



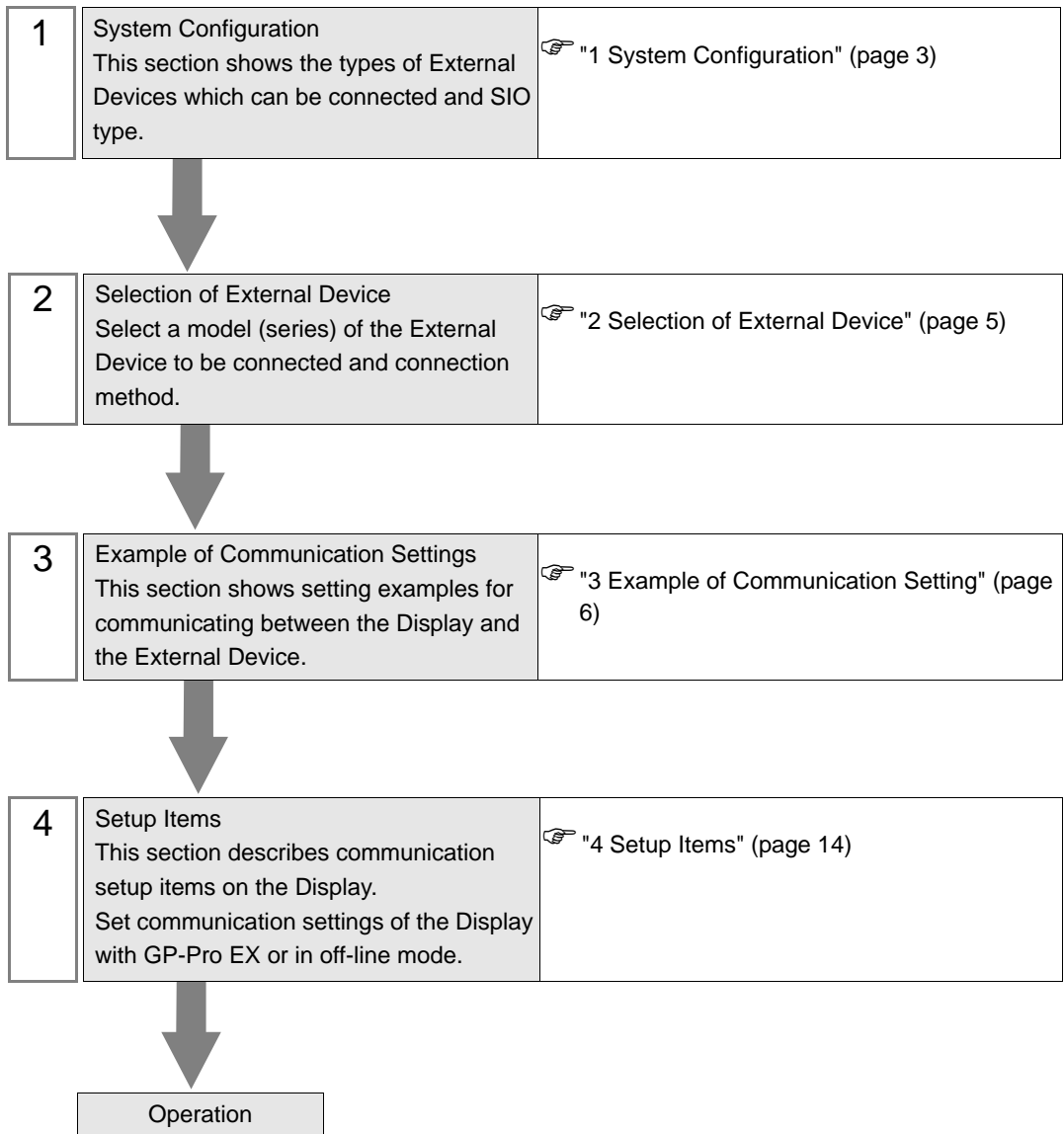
# KV-700/1000 Series Ethernet Driver

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5	Supported Device.....	18
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## Introduction

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

In this manual, the connection procedure will be described by following the sections below:



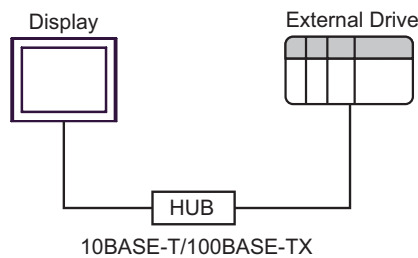
# 1 System Configuration

The following shows the system configuration where the External Device of KEYENCE Corporation and the Display are connected.

