# PLC CONNECTION MANUAL

## ADDITIONAL MANUAL

# RKC Instrument Inc.
# CB/REX-F/LE100 Series
# (RKC protocol)



Pro-face
Human Machine Interface

# Reading the Device/PLC Connection Manual

This additional manual provides connection information for the RKC Instrument Inc. CB, REX-F or LE100 Series (RKC protocol) models, and is a supplement to the LT Editor and GP-PRO/PBIII for Windows Device/PLC Connection Manual.

Please refer to this data when connecting a RKC Instrument Inc. CB, REX-F or LE100 Series (RKC protocol) unit.

For information concerning general type PLC connections and this document's documentation conventions, please refer to your Device/PLC Connection manual.

When connecting a Factory Gateway unit, please substitute the words "Factory Gateway" for this document's "LT/GLC/GP".

The information in this document will be included in the next version of the Device/PLC Connection manual. Therefore, please consider this a provisional document.

# Installation

This CD-ROM includes all the driver files required by the LT/GLC/GP to communicate with a CB, REX-F or LE100 Series (RKC protocol). This document assumes that one or more of the following software applications are already installed on your PC. Please note that if more than one of these applications are installed, the screen and data transfer files included in this CD-ROM must be installed in each of those applications.

For information about the installation of the software, refer to that software's Operation Manual.

■ Software Applications
- LT Editor Ver.1.0 or later
- GP-PRO/PBIII for Windows Ver.5.0 or later
- Pro-server with Pro-Studio for Windows Ver.3.0 or later[*1]

**1)** Confirm that the Screen Editor software is installed on your hard drive.

**2)** Double-click on the “cb_rkc.exe” file contained in the CD-ROM.

**3)** Once the set up program starts, follow the instructions given in the installation program.

*Important*

**When using the CB, REX-F or LE100 Series (RKC protocol), select [RKC CB/REX-F/LE100(RKC)] for the " PLC Type" .**

**When using GP-PRO/PBIII for Windows Ver.6.0 or later, click on the Device/PLC area’s [other] selection and then click on [RKC CB/REX-F/LE100(RKC)].**

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***1 When using the Factory Gateway unit, GP-Web Ver. 1.0 or later, or GP-Viewer Ver. 1.0 or later, be sure to select the Pro-Server with Pro-Studio for Windows folder as the “Destination Folder”.**

# 12.4 RKC INSTRUMENT INC. Controllers

## 12.4.1 System Structure

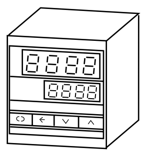
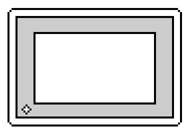
The following describes the system configuration used when connecting the GP/GLC/LT to an RKC Controller.

*Important*

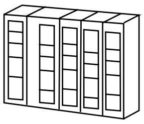
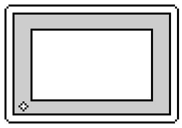
- ***GP/GLC/LT's System Area (LS0 to LS19) Settings***

  ***The GP/GLC/LT's system area (20 words) cannot be allocated to the Controller's own data area. When you are entering the system area settings via the screen editor software or via the GP/GLC/LT's OFFLINE screen, be careful that you do not use the Controller's own data area.***

### ■ CB Series (Modbus protocol)

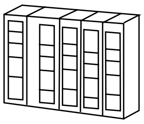
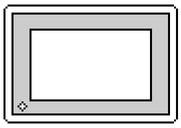
<table>
<tr><th>Controller</th><th>Cable Diagram</th><th>GP/GLC/LT</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td rowspan="2">CB100 Z-1021<br>CB400 Z-1021<br>CB500 Z-1021<br>CB700 Z-1021<br>CB900 Z-1021<br>(Applicable for Modbus Protocol)</td><td>RS-422(2-wire)<br>(Cable Diagram 3)</td><td rowspan="2">GP Series<br>GLC Series<br>LT Type H</td></tr>
<tr><td>RS-422(2-wire)<br>1:n connection<br>(Cable Diagram 5)</td></tr>
</table>

## ■ **SR-Mini Series** (Modbus protocol)

| Controller | Cable Diagram | Cables | GP/GLC/LT |
|---|---|---|---|
|  | | |  |
| H-PCP-AZ-1021 | RS-232C (Cable Diagram 1) | RKC's W-BF-01-□□□□ *1 | GP Series GLC Series LT Type H |
| | RS-422(4-wire) (Cable Diagram 2) | | |
| | RS-422(4-wire) 1:n Connection (Cable Diagram 4) | RKC's W-BF-01-□□□□ *1 W-BF-02-□□□□ | |

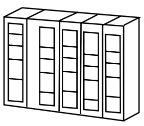
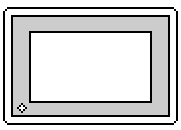
**1 □□□□ indicates the cable length (mm).*

## ■ **SRX Series** (Modbus protocol)

| Controller | Cable Diagram | GP/GLC/LT |
|---|---|---|
|  | |  |
| X-TIO-A-□□-□□*□□ | RS-422(4-wire) (Cable Diagram 11) | GP Series GLC Series LT Type H |
| | RS-422(4-wire) 1:n Connection (Cable Diagram 12) | |

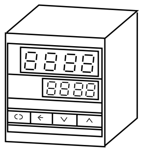
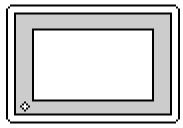
**1 The model data "□" will vary depending on the type of option.*
*For detailed temperature Controller information, refer to that unit's catalog.*

## ■ **SRV Series** (Modbus protocol)

| Controller | Cable Diagram | GP/GLC/LT |
|---|---|---|
|  | |  |
| V-TIO-A-□□-□□*□□ | RS-422(4-wire) (Cable Diagram 11) | GP Series GLC Series LT Type H |
| | RS-422(4-wire) 1:n Connection (Cable Diagram 12) | |

**1 The model data "□" will vary depending on the type of option.*
*For detailed temperature Controller information, refer to that unit's catalog.*

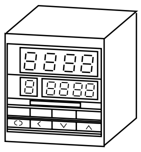
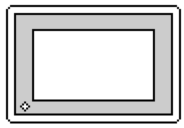
## ■ **CB Series** (RKC protocol)

| Controller *1 | Cable Diagram | GP/GLC/LT *2 |
|---|---|---|
|  | |  |
| CB100□□□□-□□*□□-5□/□<br>CB400□□□□-□□*□□-5□/□<br>CB500□□□□-□□*□□-5□/□<br>CB700□□□□-□□*□□-5□/□<br>CB900□□□□-□□*□□-5□/□ | RS-422(2-wire)<br>(Cable Diagram 6) | GP Series<br>GLC Series<br>LT Type H |
| | RS-422(2-wire)<br>1:n Connection<br>(Cable Diagram 7) | |

**1 The model data "□" will vary depending on the type of option.*
*For detailed temperature Controller information, refer to that unit's catalog. Units that have an option of serial data transfer will have a "5" in their model code.*

**2 This unit can be used with GP-377 Series, GP77R Series, GP2000 Series, GLC2000 Series, and LT TypeC Units.*

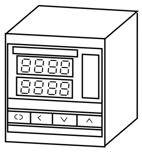
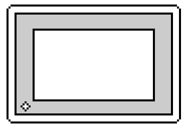
## ■ **REX-F Series** (RKC protocol)

| Controller *1 | Cable Diagram | GP/GLC/LT *2 |
|---|---|---|
|  | |  |
| F400□□□□-□□*□□-□□□-1□<br>F700□□□□-□□*□□-□□□-1□<br>F900□□□□-□□*□□-□□□-1□ | RS-232C<br>(Cable Diagram 8) | GP Series<br>GLC Series<br>LT Type H |
| F400□□□□-□□*□□-□□□-4□<br>F700□□□□-□□*□□-□□□-4□<br>F900□□□□-□□*□□-□□□-4□ | RS-422(4-wire)<br>(Cable Diagram 9) | |
| | RS-422(4-wire)<br>1:n Connection<br>(Cable Diagram 10) | |
| F400□□□□-□□*□□-□□□-4□<br>F700□□□□-□□*□□-□□□-4□<br>F900□□□□-□□*□□-□□□-4□ | RS-422(2-wire)<br>(Cable Diagram 6) | |
| | RS-422(2-wire)<br>1:n Connection<br>(Cable Diagram 7) | |

