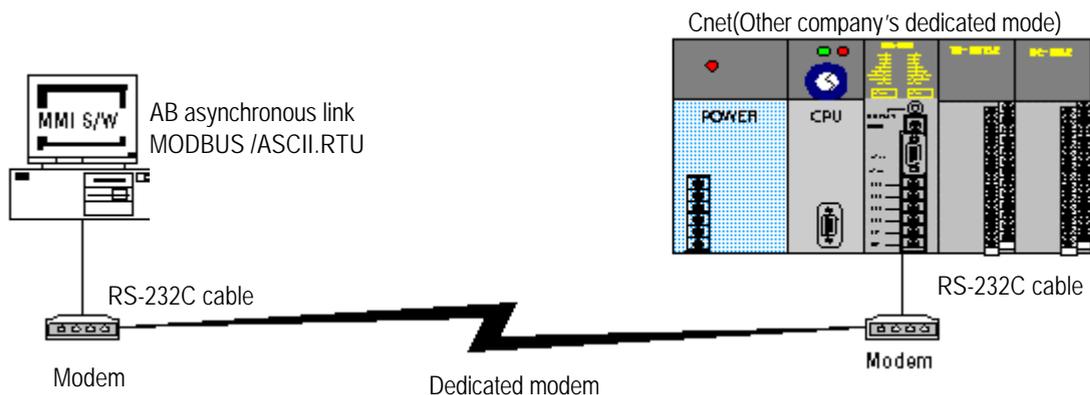


### 7.4 Other company's dedicated mode Ver.2.0

#### 7.4.1 Introduction

Other company's dedicated mode enables user to communicate with other company's devices by having the most useful protocol as selected among communication protocols used in industrial devices built in GLOFA PLC Cnet I/F module without preparing additional communication program, which is added in Ver.2.0. Asynchronous Link Full Duplex Protocol for serial communication made by AB(ALLEN-BRADLEY) and MODBUS ASCII/RTU Protocol made by MODICON PLC among other company's protocols are supported in Cnet Ver.2.0. Other company's dedicated communication driver supports only server function without master operation available. [Figure 7.20] shows an example of system configuration for communication in other company's dedicated mode. Cnet I/F module operates as a server and executes response function to data request from higher PC or DCS when in AB or MODBUS's dedicated mode communication as shown in the figure.

[Figure 7.20] Example of communication system in other company's dedicated mode



Other company's dedicated mode has the following features.

- AB Asynchronous Link Full Duplex protocol supported.
- MODBUS ASCII/RTU protocol supported.
- Other company's communication driver can be used as downloaded in Frame Editor.
- Other company's dedicated mode can be set in On-line mode,.
- Operation available for RS-232C/RS-422 in stand-alone or interlocking mode.
- Operation available always as a server, however, unavailable as a master.
- PLC programming is unnecessary.
- Extension available for protocols which will be added in future.
- Access available to %M area of direct variable area in PLC.

### 7.4.2 Operating mode & downloading of communication driver

#### 1) Type of communication drivers

Other company's dedicated mode can be set by mode change from On-line mode of mode switch '9' via Frame Editor to other company's dedicated mode, and can be operated via AB Asynchronous Link Full Duplexor MODBUS protocol by downloading of communication driver file to Cnet I/F module. Communication driver file as an OS file to perform operation of specified protocol among other company's dedicated modes is to download just one Cnet I/F module for the service. Communication driver is saved in Cnet I/F module's built-in flash memory as kept even if powered OFF. Communication drivers are classified as specified in Table 7.26] according to protocol type and Cnet I/F module type with extension name of \*.LIB.

