Make Life Easy :

User Manual
for Communication

HMI

GP/LP Series
(Modbus Master)

Thank you for purchasing an Autonics product.
This user manual contains information about the product and its proper use,
and should be kept in a place where it will be easy to access.

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Preface

Thank you for purchasing Autonics product.
Please familiarize yourself with the information contained in the Safety Considerations section before using this product.
This user manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.
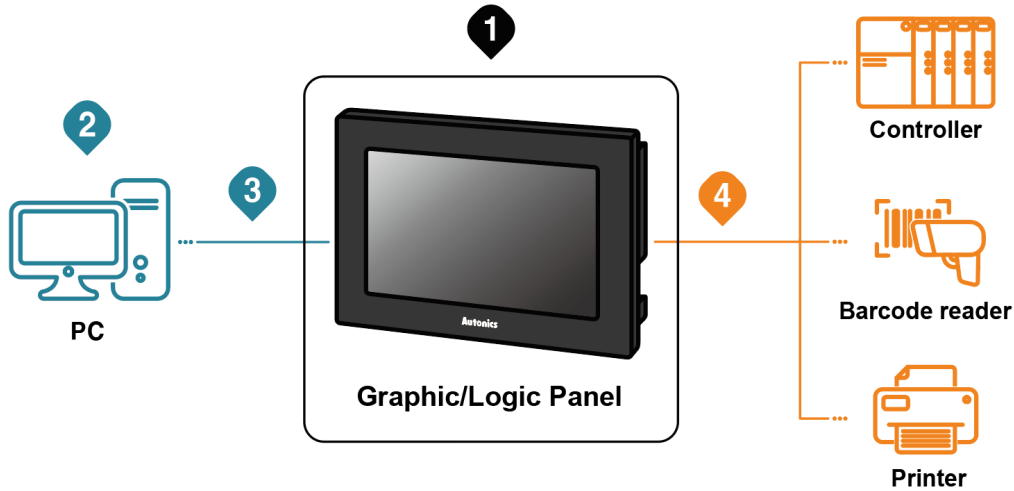
User Manual Guide

- Please familiarize yourself with the information in this manual before using the product.
- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- A user manual is not provided as part of the product package. Please visit our website (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through our website.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our website.
- Inner device of this user manual for communication is based on GP.
  If you use LP, refer to "LP user manual" for inner device of LP.

User Manual Symbols

Symbol	Description
Note	Supplementary information for a particular feature.
Warning	Failure to follow instructions can result in serious injury or death.
Caution	Failure to follow instructions can lead to a minor injury or product damage.
Ex.	An example of the concerned feature's use.
※1	Annotation mark.

Reference Manual for Each Configuration

① Graphic/Logic panel device specification, installation, maintenance, management, firmware update and system configuration

| Hardware Manual | A Series | GP-A Series User Manual, LP-A Series User Manual |
| | S Series | GP-S070 User Manual, GP-S044/057 User Manual, LP-S070 User Manual, LP-S044 User Manual |

② Project drawing, programming

| Software Manual | Drawing | atDesigner User Manual, GP Editor User Manual |
| | Programming | atLogic User Manual, atLogic Programming Manual |

③ Project Upload/Download

| Hardware Manual | A Series | GP-A Series User Manual, LP-A Series User Manual |
| | S Series | GP-S070 User Manual, GP-S044/057 User Manual, LP-S070 User Manual, LP-S044 User Manual |

④ Connected device setting, communication setting

Software Manual	Drawing	atDesigner User Manual, GP Editor User Manual
	Programming	atLogic User Manual, atLogic Programming Manual
Hardware Manual	A Series	GP-A Series User Manual, LP-A Series User Manual
	S Series	GP-S070 User Manual, GP-S044/057 User Manual, LP-S070 User Manual, LP-S044 User Manual

④ Check connectable device, connection cable model name and protocol

| Communication Manual | GP/LP Communication Manual |

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1 System Organization

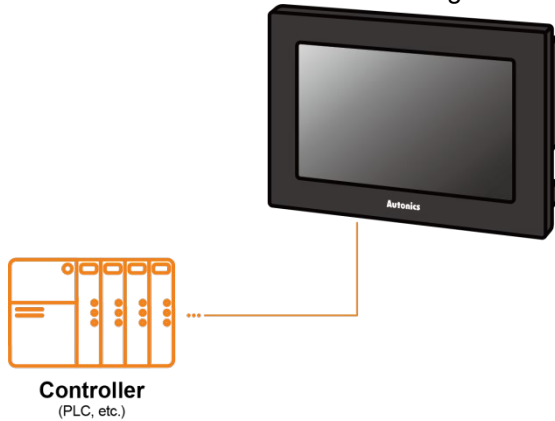GP/LP can be connected with various controller, barcode reader and printer via RS232C, RS422, Ethernet, CAN amd USB HOST port.

