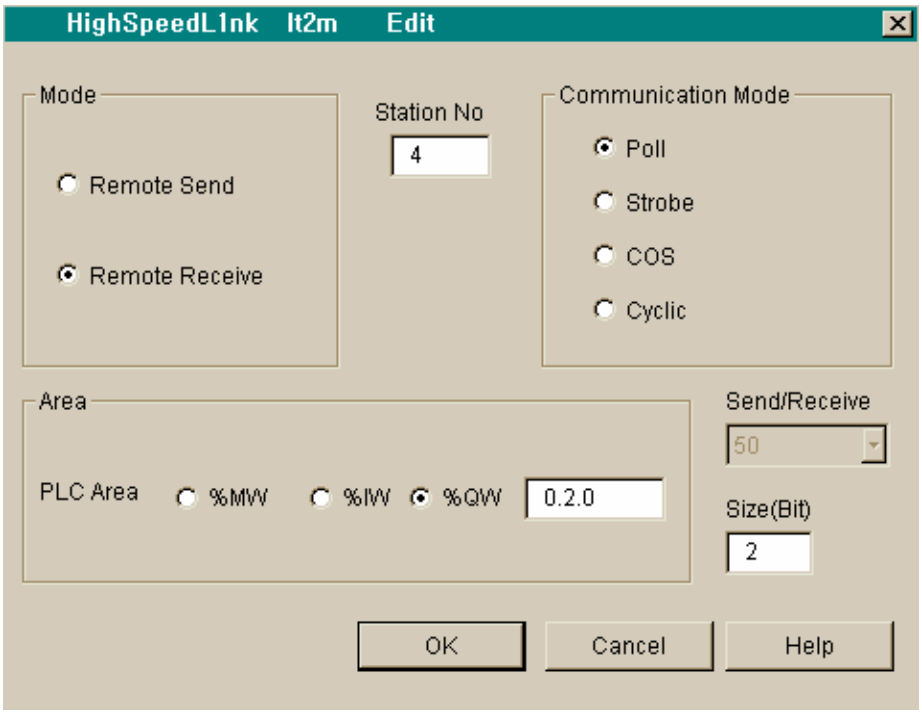


Figure above shows setting method of receiving data on single type I/F input module(G0L-DSIA). It can be set with the opposite station number, communication mode, storage area for received data and size(2 byte) like as output module.

Remark

1) This can be set as the same way of GLOFA-GM series at the time of communicating with other company's single type I/F module. Only data size is set like following.

- DRT1-OD08 : 1byte
- 1794-OB16/IB16 : 4 byte

[Table 6.8] Contents of *high speed link* parameter setting(setting master module)

Item		Contents
Mode	Remote sending	To send data to single type I/F output module.
	Remote receiving	To receive data from single type I/F input module.
Station number		To set station number of single type I/F module for communicating.
Comm. Mode 1)	Poll	Perform Poll service
	Strobe	Reserved(Not in use)
	COS	Reserved(Not in use)
	Cyclic	Reserved(Not in use)
Area	In case of Remote sending	To set an area of its own station's data which will be sent to the opposite station
	In case of Remote receiving	To set an area to store data received from single type I/F module(%Iw area is Disable)
Sending/Receiving cycle(msec)		It sets the sending/receiving cycle and it can be set by selecting 'link setting' item on *high speed link.*
Size(Byte) 2)		It sets the size of data to be sent or received. It is set as 1 word.(2 byte).

Remark

1) Communication mode is selected as Poll(Others will be served later)

2) Size setting is fixed as 1 word for both single type I/F input/output.
If you do not select 2 byte then communication is Impossible
(1byte,3byte,4byte).

3) When you communicate with master module and single type remote module, according to the type of pertinent remote module you must set one of both sending or receiving. (refer to program example 3)

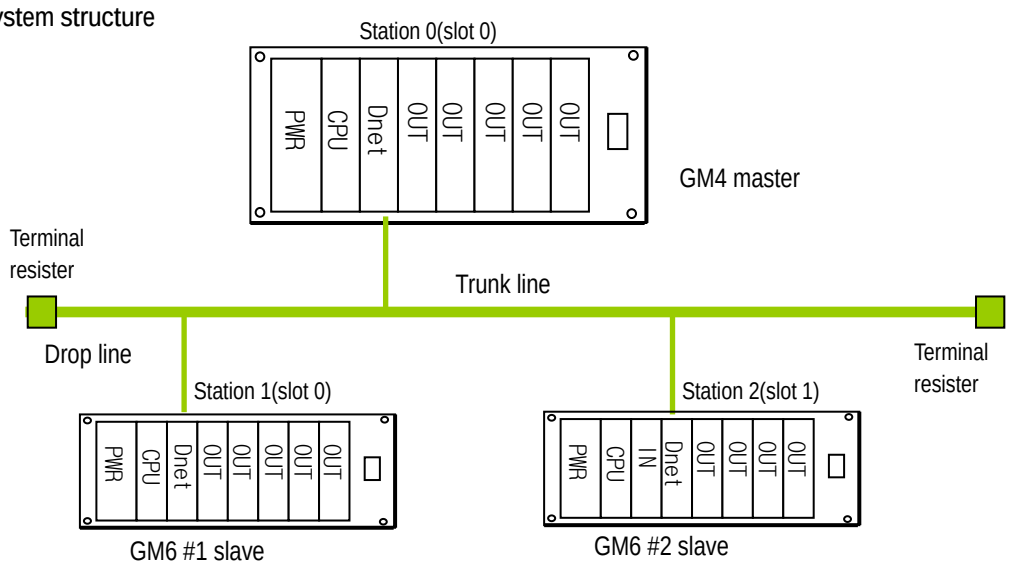
6.3 Program examples

6.3.1 Communication among LGIS's master module, #1

Example 1	In case sending or receiving individually performed among master and slave module.

Communication module(station 0) on GM4 base slot, communication module(0 station 0) on base slot 0, communication module(station 1) on GM6 #1 slot 0, communication module(station 2) on GM6 #2 slot1 is respectively attached. It is the data sending and receiving program from station 0 to station 1 or station 2. (refer to I/O structure map).

●System structure

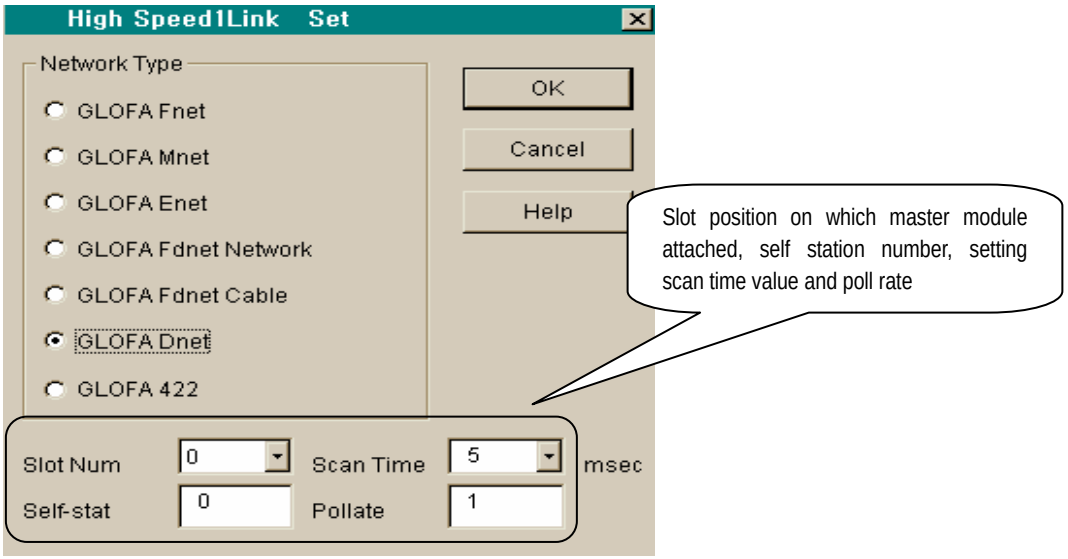


● I/O structure map

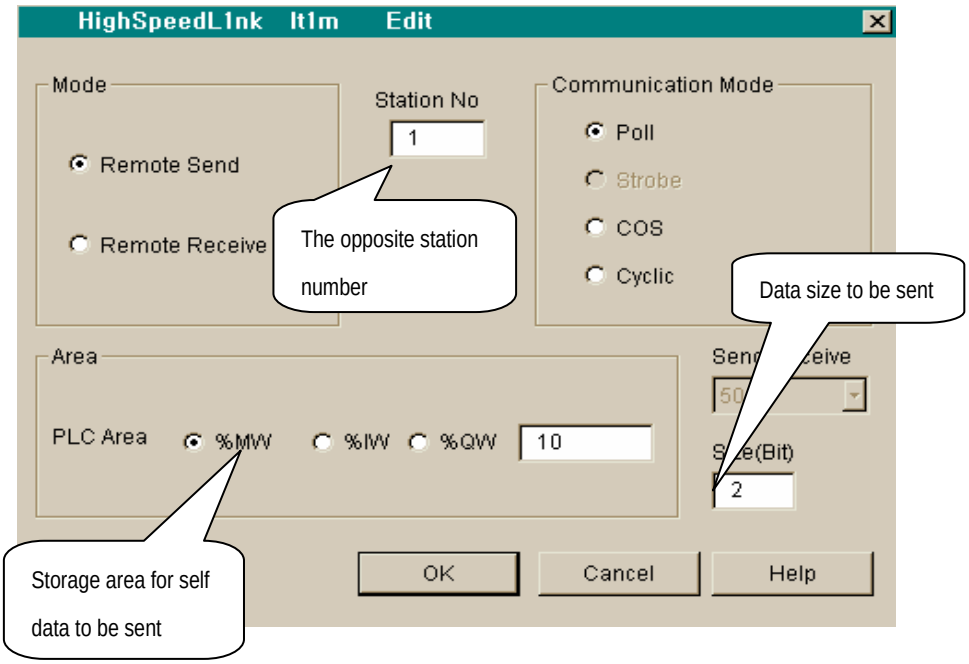
Sending/Receiving structure		Reading area	Storage area	Size(Byte)
GM4(station 0) (Master)	Sending: GM6 station 1	%MW10	-	2
	Receiving:GM6 station 2	-	%QW0.1.0	6
GM6(Station 1) (Slave)	Receiving:GM4 station 0	-	%QW0.1.0	2
GM6(station2) (Slave)	Sending:GM4 station 0	%MW50	-	6

1) Setting of *high speed link* parameter on GM4(Station 0)

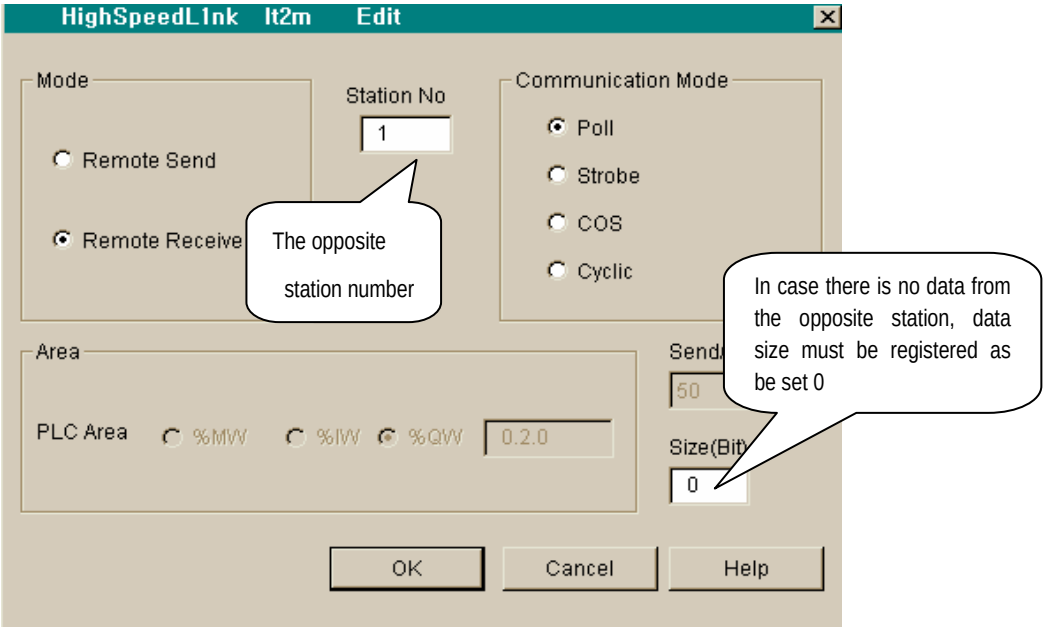
- Setting 'Link set' on master module



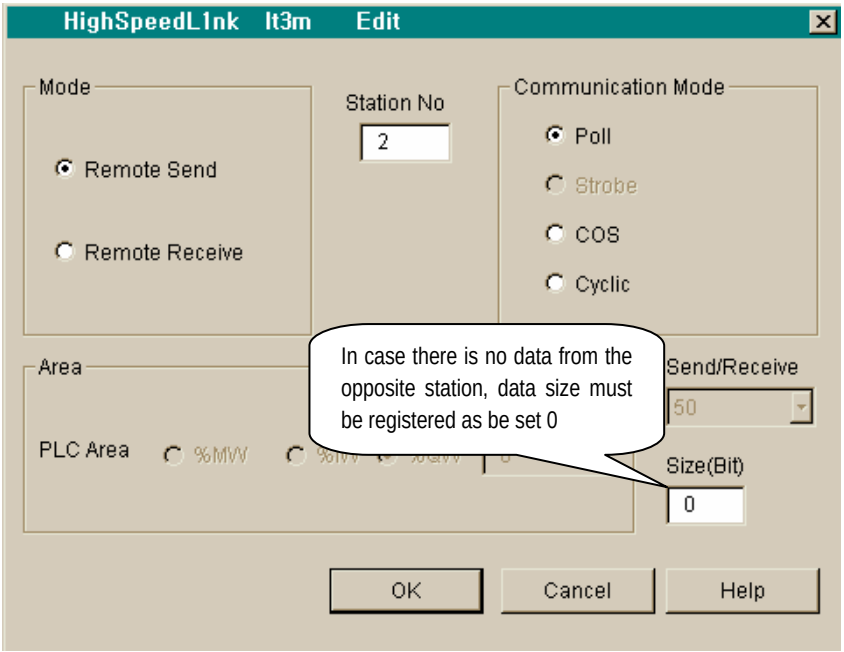
- Setting of parameter for sending to GM6 station 6



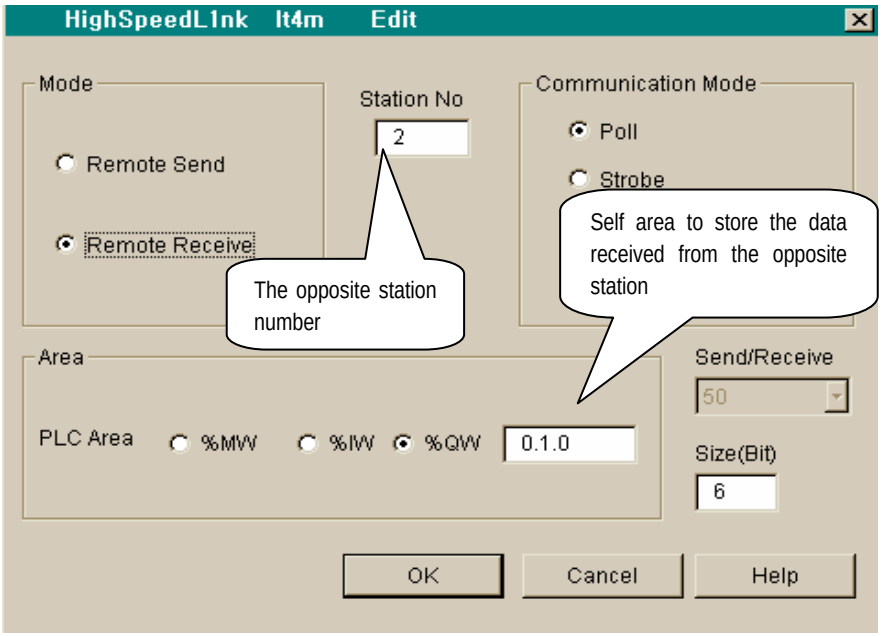
- Setting receiving parameter from GM6 station 1



