GP-PRO/PBIII

PLC CONNECTION MANUAL

ADDITIONAL MANUAL

Protocols for
Omron Corporation SYSMAC-C (1:n)

Pro-face
Human Machine Interface

1 Installation

This CD-ROM includes all the protocol files required by the GP/GLC to communicate with an Omron Corporation PLC. Also, you will need to have the GP Screen Editor software (GP-PRO/PBIII for Windows95 version 2.1 or higher) installed on your personal computer's hard disk. For information about the installation of the GP Screen Editor software, refer to that software's Operation Manual.

1) Be sure to Confirm that the GP Screen Editor software is installed in your PC prior to starting this installation.

2) To install the Omron protocol files, click on this CD-ROM's "sysmacc2.exe" files icon.

3) Once the setup program starts, follow the instructions given to install the protocol.

When using the Omron SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61) unit (1:n connection), select [OMRON SYSMAC-C 1:n Comm] for the "PLC Type".

2 List of Connectable PLCs

The following Omron PLCs can be connected to GP/GLC.

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

Company	Series	PLC	Link I/F or CPU Direct	PLC Type Shown in GP Screen Editor Software
Omron Corporation	SYSMAC-C	CQM1H-CPU51 CQM1H-CPU61	CQM1H-SCB41*1	OMRON SYSMAC-C 1:n Comm.

**1 Use port 2 of the serial communications board CQM1H-SCB41, which is an RS-422A/485 port.*

3 System Structure

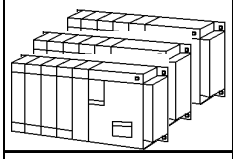
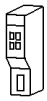
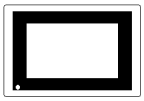
The following describes the system configuration used when connecting the GP/GLC to Omron PLCs.

- When the PLC is in the RUN mode, the GP cannot write data to the PLC. To allow the GP to write data to the PLC, set the operation mode of the PLC to the Monitoring mode, which allows writing access while the PLC is running.
- Using the PLC in RUN Mode

  1. When the GP is used to perform data write to a PLC that is in [RUN Mode], the GP must first force the PLC to change to [Monitoring Mode]. At this time, the error message "Host Communication Error (02:01:##[*1]) will briefly appear.
  2. When Pro-Server writes data to the PLC, a GP error code (##[*1]01) will appear. At this time, resend the write request to the same STA (node) Number. This will trigger the GP to force the PLC to change to [Monitoring Mode]. At this time data transfer can be performed normally.

Neither of the above error codes will effect GP/GLC data transfer.

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

CPU	Link I/F	Cable Diagram	Cables	GP
				
CQM1H-CPU51 CQM1H-CPU61	CQM1H-SCB41[*2]	RS-422 (1:n communications) <Cable Diagram 1>	Link adapter made by Omron B500-AL001[*3]	GP Series GLC Series
		RS-422 (1:n communications) <Cable Diagram 2>		

**1 ## denotes the station No. of the PLC communicating with the GP.*

**2 Use port 2 of the serial communications board CQM1H-SCB41, which is an RS-422A/485 port.*

**3 The RS-422 communication port is a D-sub type connector. To make a 1:n communication, use the link adapter made by Omron or a terminal block.*

Up to eight PLCs can be connected to a GP.

4 Cable Diagrams

The cable diagrams shown below and the cable diagrams recommended by Omron Corporation may differ. However, when connecting with GP/GLC, use the cable diagrams in this manual.

- ***We recommend using Hirakawa Hewtech's CO-HC-ESV-3P*7/0.2 as the communication cables.***
- ***Ground either of the communication cable shields, the one for the serial communication board's RS-422A/485 connector or the one on the GP side.***
- ***No SG terminal is provided for the PLC. It is unnecessary to ground SG terminal for GP/GLC because the PLC internal signal line is insulated.***
- ***Set the terminator setting switch "TERM" of the SYSMAC-COM1H to be the terminal station to ON. When connecting two PLCs, the PLC that is more distant from the GP/GLC in terms of communication cable length becomes the terminal station.***
- ***Set the PLC's 2-wire/4-wire setting switch "WIRE" to "4".***
- ***The maximum cable length for RS-422/485 communication is 500 m. The maximum length allowed for branch cables of T-type connection is 10 m. In the following diagrams, the communication distance between GP and Station No. n corresponds to the total cable length.***