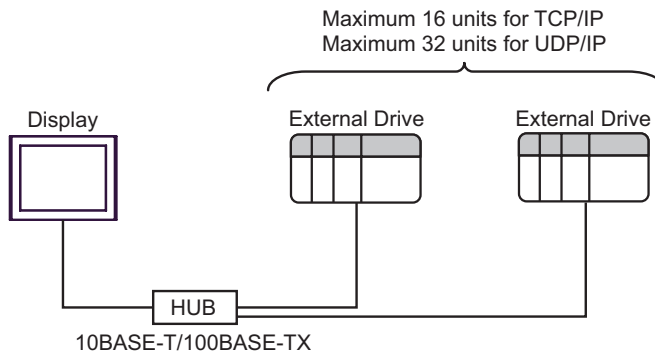
Series	CPU	Link I/F	SIO Type	Setting Example
KV-700 Series	KV-700	KV-LE20A	Ethernet (UDP)	Setting Example 1 (page 6)
			Ethernet (TCP)	Setting Example 2 (page 8)
KV-1000 Series	KV-1000	KV-LE20A	Ethernet (UDP)	Setting Example 3 (page 10)
			Ethernet (TCP)	Setting Example 4 (page 12)

## ■ Connection Configuration

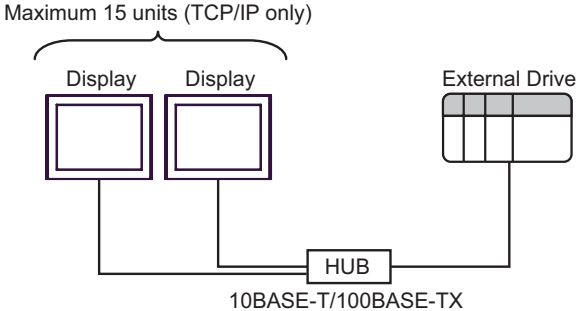
- 1:1 Connection



- 1:n Connection

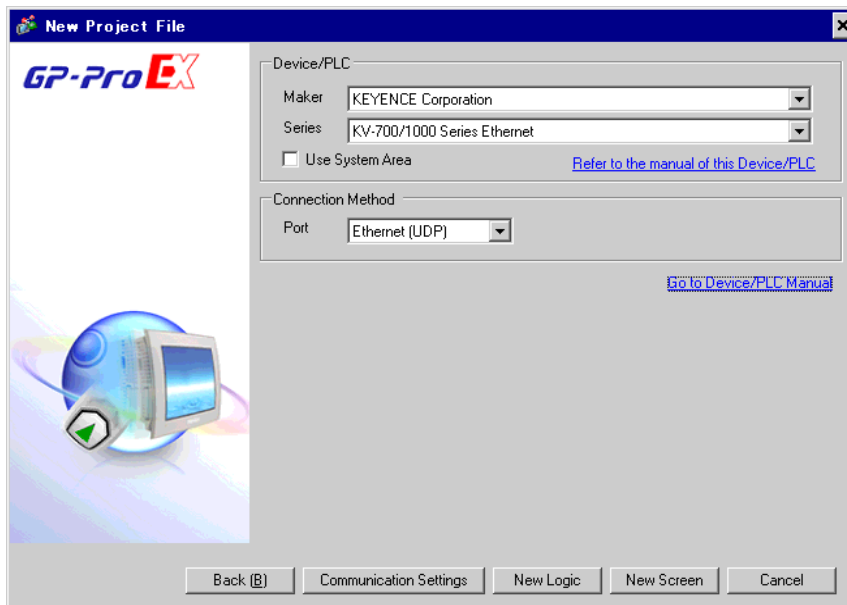


- n:1 Connection



## 2 Selection of External Device

Select the External Device to be connected to the Display.