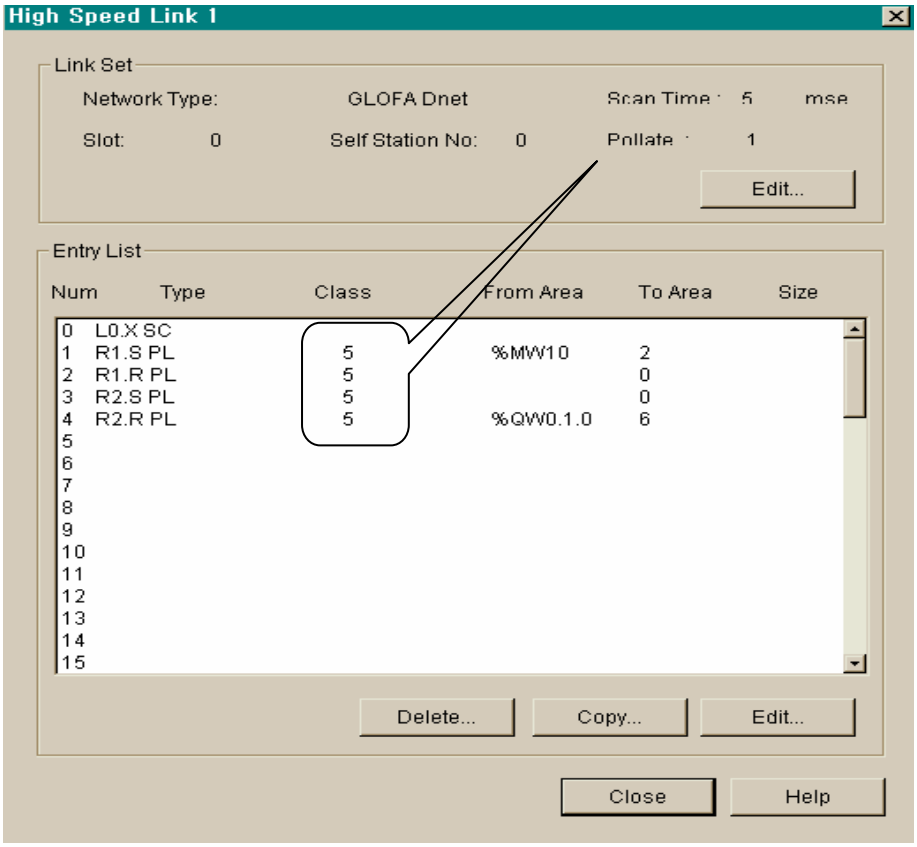
- Setting parameter for sending to GM6 station 2



- Setting parameter for sending to GM6 station 2

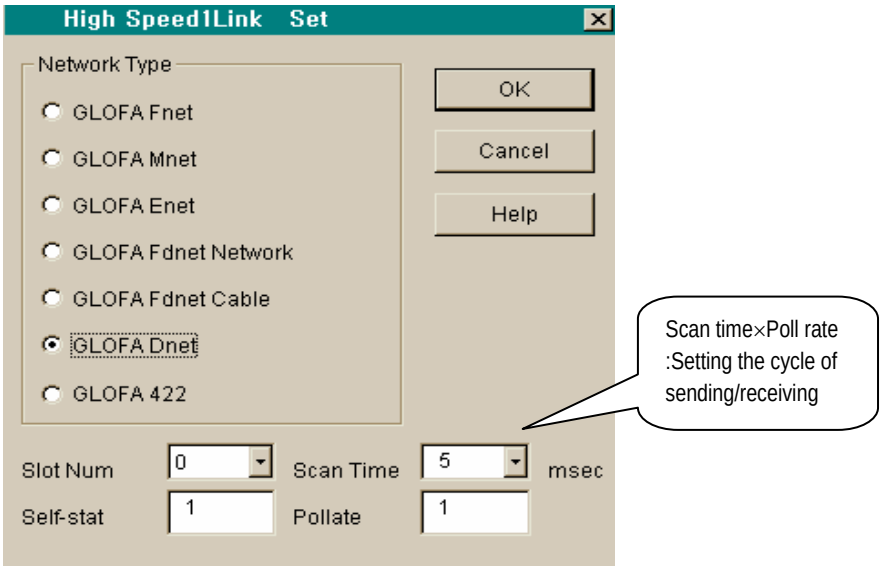


- Display of finished setting '*high speed link* 1' on master module

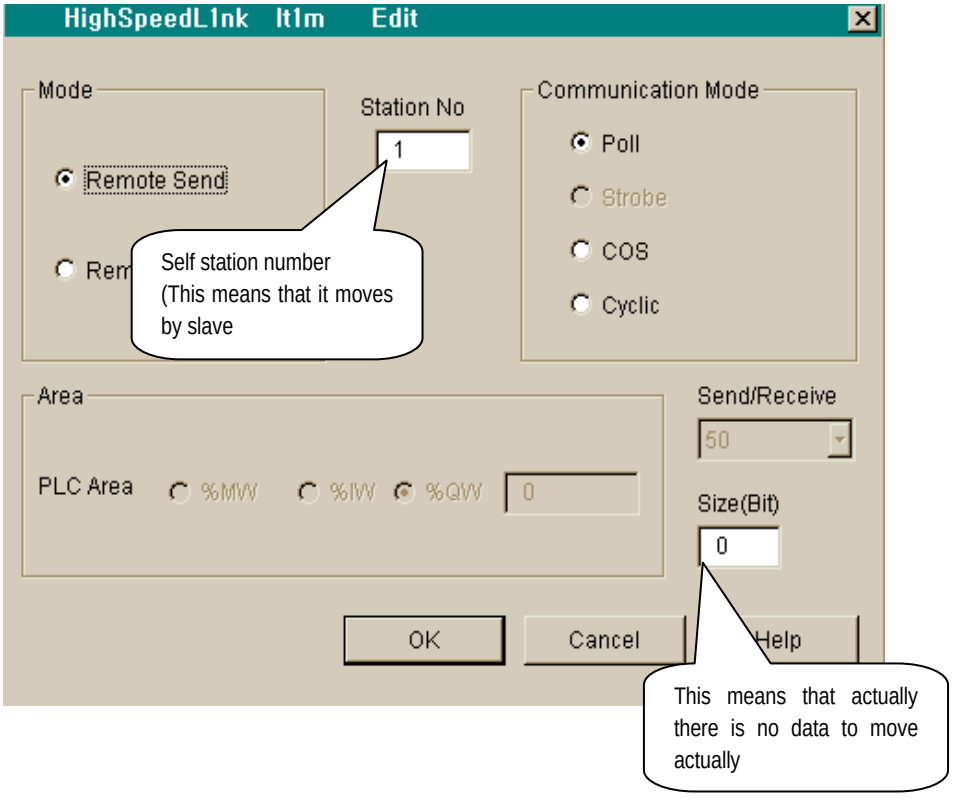


2) Setting *high speed link* parameter on GM6 #1(station 1)

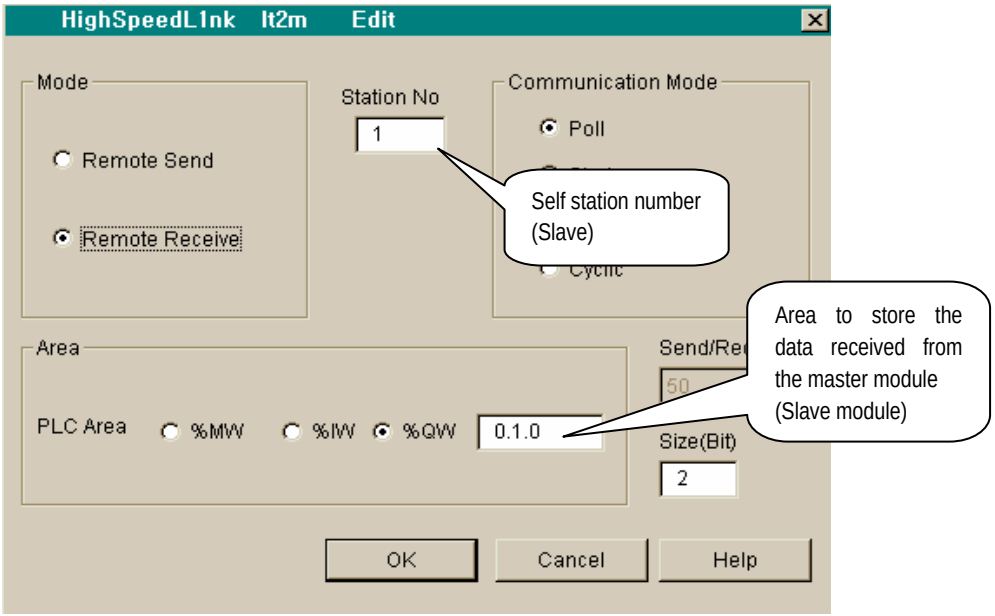
- Setting 'Link set' on slave module



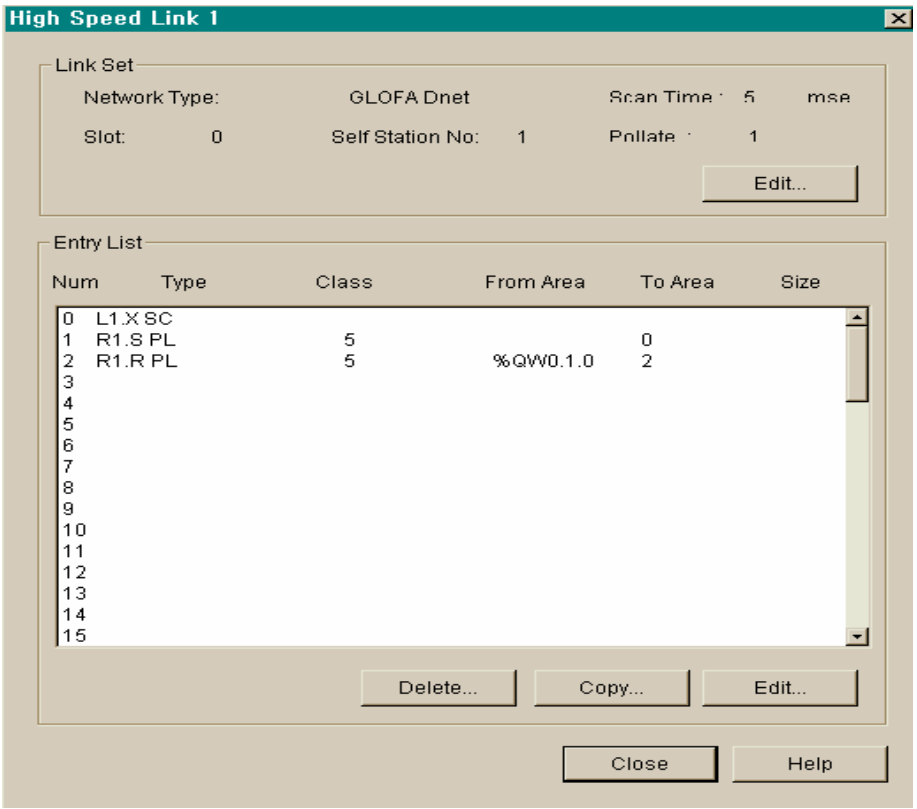
- Setting parameter for sending to GM4 master station



- Setting parameter for sending to GM4 master station

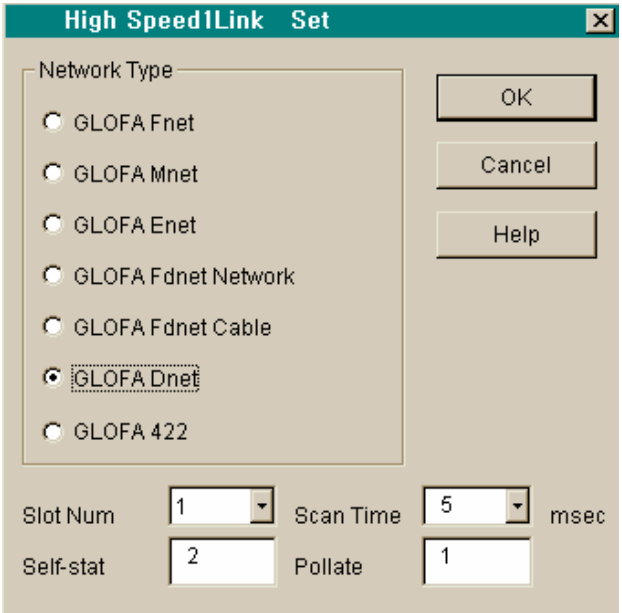


- Display of finished setting '*high speed link* 1' on slave module

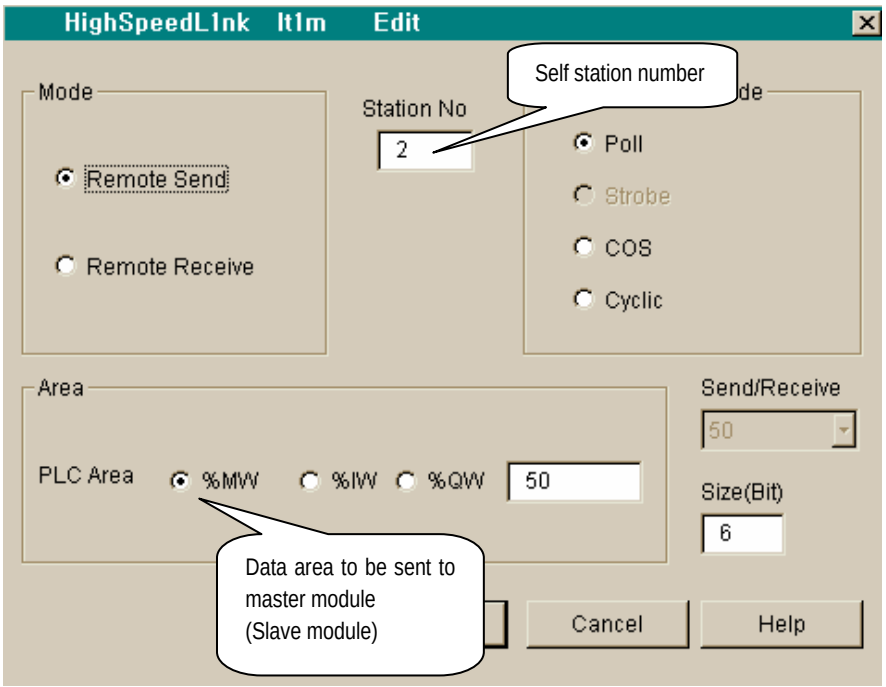


3) Setting parameter for *high speed link* on GM6 #2(station 2)

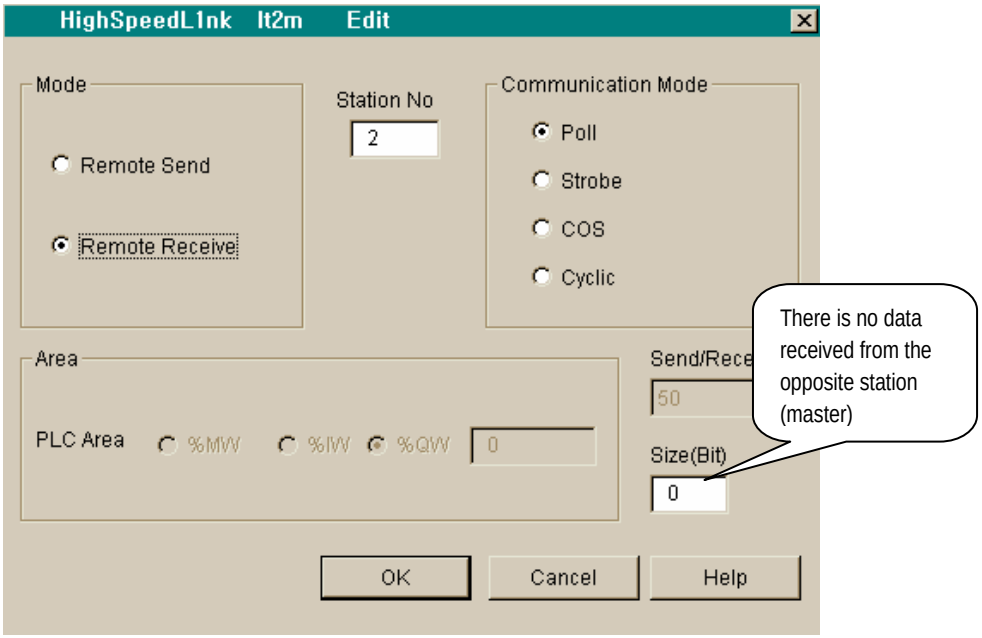
- Setting 'link set' on slave module



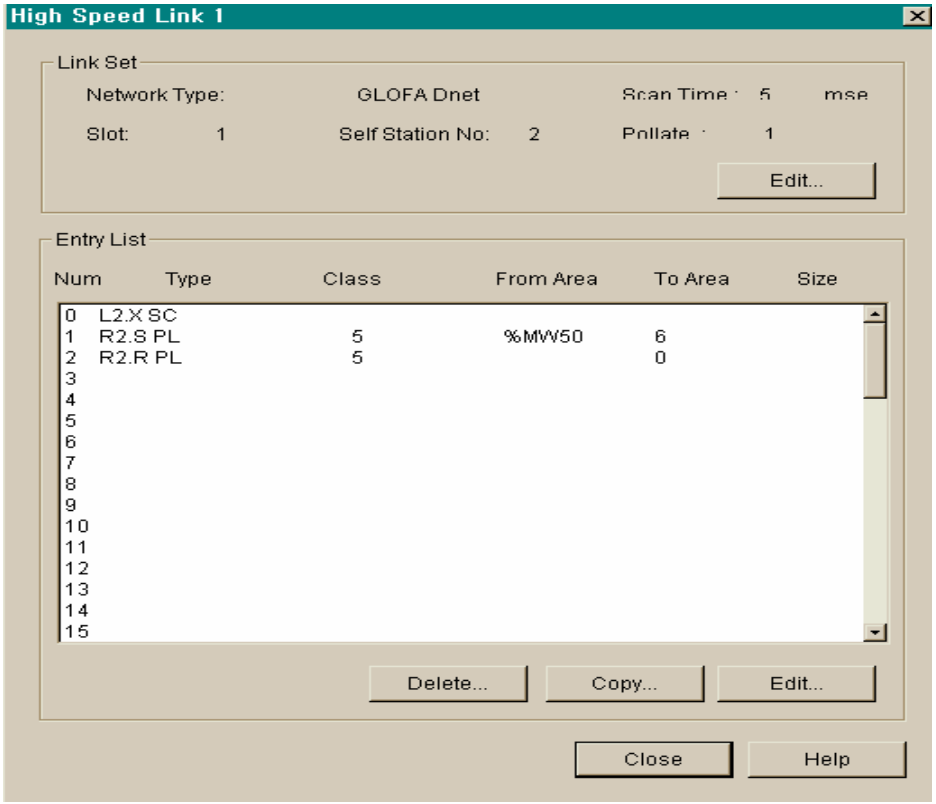
- Setting parameter for sending to GM4 master station