Controller
(PLC, etc.)

Barcode reader

Printer

1.1   1:1 Communication

A GP/LP can communicate with a single controller A.

Controller
(PLC, etc.)

(1) Communication configuration by GP/LP model

The communication configuration by GP/LP model is listed below.
For detailed information about the communication configuration, please refer to 'GP/LP User Manual'.

- GP/LP-S Series

Series	Chanel	Connecting port	Description
GP/LP-S044, GP-S057	CH1	RS232C/RS422	Direct communication available
	CH2	RS422/RS485	Link device[1] communication available
GP/LP-S070	CH1	RS232C/RS422	Direct communication available Link device[1] communication available
	CH2	RS422/RS485	Direct communication available Link device[1] communication available

- GP/LP-A Series

Series	Connecting port	Description
GP/LP-A070	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port	Direct communication available Link device[1] communication available
GP/LP-A104	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port, CAN[2] port	Direct communication available Link device[1] communication available

※1: Please refer to 'GP Editor User Manual' for Link device instruction.

※2: Only Autonics' ARD Series can be connected to CAN port.

1.2   1:N Communication of Same Controllers

1:N communication stands for one LP communicating with multiple of controllers.
The GP/LP observes the connected controllers or relays data between controllers.
A GP/LP can communicate with the multiple of controller As.
The controller has to be able to set address of each device, and the address should not be duplicated.

Controller A-1
(PLC, etc.)

Controller A-2
(PLC, etc.)

Controller A-1
(PLC, etc.)

Controller A-2
(PLC, etc.)

Controller A-n
(PLC, etc.)

(1) Communication configuration by GP/LP model

The communication configuration by GP/LP model is listed below.
For detailed information about the communication configuration, please refer to 'GP/LP User Manual'.

- GP/LP-S Series

Series	Chanel	Connecting port	Description
GP/LP-S044, GP-S057	CH1	-	Multiple connection unavailable
	CH2	RS422	Link device[1] communication available
GP/LP-S070	CH1 or CH2	RS422	Direct communication available Link device[1] communication available