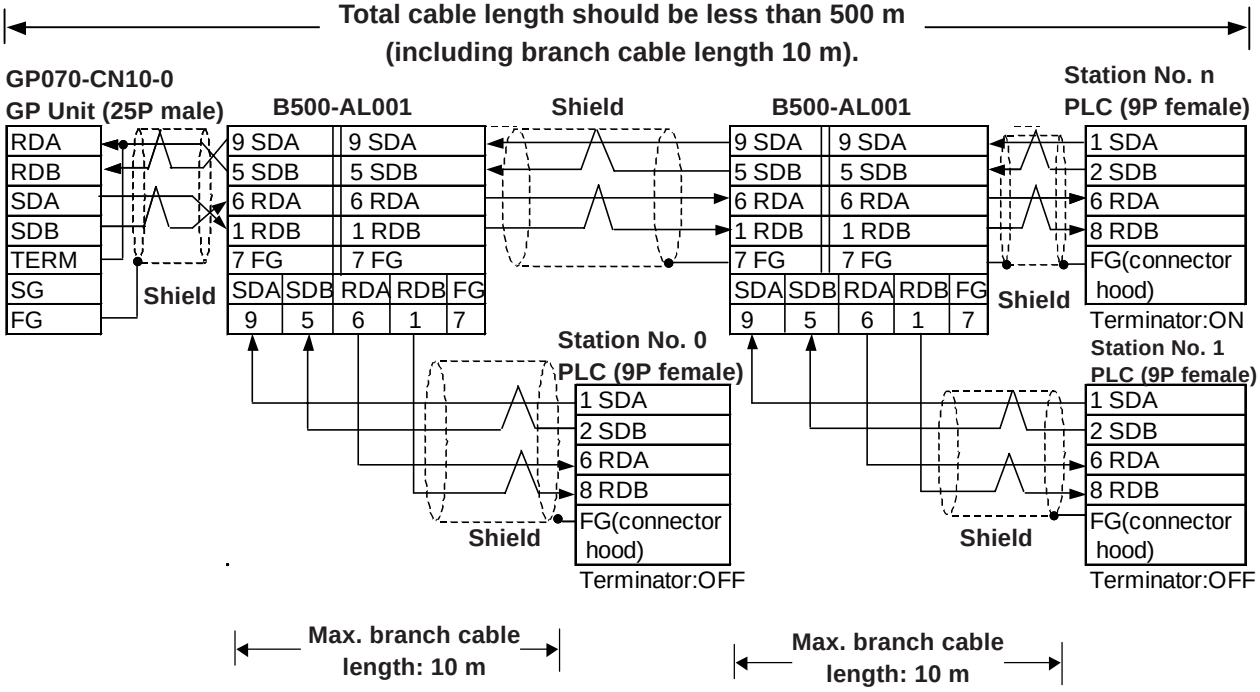
  In Cable Diagram 1, the cable between Station No. 0 and Station No. 1 becomes a branch cable.
- ***When connecting the PLC, use the Omron link adapter, B500-AL001 or a terminal block.***