- Setting parameter for sending to GM4 master station



- Display finished setting 'highspeedlink 1' on slave module

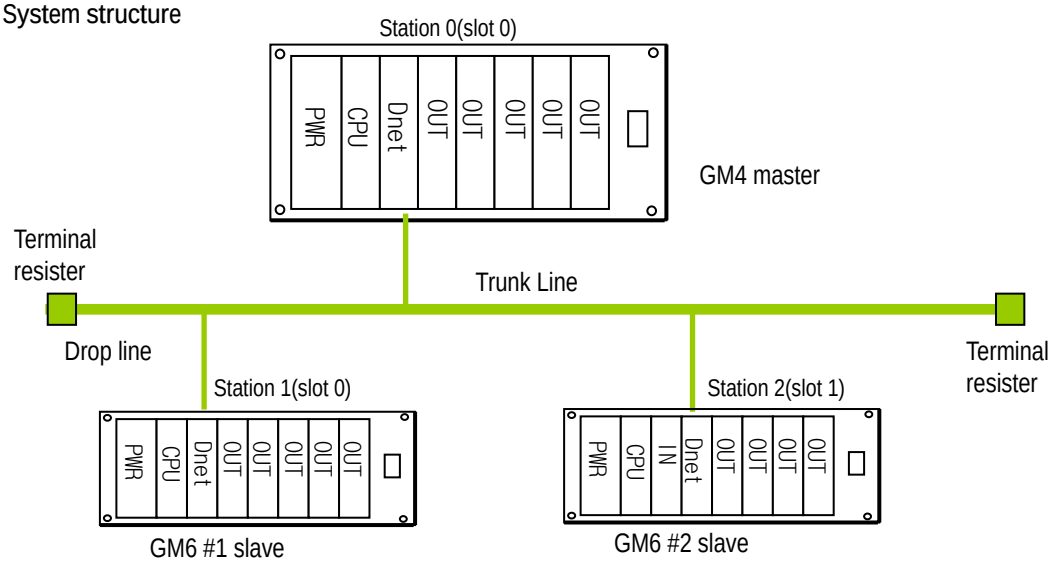


6.3.2 Communication among LGIS's master modules, #2

Example 2	In case sending/receiving is performed simultaneously among master and slave module

Communication module(station 0) on GM4 base slot, communication module(0 station 0) on base slot 0, communication module(station 1) on GM6 #1 slot 0, communication module(station 2) on GM6 #2 slot1 is respectively attached. It is the data sending and receiving program from station 0 to station 1 or station 2. (refer to I/O structure map).

● System structure

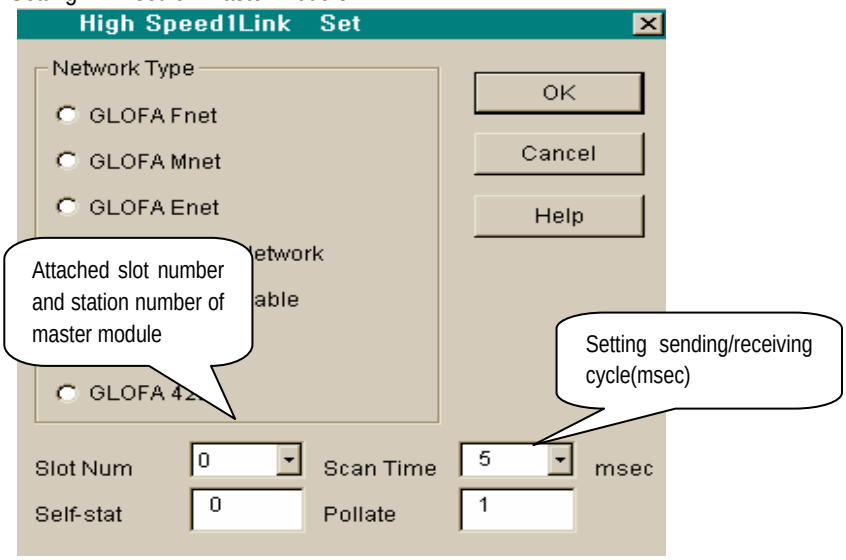


● I/O Structure map

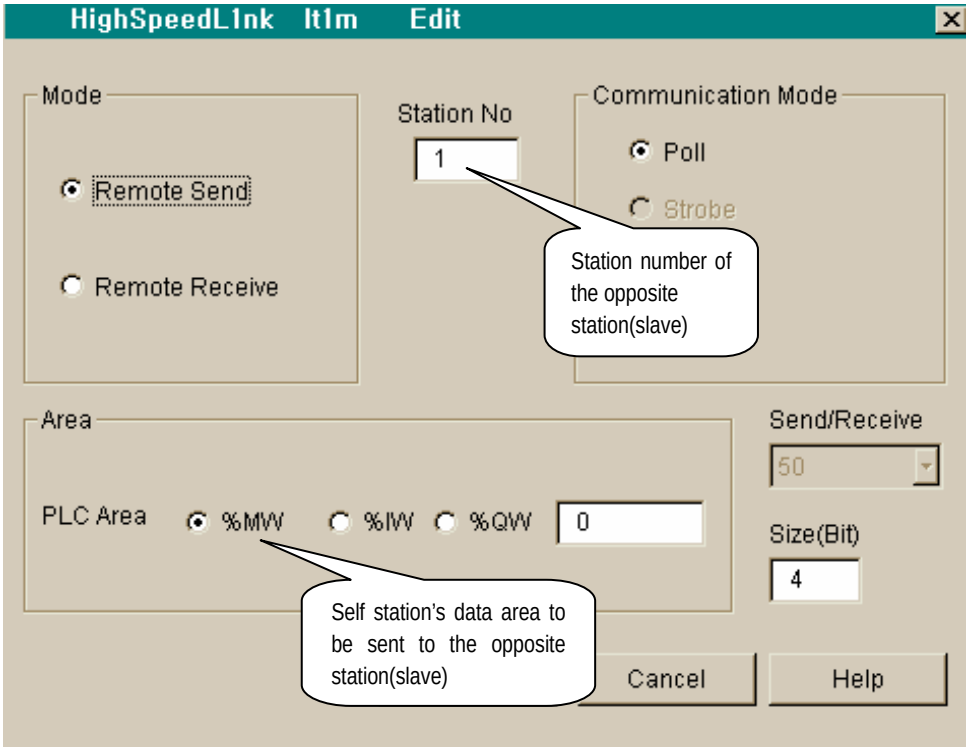
Sending/receiving structure		Reading area	Storage area	Size(Byte)
GM4(station0) (master)	Sending:GM6 station1	%MW0	-	4
	Receving:GM6 station 1	-	%QW0.1.0	2
	Sending:GM6 station 2	%MW0	-	8
	Receving:GM6 station 2	-	%QW0.2.0	2
GM6(station1) (slave)	Sending:GM4 station 0	%MW100	-	2
	Receving:GM4 station 0	-	%QW0.1.0	4
GM6(station2) (Slave)	Sending:GM4 station 0	%MW200	-	2
	Receving:GM4 station 0	-	%QW0.2.0	8

1) Setting parameter of '*high speed link*' on GM4(station 0)

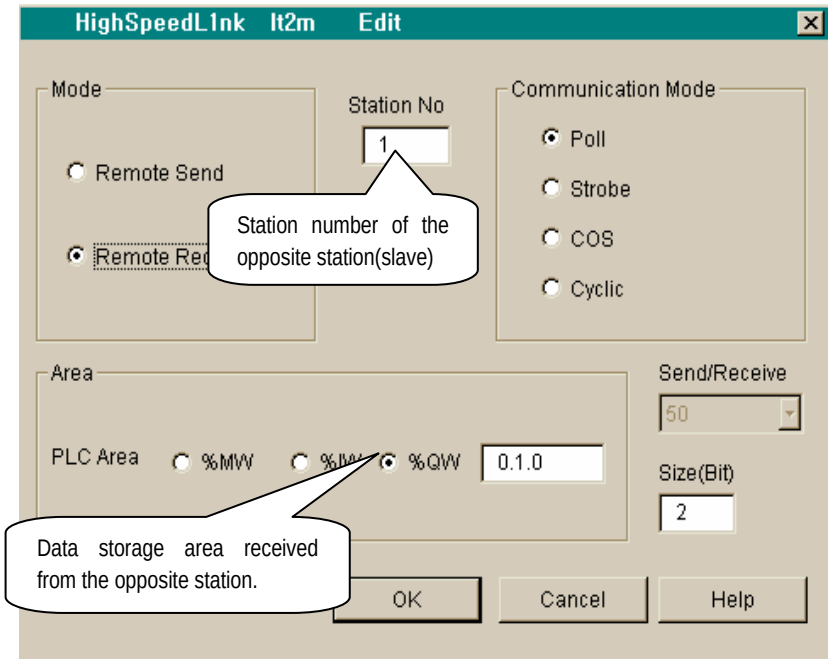
- Setting 'Link set' on master module



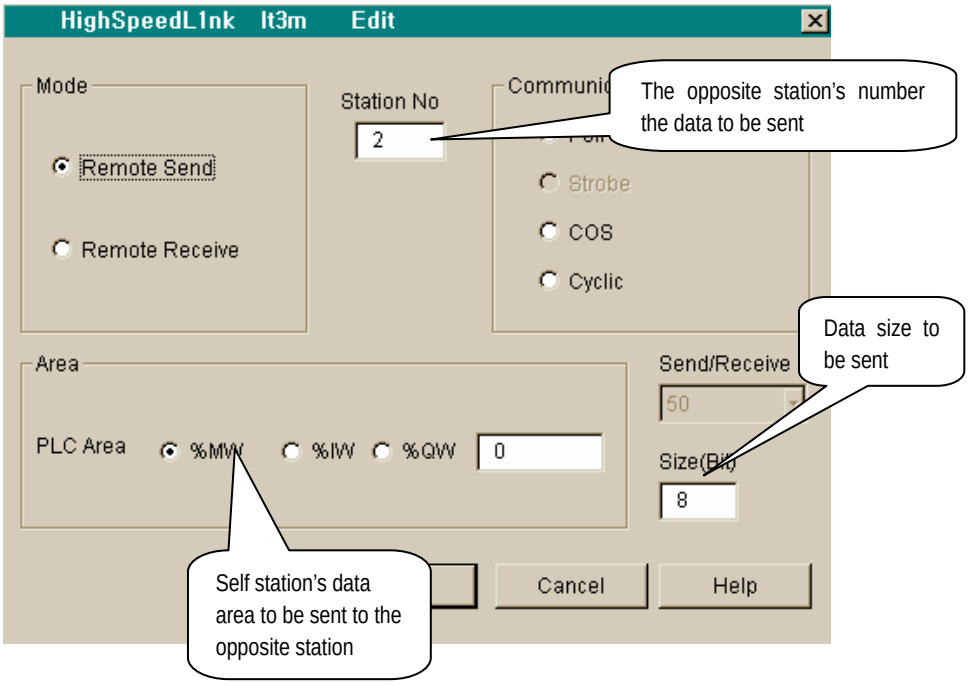
- Setting parameter for sending on GM6 station 1



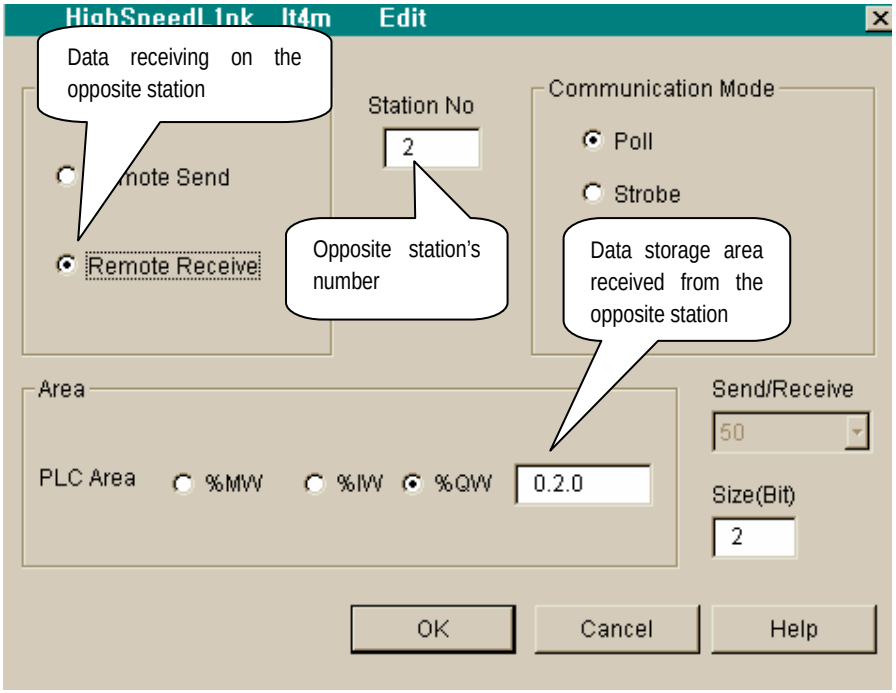
- Setting parameter for receiving GM6 station 1



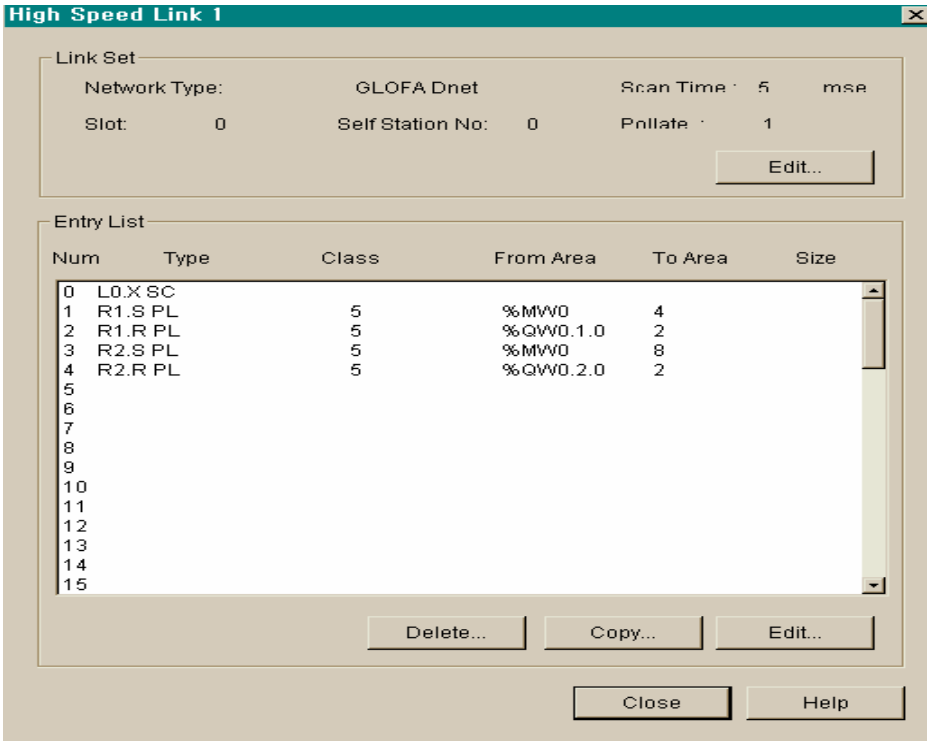
- Setting parameter for sending to GM6 station 2



