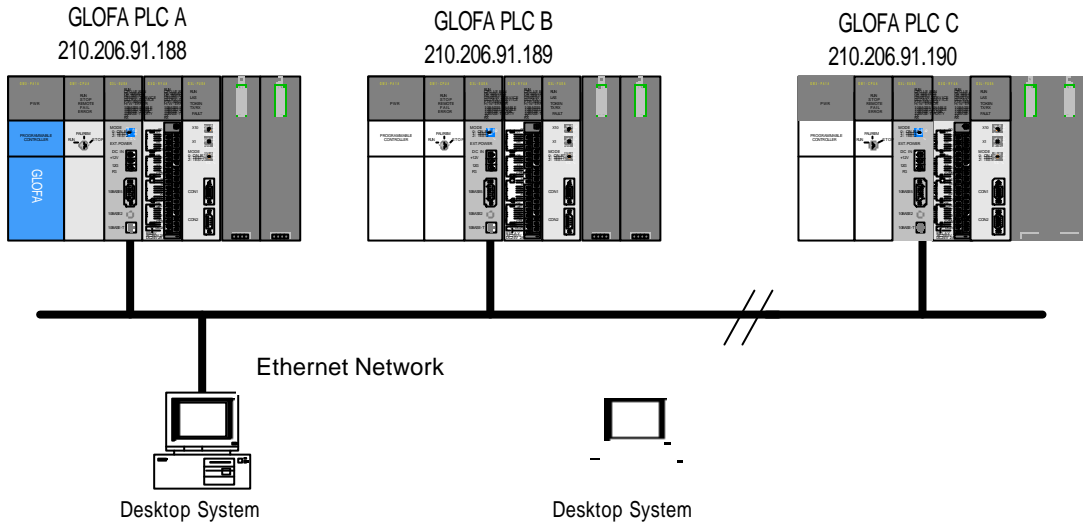


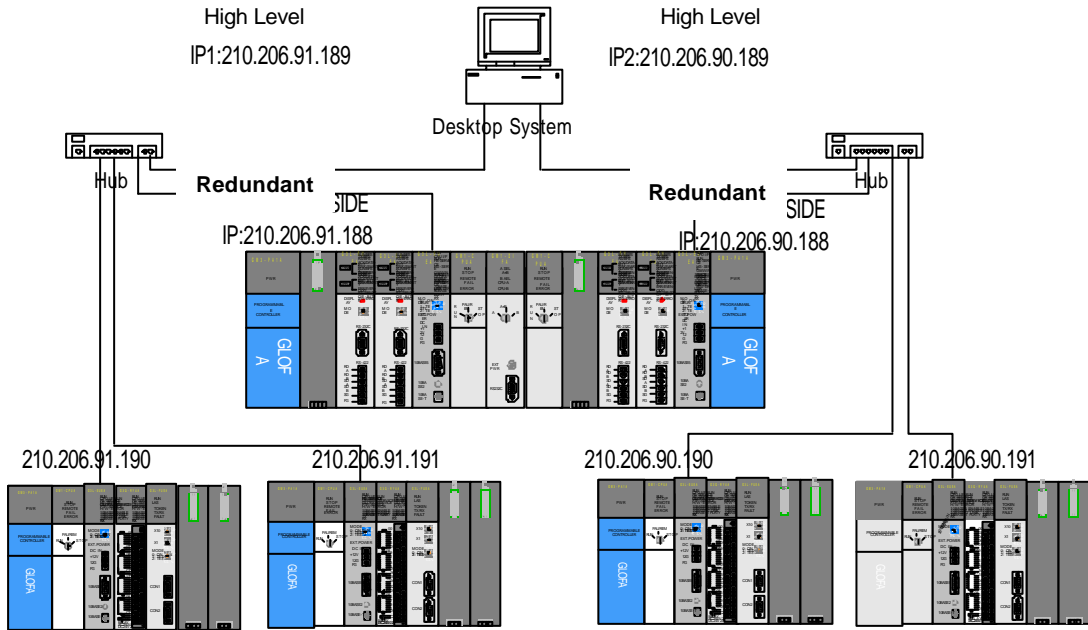
# Chapter 10 Dedicated Communication

## 10.1 Dedicated Communication

### 10.1.1 System Configuration

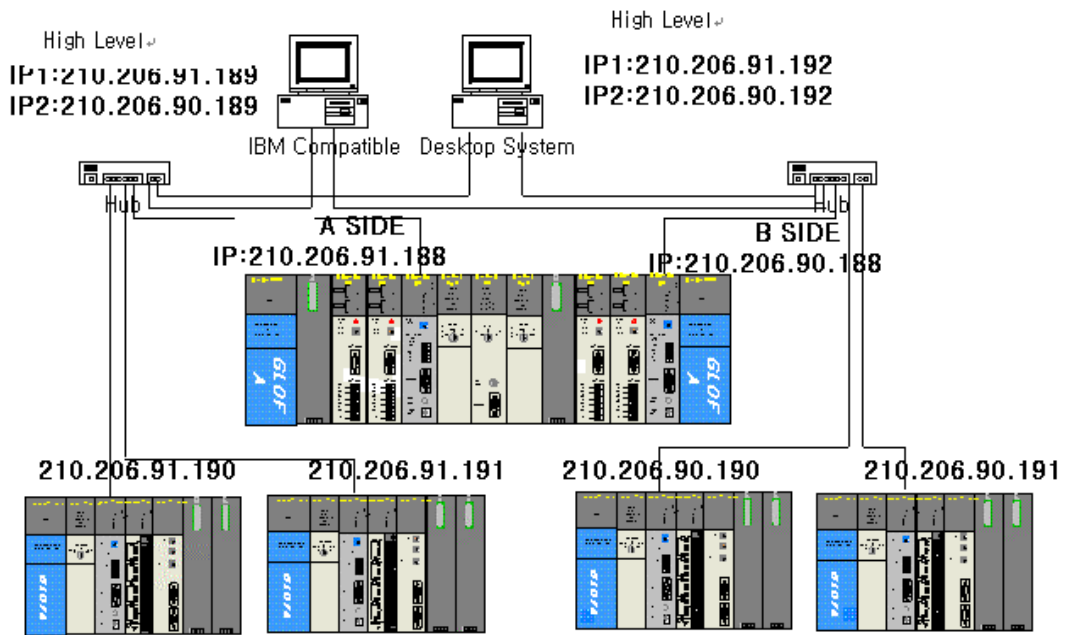


[Figure 10.1.1(A)] Ethernet System Configuration1



[Figure 10.1.1(B)] Ethernet System Configuration 2

# Chapter 10 Dedicated Communication



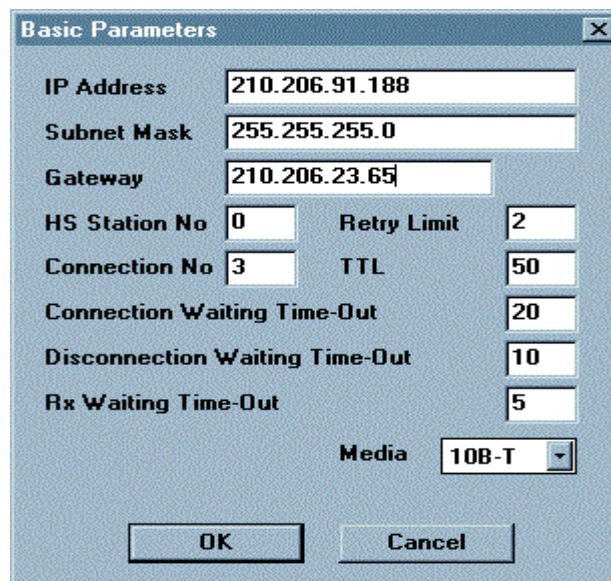
[Figure 10.1.1(C)] Ethernet System Configuration 3

### 10.2 Description of functions

This service is used to read and write information and data of PLC at PC and peripheral devices through the protocol built in GLOFA Enet module and to control(Run, Stop, Pause) PLC including download/upload of PLC program.