- GP/LP-A Series

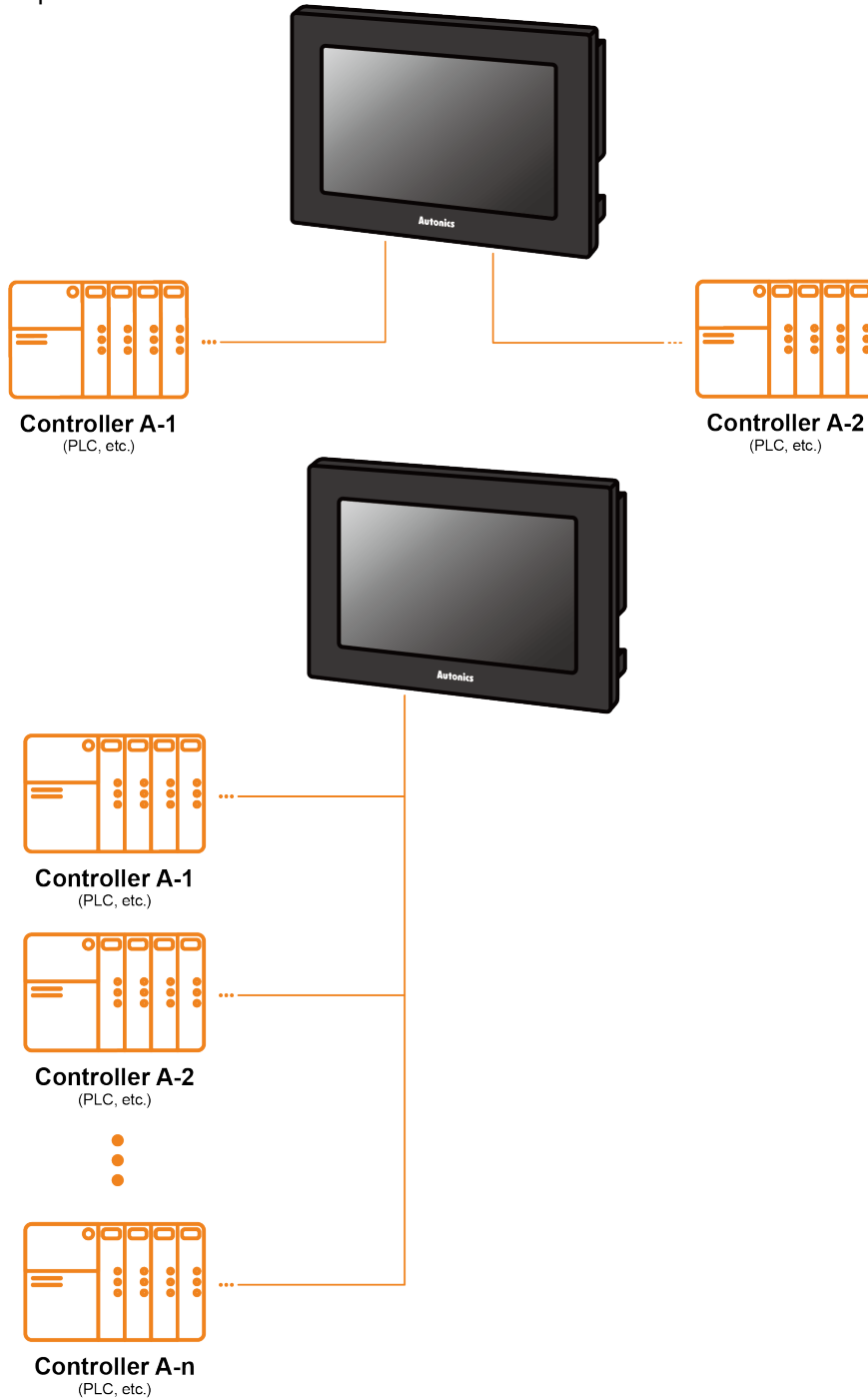| Series	Connecting port	Description
GP/LP-A070	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port	Direct communication available Link device[1] communication available
GP/LP-A104	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port, CAN[2]port	Direct communication available Link device[1] communication available

※1: Please refer to 'GP Editor User Manual' for Link device instruction.

※2: Only Autonics' ARD Series can be connected to CAN port.

(2) RS422 communication connection diagram

1.3 1:N Communication of Different Controllers

1:N communication stands for one GP/LP communicating with multiple of controllers.
The GP/LP observes the connected controllers or relays data between controllers.
The GP/LP can communicate with the multiple of different controllers.

1.3.1 1:1:1 Communication

A GP/LP can communicate with a signle controller A and a signle controller B.
The GP/LP relays communications between the controller A and B.

Controller A
(PLC, etc.)

Contoller B
(PLC, etc.)

(1) Communication configuration by GP/LP model

The communication configuration by GP/LP model is listed below.
For detailed information about the communication configuration, please refer to 'GP/LP User Manual'.