Setup Items	Setup Description
Maker	Select the maker of the External Device to be connected. Select "KEYENCE Corporation".
Series	Select a model (series) of the External Device to be connected and connection method. Select "KV-700/1000 Series Ethernet". Check the External Device which can be connected in "KV-700/1000 Series Ethernet" in system configuration. ☞ "1 System Configuration" (page 3)
Use System Area	Check this option when you synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the ladder program of the External Device to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)" This can be also set with GP-Pro EX or in off-line mode of the Display. Cf. GP-Pro EX Reference Manual "5.14.6 Setting Guide of [System Setting Window], Setting Guide of [Main Unit Settings], System Area Setting" Cf. Maintenance/Troubleshooting "2.14.1 Common to the Display", Setting Guide of [Main Unit Settings], System Area Setting"
Port	Select the Display port to be connected to the External Device.

### 3 Example of Communication Setting

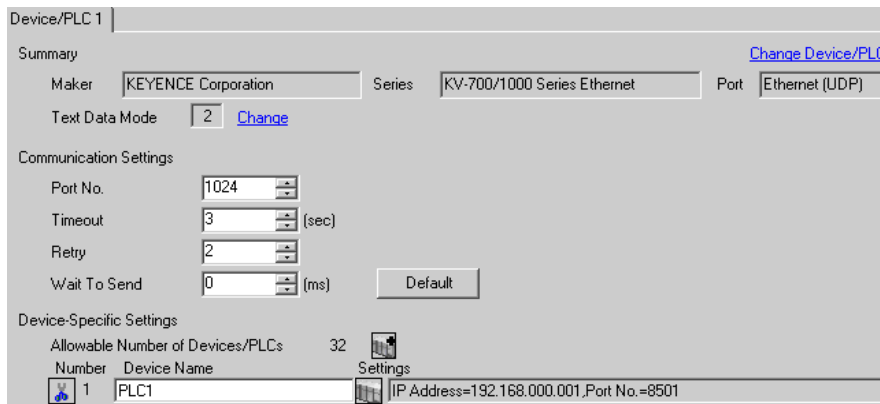
The following shows examples of communication settings of the Display and the External Device, which is recommended by Digital Electronics Corp.

#### 3.1 Setting Example 1



##### ■ Settings of GP-Pro EX

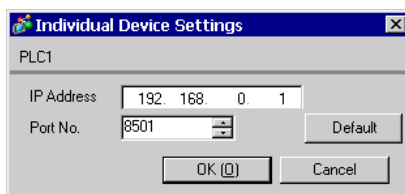
##### ◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



##### ◆ Device Setting

To display the setting screen, click  ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings]. When you connect multiple External Devices, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



##### ◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the Display in the off-line mode of the Display.

## ■ Setting of External Device

Use the configuration tool (KV BUILDER/Ver4.70) for communication settings of the External Device. Please refer to the manual of the External Device for more details.

- 1 Start up the configuration tool.
- 2 Select [New Project] from the [File] menu, enter a project name, and then click the [OK] button.
- 3 In the [Change Device] dialog box, if extended memory is installed, select "KV-700+M"; if not, select "KV-700". Then click the [OK] button.
- 4 In the dialog box that appears, click the [Yes] button to move to the Unit Editor.
- 5 Click the [Unit selection (2)] tab, select "KV-LE20A", and then drag and drop the unit between the CPU and the end unit.
- 6 With KV-LE20A selected, switch to the [Unit setup (3)] tab, and set as follows.

Item	Setting
First DM No.	DM10000
Baud Rate	100/10 Mbps (automatic)
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Port No. (HOST Link)	8501

- 7 Select [Save and Exit] from the [File] menu to return to the editor mode.
- 8 From the [Monitor/Simulator] menu, select [Convert → Move → Monitor].
- 9 Check [Unit setting information], and then click the [Exec] button. The setting information is transferred.