■ Recommended Cable for RS-422A/485

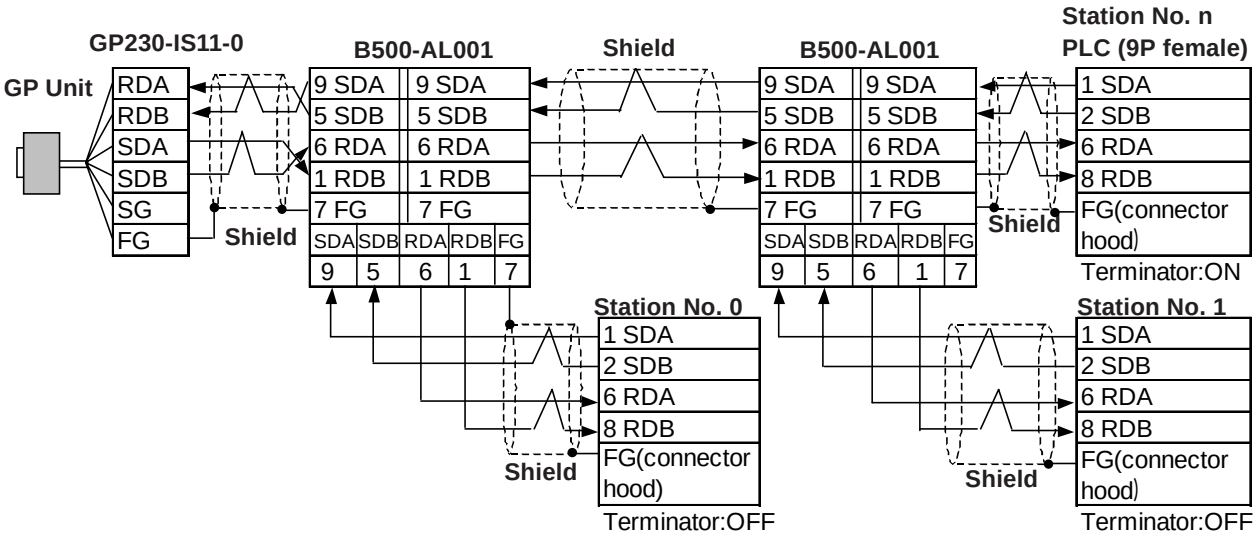
Company	Model
Hirakawa Hewtech	CO-HC-ESV-3P*7/0.2

■ Cable Diagram 1 (1:n) RS-422 (4-wire)

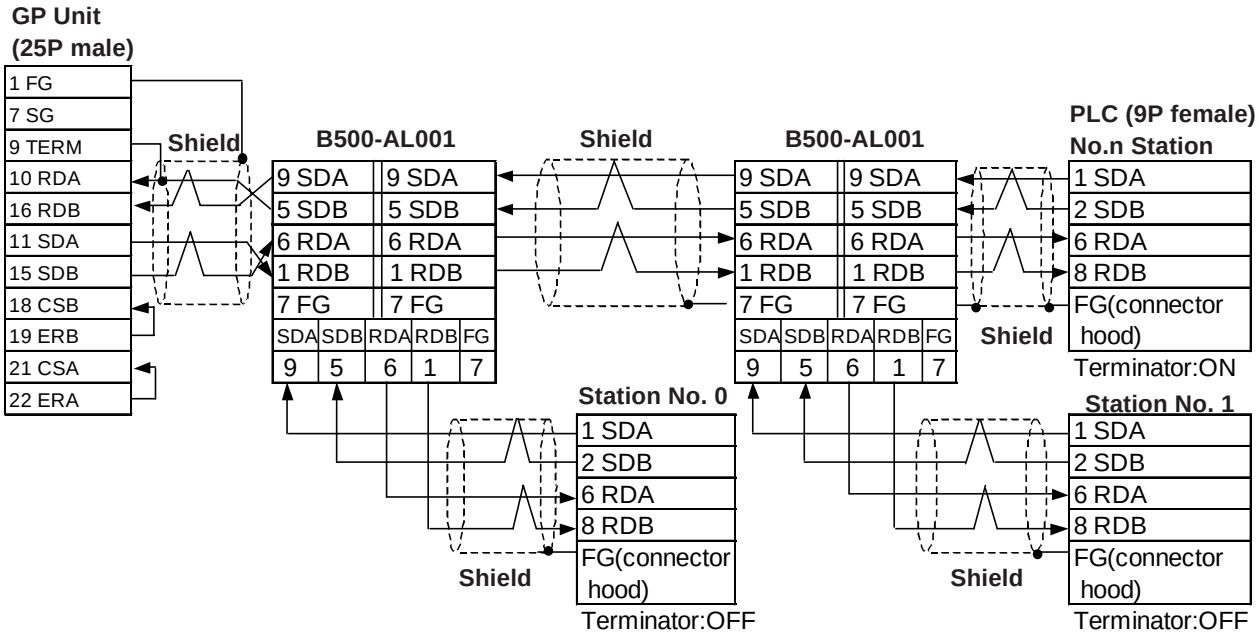
• When using Digital's RS-422 connector terminal adapter GP070-CN10-O