- Setting parameter for sending on GM6 station 2

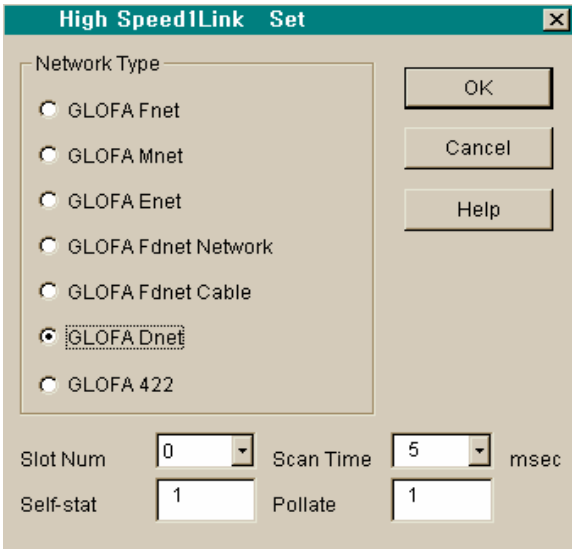


- Display of finished setting *high speed link* on Master module

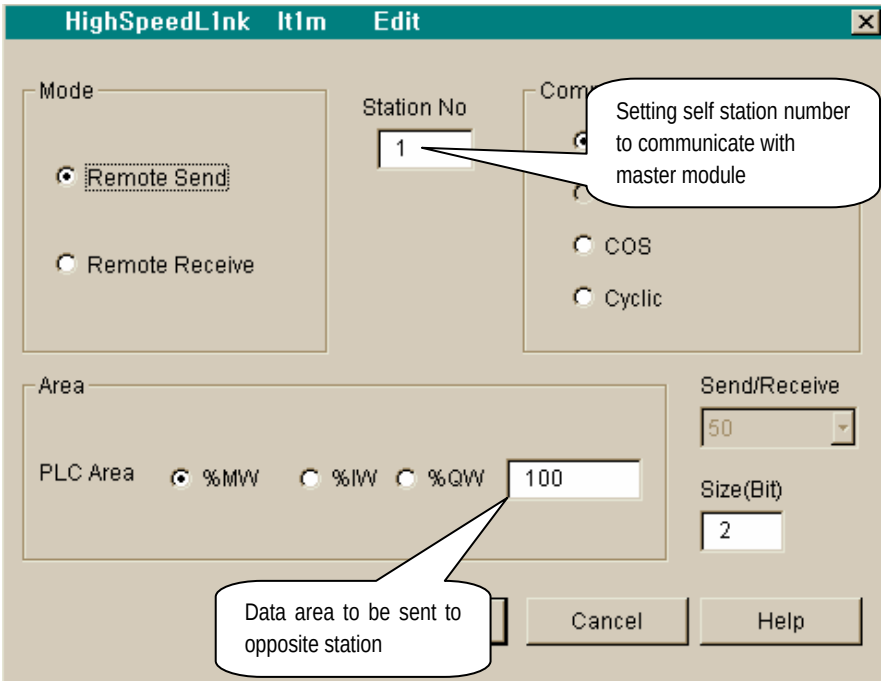


2) Setting parameter for *high speed link* on GM6 #1(station 1)

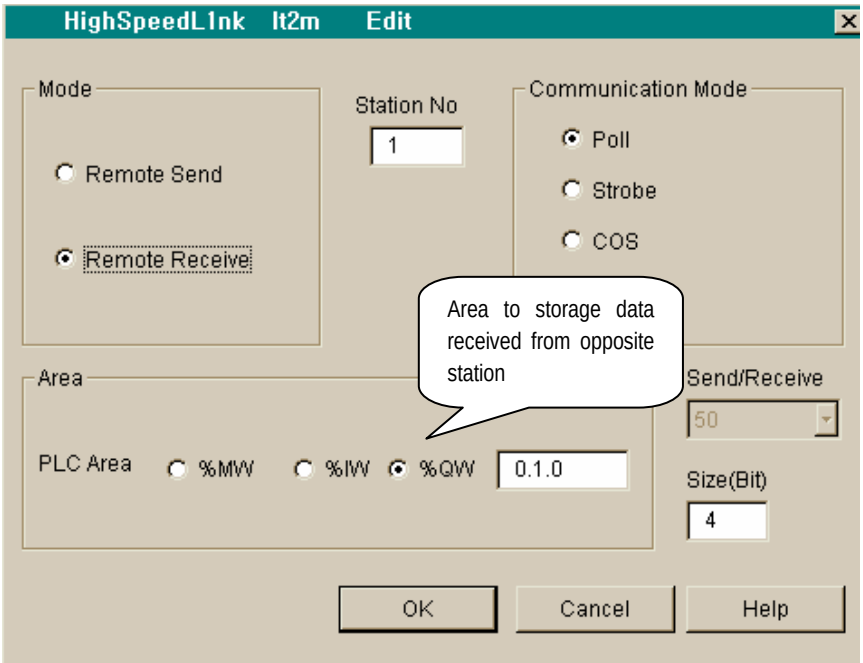
- Setting 'link information' on slave module



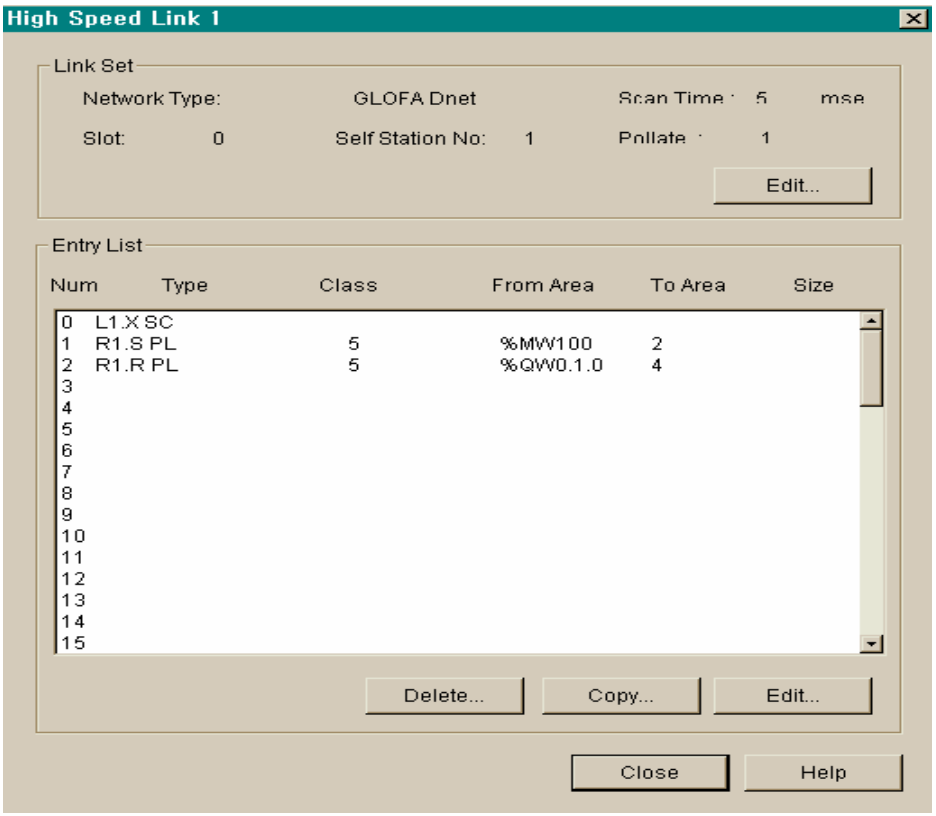
- Setting parameter of sending to GM4 master station



- Setting parameter of receiving to master station

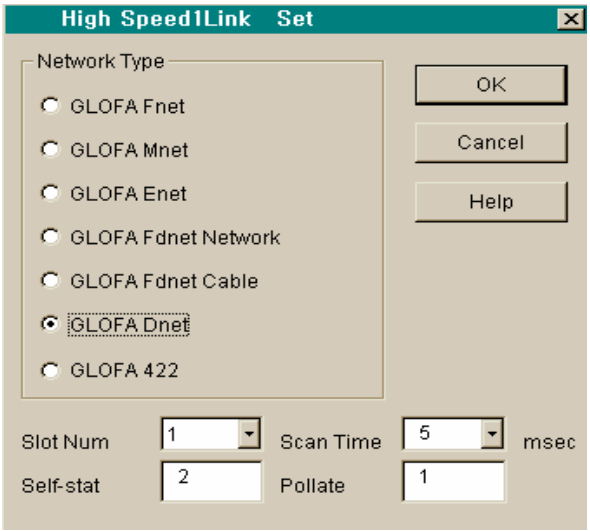


- Display finished setting '*high speed link* 1' on slave module

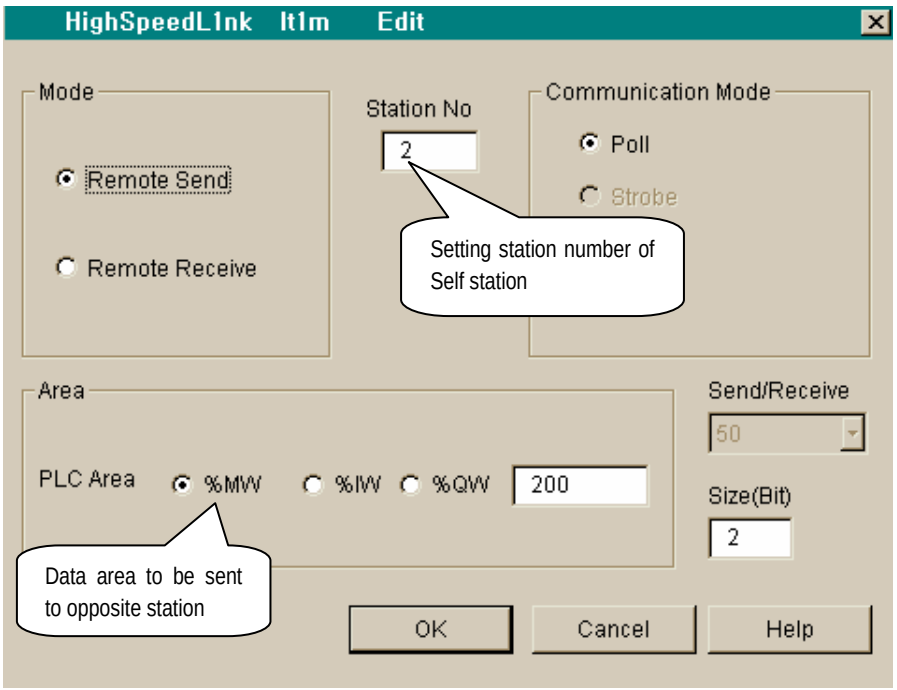


3) Setting of *high speed link* parameter on GM6 #2(station 2)

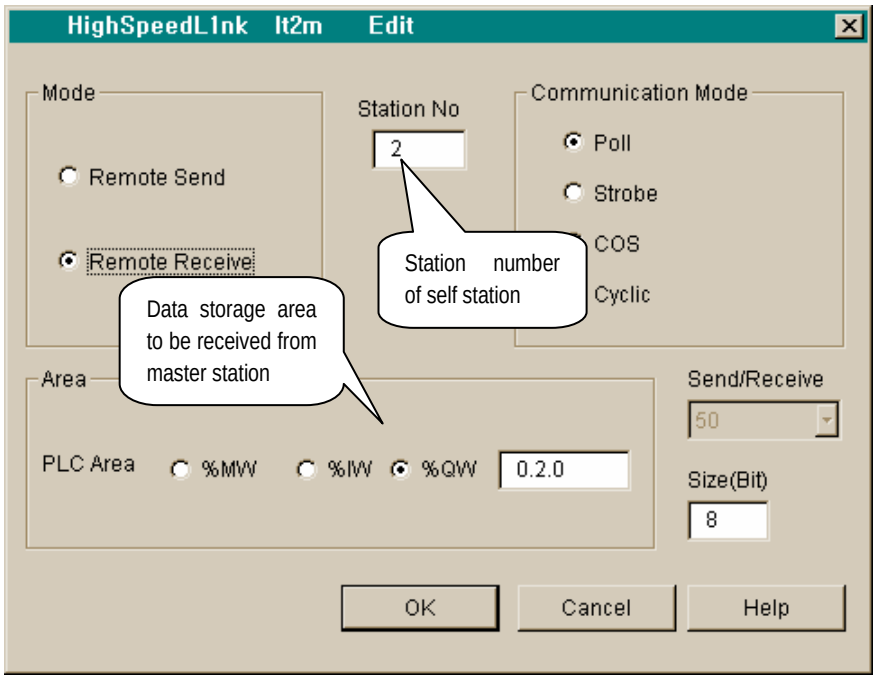
- Setting 'Link information' on slave module



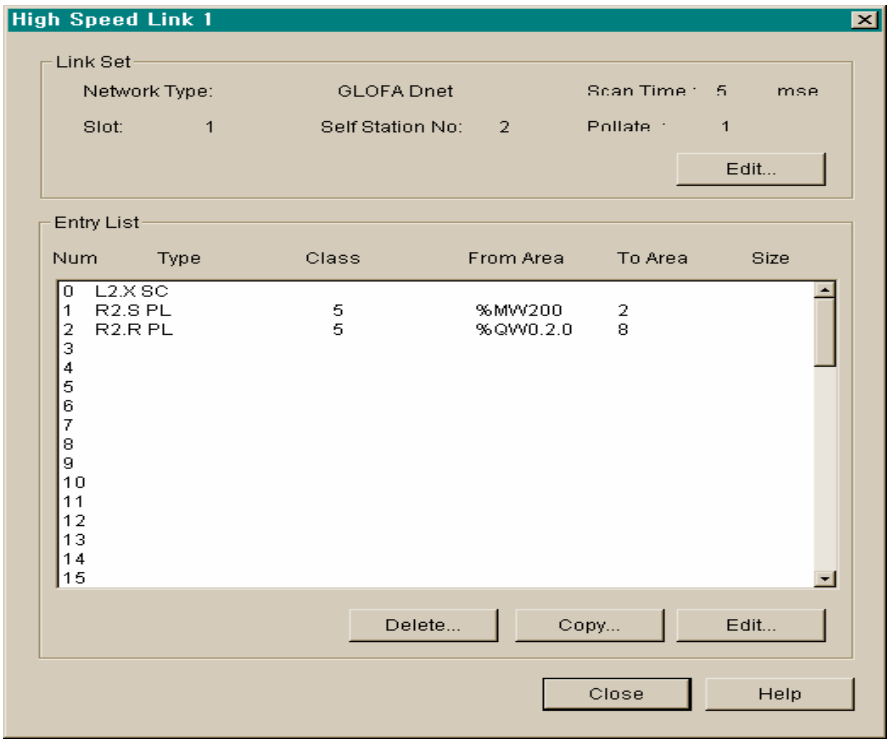
- Setting parameter of sending to GM4 master station



- Setting parameter of receiving to GM4 master station



- Display of finished parameter '*high speed link* 1' on slave module

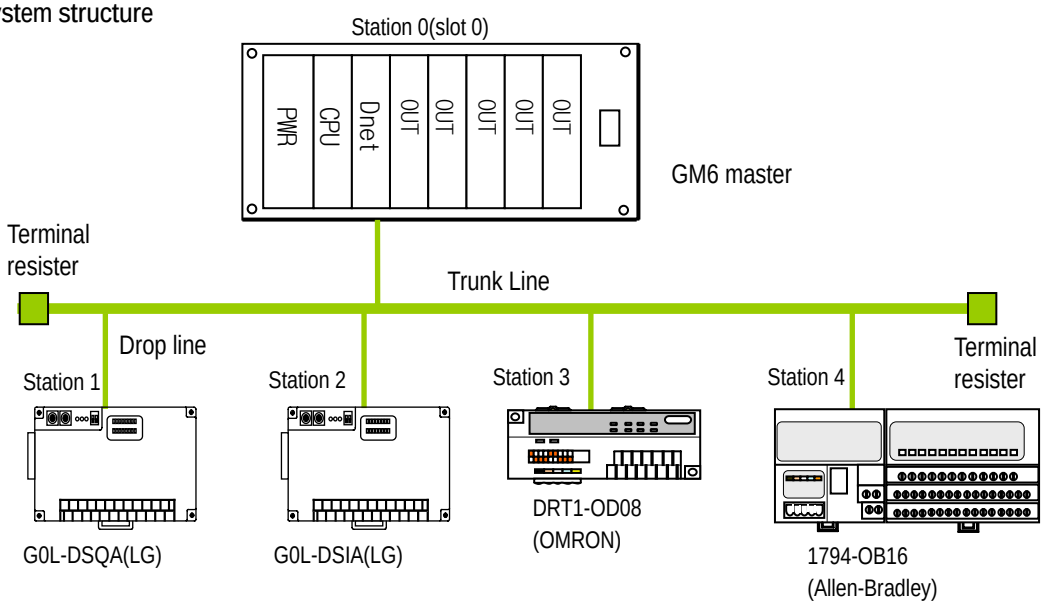


6.3.3 Communication among LGIS's and other company's slave modules

Example 3

Communication master module(station 0) on GM6 base slot 0 is attached and send or receive data to single remote modules with station number 1~4(refer to I/O structure map).