- GP/LP-S Series

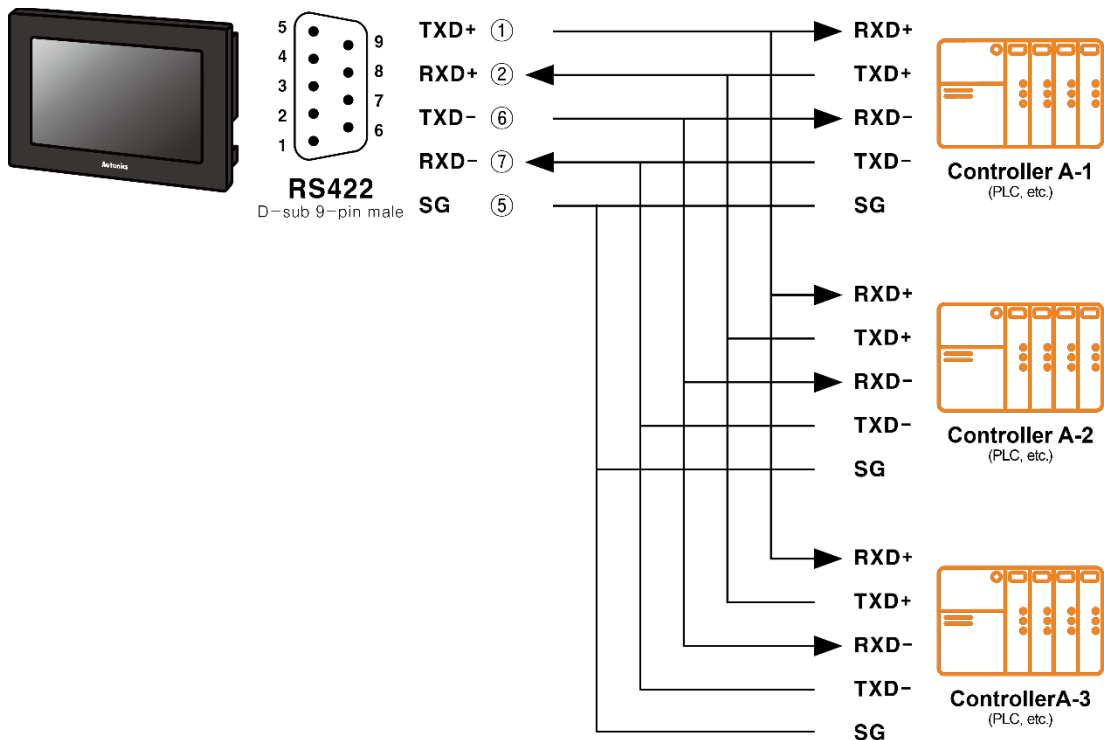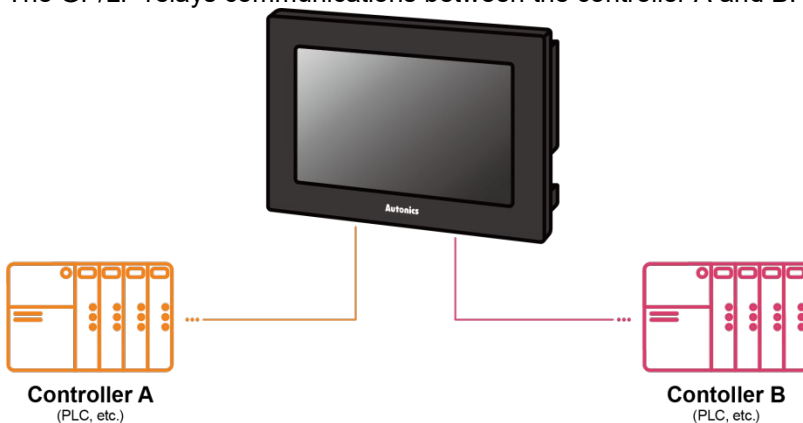| Series	Chanel	Connecting port	Description
GP/LP-S044, GP-S057	CH1	RS232C/RS422	Direct communication available
	CH2	RS422/RS485	Link device[1] communication available
GP/LP-S070	CH1 or CH2	RS422/RS485	Direct communication available Link device[1] communication available

- GP/LP-A Series

Series	Connecting port	Description
GP/LP-A070	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port	Direct communication available Link device[1] communication available
GP/LP-A104	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port, CAN[2] port	Direct communication available Link device[1] communication available

※1: Please refer to 'GP Editor User Manual' for Link device instruction.

※2: Only Autonics' ARD Series can be connected to CAN port.

1.3.2   1:1:N Communication

A GP/LP can communicate with a single controller A and the multiple of controller Bs..
The GP/LP relays communication between the controller A and B.
The controller has to be able to set address of each device, and the address should not be duplicated.

Controller A
(PLC, etc.)

Controller B-1
(PLC, etc.)

Controller B-2
(PLC, etc.)

Controller B-n
(PLC, etc.)

(1) Communication configuration by GP/LP model

The communication configuration by GP/LP model is listed below.
For detailed information about the communication configuration, please refer to 'GP/LP User Manual'.