• When using Digital's RS-422 cable GP230-IS11-O



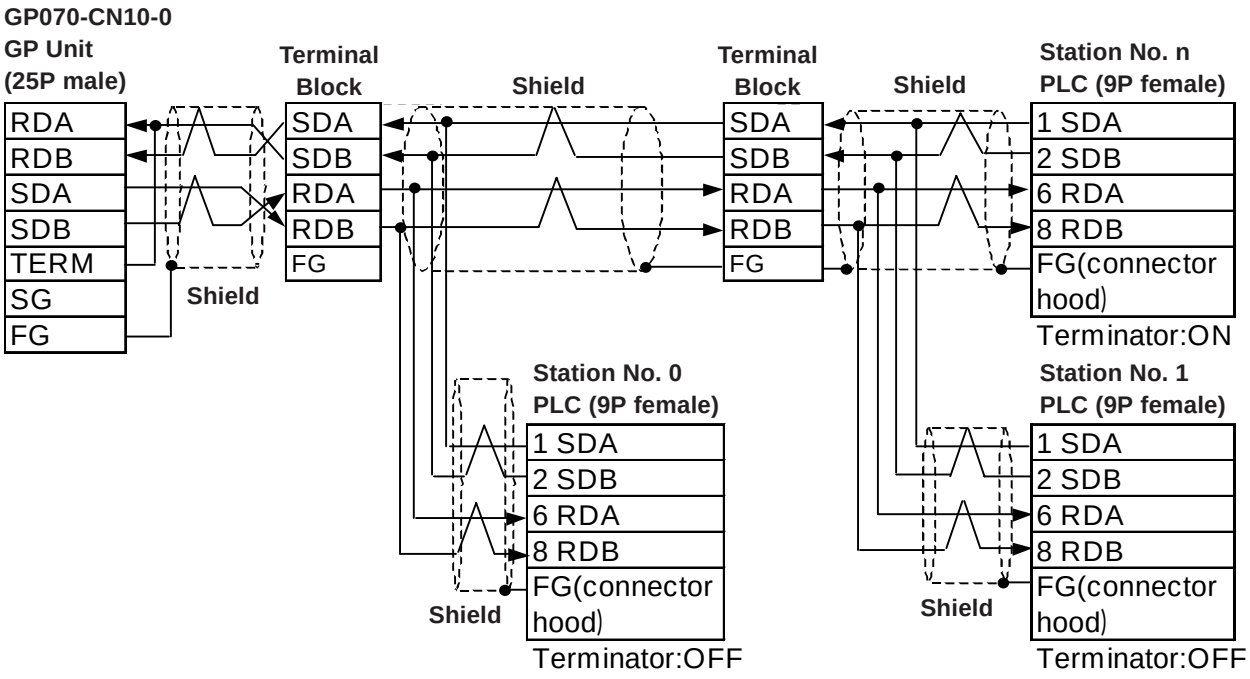
• **When making your own cable connection**