[Table 7.26] Type of communication drivers

File name	Description	Applicable module
AB34.LIB	AB Asynchronous Link Full Duplex communication driver	G3L-CUEA/G4L-CUEA
AB6.LIB		G6L-CUEB/G6L-CUEC
MODBUS34.LIB	MODBUS ASCII/RTU communication driver	G3L-CUEA/G4L-CUEA
MODBUS6.LIB		G6L-CUEB/G6L-CUEC

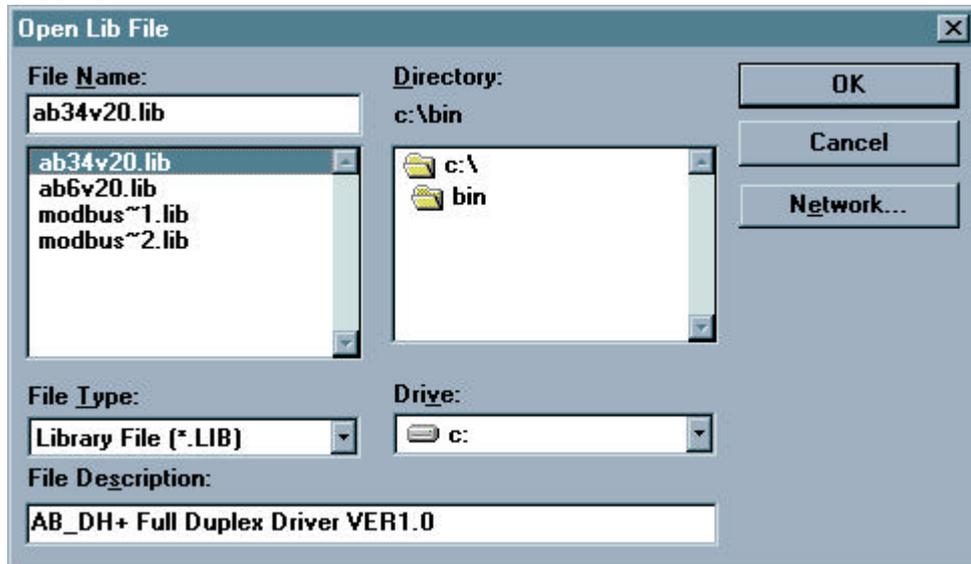
Communication driver file agreed with the service shall be downloaded, however, the number of downloads is not restricted. In other words, a module used in AB Asynchronous Link Full Duplex can be used in MODBUS communication mode if MODBUS communication driver has been downloaded.

#### 2) How to download communication driver

Correspondent communication driver file is to be downloaded for the service in other company's dedicated mode as selected among the files in [Table 7.26]. If incorrect file is selected and downloaded, normal operation of Cnet I/F module isn't allowed. Next is how to download other company's communication driver via Cnet I/F module.

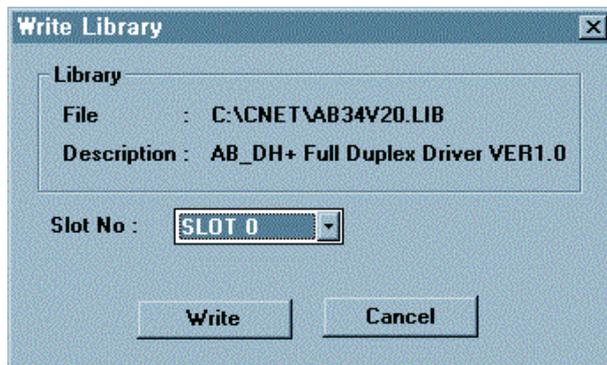
A) If Cnet mode switch is set to Write flash mode and then PLC is powered on, LED No.'0' of Cnet I/F module flashes in a cycle of 1sec.

B) If 'Open library file' menu is selected from higher file menu after On-line connection with Frame Editor executed, the following screen to Open library file is displayed, where applicable directory and desired LIB file is selected to display information about the applicable file in File Information. The figure below shows the case that AB34.LIB file is selected.



C) Select AB34.LIB file in the figure and then click on OK.

D) Select Write flash memory from sub-menu of flash memory in On-line menu of menu bar to display the following screen to Write library, where slot number Cnet I/F module is mounted on is to be selected and Write button is to be selected to download library selected to flash memory.