- GP/LP-S Series

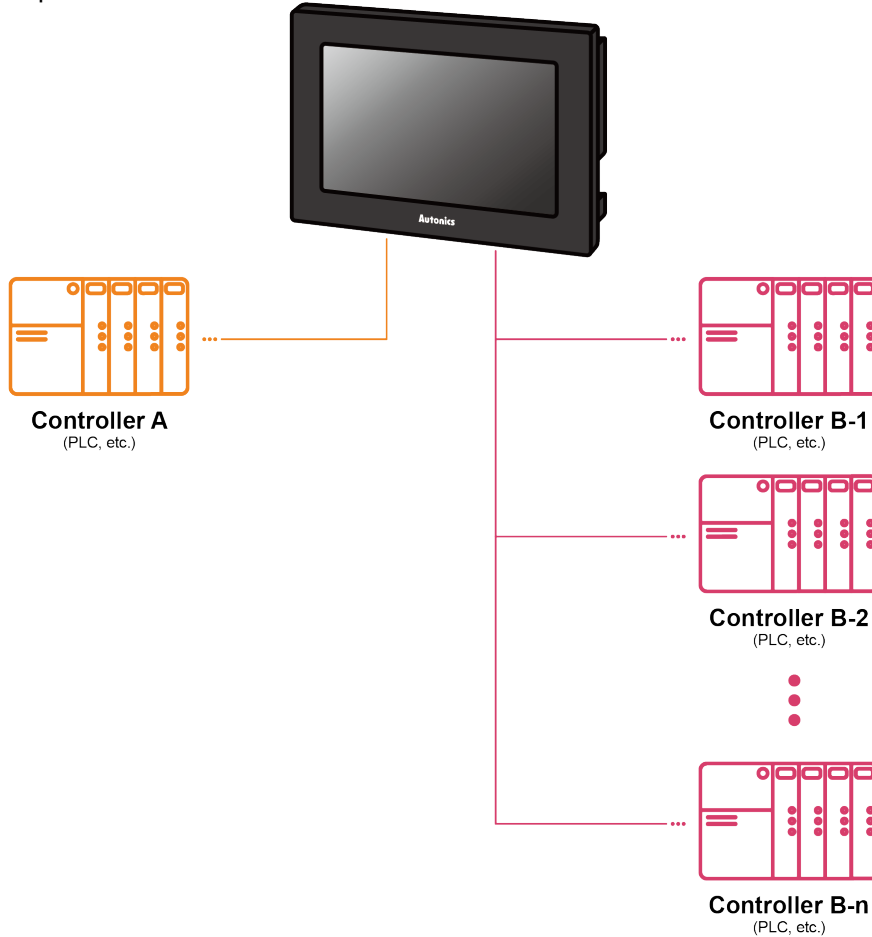| Series	Chanel	Connecting port	Description
GP/LP-S044, GP-S057	CH1	RS232C	Single direct communication available
	CH2	RS422/RS485	Link device[1] multiple communication available
GP/LP-S070	CH1 or CH2	RS232C	Single direct communication available. Link device[1] single communication available
		RS422/RS485	Multiple direct communication available. Link device[1] multiple communication available

- GP/LP-A Series

Series	Connecting port	Description
GP/LP-A070	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port	Direct communication available Link device※1 communication available
GP/LP-A104	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port, CAN※2 port	Direct communication available Link device※1 communication available

※1: Please refer to 'GP Editor User Manual' for Link device instruction.

※2: Only Autonics' ARD Series can be connected to CAN port.