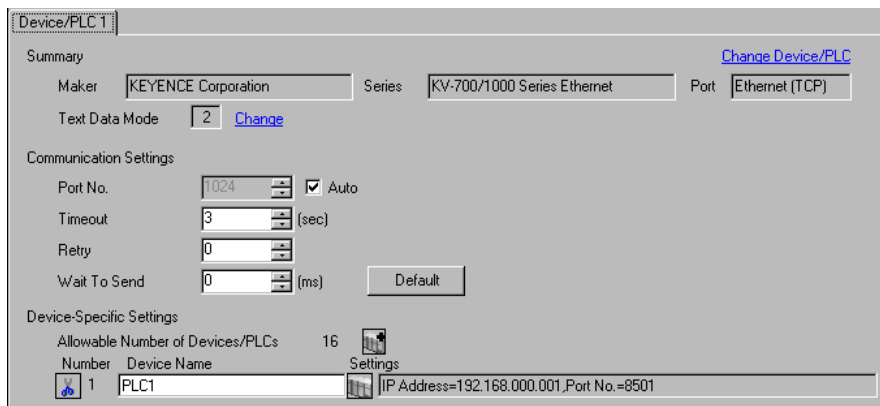
This completes the setting of the External Device.

## 3.2 Setting Example 2

### ■ Settings of GP-Pro EX

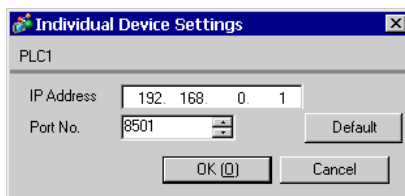
#### ◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



#### ◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings]. When you connect multiple External Devices, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



#### ◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the Display in the off-line mode of the Display.



## ■ Setting of External Device

Use the configuration tool (KV BUILDER/Ver4.70) for communication settings of the External Device. Please refer to the manual of the External Device for more details.

- 1 Start up the configuration tool.
- 2 Select [New Project] from the [File] menu, enter a project name, and then click the [OK] button.
- 3 In the [Change Device] dialog box, if extended memory is installed, select "KV-700+M"; if not, select "KV-700". Then click the [OK] button.
- 4 In the dialog box that appears, click the [Yes] button to move to the Unit Editor.
- 5 Click the [Unit selection (2)] tab, select "KV-LE20A", and then drag and drop the unit between the CPU and the end unit.
- 6 With KV-LE20A selected, switch to the [Unit setup (3)] tab, and set as follows.

Item	Setting
First DM No.	DM10000
Baud Rate	100/10 Mbps (automatic)
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Port No. (HOST Link)	8501

- 7 Select [Save and Exit] from the [File] menu to return to the editor mode.
- 8 From the [Monitor/Simulator] menu, select [Convert → Move → Monitor].
- 9 Check [Unit setting information], and then click the [Exec] button. The setting information is transferred.

This completes the setting of the External Device.

### 3.3 Setting Example 3

#### ■ Settings of GP-Pro EX

##### ◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

##### ◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings]. When you connect multiple External Devices, click from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.

##### ◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the Display in the off-line mode of the Display.

## ■ Setting of External Device

Use the configuration tool (KV STUDIO/Ver2.50) for communication settings of the External Device. Please refer to the manual of the External Device for more details.

- 1 Start up the configuration tool.
- 2 Select [New Project] from the [File] menu, enter a project name, and then click the [OK] button.
- 3 In the dialog box that appears, click the [Yes] button to move to the Unit Editor.
- 4 Click the [Unit selection (2)] tab, select "KV-LE20A", and then drag and drop the unit between the CPU and the end unit.
- 5 With KV-LE20A selected, switch to the [Unit setup (3)] tab, and set as follows.

Item	Setting
First DM No.	DM10000
Baud Rate	100/10 Mbps (automatic)
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Port No. (HOST Link)	8501

- 6 Select [Save and Exit] from the [File] menu to return to the editor mode.
- 7 From the [Monitor/Simulator] menu, select [Convert → Move].
- 8 Check [Unit setting information], and then click the [Exec] button. The setting information is transferred.