It is available using TCP port 2004 and UDP port 2005 of Enet communication module serviceably for communication between LG Ethernet modules, higher system (PC program, MMI) and LG Ethernet module.

#### 10.2.1 Basic setting of frame editor



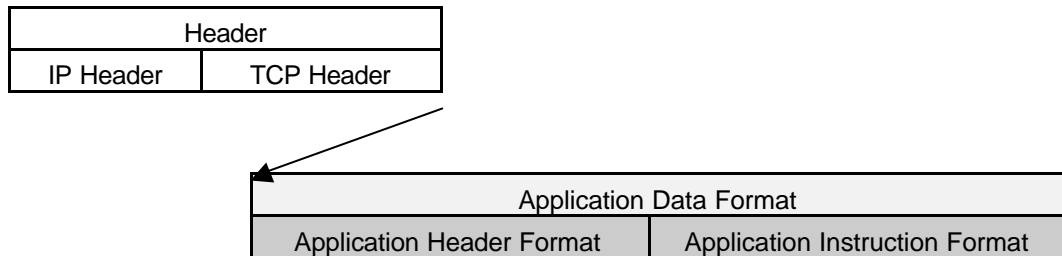
IP Address	210.206.91.188		
Subnet Mask	255.255.255.0		
Gateway	210.206.23.65		
HS Station No	0	Retry Limit	2
Connection No	3	TTL	50
Connection Waiting Time-Out	20		
Disconnection Waiting Time-Out	10		
Rx Waiting Time-Out	5		
Media	10B-T		

Basic parameters shall be surely set and then downloaded for communication by exclusive service as basic parameters are surely to be downloaded and then used for Ethernet communication. The number of exclusive connections in basic parameters of frame editor means the number of channels (MMI connection) engaged via LG exclusive port(2004). Thus, the number of channels connected for LG's exclusive communication can be modified by changing the number of exclusive connections of frame editor.

## Chapter 10 Dedicated Communication

### 10.2.2 Frame structure

Application frame structure of LG GLOFA Ethernet module is as shown below.



#### 1) Header structure(Application Header Format)

Item	Size (byte)	Description
Company ID	10	"LGIS-GLOFA" (ASCII CODE : 4C 47 49 53 2D 47 4C 4F 46 41)
PLC Info	2	* Client(MMI) → Server(PLC) : Don' care (0x00) * Server(MMI) → Client(PLC) : Bit00~05 : CPU TYPE 0(GM1), 1(GM2), 2(GM3), 3(GM4), 4(GM5), 8(GM3 Remote), 9(GM4 Remote) Bit06 : 0 (Duplex Master / single), 1(Duplex Slave) Bit07 : 0(CPU operation normal), 1(CPU operation error) Bit08~12 : System status 2(STOP), 4(RUN), 8(PAUSE), 10(DEBUG) Bit13~15 : Enet module slot No.
Reserved	1	0x00 : Reservation area
Source of Frame	1	* Client(MMI) → Server(PLC) : 0x33 * Server(PLC) → Client(MMI) : 0x11
Invoke ID	2	ID to distinguish between frames in order (Response frame is sent with this number as attached on)
Length	2	Byte size of application instruction
Reserved	1	0x00 : Reservation area
Reserved (BCC)	1	0x00 : Reservation area (Application Header' s Byte Sum)

## Chapter 10 Dedicated Communication

### 2) Basic structure of the frame (Application Instruction Format)

#### a. Header

Company ID ( ' LGIS- GLOFA' )	PLC information area(2)	Reserved (1)	H33 (1)	Invoke ID (2)	Length (2)	Reservation area (1)	BCC (1)
-------------------------------------	-------------------------------	-----------------	------------	------------------	---------------	----------------------------	------------

\*\* Number in ( ) means the number of byte.

- Company ID : ASCII letters, ' LGIS-GLOFA'
- PLC Info : Information area for PLC
- Invoke ID : ID to distinguish between frames in order which can be set at random if command requested. The response frame sends again the received Invoke ID if command requested.(Error checking area at PC or MMI)
- Length : Length of data area following Header among frames.

#### b. Command request frame (External communication device    Enet module)

Header	Command	Data type	Reservation area (2-byte)	Structured data area
--------	---------	-----------	------------------------------	-------------------------

#### c. ACK response frame (Enet module    External communication device, if data received normally)

Header	Command	Data type	Reservation area (2byte)	Error status (2-byte h' 0000)	Structured data area
--------	---------	-----------	-----------------------------	----------------------------------	-------------------------

#### d. NAK response frame(Enet module    External communication device, if data received abnormally)

Header	Command	Data type	Reservation area (2byte)	Error status(2-byte: Not h' 0000)	Error code (1-byte)
--------	---------	-----------	-----------------------------	--------------------------------------	------------------------

#### Remark

Note1) Such ' h ' or ' 0x ' indicates that the data is hexadecimal if it is as used in front of the figures in the frame like 01, h' 12345, h' 34, 0x12 and 0x89AB.

## Chapter 10 Dedicated Communication

### 10.2.3 Commands list

Commands used in exclusive communication service are as shown in the table below.

Command	Command code	Data type	Proceeding
Read	Request : h' 0054 Response : h' 0055	Separate	Reads data according to data type of direct variable such as Bit,Byte Word, Dword & Lword and named variable (Named variable to read is surely to be registered in access variable area).
		Continual	Reads direct variable of byte type in block unit (Max. 1,400 byte).
		Array	Reads data of array named variable. (Named variable to read is surely to be registered in access variable area)
Write	Request : h' 0058 Response : h' 0059	Separate	Writes data according to data type of direct variable such as Bit,Byte Word, Dword & Lword and named variable (Named variable to write is surely to be registered in access variable area).
		Continual	Writes direct variable of byte type in block unit (Max. 1,400 byte).
		Array	Writes data of array named variable. (Named variable to write is surely to be registered in access variable area)

[Table 10.2.3(A)] Commands list

### 10.2.4 Data type

Pay attention to data type of direct and named variables to read when direct and named variables are to be read and written.

