



# General MODBUS TCP Master Driver

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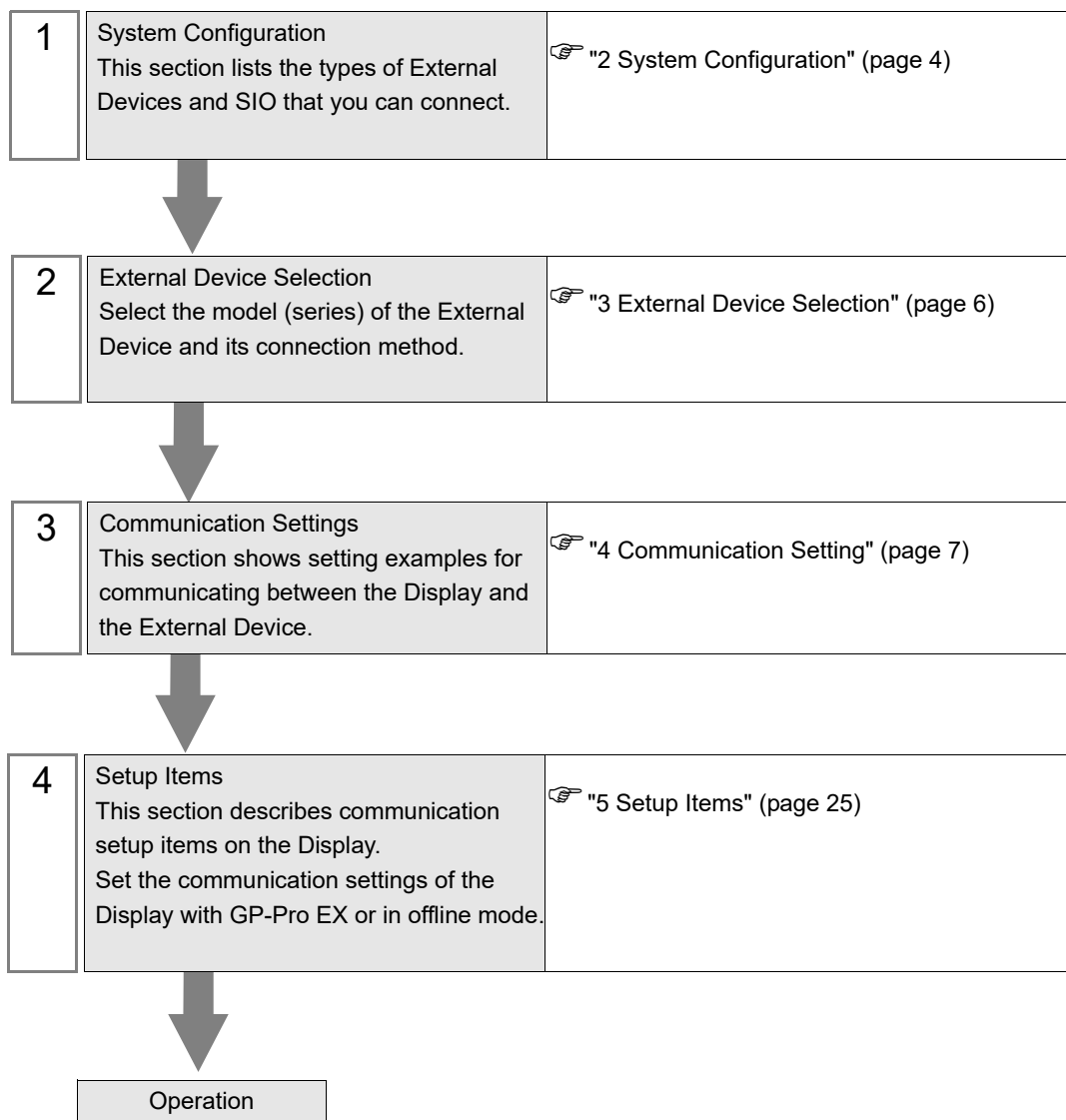
**IMPORTANT**

- The below Displays are no longer sold nor maintained by Pro-face. To reduce unplanned downtime due to aged hardware and to maximize your cyber security environment we recommend replacing your devices with a new, successor model. For details, please visit our homepage for "Recommended Substitution".  
Discontinued from GP-Pro EX 5.00 onwards: GP3000 Series, LT3000 Series, ST3000 Series, GP-4100 Series (Monochrome model), PL Series, PS3000/4000 Series, PE4000 Series.
- For details on the Displays supported by the driver, please check the "Connectable Devices" on our website.  
<http://www.pro-face.com/trans/en/manual/1064.html>

**Introduction**

This manual describes how to connect the Display and the External Device (target PLC).

In this manual, the connection procedure will be described in the sections identified below.



# 1 General MODBUS TCP Master Driver

The general MODBUS TCP Master Driver is used to connect the Display to a MODBUS-compatible External Device for general purpose.

The function code and boundary required for communication can be changed according to the External Device.

## 2 System Configuration

The system configuration in the case when the External Device and the Display are connected is shown.

Series	CPU	Link I/F	SIO Type	Setting Example
MODBUS Slave Device <sup>*1</sup>			Ethernet (TCP)	Setting Example 1 (page 7)

<sup>\*1</sup> To connect with External Device using the Modbus protocol, configure the [Device Setting] to match the specifications on the External Device.

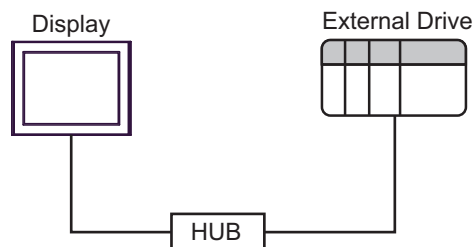
☞ Setup Items (page 25)

- External Device used to confirm connection

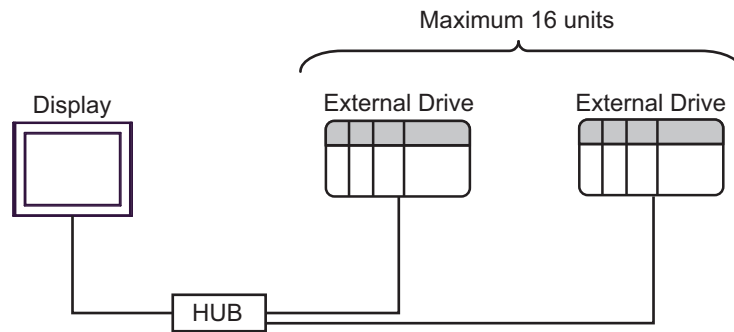
Series	CPU	Link I/F	SIO Type	Setting Example
Hitachi Industrial Equipment Systems Co., Ltd. MICRO-EHV	MVH-A64 MVH-D64 MVH-A40 MVH-D40	Ethernet port on basic unit	Ethernet (TCP)	Setting Example 2 (page 9)
			Ethernet (TCP) (Modbus Gateway)	Setting Example 3 (page 11)
silex technology, Inc. FBR-100AN	FBR-100AN	Ethernet port 1 on CPU	Ethernet (TCP)	Setting Example 4 (page 13)
		Ethernet port 2 on CPU	Ethernet (TCP)	Setting Example 4 (page 13)
IAI CORPORATION. RCON	RCON-GW/GWG-□-ET	Ethernet port on CPU	Ethernet (TCP)	Setting Example 5 (page 15)
	RCON-PC-□ RCON-PCF-□ RCON-AC-□ RCON-DC-□ RCON-SC-□	Ethernet port on RCON-GW/GWG-□-ET	Ethernet (TCP)	Setting Example 6 (page 17)
FANUC CORPORATION CNC	FANUC Series 0i-MODEL F Plus	CD38R port on Fast Ethernet board of slot 1	Ethernet (TCP)	Setting Example 7 (page 19)
		Embedded Ethernet port (CD38A)	Ethernet (TCP)	Setting Example 8 (page 22)