(2) RS422 communication connection diagram

1.3.3 N:1:N Communication

A GP/LP can communicate with the multiple of controller As and Bs.
The LP relays comnmunication between the controller A and B.
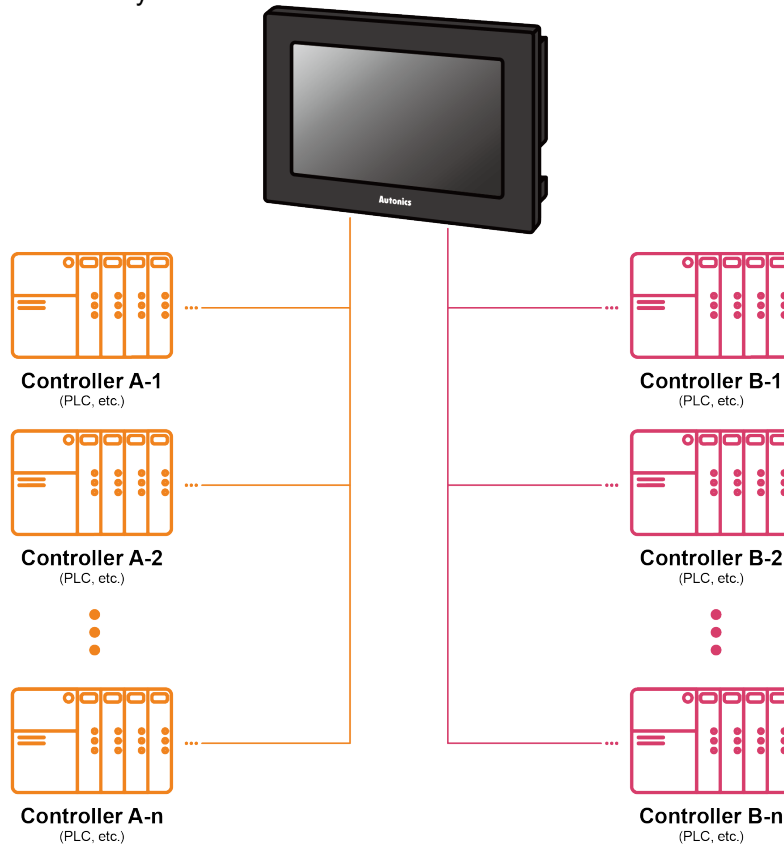
(1) Communication configuration by GP/LP model

The communication configuration by GP/LP model is listed below.
For detailed information about the communication configuration, please refer to 'GP/LP User Manual'.

- GP/LP-S Series

Series	Chanel	Connecting port	Description
GP/LP-S070	CH1 or CH2	RS232C/RS422	Multiple direct communication available Link device$^{※1}$ multiple communication available

- GP/LP-A Series

Series	Connecting port	Description
GP/LP-A070	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port	Direct communication available Link device$^{※1}$ communication available
GP/LP-A104	RS422 or RS232C-A port, RS232C or RS232C-B port, Ethernet port, CAN$^{※2}$ port	Direct communication available Link device$^{※1}$ communication available

※1: Please refer to 'GP Editor User Manual' for Link device instruction.

※2: Only Autonics' ARD Series can be connected to CAN port.

1.4   Barcode Reader, Printer Communication

A GP/LP can communicate with the barcode reader and printer.
Connect the barcode reader to utilize the barcode data.
Connect the printer to print the alarm log or the screen.

- GP/LP-S Series: printing alarm log
- GP/LP-A Series: print alarm log and screen
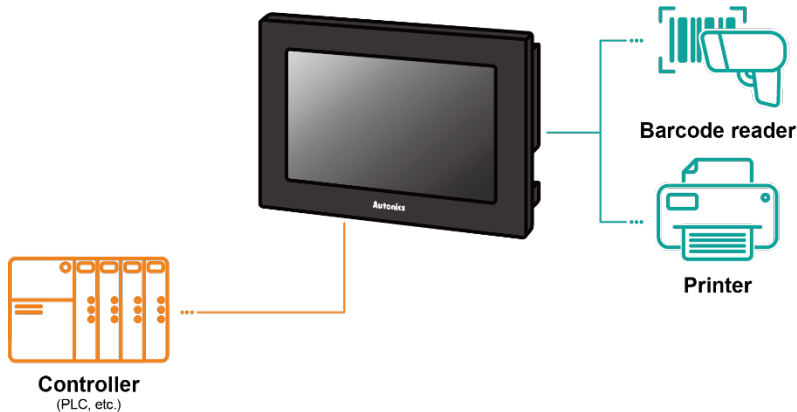
1.4.1   Communication Configuration

1.4.1.1   Barcode Reader

(1) Connected communication port

- GP/LP-S Series

Series	Connected device	Communication port		
		RS232C※	**RS422**※	**USB Host**
GP/LP-S044, GP-S057	Controller	○	○	-
	Barcode reader	○	○	-
GP/LP-S070	Controller	○	○	-
	Barcode reader	○	○	-

- GP/LP-A Series

Series	Connected device	Communication port		
		RS232C※	**RS422**※	**USB Host**
GP/LP-A070 GP/LP-A104	Controller	○	○	-
	Barcode reader	○	○	○

※RS232C/422 converter allows to opposite communication.