#### 1) Data type of direct variables

Memory device type of GLOFA GM PLC: M(Buffer memory), Q(Output), I(Input) Memory device type of GLOFA GK PLC: Data type of direct variables of P, M, L, K, C, D, T, S & F is to be displayed in the next place to displaying letter of direct variable, ' %' .

Data type	Application example
Bit	%MX0,%QX0.0.0 %IX0.0.0 ,%PX0,%LX0,%FX0
Byte	%MB10,%QB0.0.0 %IB0.0.0
Word	%MW10,%QW0.0.0 %IW0.0.0,%PW0,%LW0,%FW0,%DW0
Double Word	%MD10,%QD0.0.0 %ID0.0.0
Long Word	%ML10,%QL0.0.0 %IL0.0.0(GM1/2 available only)

[Table 10.2.4(A)] Data type list of direct variables

## Chapter 10 Dedicated Communication

### 2) Data type of named variables (only for GLOFA GM)

Set data type to command type if named variables are to be read or written.

Data type	Code	Data type	Code
BIT	h' 00	UDINT	h' 0B
BYTE	h' 01	ULINT	h' 0C
WORD	h' 02	REAL	h' 0D
DWORD	h' 03	LREAL	h' 0E
LWORD	h' 04	TIME	h' 0F
SINT	h' 05	DATE	h' 10
INT	h' 06	TOD	h' 11
DINT	h' 07	DT	h' 12
LINT	h' 08	STRING	h' 13
USINT	h' 09	Continual	h' 14
UINT	h' 0A		

[Table 10.2.4(B)] Data type list of named variables

Set an applicable value to command type according to data type of each element of array for array named variable as shown below.

Data type	Code	Data type	Code
Array BIT	h' 40	Array UDINT	h' 4B
Array BYTE	h' 41	Array ULINT	h' 4C
Array WORD	h' 42	Array REAL	h' 4D
Array DWORD	h' 43	Array LREAL	h' 4E
Array LWORD	h' 44	Array TIME	h' 4F
Array SINT	h' 45	Array DATE	h' 50
Array INT	h' 46	Array TOD	h' 51
Array DINT	h' 47	Array DT	h' 52
Array LINT	h' 48		
Array USINT	h' 49		
Array UINT	h' 4A		

[Table 10.2.4(C)] Data type list of array named variables

#### Remark

Note1) The name shall be registered in access variable area of PLC program to read or write a named variable. Refer to user manual of GLOFA GM NETWROK or GMWIN for registration procedures.

**10.3 Command execution**

**10.3.1 Separate Read of direct variables**

**1) Introduction**

It is a function to read the variable as ageeable to memory data type with PLC device memory set directly. Upto 16 separate device memories can be read at a time.

**2) Request format(PC -> PLC)**

Read request of separate variable (MMI → PLC)

Item	Size(byte)	Description
Command	2	0x0054 : Read Request
Data type	2	Refer to the table of Data type
Reservation area	2	0x0000 : Don' t Care.
Number of variables	2	Max. number of variables to read is 16
Variable length	2	Max. length of variable is 16 letters
Variable	Variable length	Variable name, direct variable & access variable are available.
...	...	...
Length of variable name	2	Max. number of variables to read is 16
Variable	Variable length	Variable name, direct variable & access variable are available.

} Repeatedly (Max.16) as many as the number of variables

1 block(setting available repeatedly upto 16 blocks)

Format name	Header	Command	Data type	Reservat- ion area	Number of blocks	Variable length	Direct variable	.....
Code (Ex.)		h' 0054	h' 0002	h' 0000	h' 0001	h' 0006	%MW100	

1 block(setting available repeatedly up to 16 blocks)

\* **Number of blocks** : It is to set such number of blocks composed of ' [Variable length][Direct variable]' as is in this request format upto 16 blocks. Thus, the value of [Number of blocks] shall be h' 0001 ~ h' 0010 .



## Chapter 10 Dedicated Communication

- \* **Variable length**(Length of direct variable name) : It means the number of letters of the name indicating direct variable where upto 16 letters are allowed. The range of this value is h' 01 ~ h' 10.
- \* **Direct variable** : It is where the address of variable to read actually is to be input in ASCII within 16 letters. Others than figures, upper/lower case, ' % ' and ' . ' are not allowed as a variable name.

Direct variables available according to PLC type are as shown in the table below.

Type	Bool	Byte	Word	Double Word	Long Word
GM1	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	%ML,%QL,%IL
GM2	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	%ML,%QL,%IL
GM3	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	--
GM4	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	--
GM5	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	--
GM6	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	--
GM7	%MX,%QX, %IX	%MB,%QB, %IB	%MW,%QW, %IW	%MD,%QD,%ID	--

[Table 10.3.1(A)] Type of direct variable

### Remark

Note1) Two byte shall be repositioned as changed without H in front of figures to display hexadecimal word data in the frame above when prepared.

Ex.) h' 0054 5400

### Remark

Note1) Refer to GLOFA PLC technical manual for area setting of each device of GLOFA GM series.

Note2) Device data type of each block shall be surely the same. If data type of the first block is Word and data type of the second block is Double Word, error may occur.

## Chapter 10 Dedicated Communication

### 3) Response format(PLC' s ACK response)

Read response of separate variable (PLC → MMI)

Item	Size(byte)	Description	
Command	2	0x0055 : Read Response	
Data type	2	Refer to the table of Data type	
Reservation area	2	0x0000 : Don' t Care	
Error status	2	Normal if 0, abnormal if not 0	
Error information	2	Lower byte is error No. if the error status is abnormal	
Number of variables		Number of variables read if the error status is normal.	
Data size	2	Byte size of data	Repeatedly (Max.16) as many as the number of variables (Max. 16)
data	Data size	Data Read	
...	...		
Data size	2	Byte size of data	
Data	Data size	Data Read	

Format name	Header	Comm- and	Data type	Reserv- ation area	Error status	Number of blocks	Number of data	Data	...
Code (Ex.)	...	h' 0055	h' 0002	h' 0000	h' 0000	h' 0001	h' 0002	h' 1234	...

1 block(Max. 16 block)

\* **Number of data** : It means **the number of HEX byte**. The number is decided by memory type(X,B,W,D,L) which is included in the direct variable name of computer requested format.

\* **Number of blocks**: It is to set such number of blocks composed of ' [Number of data][Data]' as is in this request format upto 16 blocks. Thus, the value of [Number of blocks] shall be h' 0001~ h' 0010.

Classification	Direct variable available	Number of data(Byte)
Bool(X)	%MX,%QX,%IX,%(P,M,L,K,F,T)X	1 (Lowest bit only valid)
Byte(B)	%MB,%QB,%IB	1
Word(W)	%MW,%QW,%IW,%(P,M,L,K,F,T,C,D,S)W	2
Double Word(D)	%MD,%QD,%ID	4
Long Word(L)	%ML,%QL,%IL	8

[Table 10.3.1(B)] Number of data according to variables

## Chapter 10 Dedicated Communication

### Remark

Note1) Number of data, H04 means that 4-byte hexadecimal (HEX) data (Double Word) is in the data.

Note2) If data type is Bool, the data read is displayed in 1 byte (HEX). Namely, h' 00 is displayed if bit value is 0 and h' 01 is displayed if bit value is 1.