### ■ Connection Configuration

#### ◆ 1:1 Connection

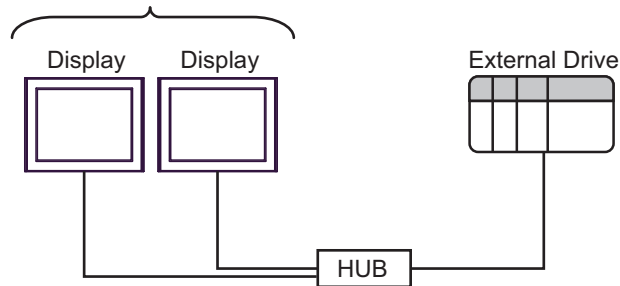


## ◆ 1: n Connection



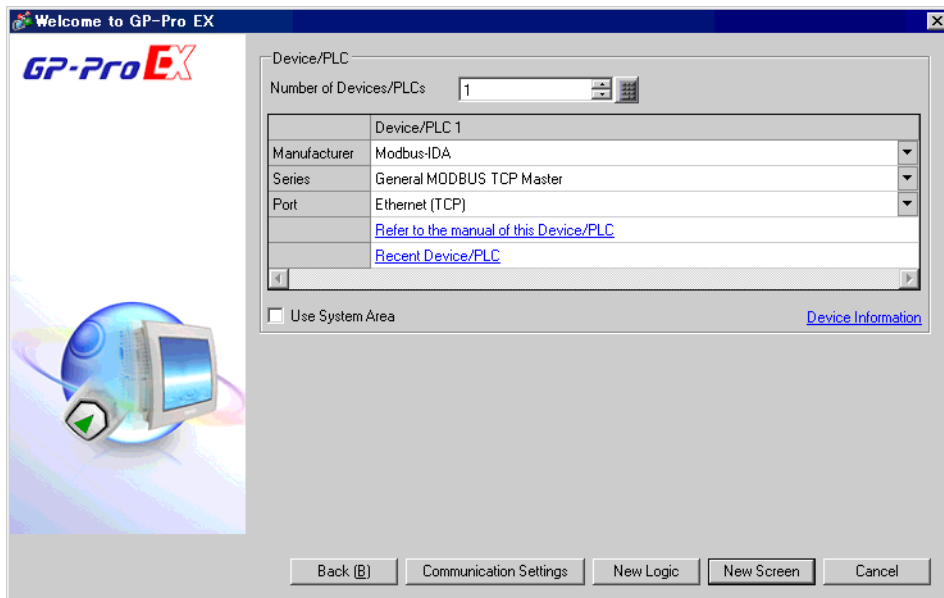
## ◆ n: 1 Connection

The number of connectable Displays depends on the External Device.



### 3 External Device Selection

Select the External Device to be connected to the Display.



Setup Items	Setup Description
Number of Devices/PLCs	Enter an integer from 1 to 4 to define the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to connect. Select "Modbus-IDA".
Series	Select the External Device model (series) and the connection method. Select "General MODBUS TCP Master". In System configuration, make sure the External Device you are connecting is supported by "General MODBUS TCP Master". ☞ "2 System Configuration" (page 4)
Port	Select the Display port to connect to the External Device.
Use System Area	Check this option to synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the External Device's ladder program to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" This feature can also be set in GP-Pro EX or in the Display's offline mode. Cf. GP-Pro EX Reference Manual "System Settings [Display Unit] - [System Area] Settings Guide" Cf. Maintenance/Troubleshooting Guide "Main Unit - System Area Settings"

## 4 Communication Setting

Examples of communication settings of the Display and the External Device, recommended by Pro-face, are shown.

### 4.1 Setting Example 1

#### ■ GP-Pro EX Settings

##### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

Device/PLC 1

Summary

Manufacturer: Modbus-IDA Series: General MODBUS TCP Master Port: Ethernet (TCP) [Change Device/PLC](#)

Text Data Mode: 1 [Change](#)

Communication Settings

Port No.: 1024 ☒ Auto

Timeout: 3 (sec)

Retry: 0

Wait To Send: 0 (ms) [Default](#)


Device-Specific Settings

Allowable Number of Devices/PLCs: 16 [Add Device](#)

No.	Device Name	Settings
1	PLC1	IP Address=192.168.0.001,Port No.=502,Unit ID=255

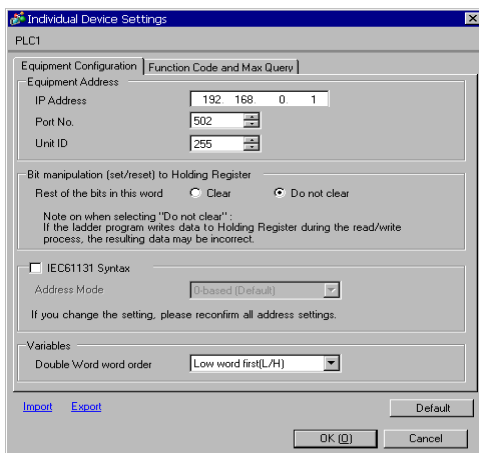
[Add Indirect Device](#)

### ◆ Device Setting

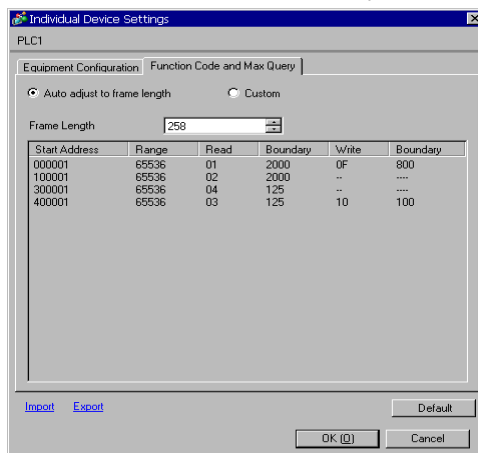
To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings]  .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab



[Function Code and Max Query] Tab



Start Address	Range	Read	Boundary	Write	Boundary
000001	65536	01	2000	0F	800
100001	65536	02	2000	..	....
300001	65536	04	125	..	....
400001	65536	03	125	10	100

### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings

External Device settings vary depending on the device. Refer to your External Device manual for details.

### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.




## 4.2 Setting Example 2

### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab

[Function Code and Max Query] Tab

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings (Ethernet port on basic unit)

Use the programming software (Control Editor) for communication settings. Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. Start the programming software and create a project. The project appears in offline mode.
2. In the tree view, from [CPU Parameters] double-click [CPU settings] and [IP address]. The [CPU Communication Setting (IP Address)] dialog box appears.
3. Set the following items and click [Set].

Setup Items	Setting
IP Address	192.168.0.1
Subnet mask	255.255.255.0
Default gateway	0.0.0.0
Link Speed / Duplex	Auto Negotiation

4. In the tree view, from [CPU Parameters] double-click [CPU settings] and [Modbus-TCP/RTU]. The [CPU communication settings (Modbus-TCP/RTU)] dialog box appears.
5. Set the following items and click [Set].

Setup Items	Setting	Remarks
Port No.	502	
Enable gateway	OFF	
Ethernet timeout	3000	Set to 0 when not using timeout.

6. Enter online mode, and transfer the settings to the External Device.
7. Restart the External Device.

### ◆ Notes

- Check with your network administrator about the IP address you want to use. Do not duplicate IP addresses on the same network.


## 4.3 Setting Example 3

### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab

[Function Code and Max Query] Tab

Start Address	Range	Read	Boundary	Write	Boundary
000001	65536	01	2000	0F	800
100001	65536	02	2000	--	----
300001	65536	04	125	--	----
400001	65536	03	125	10	100

Buttons for 'Import', 'Export', 'Default', 'OK', and 'Cancel' are at the bottom.

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings (Ethernet port on basic unit)

Use the programming software (Control Editor) for communication settings. Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. Start the programming software and create a project. The project appears in the offline mode.
2. In the tree view, from [CPU Parameters] double-click [CPU settings] and [IP address]. The [CPU Communication Setting (IP Address)] dialog box appears.
3. Set the following items and click [Set].

Setup Items	Setting
IP Address	192.168.0.1
Subnet mask	255.255.255.0
Default gateway	0.0.0.0
Link Speed / Duplex	Auto Negotiation

4. In the tree view, from [CPU Parameters] double-click [CPU settings] and [Modbus-TCP/RTU]. The [CPU communication settings (Modbus-TCP/RTU)] dialog box appears.
5. Set the following items and click [Set].

- Modbus-TCP Settings

Setup Items	Setting	Remarks
Port No.	502	
Enable gateway	OFF	
Ethernet timeout	3000	Set to 0 when not using timeout.

- Modbus-RTU Settings

Setup Items	Setting	Remarks
Serial com. Baudrate	115.2kbps	Match the settings of Modbus Slave devices.
Serial com. Format	8-E-1	Data length: 8-bit, Even parity, Stop bit: 1-bit Match the settings of Modbus Slave devices.
Serial com. Timeout	100	Set to 0 when not using timeout.

6. Enter online mode, and transfer the settings to the External Device.
7. Restart the External Device.

### ◆ Notes

- Check with your network administrator about the IP address you want to use. Do not duplicate IP addresses on the same network.


## 4.4 Setting Example 4

### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab

[Function Code and Max Query] Tab

Start Address	Range	Read	Boundary	Write	Boundary
300001	88	04	125	--	---

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings

Use DIP switches and a web browser for defining communication settings. Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. Turn off all DIP switches on the External Device.
2. Open a web browser.
3. Enter the IP address in the address bar (default IP address on LAN Port1: 192.168.1.1).
4. Create a new password and click [Submit].
5. Enter the password and click [Login].
6. Click [General] from [Network Conf.].
7. Set the following and click [Submit].

Setup Items		Setting	Remarks
LAN Port1	DHCP Client	Enable	Set the DHCP client to be enabled or disabled.
	IP Address	192.168.1.10	Enter the IP address.
	Sub Net Mask	255.255.255.0	Enter the subnet mask.

8. Click [Modbus TCP] from [Network Conf.].
9. Set the following and click [Submit].

Setup Items	Setting	Remarks
Modbus TCP Port	502	Use an integer from 0 to 32767 to specify the Modbus TCP port number. This is the same port number as the Display.

### ◆ Notes

- Check with your network administrator about the IP address you want to use. Do not duplicate IP addresses on the same network.

#### NOTE

- When using Ethernet port 2, replace LAN Port1 in procedure 7 with LAN Port2.

## 4.5 Setting Example 5

### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

**Device/PLC 1**

**Summary**

Manufacturer:  Series:  Port:

Text Data Mode:  [Change](#)

**Communication Settings**

Port No.:  ☒ Auto

Timeout:  (sec)

Retry:

Wait To Send:  (ms) [Default](#)

**Device-Specific Settings**

Allowable Number of Devices/PLCs:  [Add Device](#)

No. Device Name Settings

No.	Device Name	Settings
1	PLC1	IP Address=192.168.250.020, Port No.=502, Unit ID=255

[Add Indirect Device](#)

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab

**Individual Device Settings**

PLC1

**Equipment Configuration** **Function Code and Max Query**

Equipment Address

IP Address:

Port No.:

Unit ID:

Bit manipulation (set/reset) to Holding Register

Rest of the bits in this word ☐ Clear ☒ Do not clear

Note on when selecting "Do not clear":  
If the ladder program writes data to Holding Register during the read/write process, the resulting data may be incorrect.

☐ IEC61131 Syntax

Address Mode:

If you change the setting, please reconfirm all address settings.

Variables

Double Word word order:

[Import](#) [Export](#) [Default](#) [OK \(O\)](#) [Cancel](#)

[Function Code and Max Query] Tab

**Individual Device Settings**

PLC1

**Equipment Configuration** **Function Code and Max Query**

☐ Auto adjust to frame length ☒ Custom

[Add](#) [Configuration](#) [Delete](#)

Start Address	Range	Read	Boundary	Write	Boundary
000001	65536	01	2000	0F	800
100001	65536	02	2000	--	---
300001	65536	04	125	--	---
400001	65536	03	125	10	100

[Import](#) [Export](#) [Default](#) [OK \(O\)](#) [Cancel](#)

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings

Use the MODE selector switch on the RCON-GW and the Parameter Configuration Tool in the IAI GateWay Unit Software for defining communication settings. Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. On the RCON-GW, connect to the USB port.
2. Set the RCON-GW's MODE selector switch to "MANU".
3. Start the Parameter Configuration Tool.
4. From SelectGwType, select "RCON".
5. Click [Port Config] to set the COM port to use for communication.
6. Click [OK].
7. Click [Read].
8. Click [Ethernet connection setting] from [Setting] menu.
9. Set the IP address of the CPU and click [OK].
10. Click [Write].

### ◆ Notes

- Check with your network administrator about the IP address you want to use. Do not duplicate IP addresses on the same network.