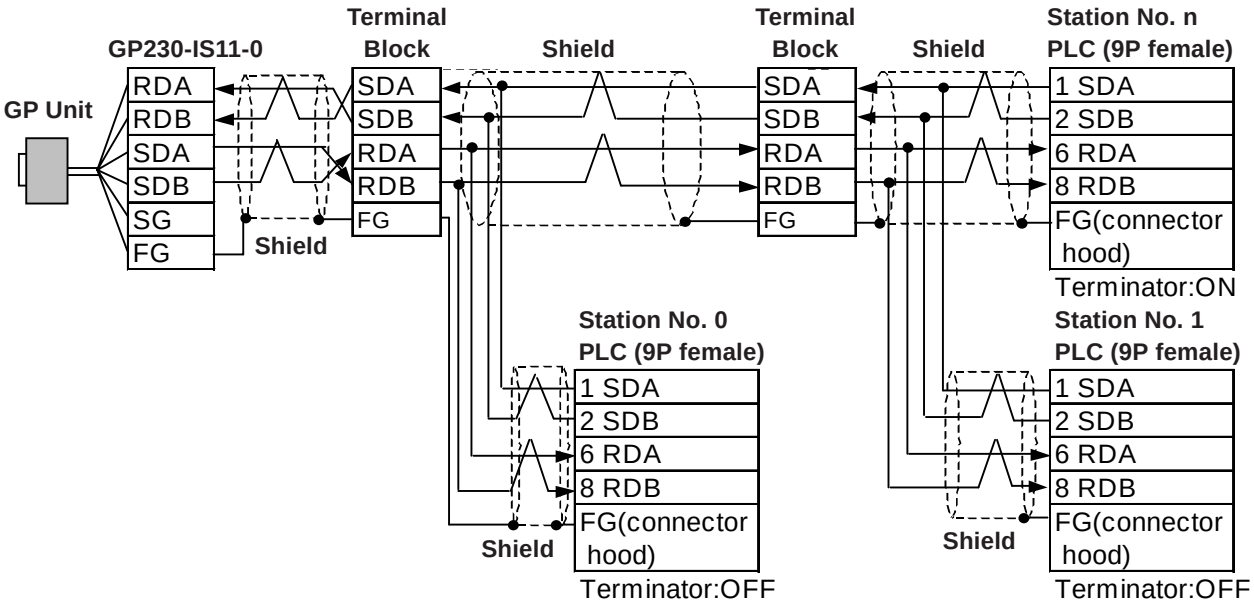
■ Cable Diagram 2 (1:n) RS-422 (4-wire)

The following are the cable diagrams used when the Omron link adapter is not used and a GP is connected with PLCs via terminal blocks.

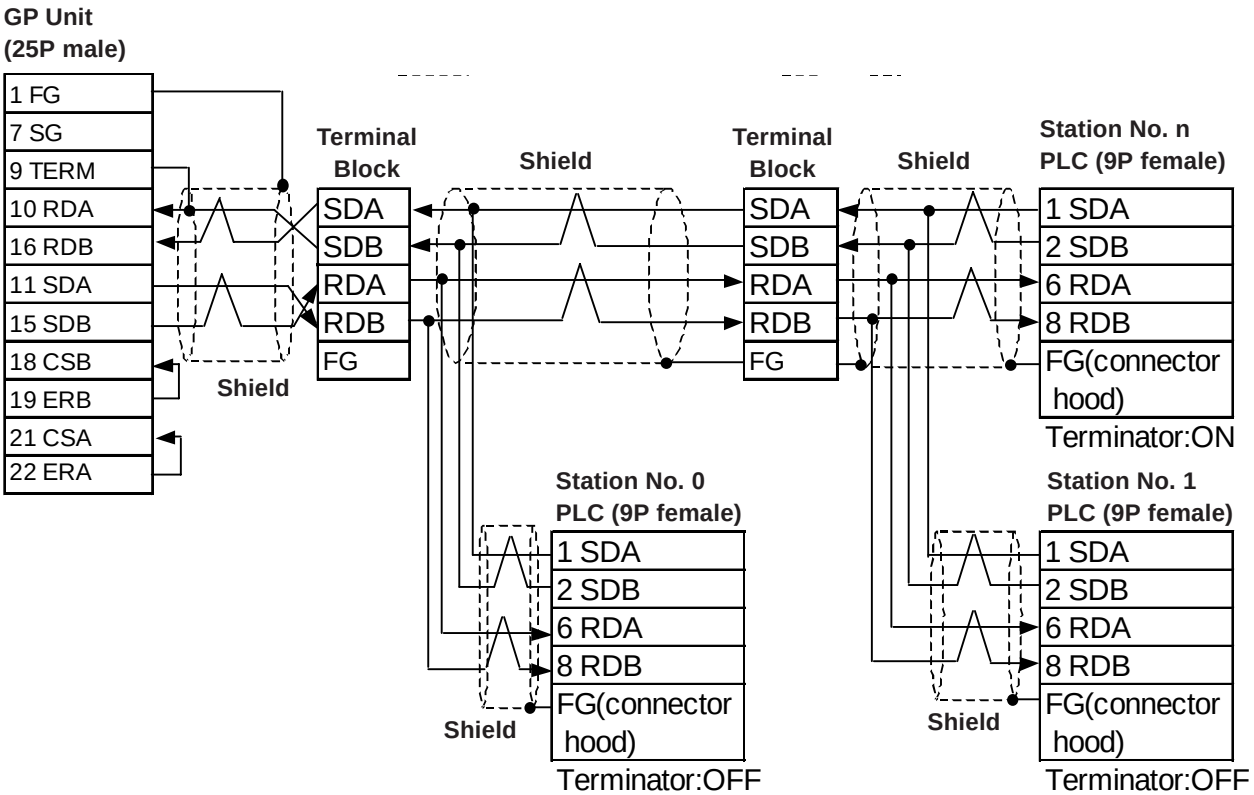
• **When using Digital's RS-422 connector terminal adapter GP070-CN10**