### 4) Response format(NAK response)

Format name	Header	Command	Data type	Reservation area	Error status	Error code (Hex 1 byte)
Code (Ex.)	...	h' 0055	h' 0002	h' 0000	h' FFFF (which is not 0)	h' 21

### Remark

Note1) Error code displays the type of error in 1 byte (HEX).

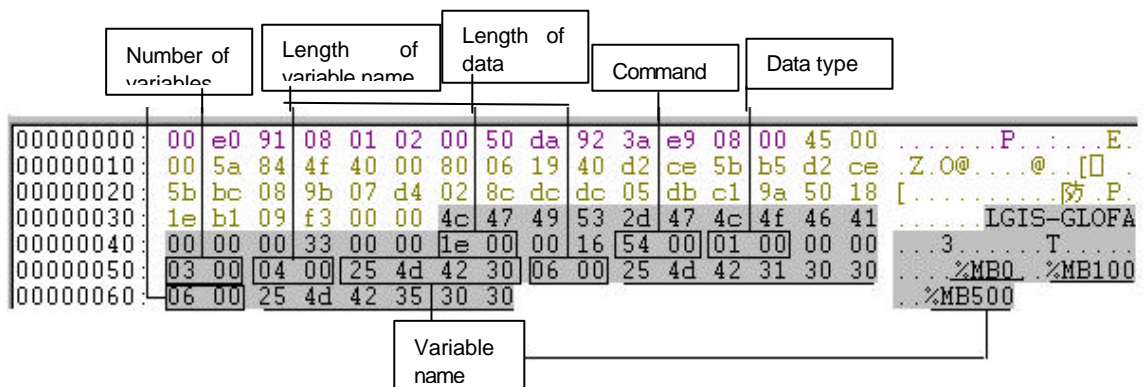
Refer to 'Appendix A3, Error codes' for details.

### \*\* Data protocol on Ethernet

Ex.) Separate Read request frame of direct variables: (Data type:byte)

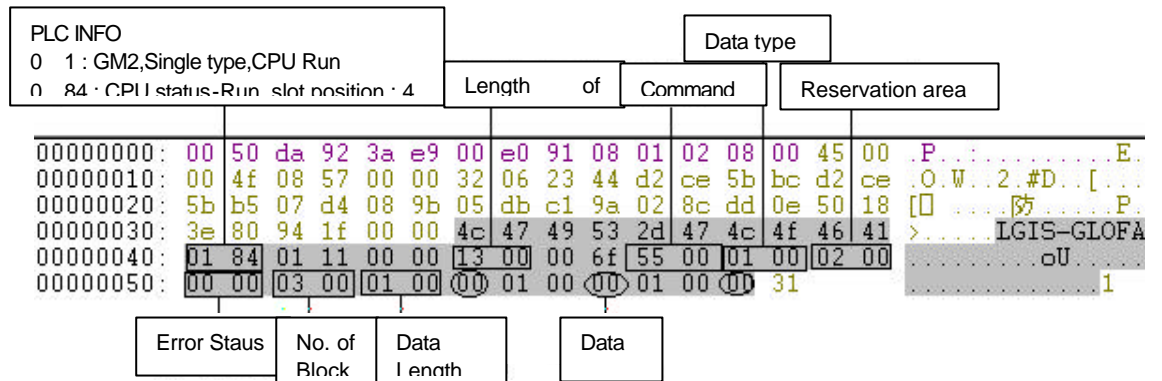
Number of variables: 3

Variables : %MB0, %MB100, %MB500



## Chapter 10 Dedicated Communication

Ex.) Separate Read response frame of direct variables: (Data type:byte)



Ex.) Separate Read request frame of direct variables: (Data type : Bool-bit)

Number of variables: 2

Variables : %MX0, %MX80

00000000:	00 e0 91 08 01 02 00 50 da 92 3a e9 08 00 45 00	.....P.....E.
00000010:	00 51 07 50 40 00 80 06 96 48 d2 ce 5b b5 d2 ce	.Q.P@...H..[ ]
00000020:	5b bc 08 a2 07 d4 02 9c 4e a1 0b d3 a0 fd 50 18	[ ] .....N..[ ]
00000030:	20 e8 2e 73 00 00 4c 47 49 53 2d 47 4c 4f 46 41	.....LGIS-GLOFA
00000040:	00 00 00 33 00 00 15 00 00 0d 54 00 00 00 00 00	.....3.....T.....
00000050:	02 00 04 00 25 4d 58 30 05 00 25 4d 58 38 30	.....%MX0,%MX80

Ex.) Separate Read response frame of direct variables : (Data type: Bool-bit)

00000000:	00 50 da 92 3a e9 00 e0 91 08 01 02 08 00 45 00	.....P.....E.
00000010:	00 4c 00 17 00 00 32 06 2b 87 d2 ce 5b bc d2 ce	.L.....2.+...[...
00000020:	5b b5 07 d4 08 a2 0b d3 a0 fd 02 9c 4e ca 50 18	[ ] .....[ ] .N.P.
00000030:	3e 80 3a f7 00 00 4c 47 49 53 2d 47 4c 4f 46 41	>.....LGIS-GLOFA
00000040:	01 84 01 11 00 00 10 00 00 6c 55 00 00 00 09 01	.....1U.....
00000050:	00 00 02 00 01 00 01 01 00 00	.....

### 10.3.2 Continual Read of direct variables

#### 1) Introduction

It is a function to continuously read data as many as set starting from the assigned address with PLC device memory set directly. However byte type of direct variables only are available.

#### 2) Request format(PC PLC)

Format name	Header	Command	Data type	Reserva- tion area	Number of blocks	Variable length	Direct variable	Number of data
Code (Ex.)	...	h' 0054	h' 0014	h' 0000	h' 0001	h' 0006	%MB100	h' 0006

#### Remark

Note1) Number of data means the number of byte in data (Max. 1,400 byte).

- \* **Data type** : Data type is available only in h' 0014.
- \* **Number of blocks** : Number of blocks is available only in h' 0001.
- \* **Variable length** : It means the number of letters of the name indicating direct variable where up to 16 letters are allowed. The range of this value is h'0001 ~ h' 0010.
- \* **Direct variable** : It is where the address of variable to read actually is to be input in ASCII within 16 letters. Others than figures, upper/lower case, ' % ' and ' . ' are not allowed as a variable name. Direct variables available for continual read according to PLC type are as shown in the table below.

Classification	Byte
GM1	%MB,%QB,%IB
GM2	%MB,%QB,%IB
GM3	%MB,%QB,%IB
GM4	%MB,%QB,%IB
GM5	%MB,%QB,%IB

[Table 10.3.2(A)] Variable area available for continual read

#### 3) Response format(PLC' s ACK response)

Format name	Header	Comm- and	Data type	Reservation area	Error status	Number of blocks	Number of data	Data
Code (Ex.)	...	h' 0055	h' 001 4	h' 0000	h' 0000	h' 0001	h' 0006	h' 01234 56789AB

- \* Number of data means the number of HEX byte.