**1 The model data "□" will vary depending on the type of option.*
*For detailed temperature Controller information, refer to that unit's catalog. Serial data transfer option types use a "1" for RS-232C, "4" for RS-422 - 4 wire, and "5" for RS-422 - 2 wire.*

**2 This unit can be used with GP-377 Series, GP77R Series, GP2000 Series, GLC2000 Series, and LT TypeC Units.*

## ■ LE-100 Series (RKC protocol)

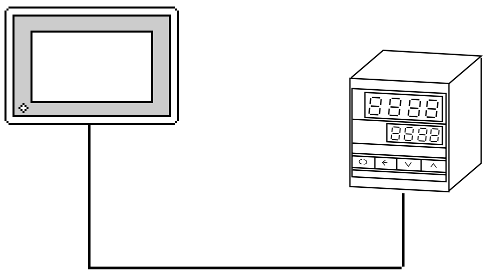
| Controller *1 | Cable Diagram | GP/GLC/LT *2 |
|---|---|---|
|  |  |  |
| LE100-□□*□5□□-□□ | RS-422(2-wire)<br>(Cable Diagram 6) | GP Series<br>GLC Series<br>LT Type H |
| | RS-422(2-wire)<br>1:n Connection<br>(Cable Diagram 7) | |

**1 The model data "□" will vary depending on the type of option.*
*For detailed temperature Controller information, refer to that unit's catalog. Units that have an option of serial data transfer will have a "5" in their model code.*

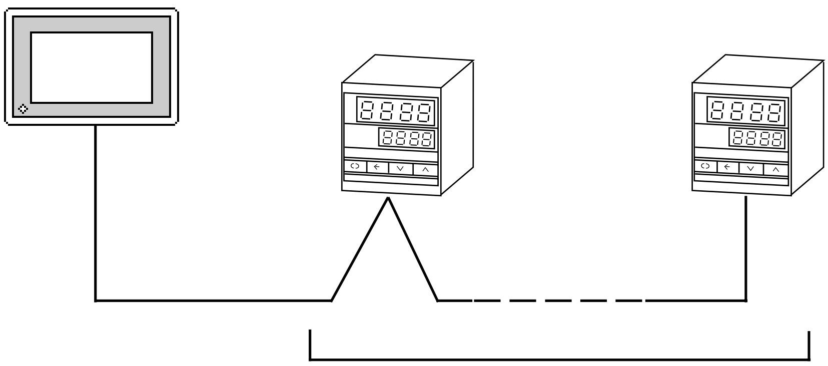
**2 This unit can be used with GP-377 Series, GP77R Series, GP2000 Series, GLC2000 Series, and LT TypeC Units.*

### ◆ Connections

•1:1 connection



•1:n connection



31 units max.

(Max. with SR-Mini Series units is 16 units)

## 12.4.2 Cable Diagrams

The cable diagrams shown below and the cable diagrams recommended by RKC INSTRUMENT INC. may differ, however, using these cables for your Controller's operations will not cause any problems.

Important

- ***When connecting the FG terminal to the connector cover, be sure that the connector cover conducts current.***
- ***Ground your Controller's FG terminal according to your country's applicable standard. For details, refer to your Controller's manual.***
- ***When connecting a cable's Shield line to an FG terminal, consider the needs of your system when deciding which side of the cable (GP/GLC or Controller) to connect. (The example below connects to the Controller's FG terminal.)***

### ■ CB Series

Important

- ***Up to 31 CB Series units can be connected to a single GP/GLC/LT.***
- ***If a communications cable is used, be sure to connect its SG (signal ground) terminal.***
- ***The following RS-422 cable is recommended.***

| Company | Item No. | Type |
|---|---|---|
| Hirakawa Densen | 2207-510-008 | CO-HC-ESV-3P X 7/0.2 |

- ***The Controller terminal number will differ depending on the type of CPU used. The following examples reflect all the CB Series units supported by the Digital Electronics Corporation.***

**<CB100,CB400,CB500,CB900>**

| Terminal No. | Signal Name |
|---|---|
| 13 | SG |
| 14 | T/R(A) |
| 15 | T/R(B) |

**<CB700>**

| Terminal No. | Signal Name |
|---|---|
| 7 | SG |
| 8 | T/R(A) |
| 9 | T/R(B) |

## ■ SR-Mini Series

**Important**

- ***Up to 16 SR-Mini Series modules can be connected to a single GP/GLC/LT.***
- ***If a communications cable is used, be sure to connect its SG (signal ground) terminal.***
- ***RS-232C cables should be 15 meters or less.***
- ***RS-422 (2-wire) cables should be 500 meters or less.***
- ***The following RS-422 cables are recommended for SR-Mini Series units.***

| Company | Type | Comments |
|---|---|---|
| RKC INSTRUMENT INC. | W-BF-01- XXXX *1 | Used when connecting an SR-Mini to a LT/GLC/GLC |
| RKC INSTRUMENT INC. | W-BF-02- XXXX *1 | Used when connecting an SR-Min to an SR-Mini |

**1 XXXX indicates the cable length (mm).*

## ■ REX-F Series

**Important**

- ***Up to 31 REX-F Series units can be connected to a single GP/GLC/LT.***
- ***Connect the shield to the GP/GLC/LT's FG terminal.***
- ***If a communications cable is used, be sure to connect its SG (signal ground) terminal.***
- ***RS-232C cables must be 15 meters or less.***
- ***RS-422 cables must be 600 meters or less.***
- ***With REX-F Series units, the terminal numbers and signal names will vary, depending on the unit's model type and data transfer method used. The following tables show the possible model type and signal name combinations.***

### ◆ RS-232C Connections

| Terminal No. | | | Signal Name |
|---|---|---|---|
| F400 | F700 | F900 | |
| 12 | 16 | 26 | SG |
| 13 | 17 | 27 | SD |
| 14 | 18 | 28 | RD |

### ◆ RS-422 (2-wire) Connections

| Terminal No. | | | Signal Name |
|---|---|---|---|
| F400 | F700 | F900 | |
| 12 | 16 | 26 | SG |
| 13 | 17 | 27 | T/R(A) |
| 14 | 18 | 28 | T/R(B) |

### ◆ RS-422 (4-wire) Connections

| Terminal No. | | | Signal Name |
|---|---|---|---|
| F400 | F700 | F900 | |
| 12 | 16 | 26 | SG |
| 13 | 17 | 27 | T(A) |
| 14 | 18 | 28 | T(B) |
| 15 | 19 | 29 | R(A) |
| 16 | 20 | 30 | R(B) |