(2) Configuration method

1st Set the items related to the use of bar codes in the project in the drawing program, GP Editor/atDesigner.

Series	Description	Drawing program menu
GP/LP-S	Device setting for data storage	Common > Barcode
	System device setting for action control	Common > System Information > System Signal 1
GP/LP-A	Device setting for connection port/data storage	Project > Project Property > Special Device Setting

※For detailed information about system device setting, please refer to 'GP Editor/atDesigner User Manual'.

2nd Download the set project in the drawing program , GP Editor/atDesigner, to GP/LP device.

3rd Make communication settings for each port in the GP/LP system menu.

※For detailed information about communication setting, please refer to 'GP/LP User Manual'.

(3) Communication specification

Item	Specification
Baud rate	300, 600, 1200, 3200, 4800, 9600, 19200, 38400, 57600, 115200bps
Data length	7, 8 bit
Parity	None, Odd, Even
Stop bit	1, 2 bit
Flow control	DSR/DTR, XON/XOFF

1.4.1.2 Printer

(1) Connected communication port

- GP/LP-S Series

Series	Connected device	Communication port		
		RS232C※	RS422※	USB Host
GP/LP-S044, GP-S057	Controller	○	○	-
	Printer	○	○	-
GP/LP-S070	Controller	○	○	-
	Printer	○	○	-

- GP/LP-A Series

Series	Connected device	Communication port		
		RS232C※	RS422※	USB Host
GP/LP-A070, GP/LP-A104	Controller	○	○	-
	Printer	-	-	○

(2) Configuration method

1st Set screen printing/alarm log printing device and touch key/switch in drawing program, GP Editor/atDesigner.

Series	Description	Drawing program menu
GP/LP-S	System device setting for action control	Common > System Information > System Signal
GP/LP-A	Device setting for screen print control	Project window > Right-click menu of the screen to print > Screen Printer Setting
	Device setting for alarm log print	Project window > Alarm History > Use Print

2nd Download the set project in the drawing program , GP Editor/atDesigner, to GP/LP device.

3rd Make communication settings for each port in the GP/LP system menu.

※ For detailed information about communication setting, please refer to 'GP/LP User Manual'.

(3) Communication specification

Item	Specification
Baud rate	300, 600, 1200, 3200, 4800, 9600, 19200, 38400, 57600 bps
Data length	7, 8 bit
Parity	None, Odd, Even
Stop bit	1, 2 bit
Flow control	DSR/DTR, XON/XOFF

2 Communication Configuration by Devices

2.1 Modbus Master

GP/LP supports the Modbus Master function, and is able to connect with other Modbus Slave.

2.1.1 Support Protocol

Type	Specification
Modbus Master01	Support Single Write, Multi Write Support Function: 1, 2, 3, 4, 5, 6, 15, 16
Modbus Master02	Support only Single Write Support Function: 1, 2, 3, 4, 5, 6
Modbus Master03	Support only Multi Write Support Function: 1, 2, 3, 4, 15, 16

2.1.2 Connectable GP/LP Model

Connected devices	Connection method	GP/LP Model								
		GP-2480 (under V2.70)	GP-2480 (over V3.00)	GP-S057	GP/LP-S044	GP/LP-S070	GP-S057 (V2)	GP/LP-S044 (V2)	GP/LP-S070 (V2)	GP/LP-A Series
MODBUS MASTER	Modbus (Master)[1]	×	×	○	○	○	○	○	○	○