# Chapter 10 Dedicated Communication

## 4) Response format (PLC's NAK response)

Format name	Header	Command	Data type	Reservation area	Error status	Error code (Hex 1 byte)
Code (Ex.)	....	h' 0055	h' 0014	h' 0000	h' FFFF	h' 21

### Remark

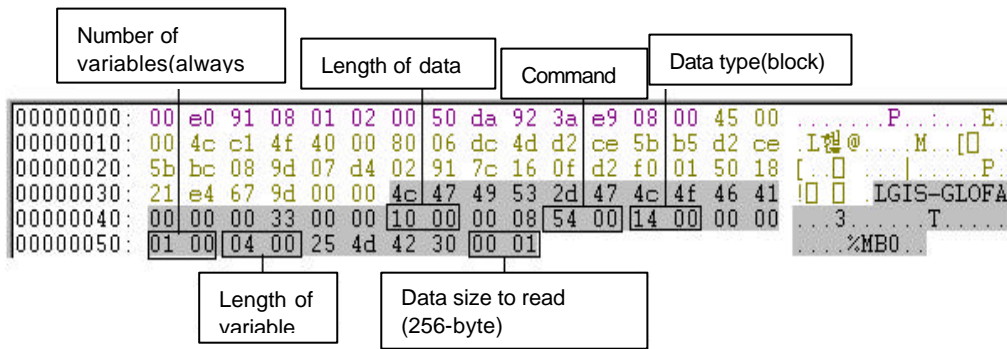
Note1) Error code displays the type of error in 1 byte (HEX).

Refer to 'Appendix A3, Error codes' for details.

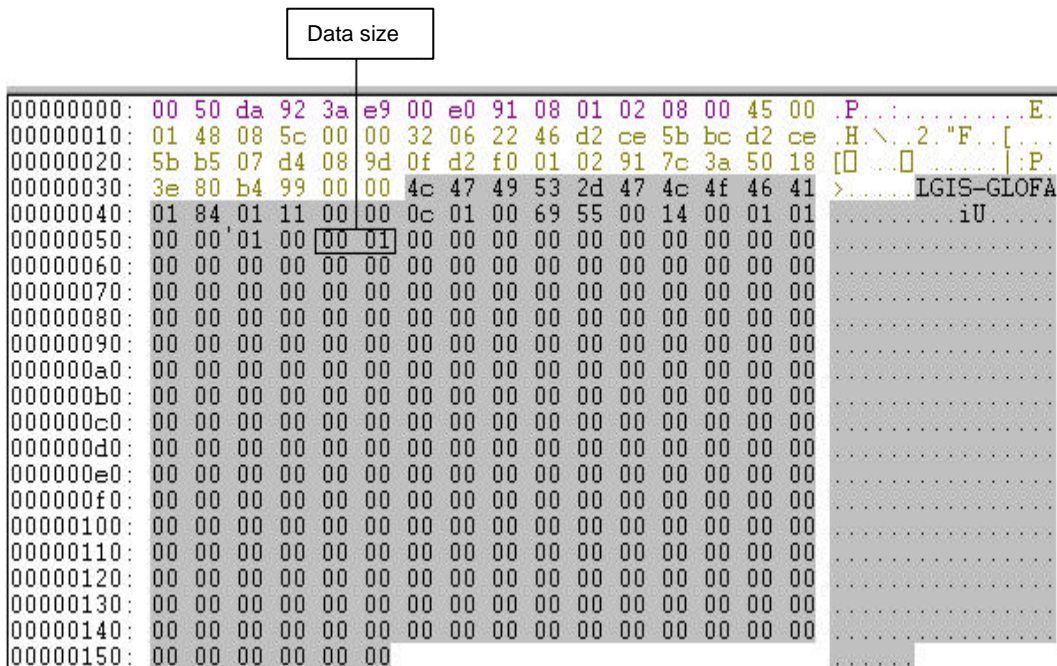
## \*\* Data protocol on Ethernet

Ex.) Continual Read request frame of direct variables: (Data type : block)

Variables : %MB0, data Size : 0x100(256 byte)



Ex.) Continual Read response frame of direct variables : (Data type : block)



10.3.3 Named variable Read

1) Introduction

It is a function to read data using the registered variable name in access variable area of PLC program. Refer to user manual of GLOFA-GM Fnet(Fieldbus)/Mnet(Mini-MAP) for registration procedures of variables.

2) Request format(PC PLC)

a. Separate type

Format name	Header	Command	Data type	Reservation area	Number of blocks	Variable length	Variable name	...
Code (Ex.)	...	h' 0054	h' 0002	h' 0000	h' 0001	h' 08	OUTPUT_1	...

1 block(setting available repeatedly up to 16 blocks)

\* **Number of blocks** : It is to set such number of blocks composed of '[Variable length][Variable name]' as is in this request format upto 16 blocks. Thus, the value of [Number of blocks] shall be h' 0001 ~ h' 0010 .

b. Array type (The number of blocks shall be surely 1)

Format name	Header	Command	Data type	Reservation area	Number of blocks	Variable length	Variable name	Number of data
Code (Ex.)	...	h' 0054	h' 0042	h' 0000	h' 0001	h' 000A	OUTPUT_ARR	h' 0004

\* **Variable length** : It means the number of letters of the variable name registered in PLC' s access variable area where up to 16 letters are allowed. The range of this value which is converted from Hex to ASCII is h' 01 ~ h' 10.

\* **Variable name** : As a variable to read actually it shall be ASCII within 16 letters. Others than figures, upper/lower case, '%' and '.' are not allowed as a variable name. Upper and lower cases are used as distinguished but be sure to use **Upper case** as PLC access variable names are all upper-cased.

## Chapter 10 Dedicated Communication

### 3) Response format(PLC' s ACK response)

#### a. Separate type

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks	Number of data	Data	...
Code (Ex.)	...	h' 0055	h' 0002	h' 0000	h' 0000	h' 0001	h' 0002	h' 1234	

1 block(Max. 16 blocks)

#### b. Array type

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks	Number of data	Data
Code (Ex.)	...	h' 0055	h' 0042	h' 0000	h' 0000	h' 0001	h' 0002	h' 1234

### Remark

Note1) Number of data means the number of byte in data.

Note2) If data type is Bool, the data read is displayed in 1 byte (HEX). Namely, h' 00 is displayed if bit value is 0 and h' 01 is displayed if bit value is 1.

### 4) Response format(PLC' s NAK response)

#### a. Separate type & array type common

Format name	Header	Command	Data type	Reservation area	Error status	Error code
Code (Ex.)	...	h' 0055	h' 0002	h' 0000	h' FFFF (which is not 0)	h' 21



10.3.4 Separate Write of direct variables

1) Introduction

It is a function to write the variable as ageeable to memory data type with PLC device memory set directly. Upto 16 separate device memories can be written at a time.