## 4.6 Setting Example 6

### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

Device/PLC 1

Summary

Manufacturer: Modbus-IDA Series: General MODBUS TCP Master Port: Ethernet (TCP)

Text Data Mode: 1

Communication Settings

Port No.: 1024 (Auto)

Timeout: 6 (sec)

Retry: 0

Wait To Send: 0 (ms)

Device-Specific Settings

Allowable Number of Devices/PLCs: 16

No. Device Name Settings

No.	Device Name	Settings
1	PLC1	IP Address=192.168.250.020, Port No.=502, Unit ID=1.

#### ◆ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] .

To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.

[Equipment Configuration] Tab

Individual Device Settings

PLC1

Equipment Configuration Function Code and Max Query

Equipment Address

IP Address: 192 168 250 20

Port No.: 502

Unit ID: 1

Bit manipulation (set/reset) to Holding Register

Rest of the bits in this word ☐ Clear ☒ Do not clear

Note on when selecting "Do not clear": If the ladder program writes data to Holding Register during the read/write process, the resulting data may be incorrect.

☐ IEC61131 Syntax

Address Mode: 0-based (Default)

If you change the setting, please reconfirm all address settings.

Variables

Double Word word order: Low word first (L/H)

Import Export Default OK (O) Cancel

[Function Code and Max Query] Tab

Individual Device Settings

PLC1

Equipment Configuration Function Code and Max Query

☐ Auto adjust to frame length ☒ Custom

Add Configuration Delete

Start Address	Range	Read	Boundary	Write	Boundary
000001	65536	01	2000	0F	800
100001	65536	02	2000	--	---
300001	65536	04	125	--	---
400001	65536	03	125	10	100

Import Export Default OK (O) Cancel

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.
- In [Individual Device Settings], set the IP address of the External Device.
- Set the Display's IP address in offline mode.

## ■ External Device Settings

Use the MODE selector switch on the RCON-GW and the Parameter Configuration Tool in the IAI GateWay Unit Software for defining communication settings. Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. On the RCON-GW, connect to the USB port.
2. Set the RCON-GW's MODE selector switch to "MANU".
3. Start the Parameter Configuration Tool.
4. From SelectGwType, select "RCON".
5. Click [Port Config] to set the COM port to use for communication.
6. Click [OK].
7. Click [Read].
8. Click [Ethernet connection setting] from [Setting] menu.
9. Set the IP address of the CPU and click [OK].
10. Click [Detail setting].
11. From the Axis No.assgnmt / unit config, click [Manual].  
To change the axis number assignment and edit the driver unit, click [Change].
12. Set the axis number assignment and click [OK].
13. Click [Write].

### ◆ Notes

- Check with your network administrator about the IP address you want to use. Do not duplicate IP addresses on the same network.



## ■ External Device Settings

Set the communication settings for the External Device on the CNC screen.

Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. Turn on the power of CNC.
2. Press the function key [SYSTEM] to display the parameter setting screen.
3. Enter “9”, “7”, and “0” using the numeric keys.
4. Press soft key [No. SEARCH].
5. Enter the following values for each parameter and press the [INPUT] key.

Parameter No.	Setting	Remarks
970	3	Uses the Modbus/TCP server.
971	-1	Does not use the FL-net function.
972	-1	Does not use the FL-net PORT2 function.
973	-1	Does not use the PROFINET IO device function.
974	-1	Does not use the PROFINET IO controller function.
975	-1	Does not use the EtherNet/IP function.
976	-1	Does not use the EtherNet/IP function.

6. Enter “1”, “4”, “8”, “8”, and “2” using the numeric keys.
7. Press the soft key [No. SEARCH].
8. Set the bit 1 to “0”.
9. Restart the CNC. If the alarm (PW0050) appears, restart the CNC again.
10. After restarting, press the function key [SYSTEM].
11. Press the [<] or [>] button on the screen until the soft key [ETHERNET] appears.
12. Press the soft key [ETHERNET].
13. Enter the following values for each item and press the [INPUT] key.

Setup Items	Setting	Remarks
IP Address	192.168.1.1	Enter the IP address.
SUBNET MASK	255.255.255.0	Enter the subnet mask.
ROUTER IP ADDRESS	Blank	Enter the router IP address.
DHCP CLIENT	0	Enter the DHCP setting. (Value set in parameter 904#6.) 0: Disable DHCP function. 1: Enable DHCP function.

14. Find the soft key [Modbus SET].
15. Press the soft key [Modbus SET].
16. Set each item and press the [INPUT] key.

Setup Items	Setting	Remarks
PORT NUMBER (TCP)	502	Enter the Modbus TCP port number.

Setup Items	Setting	Remarks
OPTION 1	RSV: 0 BCE: 0	RSV: Do not change the setting. BCE: Enter little endian (0) or big endian (1).
STATUS PMC ADDRESS	Any address	To save the status value, specify any device and address. This area uses 1 byte for addressing.

17. Press the page change key [PAGE DOWN].

18. Set the PMC address to be assigned to the Modbus address and press the [INPUT] key. (AREA1)

Setup Items	Setting	Remarks
DATA Modbus ADDRESS	1	Enter the Modbus start address (Holding register) for the link to the PMC address. Setting range is 1 to 65536.
DATA PMC ADDRESS	Any address	Enter the PMC start address (E or D or R device) for the link to the Modbus address. Enter an even number of addresses.
DATA SIZE (WORD)	100	Enter the size to be used for the link area size. This size depends on the valid range of PMC addresses. If no link is needed, enter 0.

19. To assign a PMC address to another Modbus address, prepare AREA2 or AREA3 for similar settings.

20. Restart the CNC.

#### ◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.



## ■ External Device Settings

Set the communication settings for the External Device on the CNC screen.

Please refer to the manual of the External Device for more details.

### ◆ Procedure

1. Turn on the power of CNC.
2. Press the [Home menu] button on the keyboard.
3. Press the function key [SYSTEM].
4. Enter “1”, “4”, “8”, “8” and “2” using the numeric keys.
5. Press the soft key [No. SEARCH].
6. Set the bit 1 to “1”.
7. Restart the CNC.
8. After restarting, perform procedures 2 to 4.
9. Press the [<] or [>] buttons on the screen until the soft key [EMBED PORT] appears.
10. Press the soft key [EMBED PORT].
11. Enter the following values for each item and press the [INPUT] key.

Setup Items	Setting	Remarks
IP Address	192.168.1.1	Enter the IP address.
SUBNET MASK	255.255.255.0	Enter the subnet mask.
ROUTER IP ADDRESS	Blank	Enter the router IP address.
DHCP CLIENT	0	Enter the DHCP setting. (Value set in parameter 904#6.) 0: Disable DHCP function. 1: Enable DHCP function.

12. Find the soft key [Modbus SET].
13. Press the soft key [Modbus SET].
14. Set each item and press the [INPUT] key.

Setup Items	Setting	Remarks
PORT NUMBER (TCP)	502	Enter the Modbus TCP port number.
OPTION 1	RSV: 0 BCE: 0	RSV: Do not change the setting. BCE: Enter little endian (0) or big endian (1).
STATUS PMC ADDRESS	Any address	To save the status value, specify any device and address. This area uses 1 byte for addressing.