**Remark**

[Note 1] Do not operate program such as escaping from Frame Editor while downloading to flash memory or from Windows program, nor let PC or PLC powered off. If OS data of flash memory is once damaged, normal operation of Cnet I/F module is unavailable. A/S shall be requested in this case.

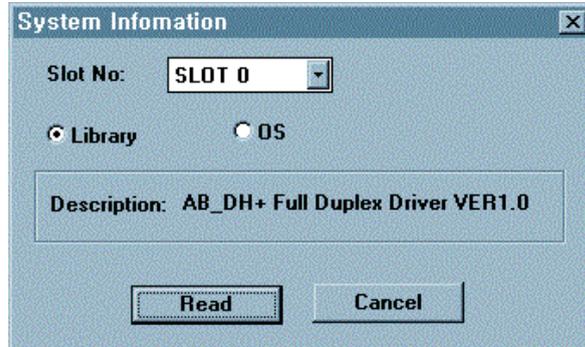
E) If library writing is completed, the following message will be displayed.



F) If the message below is displayed, check operation mode or slot number in Cnet I/F module.

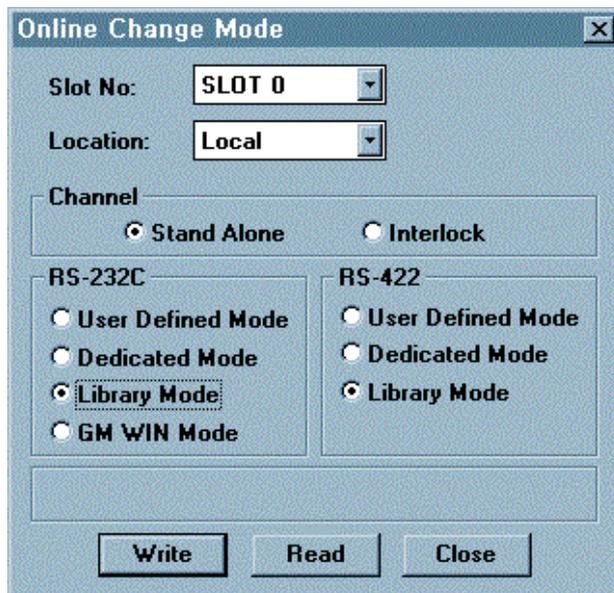


G) If library writing has been previously established, library file information of Cnet I/F module can be read. Select Read flash memory of sub-menu in flash memory from on-line menu of menu bar to display the following screen where to read flash memory information. Herein, select applicable slot and library and then press Read to check the type and the version of driver downloaded in Cnet I/F module.



### 3) How to set other company's communication mode

- A) Release On-line connection and let PLC powered off after library writing to Cnet I/F module is completed.
- B) Change Cnet I/F module's mode switch to No. 9 On-line mode and then let PLC powered on for On-line connection.
- C) Select On-line mode change from On-line menu of menu bar to display the following screen for On-line mode change, where other company's dedicated mode for RS-232C or RS-422 channel is to be set and then channel operation and connection steps are to be exactly selected with Write button clicked on to complete mode change and to start operation in other company's dedicated mode. if set to stand-alone mode Other company's dedicated mode can be operated separately for RS-232C / RS-422 channel with the individual operation available according to selected mode.



- D) In case that operation is switched to other company's dedicated mode, if LED No.0,1,2 of Cnet I/F module is On and LED No.15 (No.7 in Gm6 Cnet) flashes in a cycle of 1 sec., library has not been downloaded to flash memory. Check if communication driver is downloaded.
- E) In normal running, set and write basic parameters such as station No., communication speed, etc.
- F) Now the operation in other company's dedicated mode is completed as ready to enable communication in other company's dedicated mode via cable connection with applicable channel.
- G) Because other company's dedicated mode is to be operated as a slave only like dedicated mode, it just responds to request of master station.