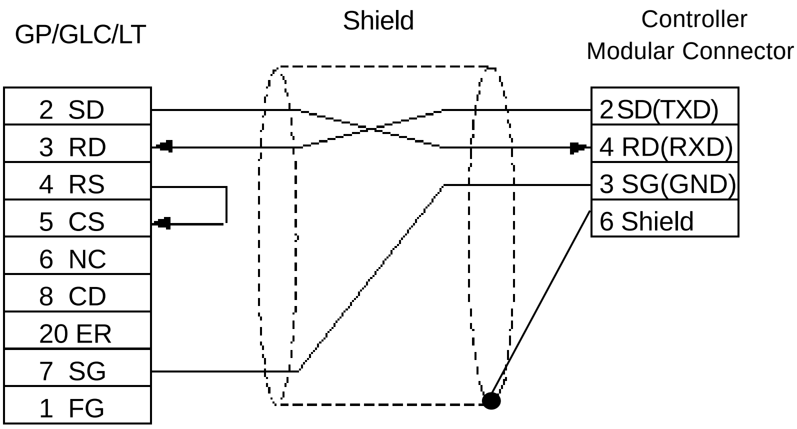
## ■ LE100 Series

***Important***

- ***Up to 31 LE100 Series units can be connected to a single GP/GLC/LT.***
- ***Connect the shield to the GP/GLC/LT's FG terminal.***
- ***If a communications cable is used, be sure to connect its SG (signal ground) terminal.***
- ***RS-422 cables must be 600 meters or less.***
- ***LE100 Series data transfer signal names are as follows:***

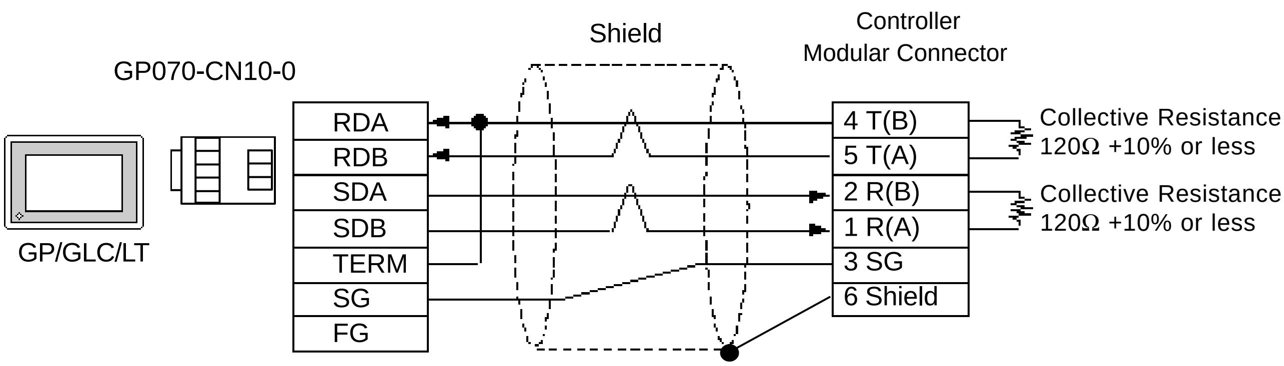
| Terminal No. | Signal Name |
|---|---|
| 1 | T/R(A) |
| 2 | T/R(B) |
| 3 | SG |