2) Request format(PC -> PLC)

Write request of separate variable (MMI → PLC)

Item	Size(byte)	Description
Command	2	0x0058 : Write Request
Data type	2	Refer to the table of Data type
Reservation area	2	0x0000 : Don' t Care.
Number of variables	2	Max. number of variables to write is 16
Variable length	2	Max. length of variable is 16 letters
Variable	Variable length	Variable name.
...	...	...
Variable length	2	Max. length of variable is 16 letters
Variable	Variable length	Variable name, direct variable & access variable are available.
Data size	2	Byte size of data
Data	Data size	Data Write.
...	...	...
Data size	2	Byte size of data
Data	Data size	Data Write.

} Repeatedly (Max.16) as many as the number of variables

Format name	Header	Com-mand	Data type	Reser-vation area	Num-ber of blocks	Varia-ble length	Direct variable	...	Number of data	Data	...
Code (Ex.)	..	h' 0058	h' 0002	h' 0000	h' 0001	h' 0006	%MW100		h' 0002	h' 1234	

1 block(setting available repeatedly up to 16 blocks)

\* **Number of blocks** : It is to set such number of blocks composed of ' [Variable length][Direct variable]' as is in this request format upto 16 blocks. Thus, the value of [Number of blocks] shall be h' 01~ h' 10.

## Chapter 10 Dedicated Communication

\* **Variable length**(Length of direct variable name) : It means the number of letters of the name indicating direct variable where upto 16 letters are allowed. The range of this value is h' 01 ~ h' 10.

\* **Direct variable** : It is where the address of variable to write actually is to be input in ASCII within 16 letters. Others than figures, upper/lower case, ' % ' and ' . ' are not allowed as a variable name.

Direct variables available according to PLC type are as shown in [Table 6.4.2(B)] below.

### Remark

Note1) Device data type of each block shall be surely the same. If data type of the first block is Word and data type of the second block is Double Word, error may occur.

Note2) Refer to GLOFA PLC technical manual for area setting of each device of GLOFA GM series.

Note3) If data type is Bool, the data read is displayed in 1 byte (HEX). Namely, h' 00 is displayed if bit value is 0 and h' 01 is displayed if bit value is 1.

### 3) Response format(PLC' s ACK response)

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks
Code (Ex.)	...	h' 0059	h' 0002	h' 0000	h' 0000	h' 0001

\***Number of blocks** : It indicates the number of blocks written normally.

### 4) Response format(NAK response)

Format name	Header	Command	Data type	Reservation area	Error status	Error code (Hex 1 byte)
Code (Ex.)	...	h' 0059	h' 0002	h' 0000	h' FFFF (which is not 0)	h' 21

### Remark

Note1) Error code displays the type of error in 1 byte (HEX). Refer to ' Appendix A3, Error codes ' for details.

# Chapter 10 Dedicated Communication

## \*\* Data protocol on Ethernet

Ex.) Separate Write request frame of direct variables: (Data type:byte)

Number of variables: 3, data:0x1122, 0x3344, 0x5566

Variables : %MB0, %MB100, %MB500

Data type is set to word type of 0x0002 as shown in the protocol below, which consequently leads to error as received. However, data can be received if only the data type is changed to byte(0x0001) in the figure below.

	Number of variables	Length of variable name	Variable name	Length of data	Word type	Byte type
00000000:	00	e0 91 08 01 02	00 50 da 92 3a e9	08 00 45 00		.P.....E.
00000010:	00	66 eb 4f 40 00	80 06 b2 33 d2 ce	5b b5 d2 ce		.f.0@...3...[]
00000020:	5b	bc 08 a0 07 d4	02 97 b7 d0 04 7c	00 b5 50 18		[...[]  ...[]]...
00000030:	21	30 3d d0 00 00	4c 47 49 53 2d 47	4c 4f 46 41		!0= LGIS-GLOFA
00000040:	00	00 00 33 00 00	2a 00 00 22 58 00	02 00 00 00		3 * "X.....
00000050:	03	00 04 00 25 4d	42 30 02 00 11 22	06 00 25 4d		%MB0 " %M
00000060:	42	31 30 30 02 00	33 44 06 00 25 4d	42 35 30 30		E10D .3D. %MB500
00000070:	02	00 55 66				.Uf

Data

Ex.) Separate Write response frame of direct variables: (error)

	Error status	Error
00000000:	00	50 da 92 3a e9 00 e0 91 08 01 02 08 00 45 00
00000010:	00	46 00 09 00 00 32 06 2b 9b d2 ce 5b bc d2 ce
00000020:	5b	b5 07 d4 08 a0 04 7c 00 d3 02 97 b8 4c 50 18
00000030:	3e	80 5e 0a 00 00 4c 47 49 53 2d 47 4c 4f 46 41
00000040:	01	84 01 11 00 00 0a 00 00 66 59 00 02 00 08 00
00000050:	ff	00 21 00

Ex.) Separate Write request frame of direct variables: (Data type:Bool-bit)

00000000:	00	e0 91 08 01 02	00 50 da 92 3a e9	08 00 45 00		.P.....E.
00000010:	00	4d fd 4f 40 00	80 06 a0 4c d2 ce	5b b5 d2 ce		.M @...[]
00000020:	5b	bc 08 a2 07 d4	02 9c 4d ea 0b d3	a0 5b 50 18		[...[]  ...[]]...
00000030:	21	8a e0 b7 00 00	4c 47 49 53 2d 47	4c 4f 46 41		! LGIS-GLOFA
00000040:	00	00 00 33 00 00	11 00 00 09 58 00	00 00 00 00		3 X.....
00000050:	01	00 04 00 25 4d	58 30 01 00 01			%MX0

Ex.) Separate Write response frame of direct variables: (Data type:Bool-bit)

00000000:	00	50 da 92 3a e9 00 e0 91 08 01 02 08 00 45 00				.P.....E.
00000010:	00	46 00 12 00 00 32 06 2b 92 d2 ce 5b bc d2 ce				.F...2+...[]
00000020:	5b	b5 07 d4 08 a2 0b d3 a0 5b 02 9c 4e 0f 50 18				[...[]  ...[]]...
00000030:	3e	80 46 61 00 00 4c 47 49 53 2d 47 4c 4f 46 41				>.Fa LGIS-GLOFA
00000040:	01	84 01 11 00 00 0a 00 00 66 59 00 00 04 01				fy.....
00000050:	00	00 01 00				

### 10.3.5 Continual Write of direct variables

#### 1) Introduction

It is a function to continuously read data as many as set starting from the assigned address with PLC device memory set directly. However byte type of direct variables only are available.

#### 2) Request format

Format name	Header	Command	Data type	Reservation area	Number of blocks	Variable length	Variable	Number of data	Data
Code (Ex.)	...	h' 0058	h' 0014	h' 0000	h' 0001	h' 0006	%MB10 0	h' 0002	h' 1234

- \* **Number of data** means the number of byte in data (Max. 1,400 byte).
- \* **Number of blocks** : Number of blocks is available only in h' 0001.
- \* **Variable length** : It means the number of letters of the name indicating direct variable where upto 16 letters are allowed. The range of this value is h' 01 ~ h' 10.
- \* **Direct variable** : It is where the address of variable to write actually is to be input in ASCII within 16 letters. Others than figures, upper/lower case, ' % ' and ' . ' are not allowed as a variable name. Direct variables available for continual write according to PLC type are as shown in [Table 10.2.4(C)].