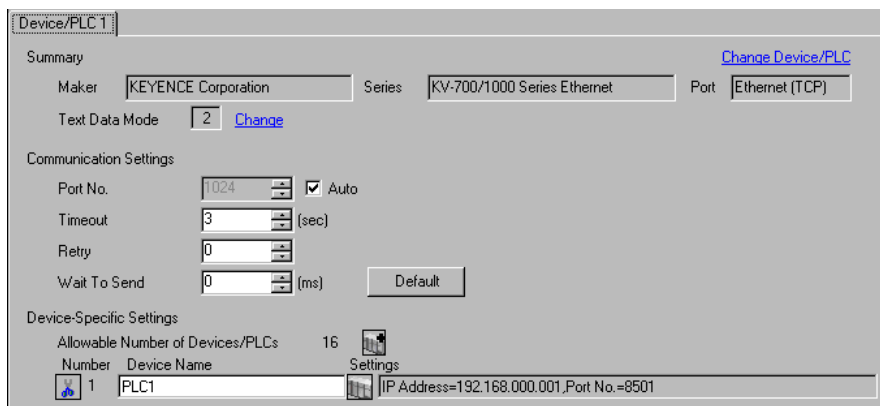
This completes the setting of the External Device.

### 3.4 Setting Example 4



#### ■ Settings of GP-Pro EX

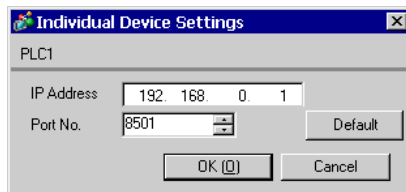
##### ◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



##### ◆ Device Setting

To display the setting screen, click  ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings]. When you connect multiple External Devices, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



##### ◆ Notes

- Check with a network administrator about IP address. Do not set the duplicate IP address.
- Set IP address on the External Device for IP address in Device-specific settings.
- You need to set IP address on the Display in the off-line mode of the Display.

## ■ Setting of External Device

Use the configuration tool (KV STUDIO/Ver2.50) for communication settings of the External Device. Please refer to the manual of the External Device for more details.

- 1 Start up the configuration tool.
- 2 Select [New Project] from the [File] menu, enter a project name, and then click the [OK] button.
- 3 In the dialog box that appears, click the [Yes] button to move to the Unit Editor.
- 4 Click the [Unit selection (2)] tab, select "KV-LE20A", and then drag and drop the unit between the CPU and the end unit.
- 5 With KV-LE20A selected, switch to the [Unit setup (3)] tab, and set as follows.

Item	Setting
First DM No.	DM10000
Baud Rate	100/10 Mbps (automatic)
IP Address	192.168.0.1
Subnet Mask	255.255.255.0
Port No. (HOST Link)	8501

- 6 Select [Save and Exit] from the [File] menu to return to the editor mode.
- 7 From the [Monitor/Simulator] menu, select [Convert → Move].
- 8 Check [Unit setting information], and then click the [Exec] button. The setting information is transferred.

This completes the setting of the External Device.

## 4 Setup Items

Set communication settings of the Display with GP-Pro Ex or in off-line mode of the Display.

The setting of each parameter must be identical to that of the External Device.

 "3 Example of Communication Setting" (page 6)