**Cable Diagram 1** (1:1) RS-232C

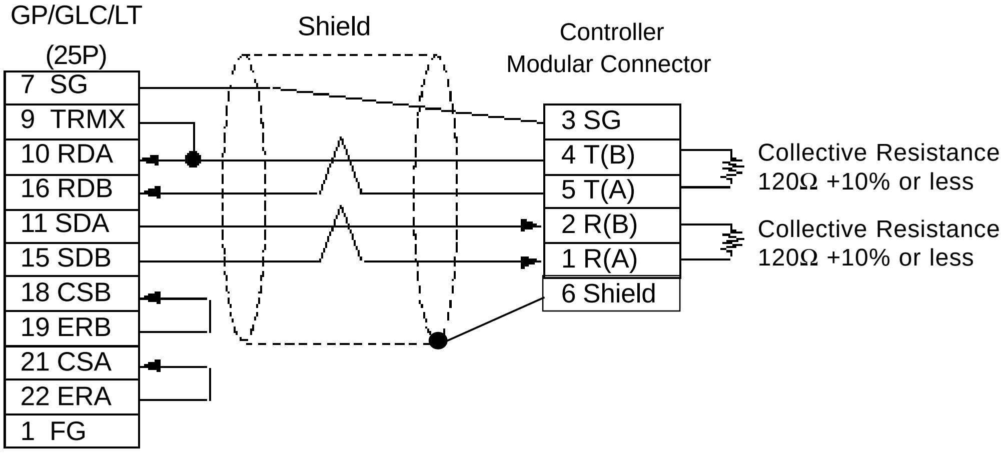



**Cable Diagram 2** (1:1) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>

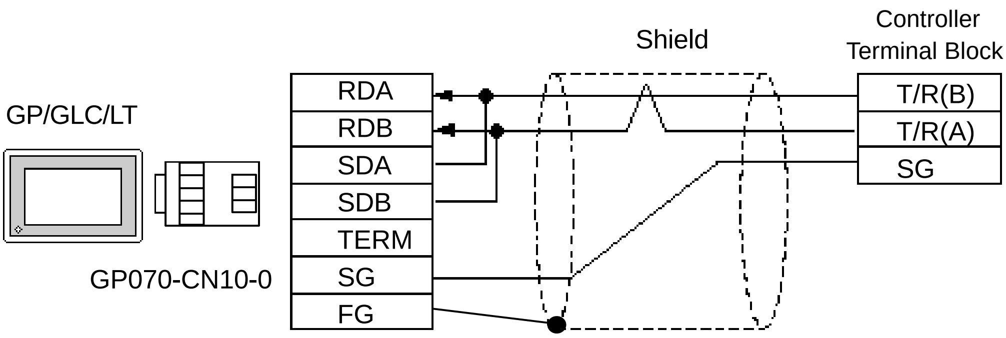



<When making your own cable>

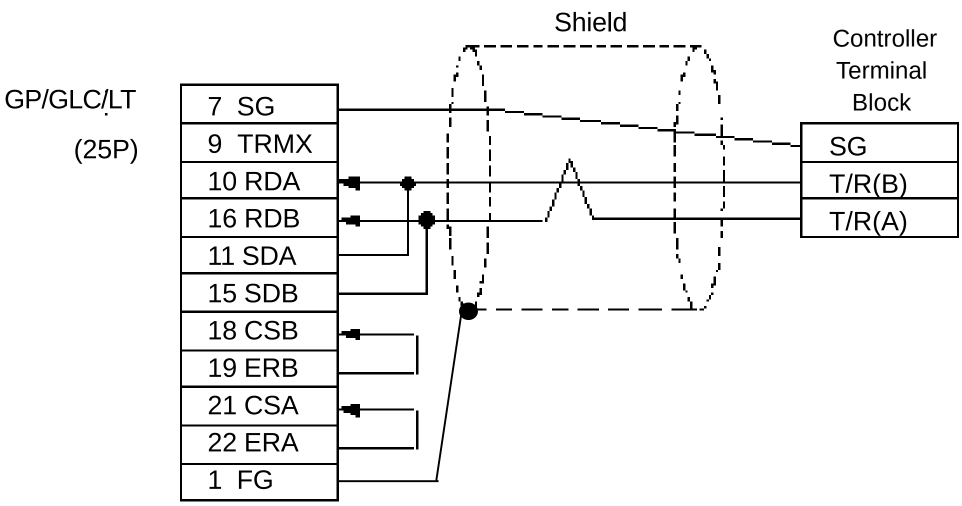


**Cable Diagram 3** (1:1) RS-422 2-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>

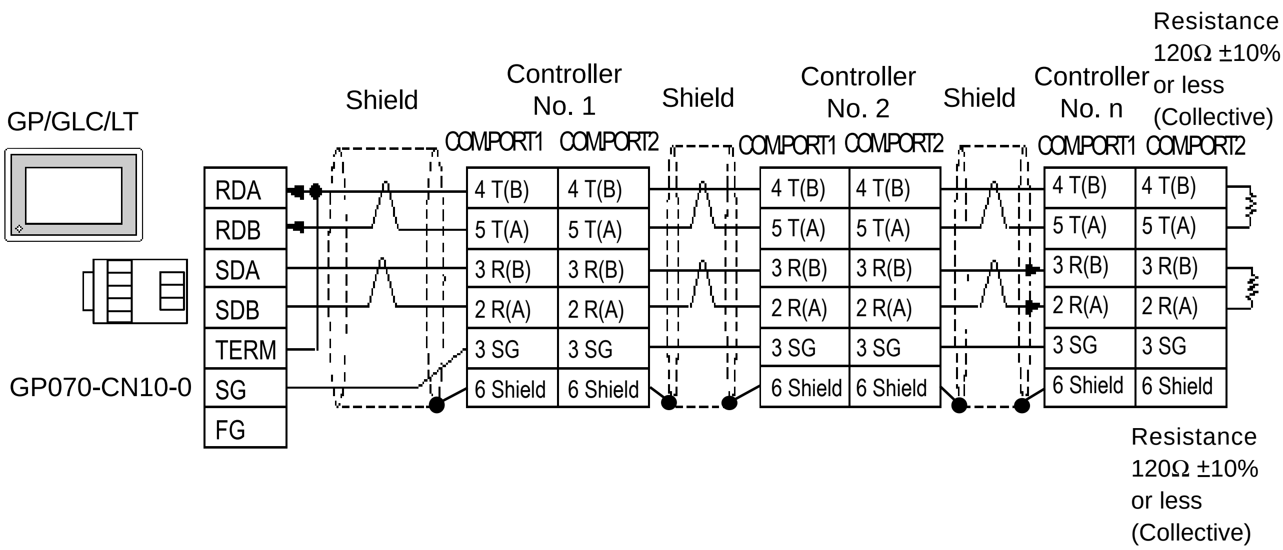



<When making your own cable>

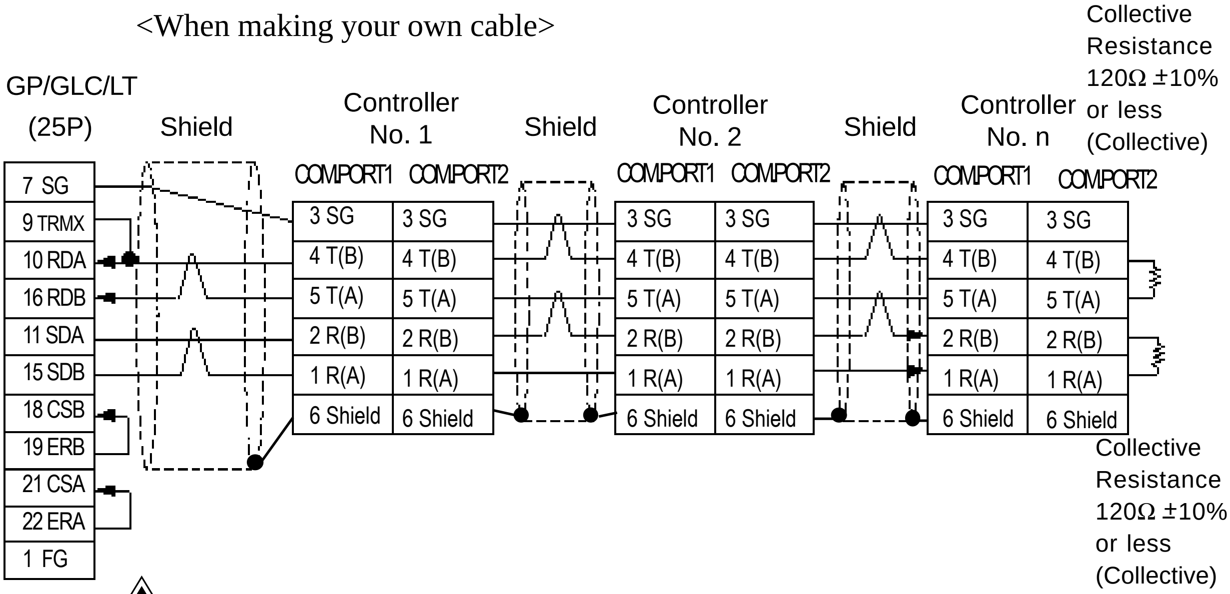



**Cable Diagram 4** (1:n) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>



<When making your own cable>

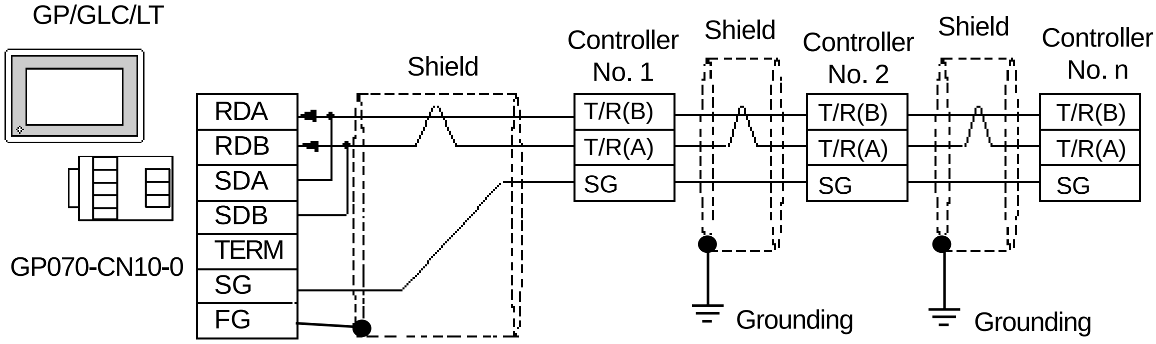



**Important**

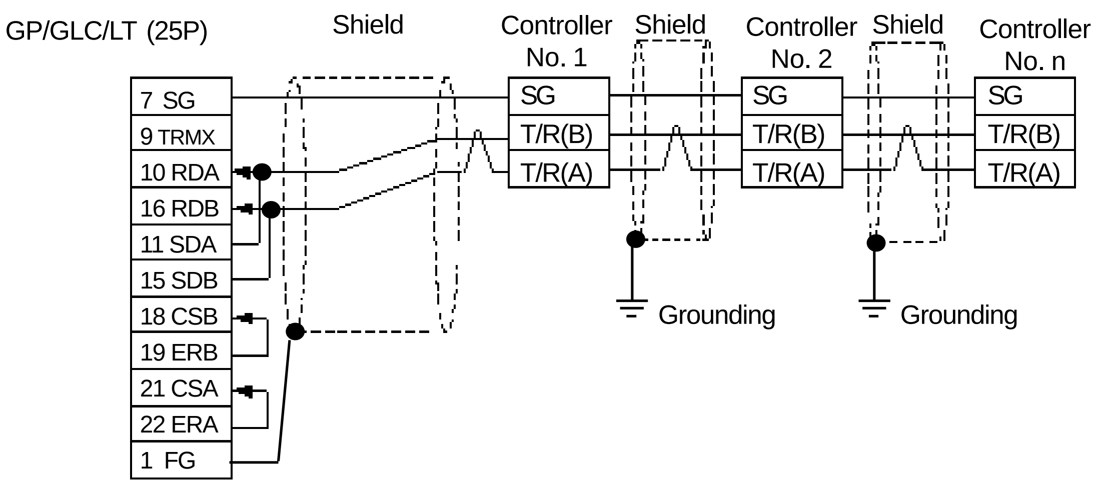
***• Up to 16 units can be connected to a single GP/GLC/LT.***