15. Press the [PAGE DOWN] key on the keyboard.
16. Set the PMC address to be assigned to the Modbus address and press the [INPUT] key. (AREA 1)

Setup Items	Setting	Remarks
DATA Modbus ADDRESS	1	Enter the Modbus start address (Holding register) for the link to the PMC address. Setting range is 1 to 65536.
DATA PMC ADDRESS	Any address	Enter the PMC start address (E or D or R device) for the link to the Modbus address. Enter an even number of addresses.

Setup Items	Setting	Remarks
DATA SIZE (WORD)	100	Enter the size to be used for the link area size. This size depends on the valid range of PMC addresses. If no link is needed, enter 0.

17. To assign a PMC address to another Modbus address, prepare AREA2 or AREA3 for similar settings.

18. Restart the CNC.

◆ Notes

- Check with your network administrator about the IP address you want to use.
- Do not duplicate IP addresses on the same network.



## 5 Setup Items

Set up the Display's communication settings in GP-Pro EX or in the Display's offline mode.

The setting of each parameter must match that of the External Device.

☞ "4 Communication Setting" (page 7)

### NOTE

- Set the Display's IP address in offline mode.

Cf. Maintenance/Troubleshooting Guide "Ethernet Settings"

### 5.1 Setup Items in GP-Pro EX

#### ■ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].


Setup Items	Setup Description
Port No.	Use an integer from "1024 to 65535" to enter the port number of the Display. If you check [Auto], the port number will be automatically set.
Timeout	Use an integer from 1 to 127 to enter the time(s) for which the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send	Enter the standby time (ms) from when the Display receives packets until it transmits the next command, from "0 to 5000".

### NOTE

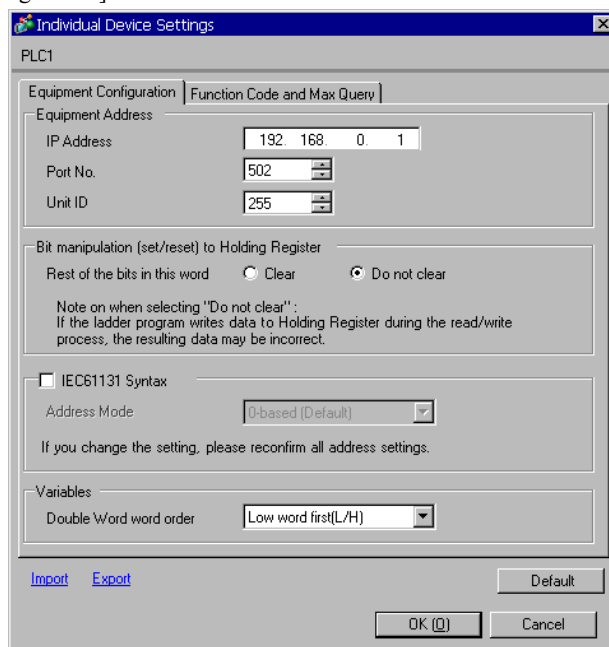
- Refer to the GP-Pro EX Reference Manual for Indirect Device.

Cf. GP-Pro EX Reference Manual "Changing the Device/PLC at Runtime (Indirect Device)"

## ■ Device Setting

To display the [Individual Device Settings] dialog box, from [Device-Specific Settings] in the [Device/PLC] window, select the external device and click [Settings] . To connect multiple External Devices, from [Device-Specific Settings] in the [Device/PLC] window, click [Add Device] to add another External Device.



- [Equipment Configuration] Tab



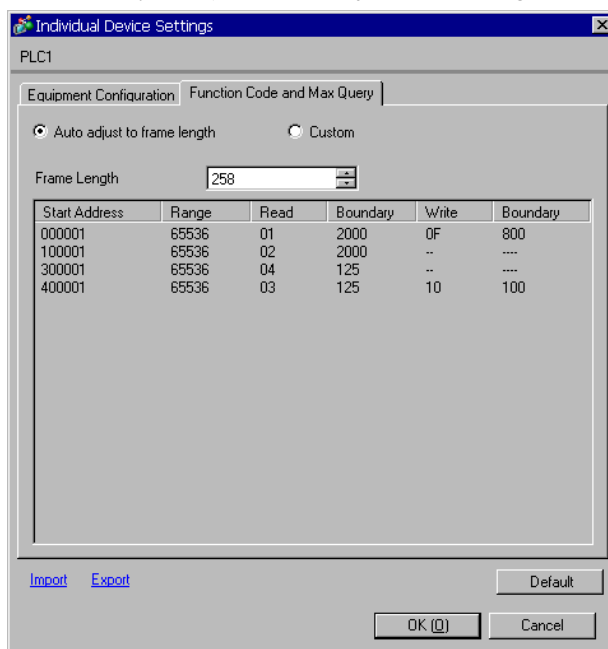
The dialog box is titled "Individual Device Settings" and has a tabbed interface with "Equipment Configuration" and "Function Code and Max Query". The "Equipment Configuration" tab is active. It contains the following sections:

- Equipment Address:** IP Address (192.168.0.1), Port No. (502), and Unit ID (255).
- Bit manipulation (set/reset) to Holding Register:** Radio buttons for "Rest of the bits in this word" (Clear) and "Do not clear". A note states: "Note on when selecting 'Do not clear': If the ladder program writes data to Holding Register during the read/write process, the resulting data may be incorrect."
- IEC61131 Syntax:** A checkbox for "IEC61131 Syntax" and a dropdown for "Address Mode" (0-based (Default)). A note says: "If you change the setting, please reconfirm all address settings."
- Variables:** A dropdown for "Double Word word order" (Low word first(L/H)).

At the bottom, there are links for "Import" and "Export", a "Default" button, and "OK (O)" and "Cancel" buttons.

Setup Items	Setup Description
IP Address	Set the IP address of the External Device. <b>NOTE</b> <ul style="list-style-type: none"> <li>• Check with your network administrator about the IP address you want to use.</li> <li>• Do not duplicate IP addresses on the same network.</li> </ul>
Port No.	Use an integer from "1 to 65535" to enter the port number of the External Device.
Unit ID	Use an integer from 1 to 247 (or 255) to enter the unit ID of the External Device.
Bit manipulation (set/reset) to Holding Register Rest of the bits in this word	Select how other bits in the same word are handled when you manipulate bits in the holding register, from "Clear" or "Do not clear".
IEC61131 Syntax	Select this item to use the IEC61131 syntax for variables. If you check this item, select the address mode from "0-based" or "1-based".
Double Word word order	Select the order of storing double word data from "Low word first" or "High word first".
Import	Import the device settings described in the xml file.  " ◆ Import Procedure in the Device Setting" (page 30)
Export	Export the device settings into the xml file.  " ◆ Export Procedure in the Device Setting" (page 30)

- [Function Code and Max Query] Tab (when "Auto adjust to frame length" is selected)