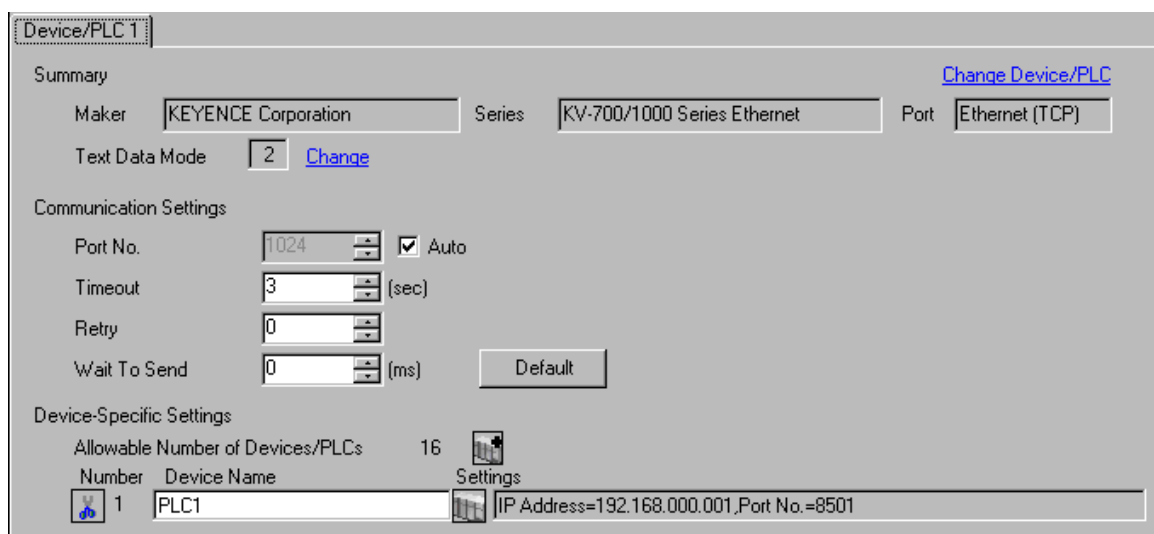
### NOTE

- You need to set the IP address of the Display in off-line mode of the Display.  
Cf. Maintenance/Troubleshooting "2.5 Ethernet Settings"

### 4.1 Setup Items in GP-Pro EX

#### ■ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.



Device/PLC 1

Summary [Change Device/PLC](#)

Maker  Series  Port

Text Data Mode  [Change](#)

Communication Settings


Port No.   Auto


Timeout  (sec)

Retry

Wait To Send  (ms)


Device-Specific Settings


Allowable Number of Devices/PLCs 16 

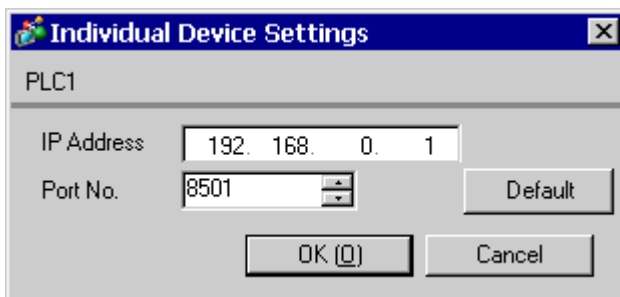
Number	Device Name	Settings
 1	PLC1	IP Address=192.168.000.001,Port No.=8501

Setup Items	Setup Description
Port No.	Use an integer from "1024 to 65535" to enter the port No. of the Display.If you check [Auto], the port No. will be automatically set. <b>NOTE</b> <ul style="list-style-type: none"> <li>[Auto] option is available to set only when you select "Ethernet (TCP)" in [Connecting Method].</li> </ul>
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, use an integer from "0 to 255" to enter how many times the Display retransmits the command.
Wait To Send	Use an integer from "0 to 255" to enter standby time (ms) for the Display from receiving packets to transmitting the next command.

## ■ Device Setting

To display the setting screen, click  ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

When you connect multiple External Devices, click  from [Device-Specific Settings] of [Device/PLC Settings] to add another External Device.



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 the network administrator about the IP address. Be sure not to duplicate IP addresses.</li> </ul>
Port No.	Use an integer from "1024 to 65535" to enter the port No. of the External Device. <b>IMPORTANT</b> <ul style="list-style-type: none"> <li>Only one display can be connected to one port number.</li> </ul>

## 4.2 Setup Items in Off-Line Mode

**NOTE**

- Please refer to the Maintenance/Troubleshooting manual for more information on how to enter off-line mode or about the operation.

Cf. Maintenance/Troubleshooting "2.2 Off-line Mode"

### ■ Communication Settings

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings] in off-line mode.

Touch the External Device you want to set from the displayed list.