**Cable Diagram 5** (1:n) RS-422 2-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>




<When making your own cable>

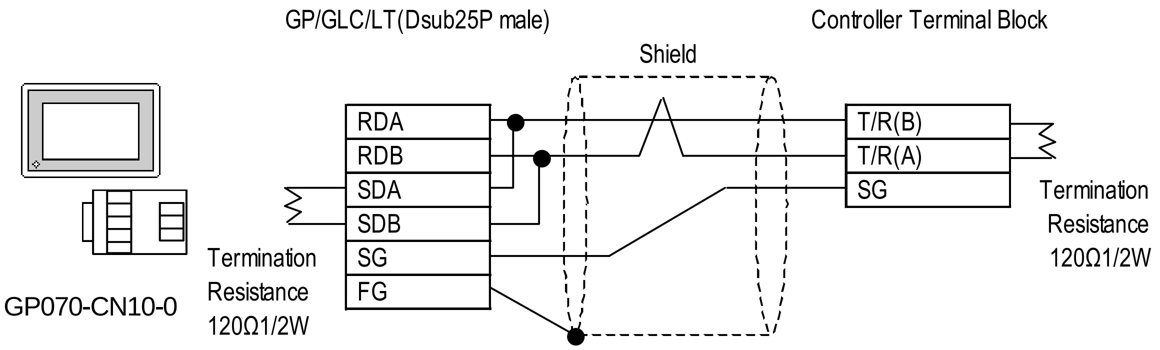



**Important**

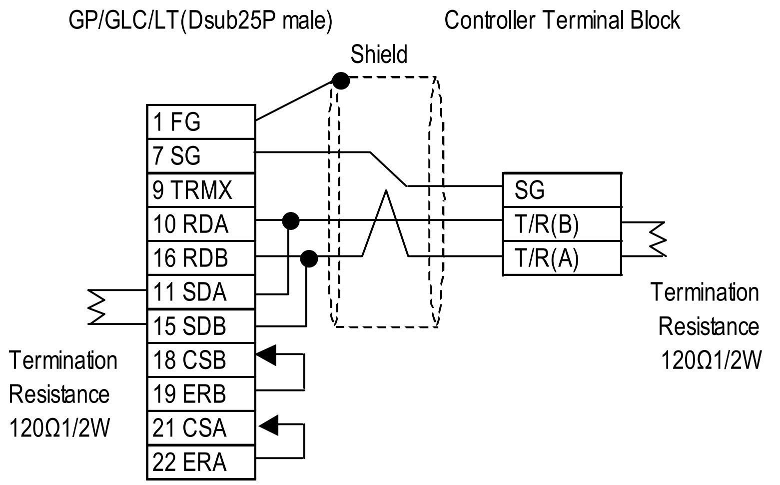
***• Up to 31 units can be connected to a single GP/GLC/LT.***

**Cable Diagram 6** (1:1) RS-422 2-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>

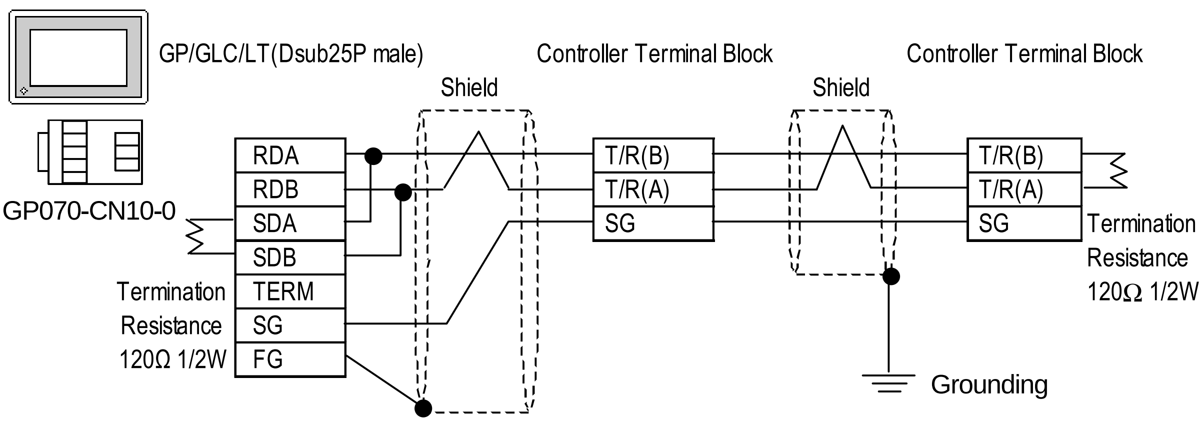



<When making your own cable>

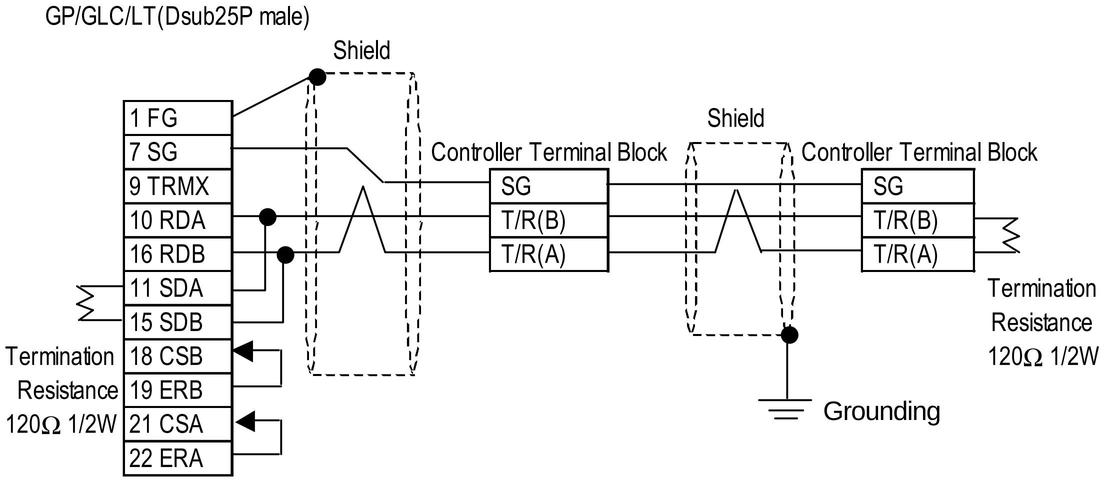



**Cable Diagram 7** (1:n) RS-422 2-Wire

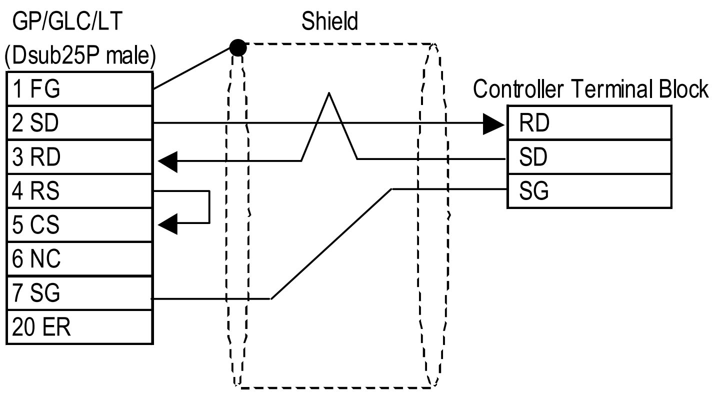
<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>