• **When using Digital's RS-422 cable GP230-IS11-O**



• **When making your own cable connection**



5 Supported Devices

The following list shows the range of devices supported by the GP/GLC.

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

can be set as the System Area Start Address.

Device	Bit Address	Word Address	Particulars	
I/O Relay	00000 ~ 24315	000 ~ 243	*1	L/H
Internal Hold Relay			*2	
Special Hold Relay	24400 ~ 25507	244 ~ 255		
Link Relay	LR0000 ~ LR6315	LR00 ~ LR63		
Latch Relay	HR0000 ~ HR9915	HR00 ~ HR99		
Auxiliary Memory Relay	AR0000 ~ AR2715	AR00 ~ AR27		
Timer (contact)	TIM000 ~ TIM511	————		
Counter (contact)	CNT000 ~ CNT511	————		
Timer	————	TIM000 ~ TIM511		
Counter	————	CNT0100 ~ CNT511		
Data Memory	————	DM0000 ~ DM6655	Bit 15 *3,*5	
Extended Data Memory	————	EM0000 ~ EM6143	Bit 15 *4	

**1 Among address range for the input/output relay and internal hold relay, there are addresses that do not exist. For more information, refer to the Omron SYSMAC-CQM1H User Manual.*

**2 Bit addresses for the special hold relay are 24400 to 25415and 25500 to 25507. Bit addresses 25508 to 25515 do not exist.*

**3 System Area Start Address: A Station No. is prepended for the device name DM. Therefore, select the device name of your desired Station No. in the Mode Settings item under the GP Setup menu of the GP Screen Editor software or in the PLC Setup screen of the GP/GLC's OFFLINE mode.*

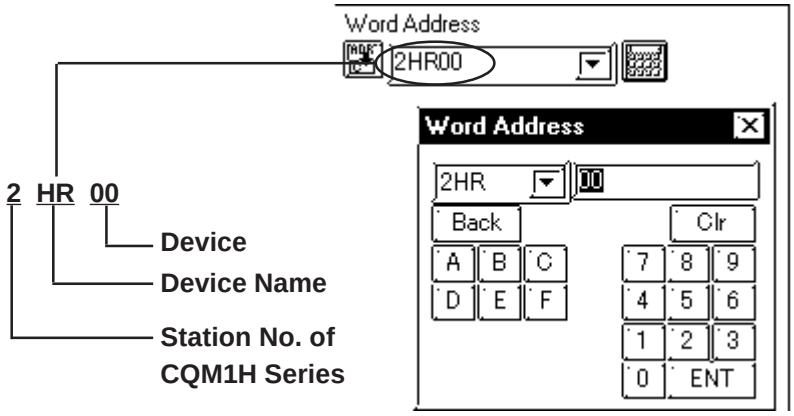
**4 Extended memory EM is only supported by CQM1H-CPU61.*

**5 Do not write data to Data Memory DM data storage area DM6569 to DM6599, or to PC System Setting Area DM6600 to DM6655. For details, refer to Omron's manuals.*

STOP

When bit write operation is performed, the GP reads the PLC's corresponding word address and turns its bit ON, then sends it back to the PLC. If any data is written to this word address by using a ladder program while the GP is reading and writing from/to the PLC, that data may not be written correctly.

When you set up parts or tags in the GP Screen Editor software, Station No. of PLCs is prepended to each device. Station Nos. are 0 to 7. Therefore, one device can have eight variations. Refer to the figure below.



6 Environment Setup

The following table lists the recommended PLC and GP/GLC communication settings.