Setup Items	Setup Description
Auto adjust to frame length	Automatically set each function code and the boundary for one communication according to the frame length. Function codes cannot be changed. To change a function code, use "Custom".
Frame Length	Set the frame length from "10 to 258". After setting, click the device list to display the boundary.
Import	Import the device settings described in the xml file. ☞ " ◆ Import Procedure in the Device Setting" (page 30)
Export	Export the device settings into the xml file. ☞ " ◆ Export Procedure in the Device Setting" (page 30)

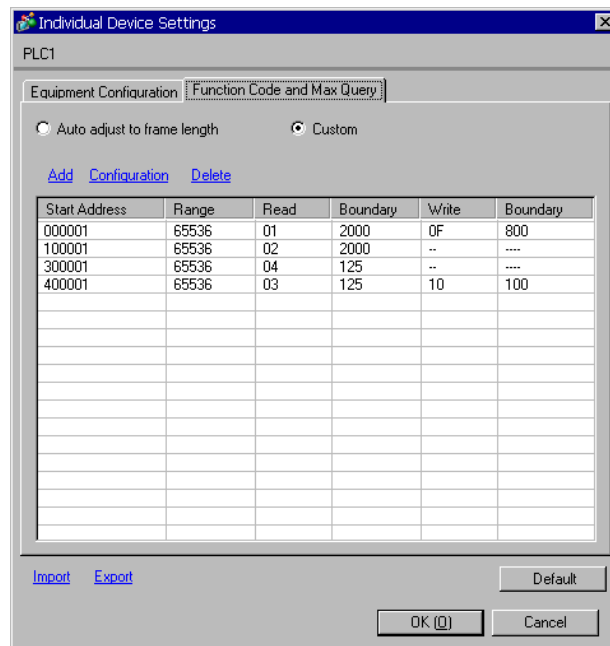
**NOTE**



- When "Auto adjust to frame length" is selected, use the following function codes. The read/write boundary is automatically calculated according to "Frame Length".

Device	Function Code	
	Read	Write
Coil	01	0F: Force Multiple Coils
Discrete Input	02	Disabled
Input Register	04	Disabled
Holding Register	03	10: Preset Multiple Register

- Use "Custom" in the following cases:
  - When you use a different function code depending on an address.
  - When you use the function code "05: Force Single Coil" or "06: Preset Single Register".
  - When the read/write boundary depends on the device.

- [Function Code and Max Query] Tab (when "Custom" is selected)



Setup Items	Setup Description
Custom	Manually set each function code and the boundary for one communication.
Add	Add the function code and its data boundary settings. Up to 20 settings can be added. Add the settings in the [Add setting] dialog box.
Configuration	Change the selected device settings. Change the settings in the [Configuration setting] dialog box.
Delete	Delete the selected device settings.
Import	Import the device settings described in the xml file.  "◆ Import Procedure in the Device Setting" (page 30)
Export	Export the device settings into the xml file.  "◆ Export Procedure in the Device Setting" (page 30)

- [Add setting] Dialog Box / [Configuration setting] Dialog Box

**Add setting**

Start Address: 000001

Range: 65536

Read Function Code: 01

Boundary: 2000

Write Function Code: 0F (Multiple)

Boundary: 800

OK Cancel

**Configuration setting**

Start Address: 000001

Range: 65536

Read Function Code: 01

Boundary: 2000

Write Function Code: 0F (Multiple)

Boundary: 800

OK Cancel

Setup Items	Setup Description
Start Address	Set the start address of the device.
Range	Set the range of the device specified in the start address.
Read	Set the function codes to be used for read and the read boundary in one communication.
Function Code	The function code is assigned by the specified start address.
Boundary	The boundary depends on the device. Refer to the following table for details.
Write	Set the function code to be used for write and the write boundary in one communication.
Function Code	The function code depends on the device. Refer to the following table for details.
Boundary	The boundary depends on the device. Refer to the following table for details.

**NOTE**

- When "Custom" is selected, use the following function codes.

Device	Function Code (Boundary)		
	Read	Write	
		Multiple	Single
Coil	01(2000)	0F: Force Multiple Coils (800)	05: Force Single Coil (Fixed to 1)
Discrete Input	02(2000)	Disabled	Disabled
Input Register	04(125)	Disabled	Disabled
Holding Register	03(125)	10: Preset Multiple Register (100)	06: Preset Single Register ( Fixed to 1)

- If the set device address is disabled to write, you cannot set the write function code and boundary.
- When you select the function code "05" or "06", the write boundary will be fixed to "1", and cannot be changed.

## ◆ Import Procedure in the Device Setting

- 1 Create the xml file based on the following format sample.
- Format sample when "Auto adjust to frame length" is selected

```
<?xml version="1.0" encoding="utf-8" ?>
<ModbusConfiguration version="1">
  <ClearBits>OFF</ClearBits>
  <AddressMode>ModiconSyntax</AddressMode>
  <DWORD>L/H</DWORD>
  <FunctionCode>
    <Mode>AutoAdjust</Mode>
    <FrameLength>258</FrameLength>
  </FunctionCode>
</ModbusConfiguration>
```

Bit manipulation to Holding Register  
Address Mode  
Double Word word order  
  
Mode  
Frame Length

- Format sample when "Custom" is selected

```
<?xml version="1.0" encoding="utf-8" ?>
<ModbusConfiguration version="1">
  <ClearBits>OFF</ClearBits>
  <AddressMode>ModiconSyntax</AddressMode>
  <DWORD>L/H</DWORD>
  <FunctionCode>
    <Mode>Custom</Mode>
    <Setting>
      <Address>000001</Address>
      <Range>65535</Range>
      <Read>
        <FunctionCode>01</FunctionCode>
        <Boundary>2000</Boundary>
      </Read>
      <Write>
        <FunctionCode>0F</FunctionCode>
        <Boundary>800</Boundary>
      </Write>
    </Setting>
  </FunctionCode>
</ModbusConfiguration>
```

Bit manipulation to Holding Register  
Address Mode  
Double Word word order  
  
Mode  
  
Start Address  
Range  
  
Read Function Code  
Read Boundary  
  
Write Function Code  
Write Boundary

- 2 Click [Import] on the [Individual Device Settings] dialog box to display the [Open] dialog box.
- 3 Select the created xml file and click [Open].

## ◆ Export Procedure in the Device Setting

- 1 Click [Export] on the [Individual Device Settings] dialog box to display the [Save as] dialog box.
- 2 Enter a name and click [Save].

## 5.2 Setup Items in Offline Mode

**NOTE**

- Refer to the Maintenance/Troubleshooting guide for information on how to enter offline mode or about the operation.

Cf. Maintenance/Troubleshooting Guide "Offline Mode"

- The number of the setup items to be displayed for 1 page in the offline mode depends on the Display in use. Please refer to the Reference manual for details.

### ◆ Communication Settings

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings] in offline mode. Touch the External Device you want to set from the displayed list.