#### Remark

Note1) Refer to GLOFA PLC technical manual for area setting of each device of GLOFA GM and GK series.

#### 3) Response format(PLC' s ACK response)

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks
Code(Ex.)	...	h' 0059	h' 0014	h' 0000	h' 0000	h' 0001

- \* **Data type** : Available data type is byte (%MB,%IB,%QB).
- \* **Number of data** : It means the number of byte(Hex).

## 4) Response format (PLC' s NAK response)

Format name	Header	Command	Data type	Reservation area	Error status	Error code (Hex 1 byte)
Code (Ex.)	....	h' 0059	h' 0014	h' 0000	h' FFFF	h' 21

\* **Error code** : Error code displays the type of error in 1 byte (HEX).  
 Refer to 'Appendix A3, Error codes' for details.

### \*\* Data protocol on Ethernet

Ex.) Continual Write request frame of direct variables: (Data type:byte)

Data:0x112233445566778899aa (0x000a)

Variable : %MB0

	Length of variable	Data size	
00000000:	00 e0 91 08 01 02 00 50 da	92 3a e9 08 00 45 00	.P.....E.
00000010:	00 56 d7 4f 40 00 80 06 c6	43 d2 ce 5b b5 d2 ce	.W @...C. [ ]
00000020:	5b bc 08 a0 07 d4 02 97 b6	8c 04 7c 00 01 50 18	[...P.
00000030:	21 e4 65 62 00 00 4c 47 49	53 2d 47 4c 4f 46 41	![] b. IGIS-GLOFA
00000040:	00 00 00 33 00 00 1a 00 00	12 58 00 14 00 00 00	...3.....X.....
00000050:	01 00 04 00 25 4d 42 30 0a 00	11 22 33 44 55 66	...%MB0..."3DUf
00000060:	77 88 99 aa		w...

Ex.) Continual Write response frame of direct variables: (Data type:byte)

	PLC Info	Command	
00000000:	00 50 da 92 3a e9 00 e0 91 08 01	02 08 00 45 00	.P.....E.
00000010:	00 46 00 02 00 00 32 06 2b a2 d2	ce 5b bc d2 ce	.F...2+...[...
00000020:	5b b5 07 d4 08 a0 04 7c 00 01 02	97 b6 ba 50 18	[...P.
00000030:	3e 80 74 6f 00 00 4c 47 49 53 2d	47 4c 4f 46 41	>.to. IGIS-GLOFA
00000040:	01 84 01 11 00 00 0a 00 00 66 59 00	14 00 01 00	.....fY.....
00000050:	00 00 01 00		.....

Error status      Number of variables

### 10.3.6 Named variable Write

#### 1) Introduction

It is a function to read data using the registered variable name in access variable area of PLC program. Refer to user manual of GLOFA-GM Fnet(Fieldbus)/Mnet(Mini-MAP) for registration procedures of variables.

#### 2) Computer requested format

##### a. Separate type

Format name	Header	Com- mand	Data type	Reser- vation area	Num- ber of blocks	Variab- -le length	Variab- -le name	...	Data length	Data	...
Code (Ex.)	...	h' 005 8	h' 000 2	h' 000 0	h' 000 1	h' 000 8	OUTP UT_1		h' 000 2	h' 12 34	

1 block(setting available repeatedly upto 16 blocks)

- \* **Number of blocks** : It is to set such number of blocks composed of '[Variable length][Variable name]' and '[Data length][Data]' as is in this request format up to 16 blocks. Thus, the value of [Number of blocks] shall be h' 0001 ~ h' 0010 .

##### b. Array type

Format name	Header	Comm- and	Data type	Reserv- ation area	Number of blocks	Variable length	Variable name	Number of data	Data
Code (Ex.)	...	h' 0058	h' 0042	h' 0000	h' 0001	h' 000A	OUTPU T_ARR	h' 0004	h' 1234 5678

- \* **Number of blocks** : Number of blocks is available only in h' 0001
- \* **Variable length** : It means the number of letters of the variable name registered in PLC' s access variable area where upto 16 letters are allowed. The range of this value which is converted from Hex to ASCII is h' 01 ~ h' 10.
- \* **Variable name** : As a variable to write actually it shall be ASCII within 16 letters. Others than figures, upper/lower case, '%' and '.' are not allowed as a variable name. Upper and lower cases are used as distinguished but be sure to use **Upper case** as PLC access variable names are all upper-cased.

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### 3) Response format(PLC' s ACK response)

#### a. Separate type

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks
Code (Ex.)	...	h' 0059	h' 0002	h' 0000	h' 0000	h' 0001

#### b. Array type

Format name	Header	Command	Data type	Reservation area	Error status	Number of blocks
Code (Ex.)	...	h' 0059	h' 0042	h' 0000	h' 0000	h' 0001

\* In case of array type, h' 0001 only shall be used for the number of variables.

\* Data length indicates the number of byte in data.

If data type is Bool, the data read is displayed in 1 byte (HEX). Namely, h' 00 is displayed if bit value is 0 and h' 01 is displayed if bit value is 1.

### 4) Response format(PLC' s NAK response)

#### a. Separate type & array type common

Format name	Header	Command	Data type	Reservation area	Error status	Error code
Code (Ex.)	...	h' 0059	h' 0002	h' 0000	h' FFFF (which is not 0)	h' 21

### 10.3.7 Status Read request (MMI → PLC)

#### 1) Introduction

It is a service applicable to use information and status of PLC through communication.

#### 2) Computer requested format

Item	Size(byte)	Description
Command	2	0x00B0 : Status Request
Data type	2	0x0000 : Don' t Care
Reservation area	2	0x0000 : Don' t Care

#### 3) Response format(PLC' s ACK response)

Item	Size(byte)	Description
Command	2	0x00B1 : Status Response
Data type	2	0x0000 : Don' t Care
Reservation area	2	0x0000 : Don' t Care
Error status	2	Normal if 0, Error code if not 0
Data size	2	0x0014
Data	20	Status Data

#### Status Data structure

Item	Size(byte)	Byte position	Description
Reserved	4	0	Reservation area
_CPU_TYPE	1	4	System type : Flag
_VER_NUM	1	5	OS version No. : Flag
_SYS_STATE	2	6	PLC mode & Run status : Flag
_PADT_CNF	1	8	GMWIN connection status : Flag
_DOMAIN_ST	1	9	System S/W configuration information : Flag
_CNF_ER	2	10	System error (Serious) : Flag
_CNF_WAR	2	12	System warning : Flag
Slot Info	2	14	Slot Information Bit01~Bit03 : Information on slot where local station is remote-connected with different station. Bit05~Bit07 : Information on slot remote-connected with different station. Bit09~Bit11 : Information on slot where this module is installed
Reserved	4	16	Reservation area

- Refer to \*Flag description for details of each item.