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

GP/GLC Settings		PLC Settings	
Baud Rate	9600 bps	**Baud Rate**	9600 bps
Data Length	7 bits	**Data Length**	7 bits
Stop Bit	2 bit	**Stop Bit**	2 bit
Parity Bit	Even	**Parity Bit**	Even
Data Flow control	ER	———	———
Communication Format	4 wire type	**2 wire/4 wire [WIRE]**	4 wire
Unit No.	0	**Station No.**[*1]	0
———		**Communication Conditions Format Setting**[*2]	0
———		**Serial Communication Mode Setting**[*3]	Upper Link
———		**Terminator Switch [TERM]**	Terminal station: ON Intermediate station: OFF

**1 Although Nos. 00 to 31 can be used for PLC station Nos., the maximum number of PLCs that can communicate with the GP on the 1:n communication basis is eight. Therefore, set up PLC station Nos. within the range of 00 to 07.*

**2 Communication Conditions Format Settings: DM6550 (Bits 0 to 3)*

DM6550 (Bit 0 to 3)	Communication Settings			
Default: 0 (Standard Setting)	Baud Rate	Data Length	Stop Bit	Parity
	9600bps	7 bits	2 bits	Even

**3 Leave the serial communication mode setting DM6550 (bits 12 to 15) set to the default setting, 0.*

7 Maximum No. of Consecutive PLC Addresses

The following table lists the maximum number of consecutive addresses that can be read by a GP from a PLC. *Refer to this table when using Block Transfer.*

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

Device	Max. No. of Consecutive Addresses
I/O Relay	256 words
Internal Hold Relay	
Special Hold Relay	
Link Relay	64 words
Latch Relay	100 words
Auxiliary Memory Relay	28 words
Timer (contact)	512 words
Counter (contact)	
Timer	
Counter	
Data Memory	
Extended Data Memory	

8 Device Codes and Address Codes

Device codes and address codes are used to specify indirect addresses for E-tags and K-tags.

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

	Device	Word Address	Device Code (HEX)	Address Code
Bit Device	Input Relay/Output Relay/Internal Hold Relay/Special Hold Relay Station No. 0	0000 ~	9000	Word Address
	Station No. 1	1000 ~	8200	Word Address
	Station No. 2	2000 ~	8400	Word Address
	Station No. 3	3000 ~	8600	Word Address
	Station No. 4	4000 ~	C200	Word Address
	Station No. 5	5000 ~	8A00	Word Address
	Station No. 6	6000 ~	8C00	Word Address
	Station No. 7	7000 ~	8E00	Word Address
	Link Relay Station No. 0	0LR00 ~	C800	Word Address
	Station No. 1	1LR00 ~	9200	Word Address
	Station No. 2	2LR00 ~	9400	Word Address
	Station No. 3	3LR00 ~	9600	Word Address
	Station No. 4	4LR00 ~	9800	Word Address
	Station No. 5	5LR00 ~	9A00	Word Address
	Station No. 6	6LR00 ~	9C00	Word Address
	Station No. 7	7LR00 ~	9E00	Word Address
	Latch Relay Station No. 0	0HR00 ~	C000	Word Address
	Station No. 1	1HR00 ~	A200	Word Address
	Station No. 2	2HR00 ~	A400	Word Address
	Station No. 3	3HR00 ~	A600	Word Address
	Station No. 4	4HR00 ~	A800	Word Address
	Station No. 5	5HR00 ~	AA00	Word Address
	Station No. 6	6HR00 ~	AC00	Word Address
	Station No. 7	7HR00 ~	AE00	Word Address
	Auxiliary Memory Relay Station No. 0	0AR00 ~	B000	Word Address
	Station No. 1	1AR00 ~	B200	Word Address
	Station No. 2	2AR00 ~	B400	Word Address
	Station No. 3	3AR00 ~	B600	Word Address
	Station No. 4	4AR00 ~	B800	Word Address
	Station No. 5	5AR00 ~	BA00	Word Address
	Station No. 6	6AR00 ~	BC00	Word Address
	Station No. 7	7AR00 ~	BE00	Word Address