● System structure

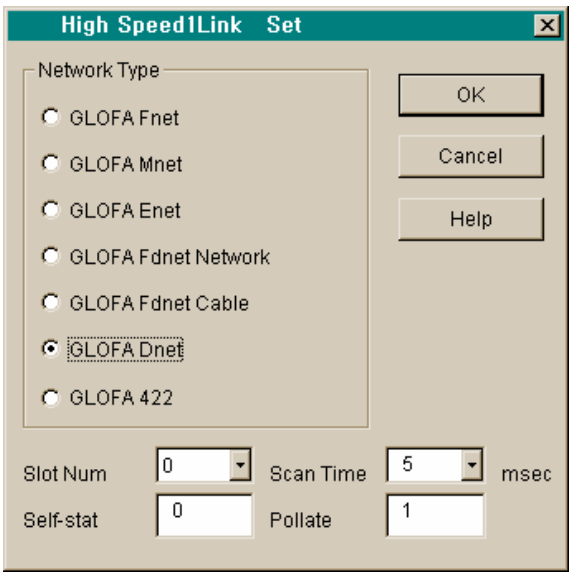


● I/O structure map

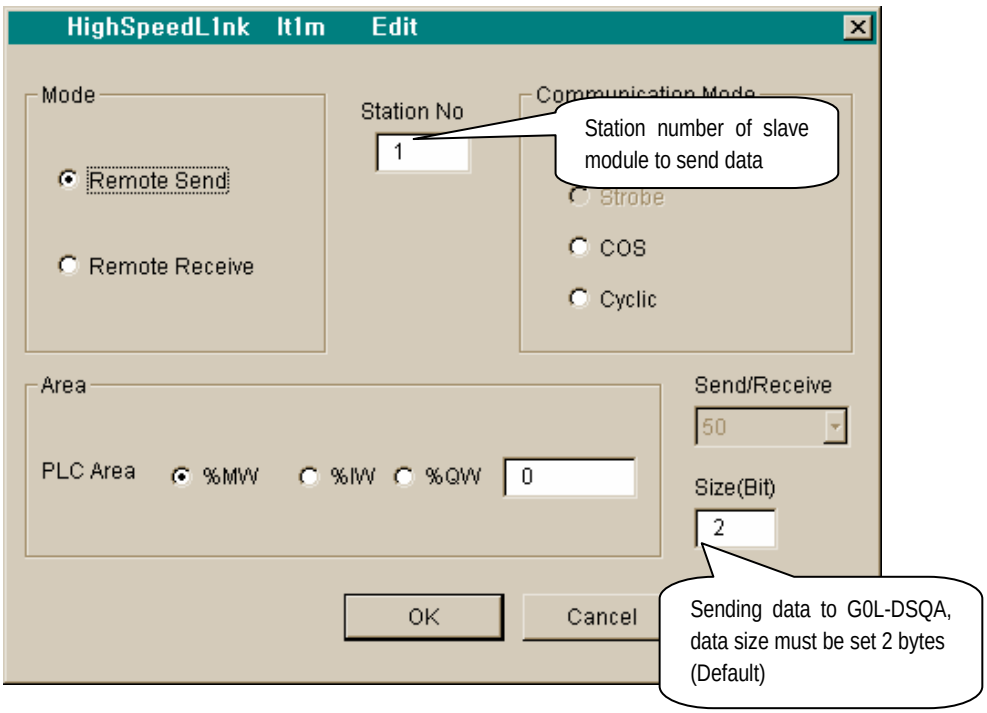
Sending/Receiving structure		Reading area	Storage area	Size(Byte)
GM6(station 0) (master)	Sending:G0L-DSQA(station 1)	%MW0	-	2
	Receiving:G0L-DSIA(station 2)	-	%QW0.1.0	2
	Sending:DRT1-OD08(station 3)	%MW100	-	1
	Sending:1794-OB16(station 4)	%MW200	-	4

1) Setting of *high speed link* parameter on GM6(station 0)

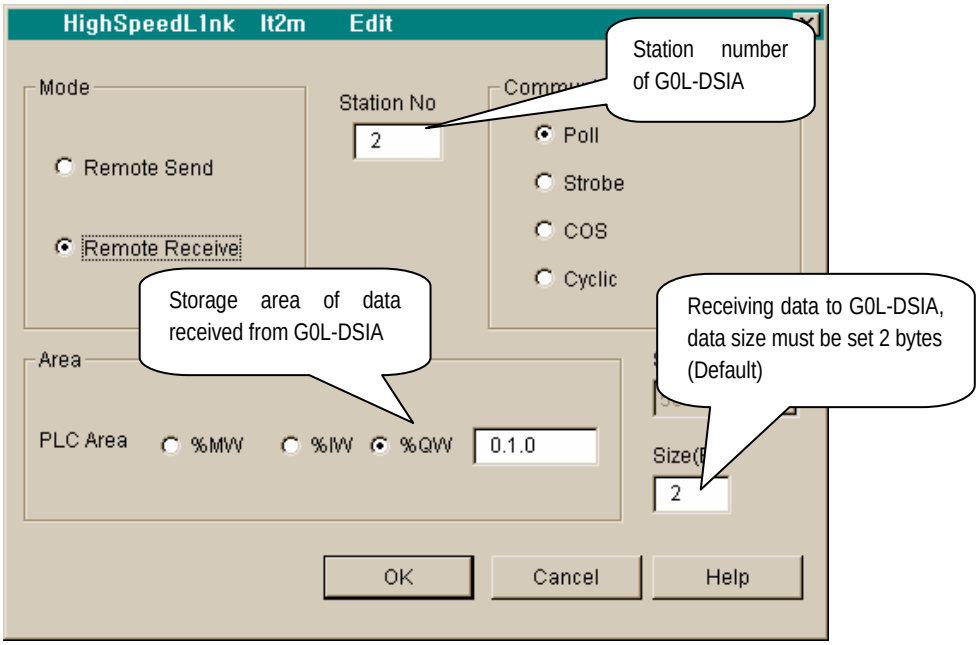
- Setting of 'Link information' on master module



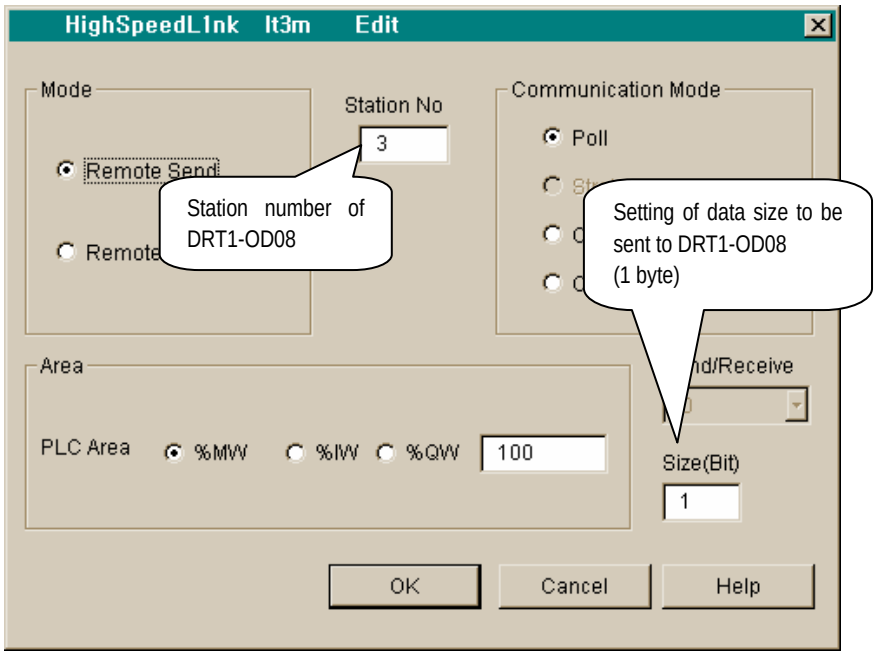
- Setting of sending parameter to station 1(G0L-DSQA)



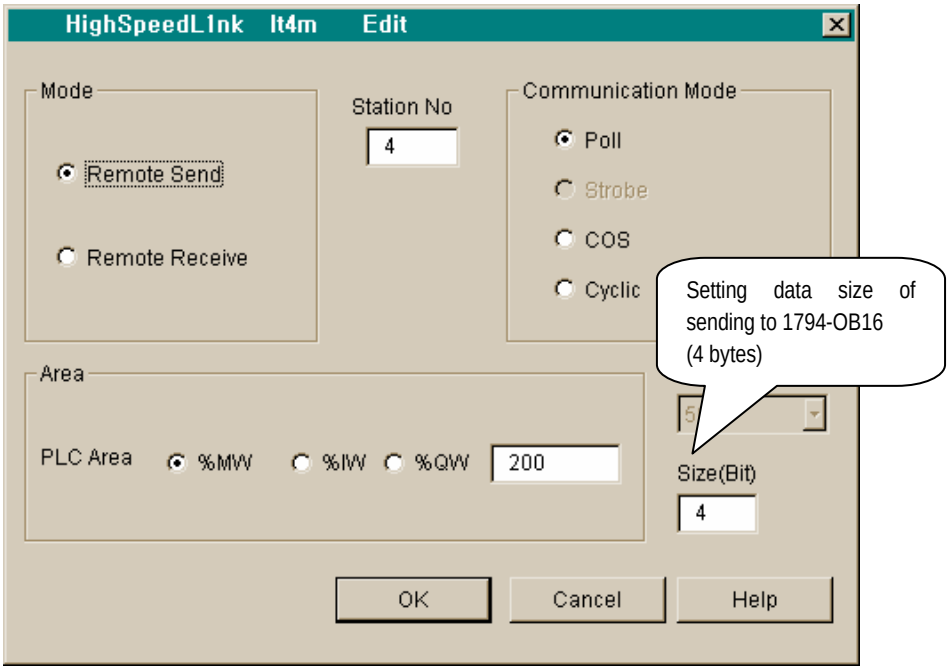
- Setting of receiving parameter to station 2(G0L-DSIA)



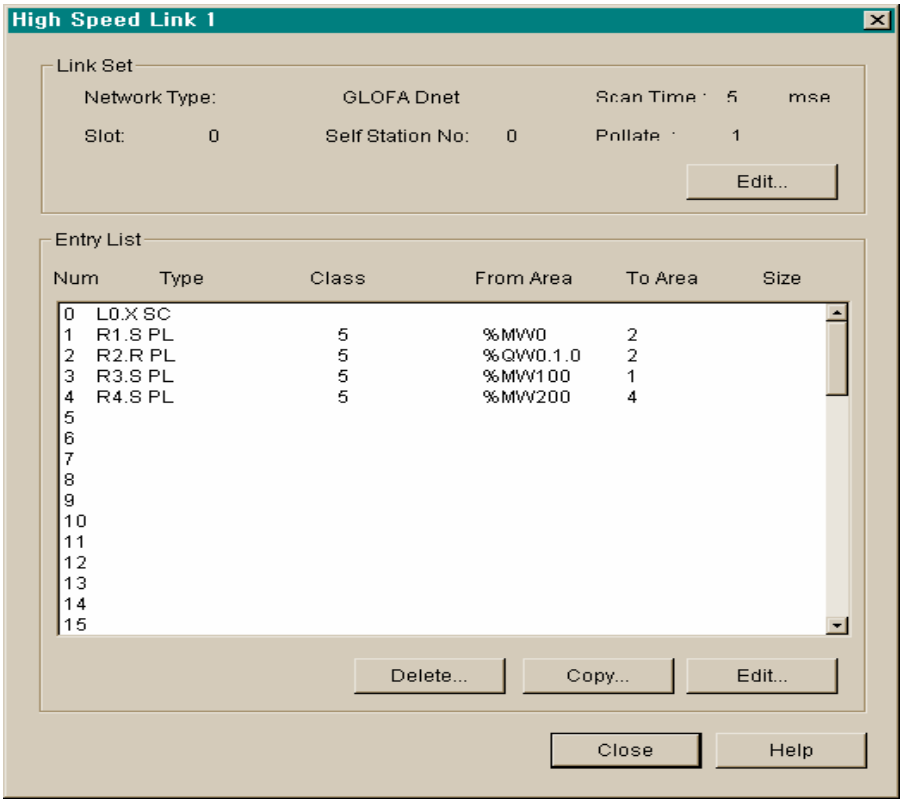
- Setting of sending parameter to station 3(DRT1-OD08)



- Setting of sending parameter to station 4(1794-OB16)



- Display of finished setting '*high speed link* 1' on master module



2) Setting of *High speed link* parameter on single type remote(station 1)

: No parameter setting

3) Setting of *High speed link* parameter on single type remote(station 2)

: No parameter setting

4) Setting of *High speed link* parameter on single type remote(station 3)

: No parameter setting

5) Setting of *High speed link* parameter on single type remote(station 4)

: No parameter setting

Remark

1) Single type slave(remote) module is not needed additional parameter setting but just only with it's own station number and Communication it's possible to communicate with master.

Chapter 7 Installation and start up

7.1 Installation

7.1.1 Precautions on installation

In case of GLOFA-GM4/6 as a maximum 2 sets of Dnet I/F module can be mounted on basic base.

1) Selecting of adequate communication module after verifying standard elements required for system construction.
2) Prepare accessories like as cable and tap, terminal resister will be using for this communication module
3) According to the communication speed which will be used for this communication module, all communication module speed must be coincident to that speed respectively and must follow specification of the cable.
4) In case you are using tap, don't forget to use terminal resister on both ends of taps
   If it is the system structured with single network, please be set without any duplicated station number. At not powered PLC on status, mount master module on base and set station number of communication and communication speed.
5) When mount this communication, verify if there is any foreign particle on base connector to be mounted and verify the status of connector pin status.
6) All communication module can not be mounted on expanded base, necessarily be attached on slot position of standard base the nearest CPU.
7) When mount this module, please be aware to be connected necessarily to base board or excellent connection to the opposite. If the connection is incorrect it may cause the problem on CPU and interface
8) The communication speed will be used for this communication module is 125k,250k,500kbps, if you want to change communication speed after setting of it turn the power off and get it changed and changed mode will be applied just after turn the power on again.

7.1.2 Required materials for installation

Required material	Dnet I/F module
Comm. cable	Thick cable/Thin cable
Tap/terminal resister	4,8port tap, Terminal resister:121Ω, 1%, 1/4W
24VDC supplying equipment	General power equipment
Connection connector	Phoenix, 5 pin Female connector

7.1.3 Installation

1) Precautions on installing connector

Please be aware of followings before installation of connector

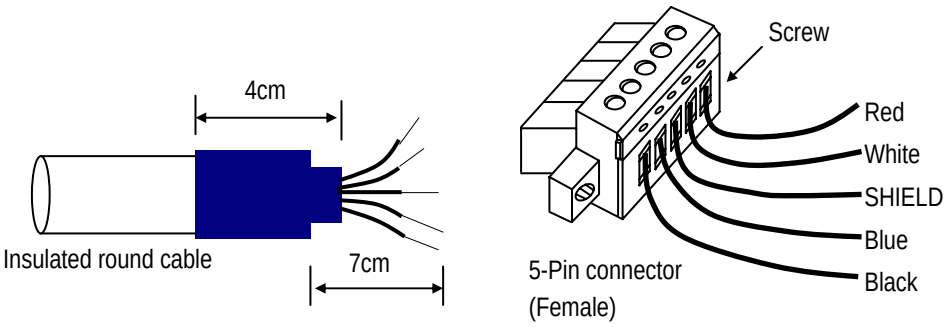
If the signal is not good on cable,

(1) If the module installed on system is on moving, then install it as the operation stop status.

(2) If currently it is powered on status then power off before working

(3) When the installation finished then fix the cable tightened up in order not to be go out

2) Installation method for connector



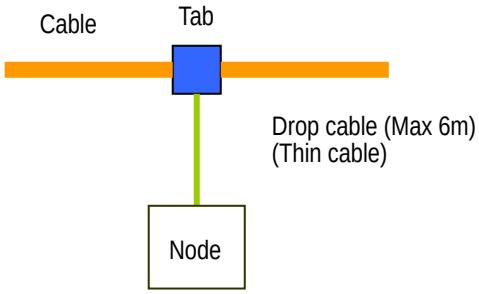
(1) Peel off the cable clothes about 7cm for cables connection

Cut off shrinking packaging cover about 4cm and wind it up to cable and wrap exposed conduct part and insulation clothes.