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### Flag description

- **\_CPU\_TYPE (1Byte)**
  - ; GM1(0x00), GM2(0x01), GM3(0x02), GM4(0x03), GM5(0x04),  
GM3\_FSM(0x05), GM4\_FSM(0x06), SRU(0x07), GMR(0x10),  
GK3(0x22), GK4(0x23), GK5(0x24),  
GK3\_FSM(0x25), GK4\_FSM(0x26)
- **\_VER\_NUM (1Byte)**
  - ; BIT0~BIT3 : Minor Version displayed  
BIT4~BIT7 : Major Version displayed  
Ex.) If v3.1 is displayed  
; 0x31 displayed
- **\_SYS\_STATE (2Byte)**

Position	Description	Indication
BIT 0	Local control	Run mode changeable status only by mode key or GMWIN displayed.
BIT 1	STOP	Displays operation status of CPU
BIT 2	RUN	Displays operation status of CPU
BIT 3	PAUSE	Displays operation status of CPU
BIT 4	DEBUG	Displays operation status of CPU
BIT 5	Operation mode change factor	Operation mode changed by key
BIT 6	Operation mode change factor	Operation mode changed by GMWIN
BIT 7	Operation mode change factor	Operation mode changed by remote GMWIN
BIT 8	Operation mode change factor	Operation mode changed by communication
BIT 9	STOP by STOP function	Stopped after scan completed by STOP function during RUN mode operation.
BIT 10	Compulsory input	Displayed during compulsory ON/OFF execution for input contact.
BIT 11	Compulsory output	Displayed during compulsory ON/OFF execution for output contact.
BIT 12	STOP by ESTOP function	Stopped immediately by ESTOP function during RUN mode operation.
BIT 13	Reservation area	
BIT 14	Monitor in execution	Displayed during external monitor execution on program and variable
BIT 15	Remote mode ON	Operation in remote mode displayed.

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- **\_PADT\_CNF (1 Byte)**

Position	Description	Indication
BIT 0	Local GMWIN connection	Bit indicating connection status of local GMWIN.
BIT 1	Remote GMWIN connection	Bit indicating connection status of remote GMWIN
BIT 2	Remote communication connection	Bit indicating connection status of remote communication
BIT 3 ~ BIT 7	Reservation area	

- **\_DOMAIN\_ST (1Byte)**

Position	Description	Indication
BIT 0	Basic parameter error	Flag indicating basic parameter error as checked
BIT 1	I/O parameter error	Flag indicating I/O configuration parameter error as checked
BIT 2	Program error	Flag indicating user program error as checked
BIT 3	Access variable error	Flag indicating access variable error as checked
BIT 4	HS link parameter error	Flag indicating HS link parameter error as checked
BIT 5 ~ BIT 7	Reservation area	

- **\_CNF\_ER (2Byte)**

Position	Description [Flag]	Indication
BIT 0	CPU configuration error [_CPU_ER]	Error flag caused if error occurs on self-diagnosis function of CPU module, if installed on other position than specified for base' s CPU, or if normal operation of CPU module is unavailable due to multi-CPU configuration error (Refer to _SYS_ERR for details)
BIT 1	Module type discord error [_IO_TYER]	Typical flag to detect and display the error caused if I/O configuration parameter of each slot and the configuration of actually installed module are different from each other or if specific module is installed on an unavailable slot (Refer to _IO_TYER_N, _IOTYER[n])
BIT 2	Module installation error [_IO_DEER]	Typical flag to detect and display the error caused if module configuration of each slot is changed during Run. (Refer to _IO_DEER_N, _IO_DEER[n])
BIT 3	FUSE disconnection error [_FUSE_ER]	Typical flag to detect and display the error caused if the fuse as installed on the module among modules of slots is disconnected. (Refer to _FUSE_ER_N, _FUSE_ER[n])

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Position	Description [Flag]	Indication
BIT 4	I/O module Read/Write error (trouble) [_IO_RWER]	Typical flag to display the error caused if normal Read/Write of I/O module among modules of slots. (Refer to _IP_RWER_N, _IO_RWER[n])
BIT 5	Special /communication module interface error(trouble) [_SP_IFER]	Typical flag to display the error caused if initializing of special or communication module among modules of slots fails or if normal interface is unavailable due to abnormal operation of the module. (Refer to _IP_IFER_N, _IP_IFER[n])
BIT 6	Detection error of serious error on external device [_ANNUN_ER]	Typical flag to display the error detection occurred if serious error on external device is detected and recorded in _ANC_ERR[n] by user program.
BIT 7	Reservation area	
BIT 8	SCAN WATCH-DOG error [_WD_ER]	Error caused if program scanning time exceeds over SCAN WATCH-DOG TIME set by parameters.
BIT 9	program code error [_CODE_ER]	Error caused if faced with command impossible to read while user program is executed.
BIT 10	STACK OVERFLOW error [_STACK_ER]	Error caused if program stack exceeds over normal range while program is executed.
BIT 11	Program error [_P_BCK_ER]	Error caused if program memory is crashed or if execution is unavailable due to program error. (Refer to _DOMAIN_ST)
BIT 12 ~ BIT 15	Reservation area	

- \_CNF\_WAR (2Byte)

Position	Description (Flag)	Indication
BIT 0	System warning(light error) RTC data error [_RTC_ERR]	Flag to display the error if occurred on RTC data
BIT 1	Data BACK_UP error [_D_BCK_ER]	Flag to indicate that cold restart is executed because normal hot or warm restart program is unavailable to execute due to data memory crashed by BACK_UP error. It is automatically reset if an applicable initializing program is complete among initializing programs.

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Position	Description (Flag)	Indication
BIT 2	Hot restart unavailable [_H_BCK_ER]	Flag to indicate that restart (warm or cold) is executed because hot restart is unavailable to execute due to exceeded hot restart time when power recovered or abnormal BACK_UP of operation data necessary for hot restart while program is executed. It is automatically reset if an applicable initializing program is complete among initializing programs.
BIT 3	Abnormal operation stop (ABNORMAL SHUTDOWN) [_AB_SD_ER]	Flag used in initializing program to warn that computation error may occur on preserved data area because the computation begins again from the start of the program if warm restart is executed when powered back after the program stopped midway since powered off while the program is executed. It is automatically reset if an applicable initializing program is complete. It is also displayed if the program stopped midway by 'ESTOP' function.
BIT 4	TASK clash (Settler, External task) [_TASK_ERR]	Flag to display the task clash if both tasks identical are to be executed as requested when user program is executed. (Refer to _TC_BMAP[n], _TC_CNT[n] for details)
BIT 5	Battery error [_BAT_ERR]	Flag to detect and display the error caused if battery voltage for back-up of user program and data memory is lower than specified.
BIT 6	Light error detected on external device [_ANNUN_WR]	Typical flag to display the error detection occurred if light error on external device is detected and recorded in _ANC_WB[n] by user program.
BIT 7	Reservation area	
BIT 8	HS link parameter1 error [_HSPMT1_ER]	Typical flag to check each HS link parameter at HS link enabled and to display the error if occurred by HS link unavailable. It is reset if HS link disabled.
BIT 9	HS link parameter2 error [_HSPMT2_ER]	
BIT 10	HS link parameter3 error [_HSPMT3_ER]	
BIT 11	HS link parameter4 error [_HSPMT4_ER]	
BIT 12 ~ BIT 15	Reservation area	