<When making your own cable>

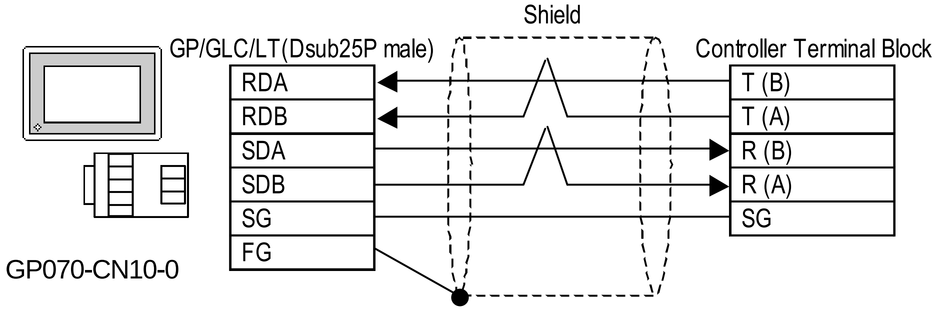



**Cable Diagram 8** (1:1) RS-232C

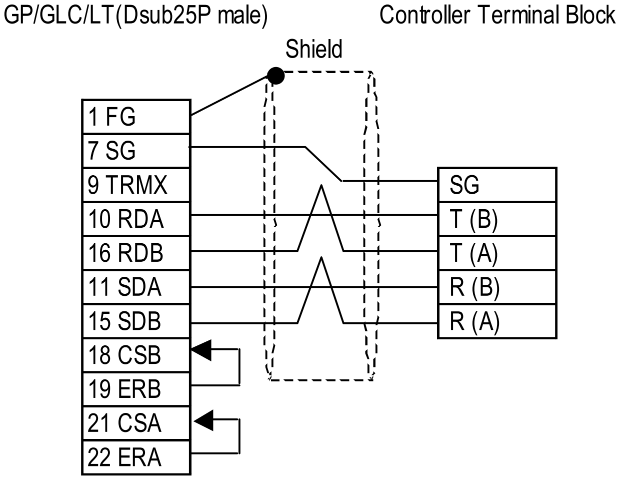



**Cable Diagram 9** (1:1) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>

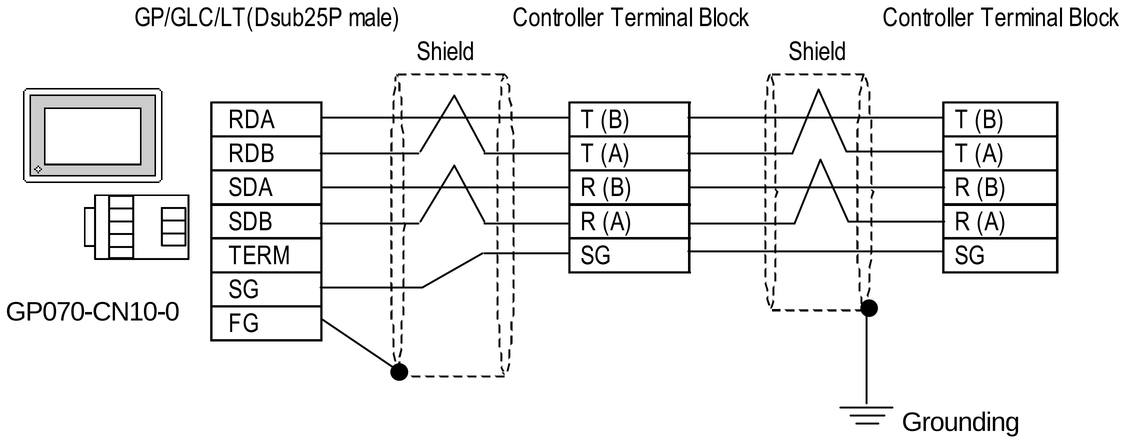


<When making your own cable>

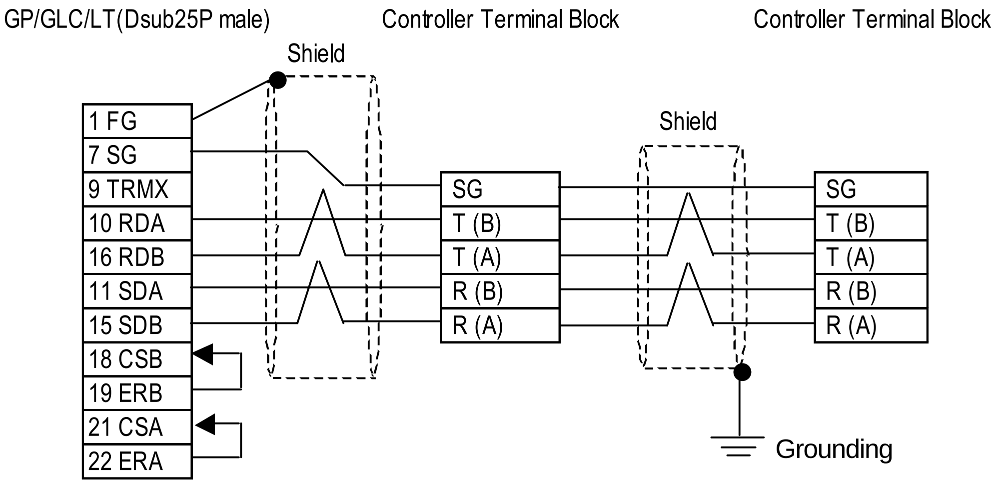



**Cable Diagram 10** (1:n) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>




<When making your own cable>

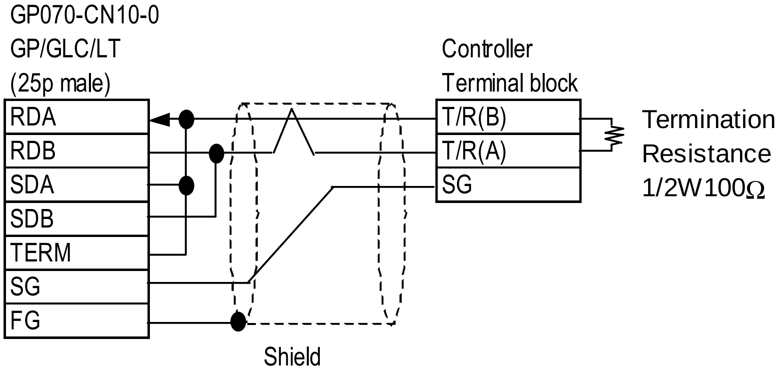



**Important**

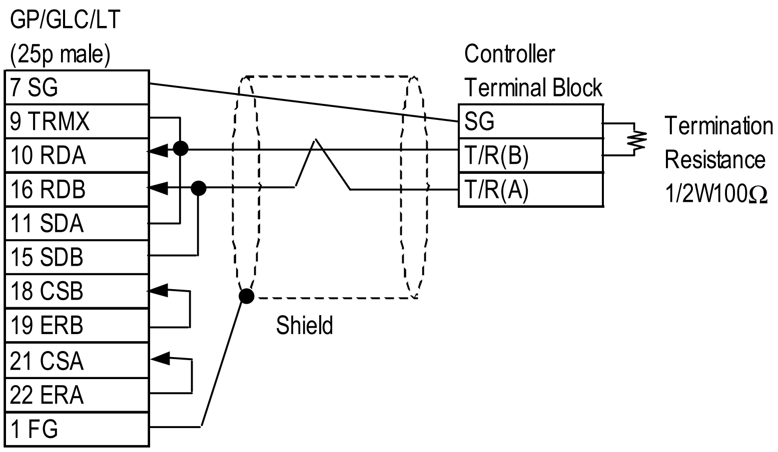
***• Up to 31 units can be connected to a single GP/GLC/LT.***