(2) Peel off the clothing of cable about 8mm from both ends and adhere to cable through getting shrinking packaging cover heated.

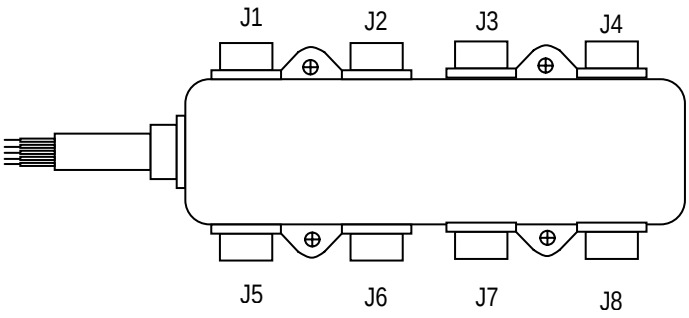
(3) Insert the peered off cable into clamp screw on adequate area and tighten the screw (Please be careful whether the signal name between both cable and connector is coincident from each other.

There is two types of cable connection method like as using tap type or drop type connection method. You'd better to prepare DC 24V power at reasonable place to sustain voltage at the time getting Dnet I/F module much or getting the cable longer.



3) Installation method of Tap (8-Port tap example)

As a maximum 8-connection and separate is possible through connection to trunk line of device port tap.



(1) Drop line consisted with Thick or Thin cable is capable for connection to device with tap. In case of open-style tap, can use following 3 types of connector

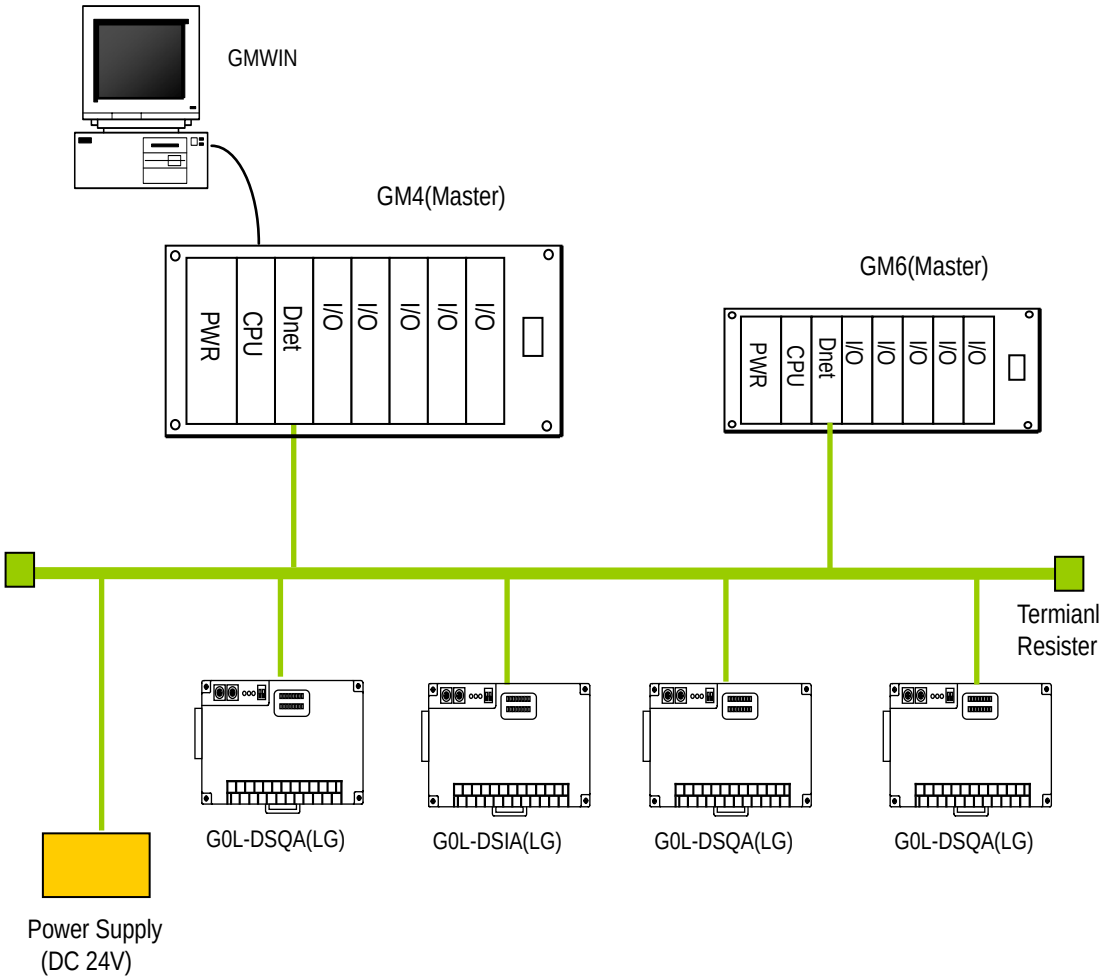
- Pluggable screw type
- Hard-wired screw type
- Soldered type

The best way of cable connection is connection of drop line while system is not powered on status.If you connect while the system is operating then check the connection status with other devices and connect to trunk line in oredr not to impact communication.

(2) When connect to trunk line do not excess over maximum tolerance length.

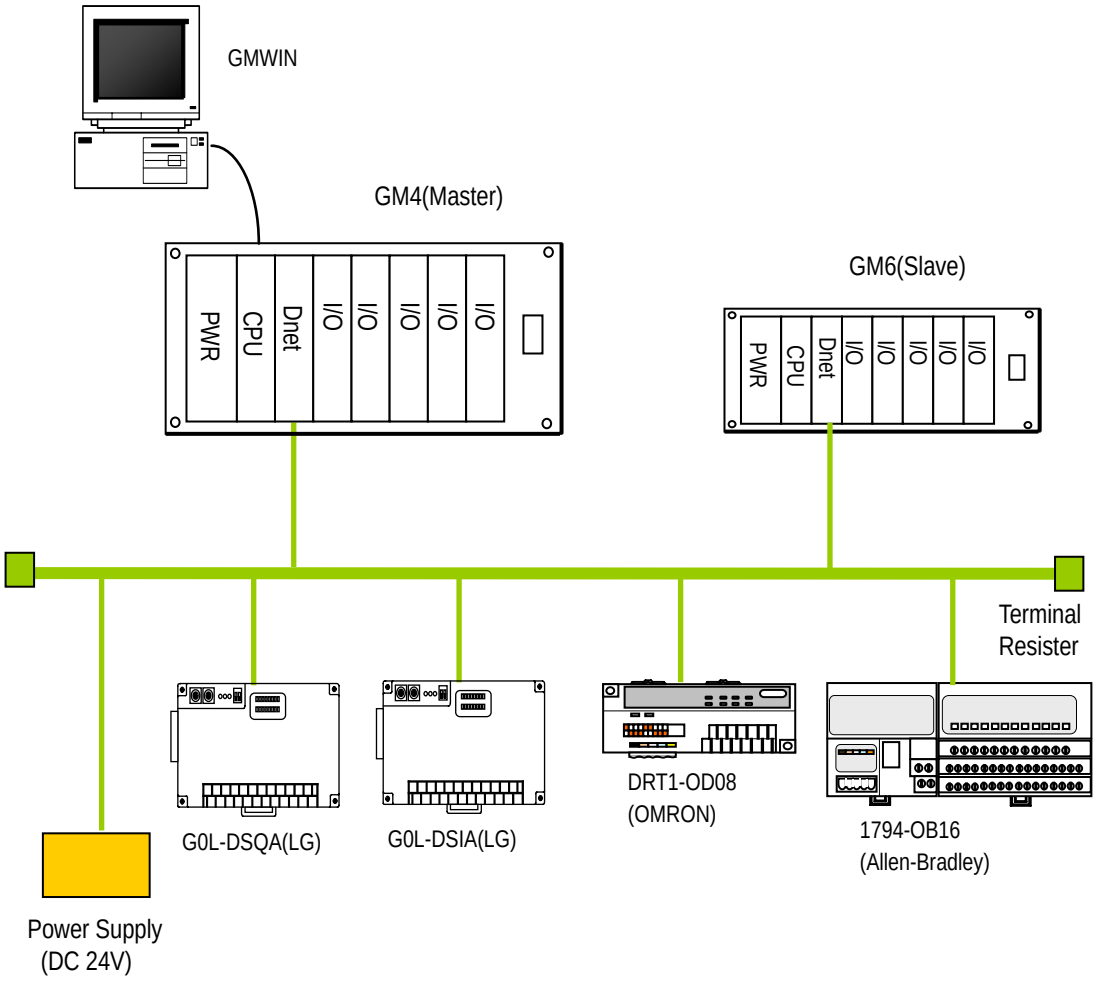
7.1.4 Examples

Structure 1
This is a structure that G4L-DUEA and G6L-DUEA has input, output slave(remote) module respectively as a master. At this time slave module can have only one master.



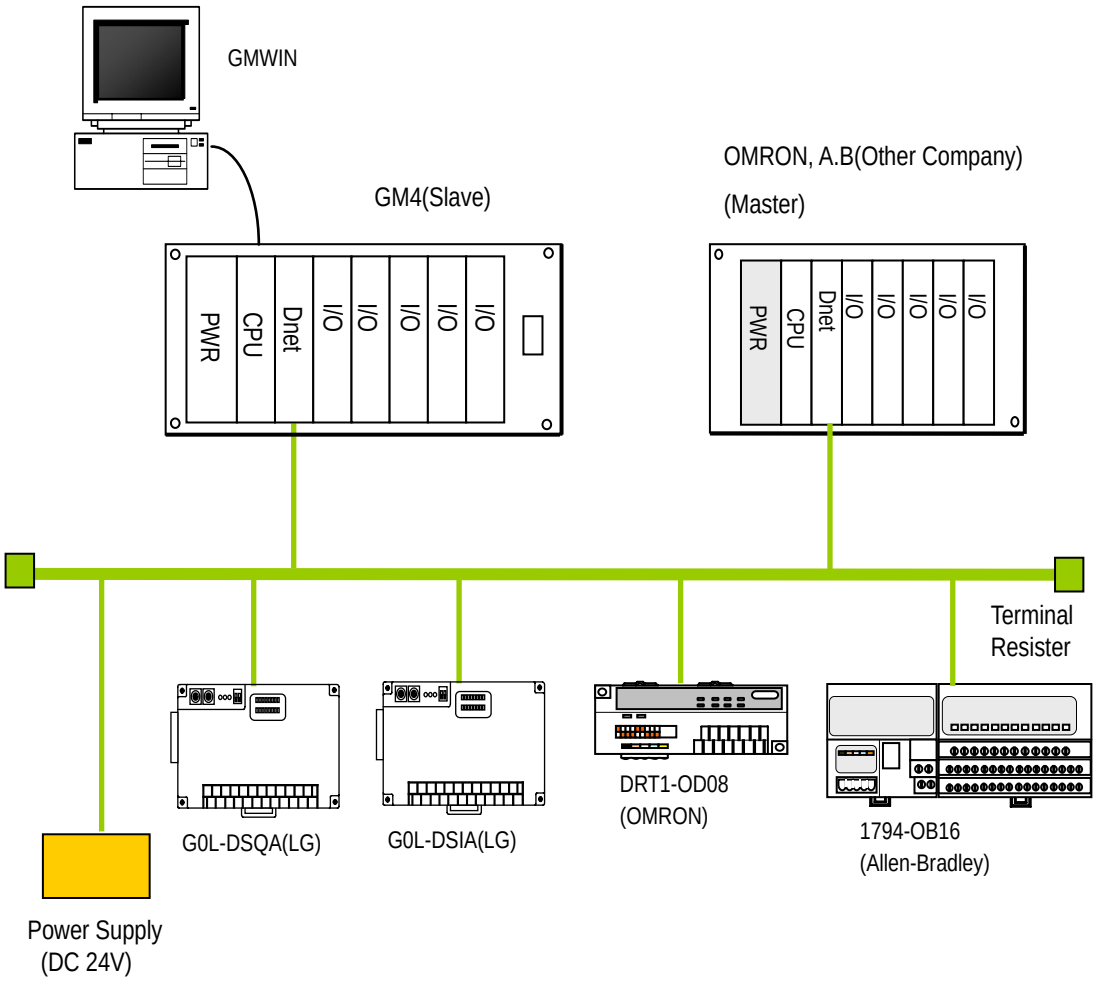
Structure 2

This is a structure that G4L-DUEA and G6L-DUEA has input, output slave(remote) module respectively as a master. at this time G6L-DUEA module moves as a slave.



Structure 3

This consists of master which Dnet I/F module like as OMRON or A.B(Allen-Bradley) and slave like as G4L-DUEA. At this time other company's master module must create program with using of each company's software tool and has to set communication speed according to communication mode selection on master.



7.2 Start up

When install the cable, terminal resister must be connected to both ends of network. If no terminal resister is exist there may be communication error and after finished connecting get the power on to verify LED operation whether it's normal. If it's normal download the pertinent program to PLC with using of GMWIN.

7.2.1 Precautions on structuring system

1) All station number should be different from each other including this module. If duplicated station number is used for connection then there may be communication error as it normal communication is impossible.
2) Please use communication cable as designated specification one. If you do not use this designated specification cable then it can not be assured that communication to the maximum cable length or there may be communication error.
3) Please check short or open cable prior to communication cable installation
4) Please tighten the connector for strong cable connection, if not it may cause severe communication error.
5) In case of long distance cable connection, please layout the wiring as keep the cable aside from power line or induced noise.
6) When connecting the communication cable and connector power plug, communication line and shield line must be connected in order. if not there will be mulfunction like as power off or breaking of communication.
7) If LED operating is abnormal status, please refer to 'chapter 8 trouble shooting' and verify the the special causes if special causes appears continuously after correction then call to service station.

7.2.2 Checking items prior to start up

Following explanes about checking items before starting up.

1) Communication module be mounted on PLC

Checking item	Contents
Installation and Checking of basic S/W	- Is that normal to install and operate GMWIN ?
Connection of communication cable(only in case of cable connected)	- Is the communication cable connection and used Tap status is enough
Mounting module	- Is the cable connection is open loop type ?
Checking switch	- Is the moving mode switch normally acts ?

2) Start up sequence

Shows the sequences after finishing installation to start up on PLC.

Start
Turn on Power : 1) Check input power 2) Check communication cable connection 3) Setting of mode switch like as communication speed, station number 4) Get the power in 5) Check LED lighting on power module 6) Check LED status on CPU module → In case abnormal, refer to instruction of PLC model for trouble shooting 7) Check the status of communication module LED →In case abnormal, refer to instruction of PLC model for trouble shooting

▼

Programming : Create program on GMWIN and write it down on CPU

▼

Check sequence : Check operating of communication module according to program

▼

Edit program : Correct the program if problems is shown on sequence program

▼

Sustain of program : 1) Store the program on floppy disk or hard disk 2) Print out circuit drawing and list 3) If necessary store the program on memory module
Finished

7.3 Maintenance and Checking

7.3.1 Daily checking

Daily check item is like following

[Table 7.3.1] Daily check item

Check Item		Check category	Decision	Action
Condition of cable connection		Loosened cable	No loosen required	Tighten the cable
Connection status of bus		Loosened bus screw	No loosen required	Tighten the bus screw
		Approaching to compressed bus	Adequate gap	Correction
LED Display	MS LED	Check green lighting	Lighting (Light-out or red is abnormal)	Refer to appendix
	NS LED	Check green lighting	Lighting, blinkling (Light-out or red is abnormal)	
	7-Segmenr (G4L-DUEA)	Check station lighting	Except station lighting is abnormal	

7.3.2 Periodic Checking

Please check 1~2 times per half year with following itmes and perform corrective action.