Comm.	Device			
General MODBUS TCP Master [TCP] Page 1/1				
Port No.		<input type="radio"/> Fixed <input checked="" type="radio"/> Auto	<input type="text" value="1024"/> <input type="button" value="▼"/> <input type="button" value="▲"/>	
Timeout(s)		<input type="text" value="3"/> <input type="button" value="▼"/> <input type="button" value="▲"/>		
Retry		<input type="text" value="0"/> <input type="button" value="▼"/> <input type="button" value="▲"/>		
Wait To Send(ms)		<input type="text" value="0"/> <input type="button" value="▼"/> <input type="button" value="▲"/>		
Exit		Back		2008/06/13 09:49:17

Setup Items	Setup Description
Port No.	Set the Port No. of the Display. Select either of [Fixed] or [Auto]. When you select [Fixed], use an integer from "1024 to 65535" to enter the port number of the Display. When you select [Auto], the port number will be automatically assigned regardless of the entered value.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, enter how many times the Display retransmits the command, from "0 to 255".
Wait To Send	Enter the standby time (ms) from when the Display receives packets until it transmits the next command, from "0 to 5000".

### ◆ Device Setting

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings]. Touch the External Device you want to set from the displayed list, and touch [Device].

(Page 1/22)

Comm. Device

General MODBUS TCP Master [TCP] Page 1/22

Device/PLC Name PLC1

IP Address 192 168 0 1

Port No. 502

Unit ID 255

Bit manipulation to HR Rest of bits in word are not cleared

Double Word word order Low word first

IEC61131 Syntax OFF

Exit Back 2008/06/13 09:49:30

Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. The device name is the title of the External Device set with GP-Pro EX.(Initial value [PLC1])
IP Address	Set the IP address of the External Device. <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <b>NOTE</b> </div> <ul style="list-style-type: none"> <li>• Check with your network administrator about the IP address you want to use.</li> <li>• Do not duplicate IP addresses on the same network.</li> </ul>
Port No.	Use an integer from "1 to 65535" to enter the port number of the External Device.
Unit ID	Use an integer from 1 to 247 (or 255) to enter the unit ID of the External Device.
Bit manipulation to HR	Displays how other bits in the same word are handled when you manipulate bits in the holding register, as "Rest of bits in word are cleared" or "Rest of bits in word are not cleared". (Not available to set in offline mode.)
Double Word word order	Displays the currently set order of storing double word data as "Low word first" or "High word first". (Not available to set in offline mode.)
IEC61131 Syntax	Displays the usage status of the currently set IEC61131 syntax in ON/OFF. (Not available in offline mode.)



(Page 2/22)

Comm.	Device			
General MODBUS TCP Master [TCP] Page 2/22				
Device/PLC Name [PLC1] ▼				
Function Code and Max Query				
Auto adjust Setting Auto adjust to Frame Length				
Frame Length 258				
				◀ ▶
Exit		Back		2008/06/13 09:49:36

Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. The device name is the title of the External Device set with GP-Pro EX.(Initial value [PLC1])
Function Code and Max Query	Displays the option to set the function code and boundary. (Not available to set in offline mode.)
Auto adjust Setting	Displays the set frame length when "Auto adjust to frame length" is selected in the online mode. (Not available to set in offline mode.)
Frame Length	

**NOTE**

- When "Custom" is selected, the setup items of the frame length are invalid.

(Page 3/22 to 22/22)

Comm.	Device			
General MODBUS TCP Master [TCP] Page 3/22				
Device/PLC Name <input type="text" value="PLC1"/>				
Custom Setting 1				
Start Address		000001		
Range		65536		
Read		01 / 2000		
Write		0F / 0000		
				<input type="button" value="←"/> <input type="button" value="→"/>
Exit		Back		2008/06/13 09:49:45

Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. The device name is the title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Start Address	Displays the start address of the device. (Not available to set in offline mode.)
Range	Displays the range of the device specified in the start address. (Not available to set in offline mode.)
Read	Displays the device function codes and boundaries to be read for one communication. (Not available to set in offline mode.)
Write	Displays the device function codes and boundaries to be written for one communication. (Not available to set in offline mode.)


**NOTE**






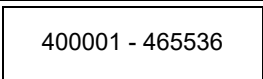



- Page 3 and the following pages display the set descriptions in order.
- When "Auto adjust to frame length" is selected, the Custom setup items are invalid.

## 6 Supported Device

Range of supported device address is shown in the table below. Please note that the actually supported range of the devices varies depending on the External Device to be used. Please check the actual range in the manual of your External Device.

### 6.1 MODBUS Slave Device

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Coil	000001 - 065536	000001 - 065521	 or 	 *1
Discrete Input	100001 - 165536	100001 - 165521		 *2
Input Register	-----	300001 - 365536		 *2
Holding Register	400001,00 - 465536,15	 400001 - 465536	*1	 *3
Input Register	-----	D300001 - D365535		 *2
Holding Register	D400001,00 - D465535,31	D400001 - D465535		 *4

\*1 Whether the data is stored as higher or lower is determined by the [Double Word word order] setting in [Device Setting].

 "5.1 Setup Items in GP-Pro EX" (page 25)

\*2 Write disable.

\*3 An access method at the time of Bit Set varies depending on the [Rest of the bits in this word] setting of [Device Setting].

"Clear"..... 

"Do not clear"..... 400001,00 - 465536,15

\*4 An access method at the time of Bit Set varies depending on the [Rest of the bits in this word] setting of [Device Setting].

"Clear"..... 

"Do not clear"..... D400001,00 - D465535,31

**NOTE** • GP-Pro EX simulation does not synchronize the coil bit address and word address values.

## ■ IEC61131 Syntax Address Description


The following table compares IEC61131 and MODBUS syntax address descriptions.

Device	MODBUS Syntax			IEC61131 Syntax				
	Format	Range	First element	Format	0-based		1-based	
					Range	First element	Range	First element
Coil	000001+i	i = 0 to 65535	000001	%Mi	i = 0 to 65535	%M00000	i = 1 to 65536	%M00001
Discrete Input	100001+i	i = 0 to 65535	100001	-	-	-	-	-
Input Register (Word)	300001+i	i = 0 to 65535	300001	-	-	-	-	-
Input Register (Word bit)	300001+i,j	i = 0 to 65535 j = 0 to 15	300001,00	-	-	-	-	-
Holding Register (Word)	400001+i	i = 0 to 65535	400001	%MWi	i = 0 to 65535	%MW00000	i = 1 to 65536	%MW00001
Holding Register (Word bit)	400001+i,j	i = 0 to 65535 j = 0 to 15	400001,00	%Mwi: Xj	i = 0 to 65535 j=0 to 15	%MW00000 :X00	i = 1 to 65536 j=0 to 15	%MW00001 :X00
Input Register (D Word)	D300001+i	i = 0 to 65534	D300001	-	-	-	-	-
Input Register (D Word bit)	D300001+i,j	i = 0 to 65534 j = 0 to 31	D300001,00	-	-	-	-	-
Holding Register (D Word)	D400001+i	i = 0 to 65534	D400001	%MDi	i = 0 to 65534	%MD00000	i = 1 to 65535	%MD00001
Holding Register (D Word bit)	D400001+i,j	i = 0 to 65534 j = 0 to 31	D400001,00	%MDi:Xj	i = 0 to 65534 j=0 to 31	%MD00000 :X00	i = 1 to 65535 j=0 to 31	%MD00001 :X00


### NOTE


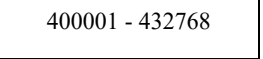
- The addresses 100000 and 300000 cannot be accessed using IEC61131 syntax.
- If you apply IEC61131 syntax to a project that has a discrete input or input register already set, the addresses become "-Undefined-" and invalid.