Comm.	Device			
KV-700/1000 Series Ethernet		[UDP]	Page 1/1	
Port No.	<input type="radio"/> Fixed <input checked="" type="radio"/> Auto	<input type="text" value="1024"/> ▼ ▲		
Timeout(s)		<input type="text" value="3"/> ▼ ▲		
Retry		<input type="text" value="2"/> ▼ ▲		
Wait To Send(ms)		<input type="text" value="0"/> ▼ ▲		
Exit		Back		2007/04/15 17:42:49

Setup Items	Setup Description
Port No.	Set the Port No. of the Display. In UDP connection, the entered port No. will be assigned regardless of whether you select [Fixed] or [Auto]. In TCP connection, select either of [Fixed] or [Auto]. When you select [Fixed], use an integer from 1024 to 65535 to enter the port No. of the Display. When you select [Auto], the port No. 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, use an integer from "0 to 255" to enter how many times the Display retransmits the command.
Wait To Send	Use an integer from "0 to 255" to enter standby time (ms) for the Display from receiving packets to transmitting the next command.



## ■ Device Setting

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

Comm.	Device			
KV-700/1000 Series Ethernet		[UDP]	Page 1/1	
Device/PLC Name		PLC1		
IP Address		192 168 0 1		
Port No.		8501		
Exit		Back		2007/04/15 17:42:51

Setup Items	Setup Description
Device/PLC Name	Select the External Device to set. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
IP Address	Set the IP address of the External Device. <b>NOTE</b> <ul style="list-style-type: none"> <li>Check with the network administrator about the IP address. Be sure not to duplicate IP addresses.</li> </ul>
Port No.	Use an integer from "1024 to 65535" to enter the port No. of the External Device. <b>IMPORTANT</b> <ul style="list-style-type: none"> <li>Only one display can be connected to one port number.</li> </ul>

## 5 Supported Device

Range of supported device address is shown in the table below. 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.

### 5.1 KV-700 Series

     : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Relay	00000 - 59915	000 - 599		
Control Relay	CR0000 - CR3915	CR00 - CR39	<span style="border: 1px solid black; padding: 2px;">L/H</span>	
Timer (Contact)	T000 - T511	----	-	
Counter (Contact)	C000 - C511	----		
High-speed Counter Comparator (Contact)	CTC0 - CTC3	----		*1
Timer (Setting Value)	----	TS000 - TS511	-	*2
Counter (Setting Value)	----	CS000 - CS511		*2
Timer (Current Value)	----	TC000 - TC511		*2
Counter (Current Value)	----	CC000 - CC511		*2
Data Memory		DM00000 - DM39999		<span style="border: 1px solid black; padding: 2px;">Bit 15</span> *3
Temporary Data Memory		TM000 - TM511		<span style="border: 1px solid black; padding: 2px;">L/H</span> <span style="border: 1px solid black; padding: 2px;">Bit 15</span>
Control Memory		CM0000 - CM3999		<span style="border: 1px solid black; padding: 2px;">Bit 15</span>
Digital Trimmer	----	TRM0 - TRM7		*1 *2
High-speed Counter (Current Value)	----	CTH0 - CTH1		*2
High-speed Counter Comparator (Setting Value)	----	CTC0 - CTC3		*2

\*1 Write disable


\*2 32-bit device.



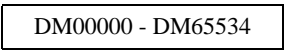






\*3 To use DM20000 to DM39999, you need to install extended memory.

**NOTE**

- Please refer to the GP-Pro EX Reference Manual for system data area.
- Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"
- Please refer to the precautions on manual notation for icons in the table.
  - ☞ "Manual Symbols and Terminology"