## Cable Diagram 11 (1:1) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>

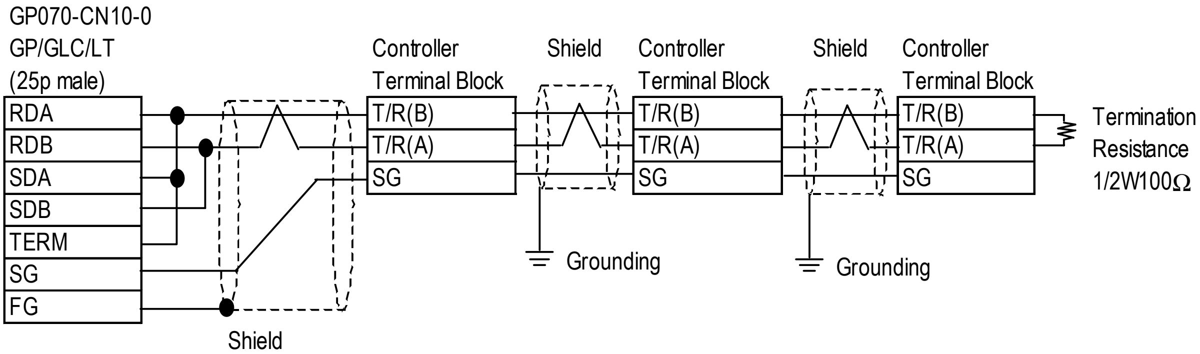



<When making your own cable>

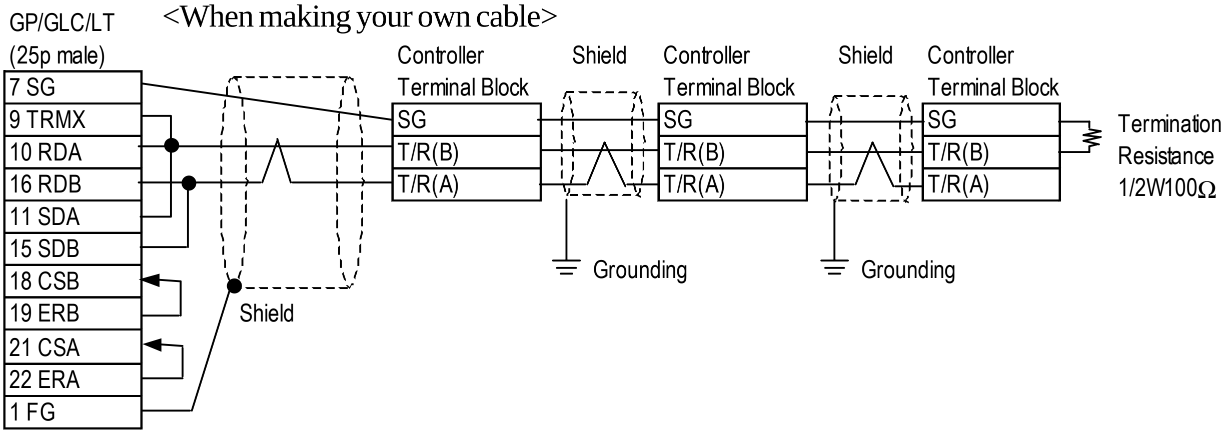



## Cable Diagram 12 (1:n) RS-422 4-Wire

<When using Digital's RS-422 connector terminal adapter GP070-CN10-0>



<When making your own cable>




**Important** ***• Up to 31 units can be connected to a single GP/GLC/LT.***

## 12.4.3 Supported Devices

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

### ■ CB Series / SR-Mini Series (Modbus protocol)

| Device | Bit Address | Word Address | Comments | |
|---|---|---|---|---|
| Data | 0000 ~ 02EEF | 0000 ~ 02EE | | L/H |

**Important**

- ***GP/GLC/LT's System Area (LS0 to LS19) Settings***

  ***The GP/GLC/LT's system area (20 words) cannot be allocated to the Controller's own data area. When you are entering the system area settings via the screen editor software or via the GP/GLC/LT's OFFLINE screen, be careful that you do not use the Controller's own data area.***

- ***The data communication feature will not operate when the slave address No. is set to "0". ( The default value is 0.)***

**Note:**

- **Indicating Controller Slave Address settings can be entered in your screen editor software. If a station number is not indicated, the previously entered station number is automatically used. (The default value is 1.)**

E.g. When entering Device Address 02EE

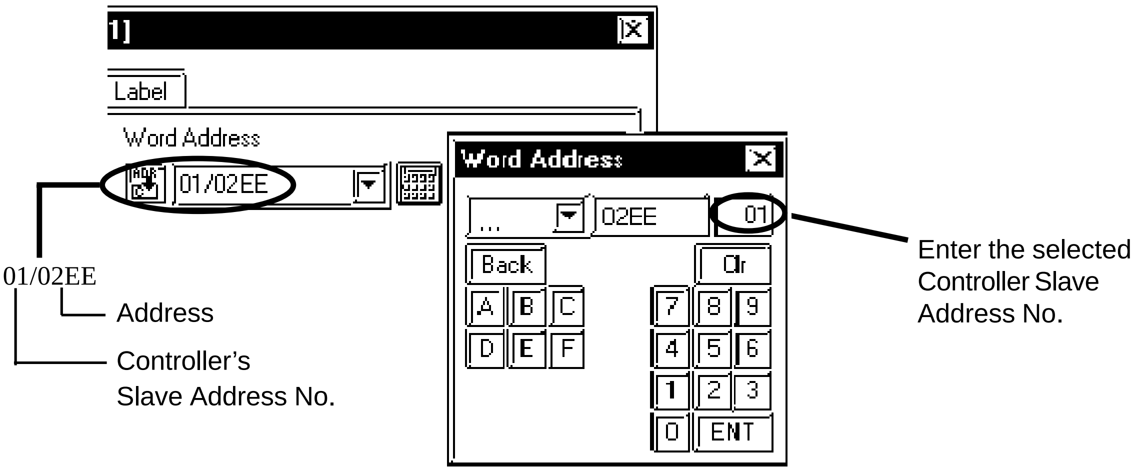
Enter the Device Name "...", and the Word Address "02EE".

01 ... 02EE

Word Address

Device Name

Controller's Slave Address No.



### ◆SRX Series

| Device | Bit Address | Word Address | Remarks | |
|---|---|---|---|---|
| ———— | 000000~3FFF | 0000~03FF | | L/H |
| | 04000~07FFF | 0400~07FF | | |
| | 08000~0883F | 0800~0883 | | |
| | 10000~13FFF | 1000~13FF | | |
| | 14000~17FFF | 1400~17FF | | |
| | 18000~1883F | 1800~1883 | | |

### ◆SRV Series

| Device | Bit Address | Word Address | Remarks | |
|---|---|---|---|---|
| ———— | 00000~03FFF | 0000~03FF | | L/H |
| | 08000~0881F | 0800~0881 | | |
| | 10000~13FFF | 1000~13FF | | |
| | 18000~1881F | 1800~1881 | | |

***Important***

- ***GP unit internal processing allocates 1024 words to each device. For this reason, the following features, which require more than one block, cannot be used. When wishing to use these functions, be sure to set them up so that they do not exceed one block.***

  ***1) Specifying the read area.***

  ***2) Specifying an a tag.***

  ***3) 2-Way block read/write (Pro-Server, GP-Web etc).***

  ***ex. In Pro-Server, it is not possible to perform a block-read of 20 words, starting from "03F9".***

- ***When a tag that will read controller discontinuous addresses is placed on a screen, the GP unit groups the addresses and does a block read of these addresses.***

  ***When this happens, a "Host Communication" error (02:02:**) occurs in the GP unit where the discontinuous addresses could not be read. (These addresses may have been unusable by the controller.)***

  ***To prevent this, specify the screen editor's [Options | Discontinuous Address Compensation Value] as 1. Also, specify the read tag's address interval as 2 words.***