[Table 7.3.2] Periodic check item

Check item		Check method	Decision point	Action
Circum. Environ.	Circum. Temp.	Measure with temp./humidity tester	0~55 ℃	Adjust it in accordance with general specification.(in case using inside control room will folllow its environ.)
	Circum. Hum.		5~95 %RH	
	Circum. Pollution	Detect corrosive Gas	No corrosive gas required	
Module status	Loose, Fluctuating	Shake communication module	Should be tightened Strongly	Tighten the screw
	Adhesing Dust,foreign particle	Visual inspection	No adhesing required	
Connection status	Loosed terminal screw	Tighten by driver	No loosing is required	Tightening
	Approaching compressing screw	Visual inspection	Should be adequate Gap	Adjusting
	Loosed connector	Visual inspection	No loosing is required	Tightening connector's fixing screw
Check Power & Voltage		Check the voltage between terminals, AC110/220V	AC 85 ~ 132V AC 170 ~ 264V	Change supplying power

Chapter 8 Trouble shooting

This chapter represents all kinds of error, finding causes and corrective action method related to system operation. If there is communication module error then it is displayed on communication module's LED. At this time find out pertinent error message on appendix and you may act trouble shooting according to error code suggested in this chapter

8.1 Abnormal operation

[Table 8.1] Hardware error of communication module

Error code	Error signal (refer to LED message on appendix)	Error type
E00-01	MS LED light-out, NS LED green blinking	Takes place interface error with PLC CPU module

[Table 8.2] Non-normal communication condition of its module

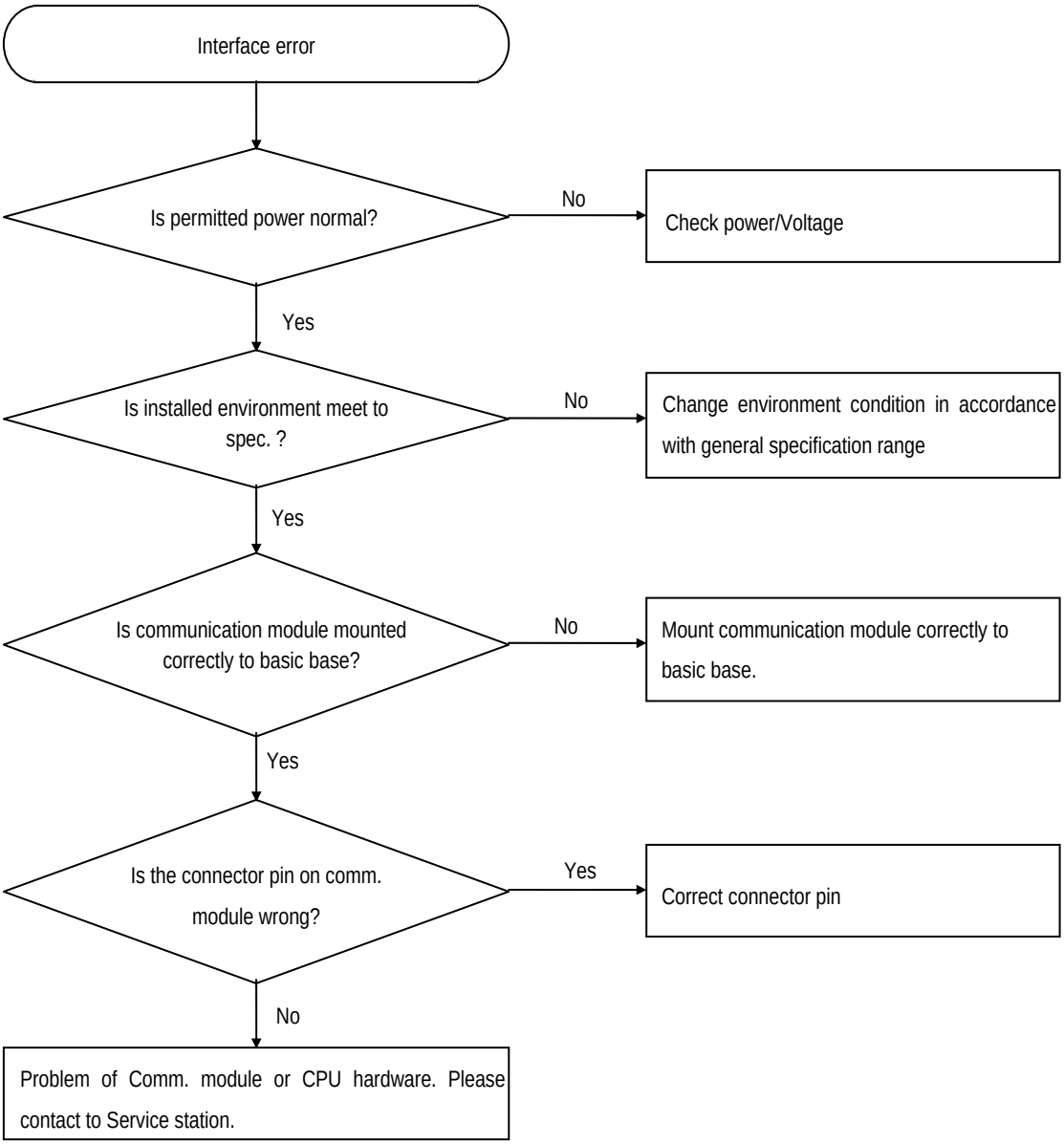
Error code	Error signal	Error type
E01-01	MS LED green lighting, NS LED green blinking	Not going connection between master module and assigned slave module.
E01-02	MS LED green lighting, NS LED red blinking	Communication station number is duplicated or problem of power supplying
E01-03	MS LED green lighting, NS LED red blinking	Communication problem while normal communication.

[Table 8.3] Non-normal GMWIN communication status

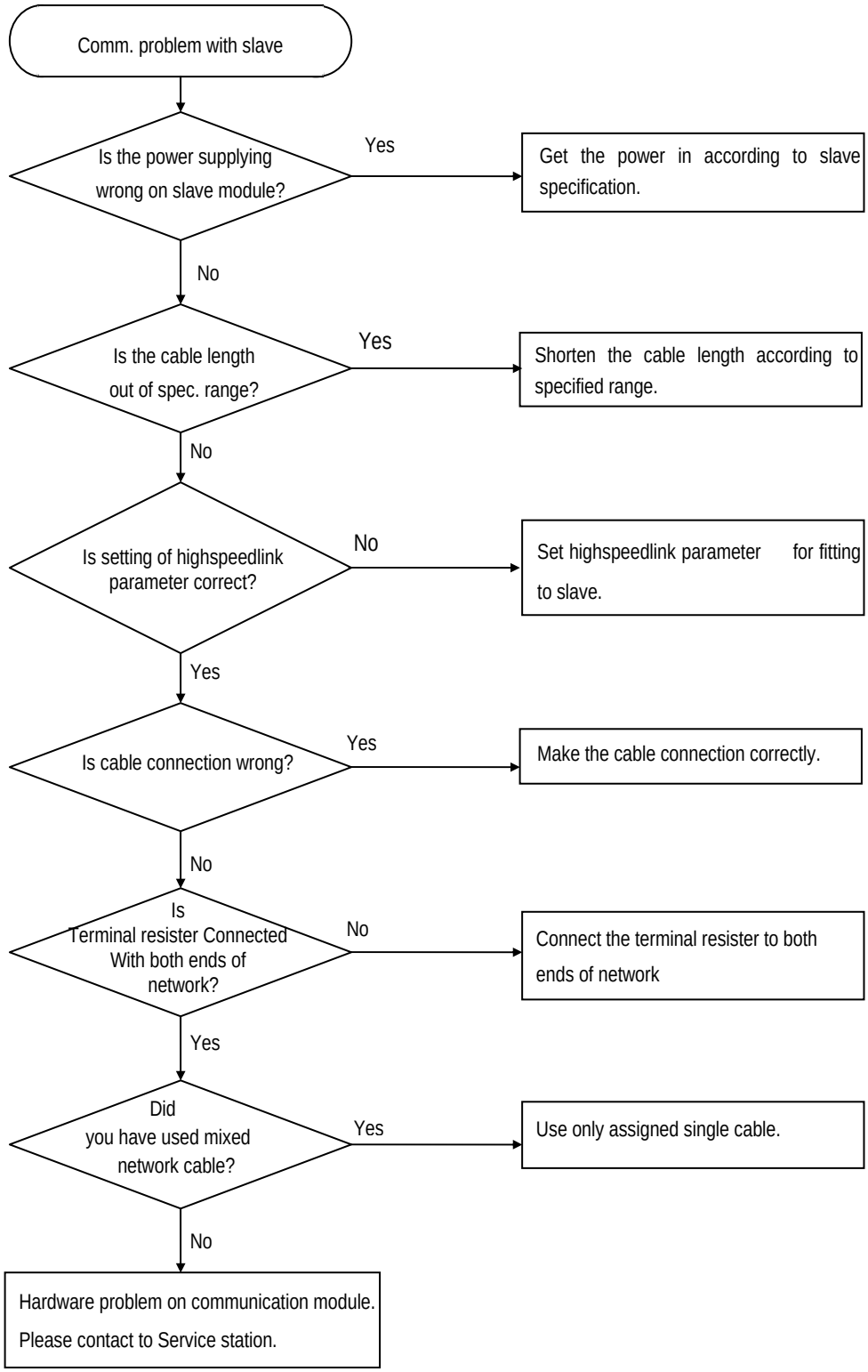
Error code	Error display	Error type
E02-01	GMWIN time out error	Not applicable to communicate with GMWIN while setting time assigned internally
E02-02	GMWIN internal communication error	Not applicable to communicate between GMWIN and CPU

8.2 Trouble shooting on Error code

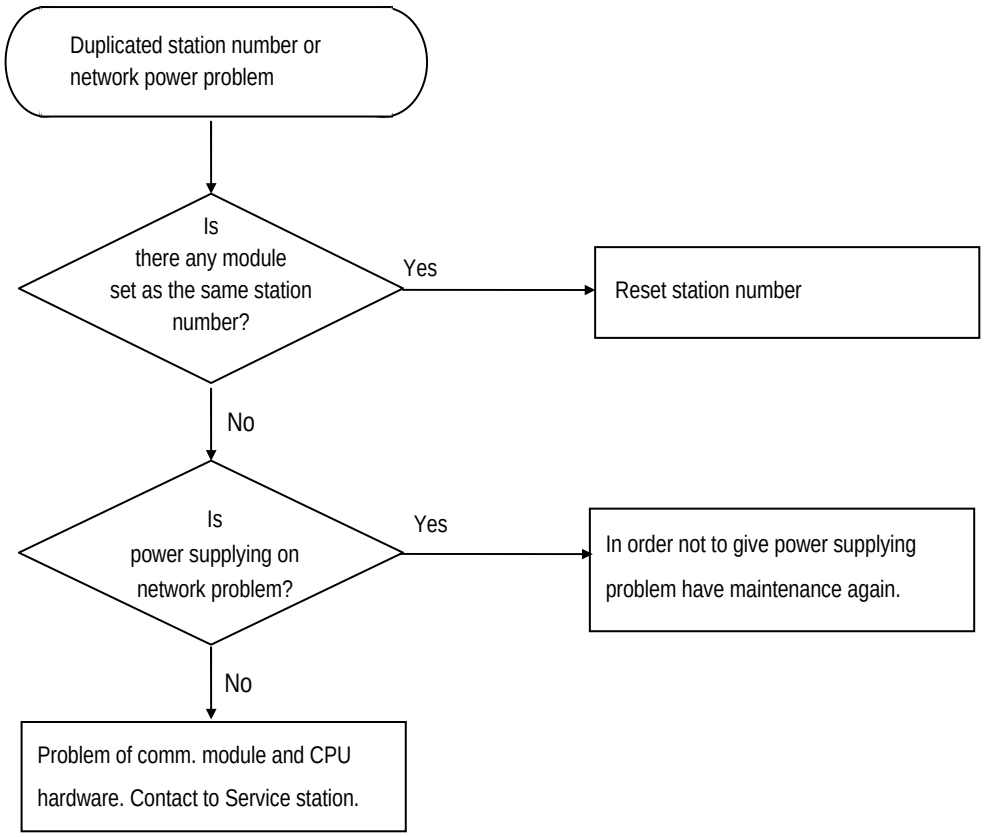
8.2.1 Error code E00-01 : Interface error



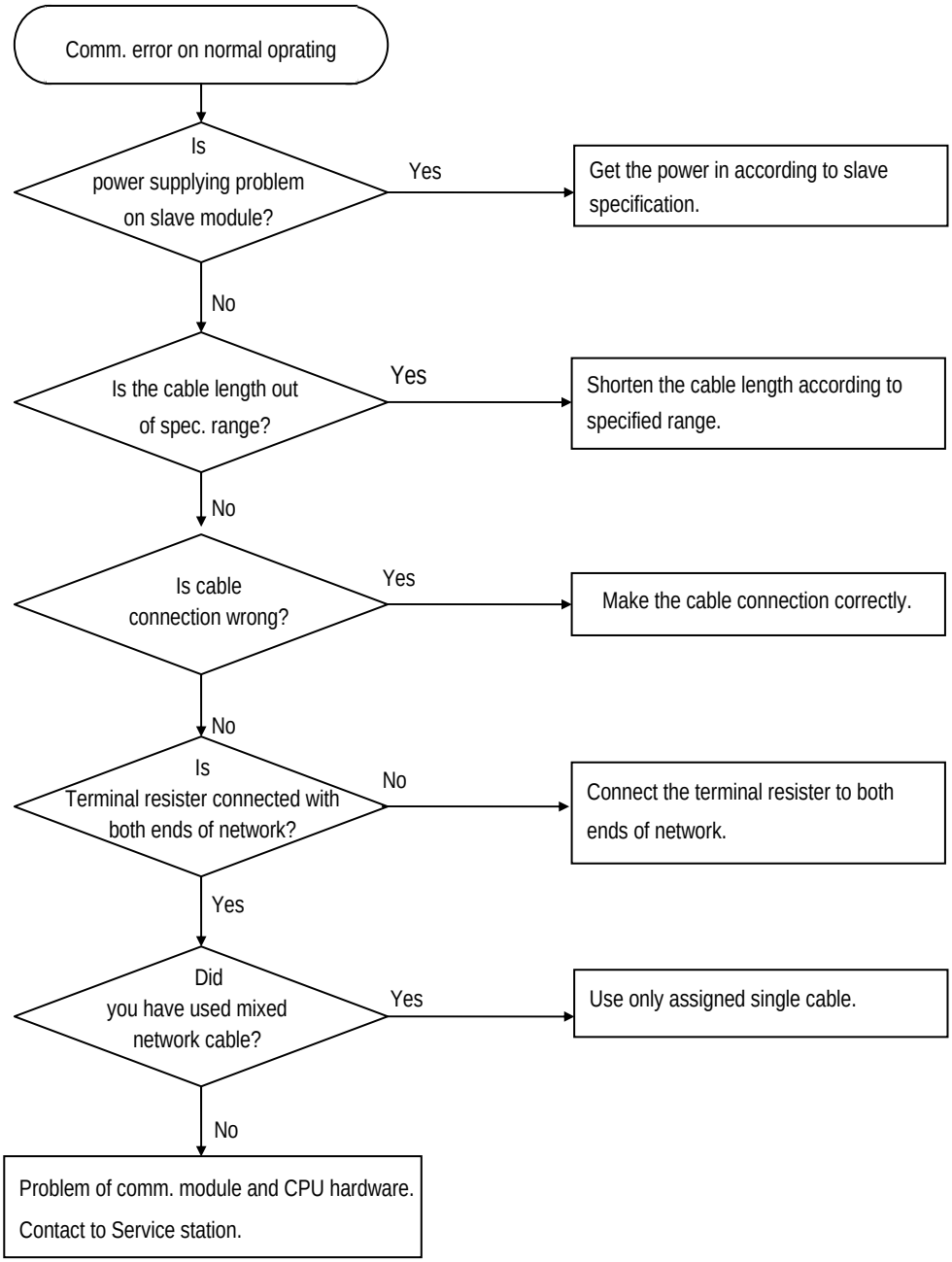
8.2.2 Error code E01-01: Communication problem with slave