H) Other company's communication mode can perform communication via %M direct variable area of GLOFA-PLC.  
Since address MAPPING used in service depends on type of communication driver, please refer to protocol communication spec. for that.

### 7.4.3 Specifications of A.B communication driver

It is communication specifications for communication via AB Asynchronous Link Full Duplex protocol through GLOFA PLC of Cnet Ver. 2.0 set to other company's dedicated mode for the service.

- Operation of AB Asynchronous Link protocol is available only in Cnet I/F module Ver.2.0 or later.
- Cnet I/F module operates as a server only, so client operation is unavailable.
- Cnet I/F module supports AB Asynchronous Link Full Duplex protocol.
- Cnet I/F module uses AB PLC-5 commands set.
- AB34.lib/AB6.lib files shall be downloaded to Cnet I/F module for AB protocol operation.
- Operation mode of Cnet I/F module is to be set to other company's dedicated mode in On-line mode.
- Basic parameters such as communication speed, station No., etc shall be set as agreed with the communication specification of MMI devices via Frame Editor.
- Separate operation for each RS-232C/RS422 channel is available.

#### 1) Basic specification

- AB Asynchronous Link Full Duplex(DF1) protocol supported(Server only supported)
- Character protocol : Start/Stop/Data/Parity setting available(using Frame Editor)
- Communication speed : 300 ~ 38400 BPS available
- Channel operation : Stand-alone/Interlocking operation available for RS-232C/RS-422 channels
- Communication mode : HEX communication
- Frame check: BCC 1 byte(complement of double the sum data except for message start/end symbols)
- Station No.area : 0 ~ 31 station available
- Command supported : AB PLC-5 commands set compliant
- Max. data length : 110 bytes

### 2) Cnet supported control code

[Table 7.27] Control code for AB Asynchronous Link service

Symbol	Type	Meaning
DLE STX	Control	Transmission station's message start symbol
DLE ETX BCC/CRC	Control	Transmission station's message end symbol
DLE ACK	Control	Receiving station's receiving success symbol
DLE NAK	Control	Receiving station's receiving failure symbol
DLE ENQ	Control	Transmission station's re-transmission request symbol of response frame
APP data	Data	User data value between 00-0f and 11-ff
DLE DLE	Control	Means HEX data of 0x10(one DLE may be ignored)

### 3) Cnet supported PLC-5 Family Command

Cnet's AB Asynchronous Link communication driver supports 4 AB PLC-5 commands among PLC-5 commands necessary for communication with GLOFA-PLC. The following table describes the commands supported in Cnet AB Asynchronous Link communication driver.

[Table7.28] Cnet I/F module supported PLC-5 Command set

Message:	CMD	FNC	Meaning
Word Write Range	0f	00	Block Word data writing
Word Read Range	0f	01	Block Word data reading
Read Modify Write	0f	26	Bit data writing
Diagnostic Status	06	03	Self-diagnosis reading

Other commands than described in [Table7.28] shall not be used as not responded in Cnet I/F module.

### 4) Response status code to commands

If the response is in error , Cnet I/F module sends error response and transmits error code to EXT STS area.

[Table7.29] shows error codes in error response.

[Table7.29] Error codes in AB Asynchronous Link

STS Code	EXT STS Code	Meaning
0xF0	0x7	File is too long
	0x9	Data or file is too large
	0xA	Transaction size plus word address is too large
	0x11	Illegal data type
	0x12	Invalid parameter or invalid data

### 5) GLOFA PLC Address Mapping

Direct variable areas of GLOFA PLC are %M, %Q and %I areas. AB Asynchronous Link communication driver has access to 2K-bytes of %M area which is an internal memory area, and B3 area & N7 area of AB PLC-5 are mapped to %M area. Only Bit area, B3 and Integer area, N7 among PLC-5 file types are accessible. Because bit command is mapped to %MX area and word command is to %MW area, access to different area is not allowed. [Table4-30] describes data memory mapping between AB PLC-5 and GLOFA PLC.