## 5.2 KV-1000 Series

 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Relay	00000 - 59915	000 - 599		*1
Internal Auxiliary Relay	MR00000 - MR99915	MR000 - MR999		
Latch Relay	LR00000 - LR99915	LR000 - LR999		
Control Relay	CR00000 - CR3915	CR000 - CR39		
Timer (Contact)	T0000 - T3999	-----	-	
Counter (Contact)	C0000 - C3999	-----		
High-speed Counter Comparator (Contact)	CTC0 - CTC3	-----		*2
Timer (Setting Value)	-----	TS0000 - TS3999		*3
Counter (Setting Value)	-----	CS0000 - CS3999		*3
Timer (Current Value)	-----	TC0000 - TC3999		*3
Counter (Current Value)	-----	CC0000 - CC3999		*3
Data Memory		 DM00000 - DM65534		
Extension Data Memory		EM00000 - EM65534		
Extension Data Memory		FM00000 - FM32766		
Temporary Data Memory		TM000 - TM511		
Control Memory		CM00000 - CM11998		
Index Register		Z01 - Z12		 *4
Digital Trimmer	-----	TRM0 - TRM7	*2 *3	
High-speed Counter (Current Value)	-----	CTH0 - CTH1	*3	
High-speed Counter Comparator (Setting Value)	-----	CTC0 - CTC3	*3	


\*1 KV-1000 shows R000 to R599 (R00000 to R59915); the Display, on the other hand, shows 000 to 599 (00000 to 59915).

\*2 Write disable

\*3 32-bit device.

\*4 Z11 and Z12, used by the External Device system, are not available to write in.

**NOTE**

- Please refer to the GP-Pro EX Reference Manual for system data area.
- Cf. GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"
- Please refer to the precautions on manual notation for icons in the table.  
 "Manual Symbols and Terminology"

## 6 Device Code and Address Code

Use device code and address code when you select "Device Type & Address" for the address type in data displays.

### 6.1 KV-700 Series

Device	Device Name	Device Code (HEX)	Address Code
Relay	----	0080	Word Address
Control Relay	CR	008A	Word Address
Timer (Setting Value)	TS	0062	Double Word Address
Counter (Setting Value)	CS	0063	Double Word Address
Timer (Current Value)	TC	0060	Double Word Address
Counter (Current Value)	CC	0061	Double Word Address
Data Memory	DM	0000	Word Address
Temporary Data Memory	TM	0001	Word Address
Control Memory	CM	0002	Word Address
Digital Trimmer	TRM	0064	Double Word Address
High-speed Counter (Current Value)	CTH	0065	Double Word Address
High-speed Counter Comparator (Setting Value)	CTC	0066	Double Word Address

## 6.2 KV-1000 Series

Device	Device Name	Device Code (HEX)	Address Code
Relay	----	0080	Word Address
Internal Auxiliary Relay	MR	0082	Word Address
Latch Relay	LR	0084	Word Address
Control Relay	CR	008A	Word Address
Timer (Setting Value)	TS	0062	Double Word Address
Counter (Setting Value)	CS	0063	Double Word Address
Timer (Current Value)	TC	0060	Double Word Address
Counter (Current Value)	CC	0061	Double Word Address
Data Memory	DM	0000	Word Address
Extension Data Memory	EM	0010	Word Address
Extension Data Memory	FM	0011	Word Address
Temporary Data Memory	TM	0001	Word Address
Control Memory	CM	0002	Word Address
Index Register	Z	0003	Word Address
Digital Trimmer	TRM	0064	Double Word Address
High-speed Counter (Current Value)	CTH	0065	Double Word Address
High-speed Counter Comparator (Setting Value)	CTC	0066	Double Word Address

## 7 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 No.
Device Name	Name of External Device where an error occurs. Name of External Device is a title of External Device set with GP-Pro EX.(Initial value [PLC1])
Error Message	Displays messages related to the error that has occurred.
Error Occurrence Area	<p>Displays the IP address or device address of External Device where an error occurs, or error codes received from External Device.</p> <p><b>NOTE</b></p> <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**

- Please refer to the manual of the External Device for more detail on received error codes.
- Please refer to "When an error is displayed (Error Code List)" in "Maintenance/Troubleshooting manual" for more detail on the error messages common to the driver.

### ■ Error Code List of External Device

Error Code (HEX)	Error Description
E0	Accessed the device not defined as device in the External Device.*1
E4	Wrote in the write disable device.

\*1 When you write to Timer (Contact/Current Value/Setting Value), Counter (Contact/Current Value/Setting Value), High-speed Counter and High-speed Counter Comparator (Setting Value), the settings in the ladder program is necessary in advance.