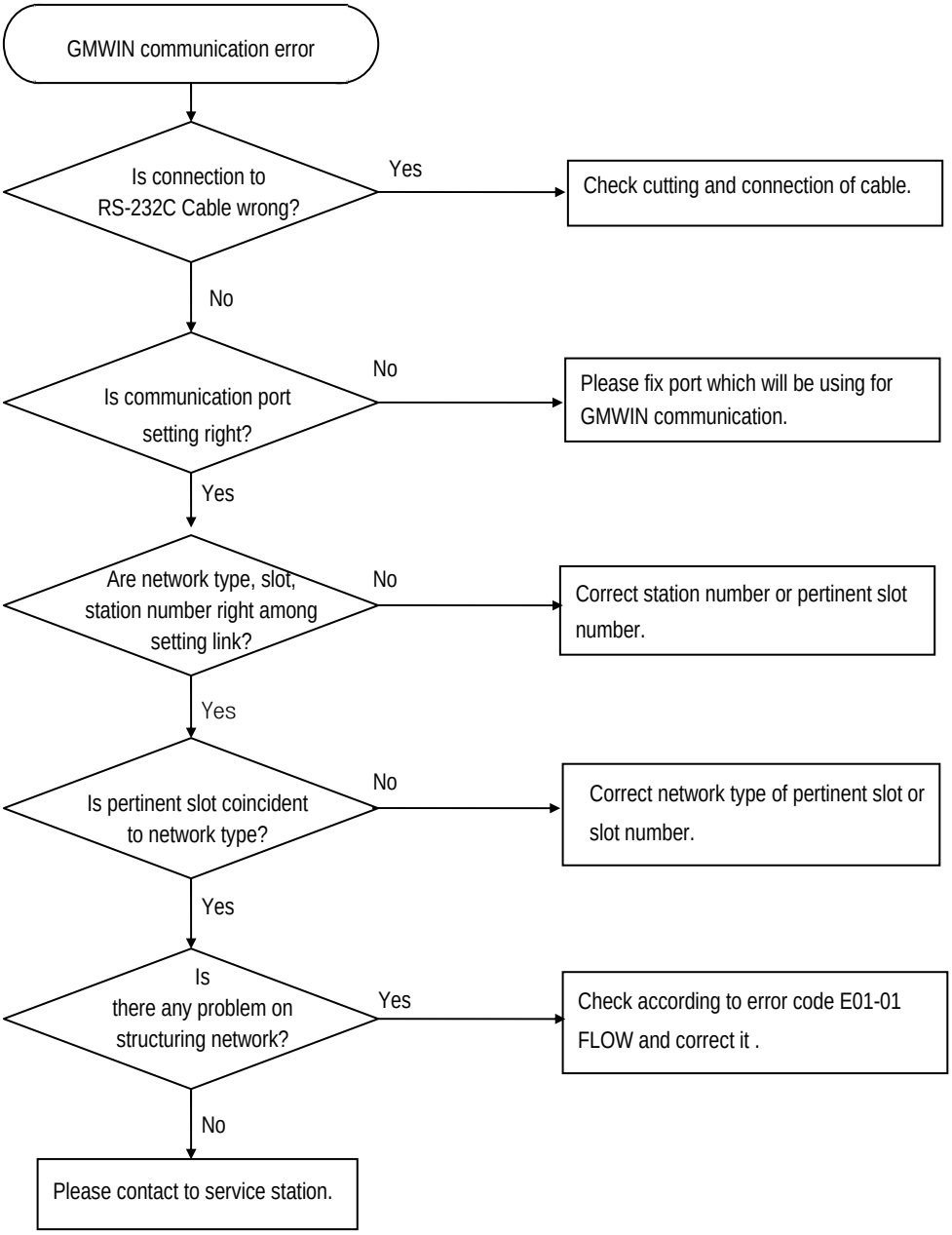
8.2.3 Error code E01-02 : Duplicates of Communication station number or Network problem



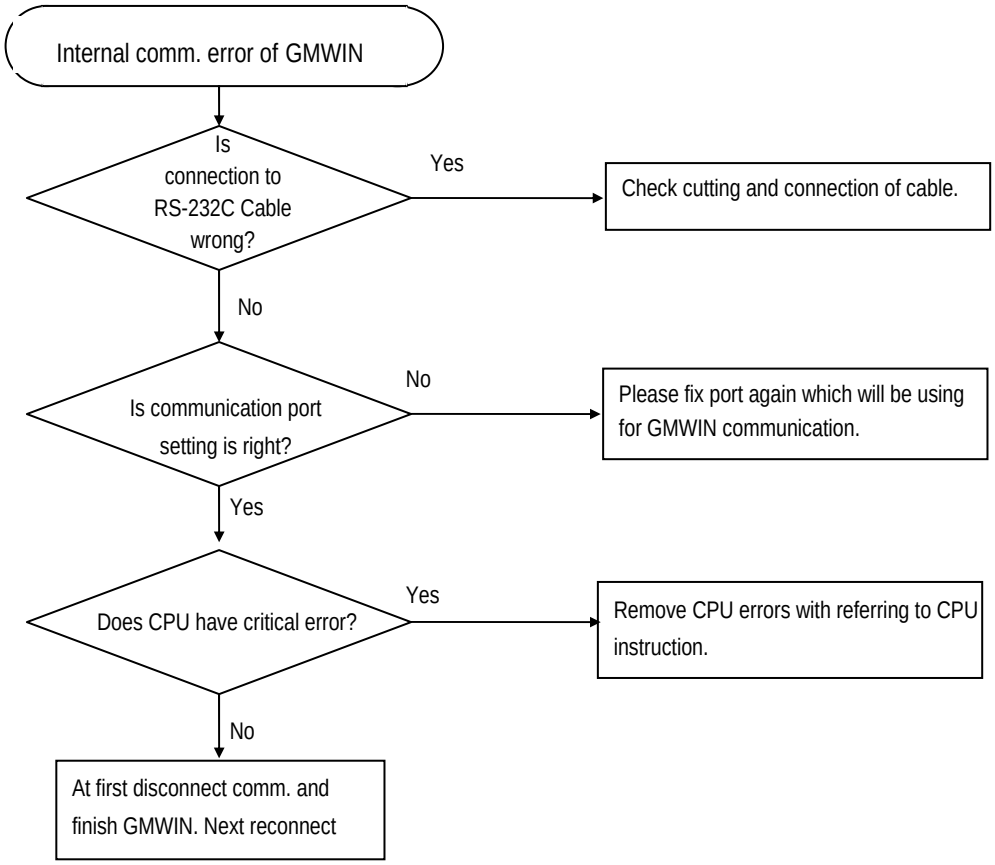
8.2.4 Error code E01-03: Commmnication error on normal operating



8.2.5 Error code E02-01 : Time out error in GMWIN communication



8.2.6 Error code E02-02 : Internal communication error of GMWIN

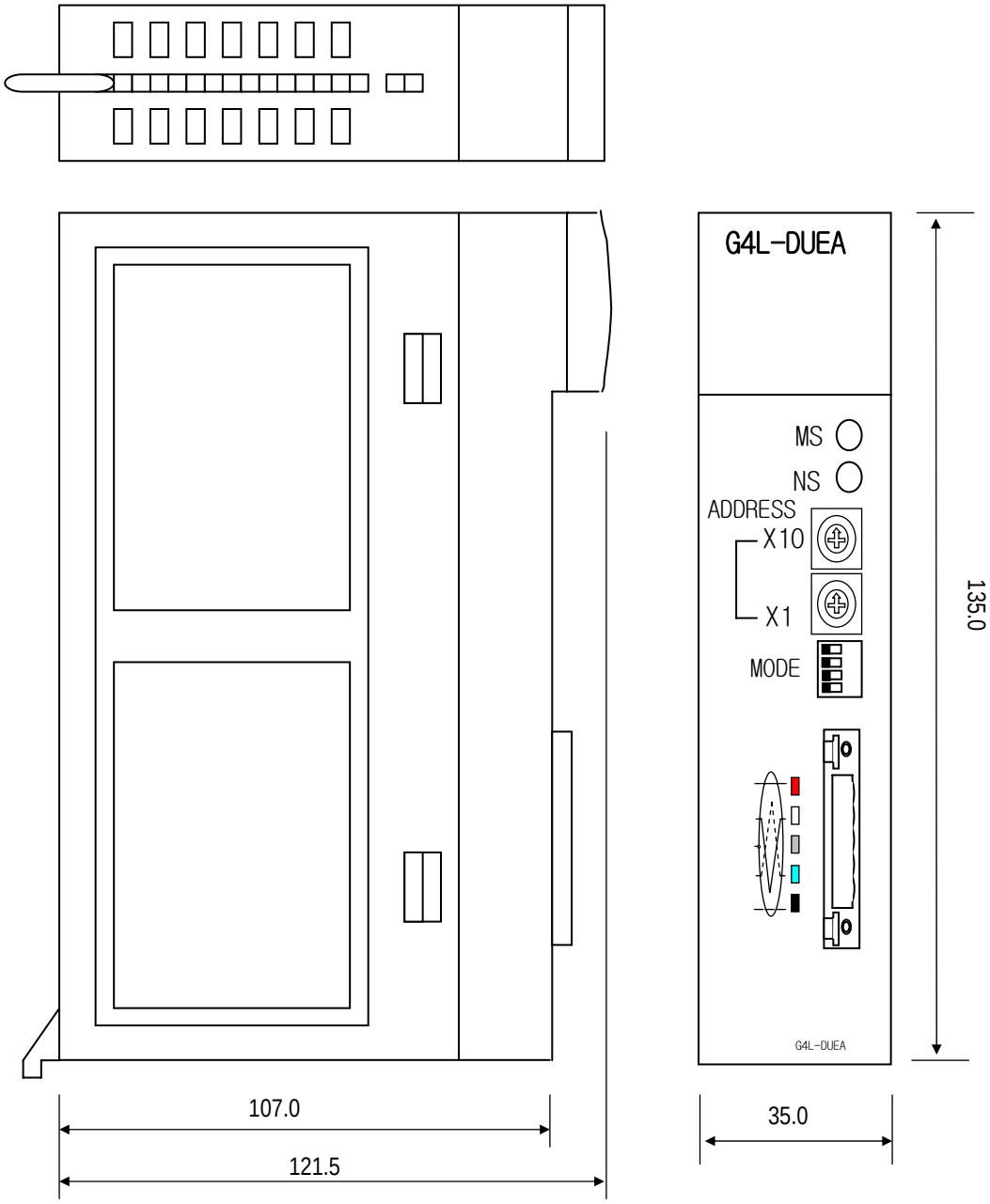


Appendix Outward Dimension

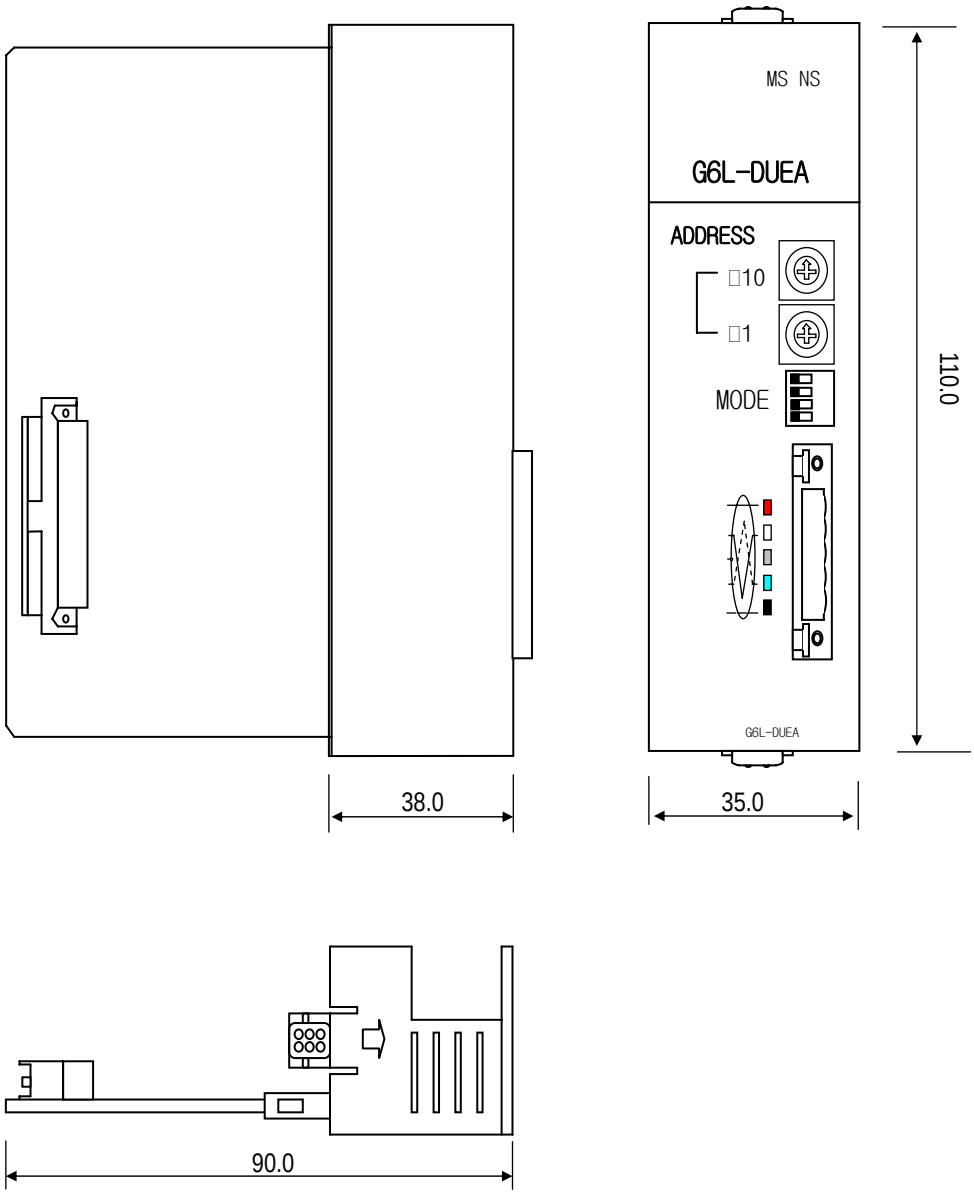
A.1 Master module(G4L-DUEA,G6L-DUEA)

● G4L-DUEA

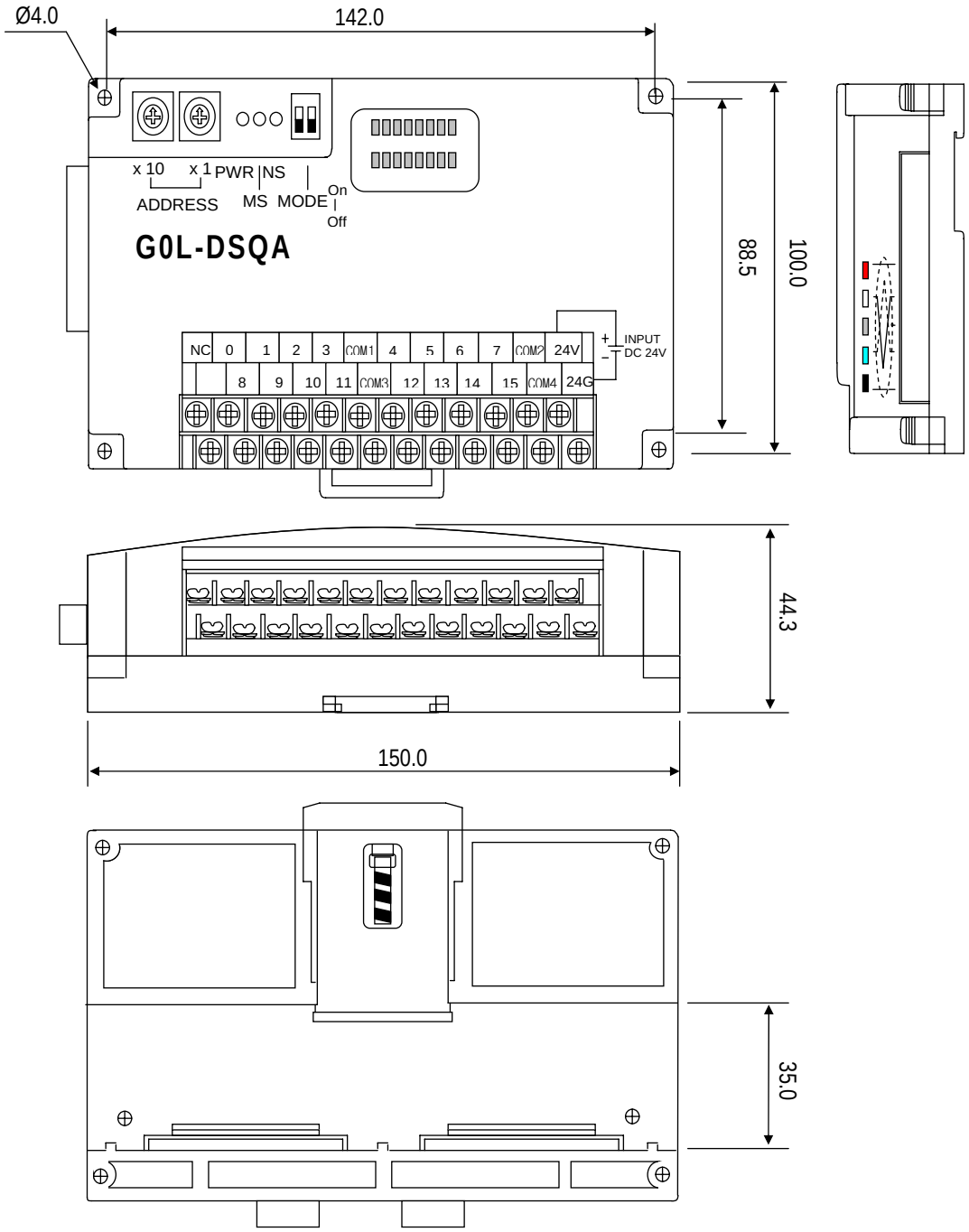
Dimm. unit: mm



● G6L-DUEA



A.2 Slave module(G0L-DSQA,G0L-DSIA)

Dimension between G0L-DSQA and G0L-DSIA is the same

Dimm. unit : mm