[Table 7.30] GLOFA PLC Address Mapping of AB communication driver

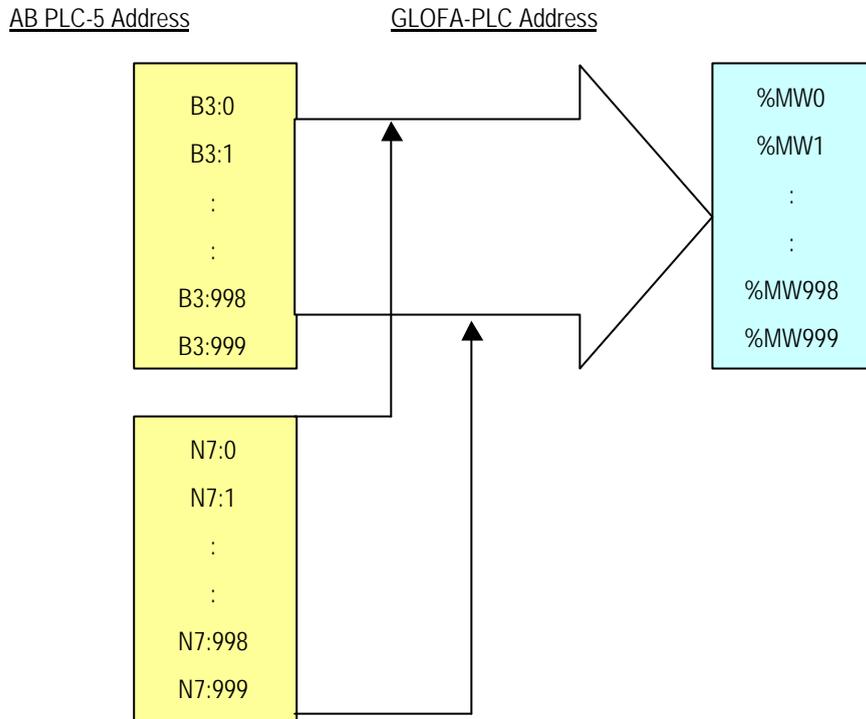
Type	AB PLC-5 Address	GLOFA-PLC Address	Support	Remark
Output	O:xxx(xxx is octal)	Not Available	NO	Not supported in AB communication driver.
Input	I:xxx(xxx is octal)	Not Available	NO	
Bit	Word: B3:xxx	↔ %MWxxx	YES	xxx = 0 - 999(Word value) yy = 0 ~ 15 (Bit value)
	Bit: B3:xxx/yy	↔ %MWxxx.yy		
Integer	N7:xxx	↔ %MWxxx	YES	
Added file for extension	File number (9 ~ 999)	Not Available	NO	Not supported in AB communication driver.

#### Remark

[Note 1] In Cnet I/F module, access to other areas than Bit & Integer areas of AB PLC-5 is not allowed. Error is responded to the other areas than set to support allowed in the table.

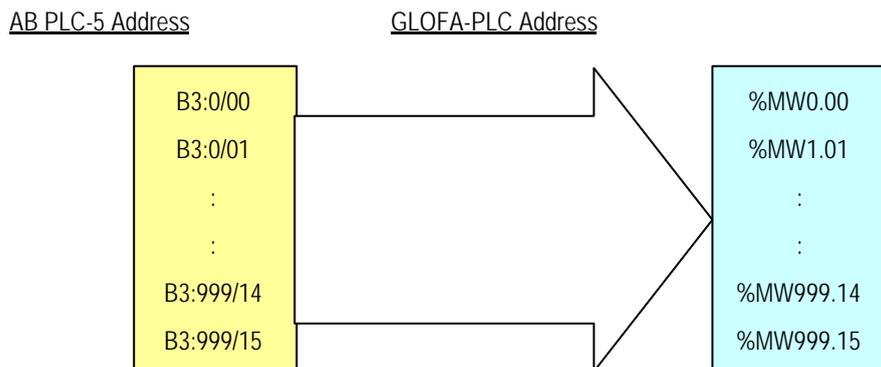
As described in [Table 7.30], AB PLC-5 B3 area & N7 area are mapped together in %MW area of GLOFA PLC. Namely, AB PLC-5 B3 : 0 area & N7 : 0 area are mapped in %MW0 area of GLOFA PLC in the range of %MW0 ~ %MW999 which is the range of B3/N7 areas of AB PLC-5. [Figure 7.21] describes GLOFA-PLC address mapping for WORD area.