2.1.3 System Organization

GP/LP Series

Modbus available device
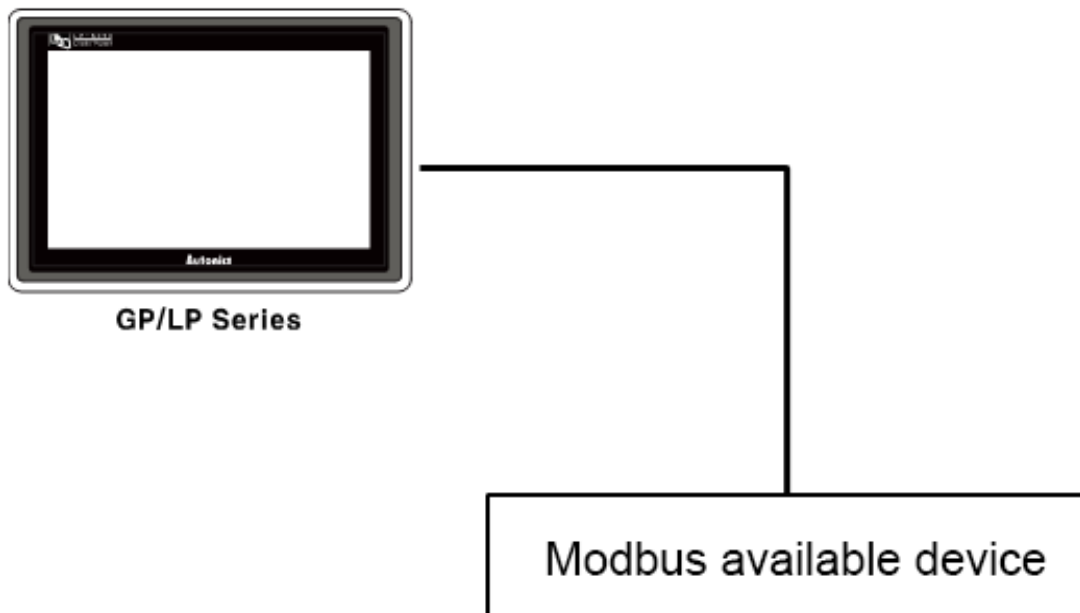
Modbus Master protocol is available to communicate with all product which supports Modbus. Communication configuration of Modbus Master protocol should be synchronized with to be connected product's communication configuration.

2.1.4　Available Device

Available devcie of Modbus Master and displayable parameter are as below.

Type	Device	Mark	Range	
			Start	End
Bit	Bit device area	0	000001	065536
	Bit device area	1	100001	165536
Word	Word device area	3	300001	365536
	Word device area	4	400001	465536

📖 **Ex.**

Device address is for Modbus Master protocol is 1 based protocol address (Start address: 1).
The below example is for TM Series of Autonics product.
Following table is part of memory map(using 0 based protocol address) for TM Series.

No (Address)				Parameter	Description
TM2		TM4			
31001	(03E8)	31001	(03E8)	CH1 Present Value	Present measured value
31002	(03E9)	31002	(03E9)	CH1 Dot	Decimal point position of sensor
31003	(03EA)	31003	(03EA)	CH1 Unit	Sensor temperature unit
31004	(03EB)	31004	(03EB)	CH1 Set Value	Present controlled temperature setting value
31005	(03EC)	31005	(03EC)	CH1 Heating_MV	Heating control value

Dot line area is for device address, solid line area is for protocol address.
To read CH1 PresentValue of TM2 from TM2_Mod protocol, it uses device address (31001). For Modbus Master protocol, it uses protocol address (03E8) plus 1. Device address of Modbus Master protocol is displayed with decimal. Therefore, protocol address value as 0x03E9 which is 0x03E8 plus 1 of CH1 PresentValue is converted decimal value as 1001 and it is used as device address. (Converting description is as below table.)

Use device address			Convert address (Hexadecimal→Decimal)						Use protocol address	
Protocol	TM2_Mod	->	Protocol address [Hexadecimal]+1		->	Protocol address [Decimal]		->	Protocol	Modbus Master
Device	TM		Read word			Read word			Device	3
Address	31001		0x03E8+1			1001			Address	01001

✏️ **Note**

Used device address on Modbus Master protocol uses the value of protocol address (in case of 0 base) plus 1. Device address of Modbus Master protocol uses decimal value.

2.1.5 Monitorable Device in GP/LP

The device range differs depending on the PLC model and the number of I/O contacts.
The available PLC model in GP/LP are as follows.
For detailed information about each device, please refer to the manuals provided by each manufacturer and

For detailed information about GP/LP internal device, please refer to 'atLogic Programing Manual'.

Type	Mark	Device
Bit	1	Read-only register
	0	Read, write register
Word	3	Read-only register
	4	Read, write register

⚠ **Caution**

Device monitoring from GP/LP displays from input start data to 16 data at once. In case of Modbus Master protocol, if the number of devices from connected product is smaller than the number of displayed devices in monitoring, you cannot check the device status by device monitoring. In this case, you should draw data on the user screen and check the data status.

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