	Device	Word Address	Device Code (HEX)	Address Code
Word Device	Timer Station No. 0	0TIM000 ~	6000	Word Address
	Station No. 1	1TIM000 ~	6200	Word Address
	Station No. 2	2TIM000 ~	6400	Word Address
	Station No. 3	3TIM000 ~	6600	Word Address
	Station No. 4	4TIM000 ~	6800	Word Address
	Station No. 5	5TIM000 ~	6A00	Word Address
	Station No. 6	6TIM000 ~	6C00	Word Address
	Station No. 7	7TIM000 ~	6E00	Word Address
	Counter Station No. 0	0CNT000 ~	7000	Word Address
	Station No. 1	1CNT000 ~	7200	Word Address
	Station No. 2	2CNT000 ~	7400	Word Address
	Station No. 3	3CNT000 ~	7600	Word Address
	Station No. 4	4CNT000 ~	7800	Word Address
	Station No. 5	5CNT000 ~	7A00	Word Address
	Station No. 6	6CNT000 ~	7C00	Word Address
	Station No. 7	7CNT000 ~	7E00	Word Address
	Data Memory Station No. 0	0DM0000 ~	0000	Word Address
	Station No. 1	1DM0000 ~	0200	Word Address
	Station No. 2	2DM0000 ~	0400	Word Address
	Station No. 3	3DM0000 ~	0600	Word Address
	Station No. 4	4DM0000 ~	0800	Word Address
	Station No. 5	5DM0000 ~	0A00	Word Address
	Station No. 6	6DM0000 ~	0C00	Word Address
	Station No. 7	7DM0000 ~	0E00	Word Address
	Extended Data Memory Station No. 0	0EM0000 ~	1000	Word Address
	Station No. 1	1EM0000 ~	1200	Word Address
	Station No. 2	2EM0000 ~	1400	Word Address
	Station No. 3	3EM0000 ~	1600	Word Address
	Station No. 4	4EM0000 ~	1800	Word Address
	Station No. 5	5EM0000 ~	1A00	Word Address
	Station No. 6	6EM0000 ~	1C00	Word Address
	Station No. 7	7EM0000 ~	1E00	Word Address
	LS Area	LS0000 ~	4000	Word Address

9 Address Conversion Table

Addresses can or cannot be converted depending on the address combination used. Address combinations which cannot be converted vary between PLC manufacturers. *Refer to the following Address Conversion Table to convert the addresses correctly.*

■ SYSMAC-C Series (CQM1H-CPU51/CQM1H-CPU61)

Device		After Conversion													
		Input	Output	Internal	Special	LR	HR	AR	TIM contact	CNT contact	TIM	CNT	DM	EM	LS
Before Conversion	I/O Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Internal Hold Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Special Hold Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Link Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Latch Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Auxiliary Memory Relay	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Timer (contact)	□	□	□	□	□	□	□	□	□			□	□	□
	Counter (contact)	□	□	□	□	□	□	□	□	□			□	□	□
	Timer	☆	☆	☆	☆	☆	☆	☆			☆	☆	☆	☆	☆
	Counter	☆	☆	☆	☆	☆	☆	☆			☆	☆	☆	☆	☆
	Data Memory	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	Extended Data Memory	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○
	LS Area	○	○	○	○	○	○	○	□	□	☆	☆	○	○	○

○: When the selected conversion mode is [Word], both word and bit addresses are converted. When the [Bit] is selected, only bit addresses are converted.

☆: *When the [Word] mode is selected, only word addresses are converted.*

□: *When the [Bit] mode is selected, only bit addresses are converted.*

Blank: *Cannot be converted.*

10 Error Codes

■ PLC-Specific Error Codes

Errors specific to PLCs appear at the lower left corner of the GP/GLC screen in the form of “PLC COM. ERROR (02:**:##).” In this form, ** denotes an PLC-specifi error code and ## denotes the PLC station No. generating the error.

<PLC-specific error codes>

Error Code	Meaning	Cause
01	Unable to run	This error is resulted when operations such as write operation is instructed by the GP while the PLC is in the RUN mode.
13	FCS Error	FSC is incorrect due to miscalculation or influence of noise.
14	Format Error	Specified device does not exist.
15	Numeric Data Error	Specified address is out of the range of existing addresses.
18	Frame Length Error	The first frame is inconsistent with the format.