[Figure 7.21] WORD area mapping of AB communication driver



[Figure 7.22] describes mapping of GLOFA PLC and AB communication driver for access to BIT area.

[Figure 7.22] MAPPING BIT area of AB communication driver



As shown in [Figure 7.21] & [Figure 7.22], access to BIT area and WORD area of GLOFA PLC via AB communication driver is available in the range of %MW0 ~ %MW999 for WORD area and %MW0.0 ~ %MW999.15 for BIT area.

### Remark

[Note 1] In Cnet I/F module, access to other areas than Bit & Integer areas of AB PLC-5 is not allowed. Error is responded to the other areas than set to support allowed in the table

Because B3 area & N7 area of AB PLC-5 mean the same %M area in GLOFA PLC, access to repeated area may be applied.

Ex.) B3:100 = %MW100, N7:100 = %MW100 (same area in GLOFA-PLC)

### 7.4.4 Specifications of MODBUS communication driver

It is communication specifications for communication via MODBUS protocol through GLOFA PLC of Cnet Ver. 2.0 set to other company's dedicated mode for the service. Application of MODBUS communication in Gm7 series from other models of Cnet I/F modules. Please refer to **8.3 MODBUS protocol communication in GM7 series manual** for details.

- MODBUS communication function is available only in Cnet I/F module Ver.2.0 or later.
- Cnet I/F module operates as a server only in MODBUS, however, client operation is unavailable.
- For MODBUS operation, download MODBUS.lib file first to Cnet I/F module via Frame Editor.
- Operation mode of Cnet I/F module is to be set to other company's dedicated mode.
- ASCII/RTU modes among MODBUS protocols are supported simultaneously.
- Basic parameters such as communication speed, station No., etc shall be set as agreed with the communication specification of external devices.
- Separate operation for each RS-232C/RS422 channel is available.

#### 1) Basic specification

- Character protocol: Start/Stop/Data/Parity setting available(using Frame Editor)
- Communication speed : 300 ~ 38400 BPS available
- Channel operation : Stand-alone/Interlocking operation available for RS-232C/RS-422 channels.
- Communication mode: HEX communication(RTU Mode), ASCII communication(ASCII Mode)
- Frame check: CRC check(RTU Mode), LRC check(ASCII Mode)
- Station No.area : 1 ~ 31 station available (station 0 unavailable)
- Data length : Reading/Writing of max.120 bytes available.
- ASCII mode : Communication via ASCII data.
  - Error check through LRC
  - Frame structure(ASCII data)

Type	Start (.)	Address	Function	Data	LRC	End(CR LF)
Size	1 byte	2 bytes	2 bytes	n bytes	2 bytes	2 bytes

- RTU mode : Communication via HEX data.
  - Error check through 16 bit CRC
  - Frame structure(HEX data)

Type	Start	Address	Function	Data	CRC	End
Size	T4 idle	1 byte	1 bytes	n bytes	2 bytes	T4 idle

### 2) Cnet supported MODBUS Command

Cnet's MODBUS communication driver supports reading/writing commands of Bit & Word areas among commands used in MODBUS Controller. [Table 7.31] describes the commands supported in Cnet MODBUS communication driver. Other function codes than described in [Table 7.31] are not responded to.