### NOTE

- Refer to the GP-Pro EX Reference Manual for system data area.  
Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"
- Please refer to the precautions on manual notation for icons in the table.  
 "Manual Symbols and Terminology"

## 6.2 MICRO-EHV Series

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Coil	000257 - 00288	000257 - 000273	 L/H	
Discrete Input	100001 - 100047	100001 - 100002		*1
Input Register	-----	300001 - 302048		*1
Holding Register	400001.00 - 432768.15	 400001 - 432768		
Input Register	-----	D300001 - D302047		*1
Holding Register	D400001.00 - D432767.31	D400001 - D432767		

\*1 Write disable

If you use Control Editor's I/O Monitor to monitor Modbus devices, use the following supported addresses table when specifying addresses.

Modbus Device		External Device	
Device	Range	Device	Range
Coil	000257 - 00288	External output	Y0100 - Y0131
Discrete Input	100001 - 100048	External input	X0000 - X0047
Input Register	300001 - 302048	Data area	WM000 - WM7FF
Holding Register	400001 - 432768	Word inner output	WR0000 - WR7FFF
Input Register	D300001 - D302047	Data area	DM000 - DM7FE
Holding Register	D400001 - D432767	Word inner output	DR0000 - DR7FFE

**NOTE**

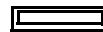
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- Refer to the GP-Pro EX Reference Manual for system data area.



Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

- Please refer to the precautions on manual notation for icons in the table.

 "Manual Symbols and Terminology"

## 6.3 FBR-100AN Series

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Input Register	-----	300001 - 300088	 or  *1	*2 *3
	-----	D300001 - D300087		*2 *3

\*1 Whether the data is stored as higher or lower is determined by the [Double Word word order] setting in [Device Setting].

"5.1 Setup Items in GP-Pro EX" (page 25)

\*2 Write disable

\*3 Modbus address map:

Overview	Modbus address	Word number	Remarks
CNC Series	300001 - 300064	64 words	String
PMC number of strains	300065 - 300072	8 words	String (Value)
CNC number of strains	300073 - 300080	8 words	String (Value)
Status	300081 - 300088	8 words	Available or unavailable

**NOTE**

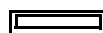
- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- Refer to the GP-Pro EX Reference Manual for system data area.





Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

- Please refer to the precautions on manual notation for icons in the table.

 "Manual Symbols and Terminology"

## 6.4 RCON Series

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Device0: Coil	000001 - 065536	000001 - 065521		
Device1: Discrete Input	100001 - 165536	100001 - 165521		 *1
Device3: Input register	-----	300001 - 365536		 *1
Device4: Holding register	400001.00 - 465536.15	400001 - 465536		

\*1 Write disable

**NOTE**

- GP-Pro EX simulation does not synchronize the coil bit address and word address values.
- Refer to the GP-Pro EX Reference Manual for system data area.


Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"


- Please refer to the precautions on manual notation for icons in the table.



"Manual Symbols and Terminology"

## 6.5 FANUC Series 0i-MODEL F Plus

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
4(Holding Register)	400001.00 - 465536.15	400001 - 465536		*1

\*1 The R, E and D areas of the PMC address can be assigned to the Modbus address; refer to FANUC's PMC programming manual (B-64513EN) for the PMC address range.

**NOTE**

- Refer to the GP-Pro EX Reference Manual for system data area.

Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"

- Please refer to the precautions on manual notation for icons in the table.



"Manual Symbols and Terminology"



## 7 Device Code and Address Code

Use device code and address code when you set "Device Type & Address" for the address type of the data display or other devices.

Device	Device Name	Device Code (HEX)	Address Code
Coil	0	0080	Value of (word address - 1) divided by 16
Discrete Input	1	0081	Value of (word address - 1) divided by 16
Input Register	3	0001	Value of (word address - 1)
Holding Register	4	0000	Value of (word address - 1)
Input Register	D3	0002	Value of (word address - 1) divided by 2
Holding Register	D4	0003	Value of (word address - 1) divided by 2

## 8 Error Messages

Error messages are displayed on the screen of Display as follows: "No. : Device Name: Error Message (Error Occurrence Area)". Each description is shown below.

Item	Description
No.	Error Number.
Device Name	Name of the External Device where an error has occurred. The Device name is the title of the External Device set with GP-Pro EX.(Initial value [PLC1])
Error Message	Displays messages related to an error that has occurred.
Error Occurrence Area	<p>Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the External Device.</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;"> <b>NOTE</b> </div> <ul style="list-style-type: none"> <li>• IP address is displayed as "IP address (Decimal): MAC address (Hex)".</li> <li>• Device address is displayed as "Address: Device address".</li> <li>• Received error codes are displayed as "Decimal [Hex]".</li> </ul>

Display Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 2[02H])"

**NOTE**

- Refer to your External Device manual for details on received error codes.
- Refer to "Display-related errors" in "Maintenance/Troubleshooting Guide" for details on the error messages common to the driver.

### ■ Error Codes Specific to the External Device

Please refer to the manual of the External Device for error codes specific to the External Device.

General MODBUS error codes are shown below.

Error Code (HEX)	Description
01	Does not support the corresponding Function Code.
02	The specified data address does not exist.
03	Data value error.

## ■ Error Messages Specific to the External Device

ID	Error Message	Description
RHxx128	(Node Name): (Device Address) can't be read because of the limitation of the Read boundary	When reading the coil or discrete input as a word address while the boundary is less than 16 bits, or accessing the input or holding register as a double word while the boundary is set to 1 word, an error will be displayed.
RHxx129	(Node Name): (Device Address) can't be written because of the limitation of the Write boundary	When writing the coil as a word address while the boundary is less than 16 bits, or accessing the holding register as a double word while the boundary is set to 1 word, an error will be displayed.
RHxx130	(Node Name): (Device Address) is not defined on Function Code and Max Query setting	When accessing the device out of the defined area, an error will be displayed.
RHxx131	(Node Name): (Device Address) can't be read because of the limitation of the Device Range setting	When reading the coil or discrete input as a word address while the range is less than 16 bits, or accessing the input or holding register as a double word while the range is set to 1 word, an error will be displayed.
RHxx132	(Node Name): (Device Address) can't be written because of the limitation of the Device Range setting	When writing the coil as a word address while the range is less than 16 bits, or accessing the holding register as a double word while the range is set to 1 word, an error will be displayed.