[Table 7.31] MODBUS communication driver supported function code

Function code	Name	Address <sup>[Note1]</sup>	GLOFA-PLC address mapping	Remark
01	Read Coil Status	0xxxx(bit-output)	%MX8~%MX9999	Bit Read
02	Read Input Status	1xxxx(bit-input)	%MX8~%MX9999	Bit Read
03	Read Holding Reg.	4xxxx(word-output)	%MW1~%MW4999	Word Read
04	Read Input Reg.	3xxxx(word-input)	%MW1~%MW4999	Word Read
05	Force Single Coil	0xxxx(bit-output)	%MX1~%MX4999	Bit Write
06	Preset Single Reg	4xxxx(word-output)	%MW1~%MW4999	Word Write
16	Presel Multi Reg.	4xxxx(word-output)	%MW1~%MW4999	Word Write

#### Remark

[Note 1] Address area of MODICON Controller has the range of 1-9999. Namely, standard of address start is set to '1, thus, %M area of GLOFA-PLC is mapped in MODBUS memory from %MW1. 1-9999 can be set in MODBUS, however, 1-4999 is available for %M area memory as of 10 K-bytes open to MODBUS in Cnet's MODBUS communication driver.

### 3) GLOFA PLC Address Mapping

Direct variable areas of GLOFA PLC are %M, %Q and %I areas. MODBUS communication driver has access to 10K-bytes(%MW1 ~ %MW4999) of %M area which is an internal memory area, and all areas of MODBUS are mapped to %M area. As for data type as agreed with function code of MODBUS Protocol, bit command is mapped to %MX area and word command is to %MW area, however, access to different area is not allowed.

If bit of MODBUS is read, namely, if Read Coil Status & Read Input Status are read, start address shall be started in a multiple of 8 (Ex. : 00008, 10008, 00016, 10048...). It is because communication module of GLOFA PLC dose not allow continuous reading of BIT address to direct variable. Continuous reading command of bit in MODBUS is processed as changed into reading command of byte block.

## Chapter 7 Communication function

[Table 7.32] describes data memory mapping between MODBUS and GLOFA Cnet.

[Table 7.32] MODBUS communication driver supported function code

MODICON controller address		Address mapping	GLOFA-PLC Address		Remark
Name <sup>[Note 1]</sup>	Address <sup>[Note 2]</sup>		Device <sup>[Note 3]</sup>	Address <sup>[Note 4]</sup>	
(0)Read Coil Status	8 ~ 9992	↔	%MX	8 ~ 9992	Bit Read
(1)Read Input Status	8 ~ 9992	↔	%MX	8 ~ 9992	Bit Read
(4)Read Holding Reg	1 ~ 4999	↔	%MW	1 ~ 4999	Word Read
(3)Read Input Reg	1 ~ 4999	↔	%MW	1 ~ 4999	Word Read
(0)Force Single Coil	1 ~ 9999	↔	%MX	1 ~ 9999	Bit Write
(4)Preset Single Reg	1 ~ 4999	↔	%MW	1 ~ 4999	Word Write
(4)Presel Multi Reg	1 ~ 4999	↔	%MW	1 ~ 4999	Word Write

### Remark

[Note 1] Figures in ( ) of each item are reference values of MODICON Controller.

[Note 2] For reading of Coil Status & Input Status, the address shall be set in a multiple of 8.

(Ex.) 8, 16, 32, 8000 → OK

3, 5, 27, 9991 → ERROR

[Note 3] All addresses of MODICON Controller are mapped in %MX / %MW areas of GLOFA-PLC causing repeated area.

(pay attention to setting)

(Ex.) Read Holding Reg 100 → %MW100 = Read Input Reg 100 → %MW100 (same area)

[Note 4] Since start address of MODICON Controller is '1', access to GLOFA PLC '0' address is unavailable, however, access to addresses starting from 1 is available. As for Word areas, max.4999 addresses only are accessible.(10 kbytes)