## ■ CB Series / REX-F Series / LE100 Series (RKC protocol)

### ◆ CB Series

| Device | Bit Address | Word Address | Comments | |
|---|---|---|---|---|
| CB | CB00000~CB0036F | CB0000~CB0036 | | H/L |

### ◆ REX-F Series

| Device | Bit Address | Word Address | Comments | |
|---|---|---|---|---|
| REX | REX00000~REX0055F | REX0000~REX0055 | | H/L |

### ◆ LE100 Series

| Device | Bit Address | Word Address | Comments | |
|---|---|---|---|---|
| LE | LE00000~LE0070F | LE0000~LE0070 | | H/L |

*Important*

- ***GP/GLC/LT's System Area (LS0 to LS19) Settings***

  ***The GP/GLC/LT's system area (20 words) cannot be allocated to the Controller's own data area. When you are entering the system area settings via the screen editor software or via the GP/GLC/LT's OFFLINE screen, be careful that you do not use the Controller's own data area.***

*Note:*

- **Indicating Controller identifier data contains data to the right of the decimal point. This decimal point data is handled by the GP/GLC/LT as follows:**

**■ When reading out data**

**Data read out by the Indicating Controller is handled as integer data.**

**EX. With a value of 100.0:**

**Indicating Controller: 100.0**

**GP/GLC/LT: 1000**

**When displaying decimal point data in a numeric display, use the [Display Data Format] area's [Decimal Places] setting. In this example, only the first decimal place is used, so this setting should be "1". Now, the data will be handled correctly.**

**EX. With a value of 100.0:**

**Indicating Controller: 100.0**

**GP/GLC/LT: 100.0**

**Depending on the designated address, decimal point will be handled internally as follows:**

**When the Device List Address is designated with no changes:**

**no decimal point data is used**

**When 0x1000 is added to the Device List Address:**

**one (1) decimal point integer is used**

**When 0x2000 is added to the Device List Address:**

**two (2) decimal point integers are used**

**When 0x3000 is added to the Device List Address:**

**three (3) decimal point integers are used**

**Depending on the Address designation method used, the GP/GLC/LT's data will be as follows:**

| Indicating Controller Data | GP/GLC/LT Data | | | |
|---|---|---|---|---|
| | No change to Address data | Adding 0x1000 to the Address | Adding 0x2000 to the Address | Adding 0x3000 to the Address |
| 123 | 123 | 1230 | 12300 | 23000 |
| 123.4 | 123 | 1234 | 12340 | 23400 |
| 12.34 | 12 | 123 | 1234 | 12340 |
| 1.234 | 1 | 12 | 123 | 1234 |

*If the address designation method and the Indicating Controller data's decimal point position are not the same, the address' decimal data will be either cut off or replaced with a "0".*

*When decimal data becomes larger than 5 digits, the left-most digit(s) will be cut.*

*EX. If "1122334" is used, the number will become "22334".*

■ **When writing data**

**When writing data to an Indicating Controller, data must be integers.**

**Depending on the designated address, the decimal point will be handled internally as follows:**

**When the Device List Address is designated with no changes:**

**no decimal point data is used**

**When 0x1000 is added to the Device List Address:**

**one (1) decimal point integer is used**

**When 0x2000 is added to the Device List Address:**

**two (2) decimal point integers are used**

**When 0x3000 is added to the Device List Address:**

**three (3) decimal point integers are used**

**EX. 1) When writing "100.0" to the CB Series unit's Alarm 1 Setting (A1)**

**GP/GLC/LT's address value: 0x1007**

**GP/GLC/LT's write value: 1000**

**EX. 2) When writing "100" to the CB Series unit's Alarm 1 Setting (A1)**

**GP/GLC/LT's address value: 0x0007**

**GP/GLC/LT's write value: 100**

**Depending on the Address designation method used, the Indicating Controller's write data will be as follows:**

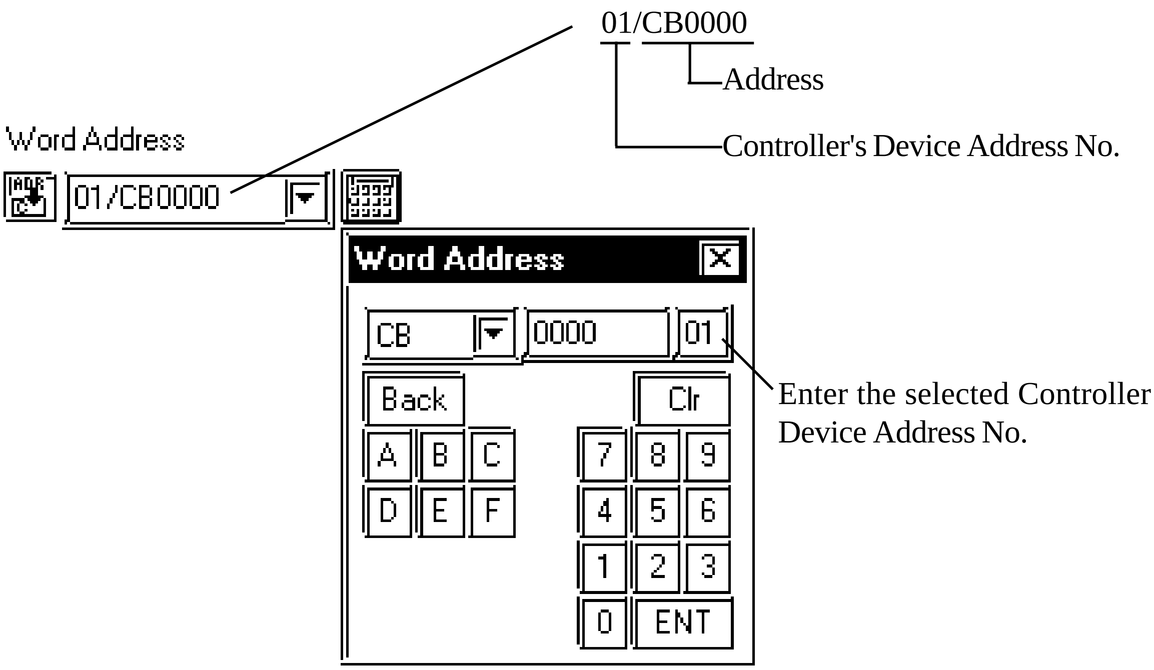
| GP/GLC/LT Data | Indicating Controller Data | | | |
|---|---|---|---|---|
| | No change to Address data | Adding 0x1000 to the Address | Adding 0x2000 to the Address | Adding 0x3000 to the Address |
| 1 | 1 | 0.1 | 0.01 | 0.001 |
| 123 | 123 | 12.3 | 1.23 | 0.123 |
| 1234 | 1234 | 123.4 | 12.34 | 1.234 |

*If the address designation method and the Indicating Controller data's decimal point position are not the same, the address' decimal data will be either cut off or replaced with "0".*

**Reference** *Please refer to your RKC Instrument Inc. Indicating Controller installation guide for information about identifier data setting ranges and decimal point positions.*

Note:
- **Indicating Controller device address settings can be entered in your screen editor software. If a device address is not indicated, the previously entered device address is automatically used. (The default value is 0.)**

<Example of device settings>



■ **Communication identifier list (CB Series)**

| Address | Identifier | Description |
|---|---|---|
| 00 | M1 | Measured value (PV) |
| 01 | M2 | Current transformer input 1 |
| 02 | M3 | Current transformer input 2 |
| 03 | AA | Alarm 1 status |
| 04 | AB | Alarm 2 status |
| 05 | B1 | Burnout |
| 06 | S1 | Set value (SV) |
| 07 | A1 | Alarm 1 setting |
| 08 | A2 | Alarm 2 setting |
| 09 | A3 | Heater break alarm 1 setting |
| 0A | A4 | Heater break alarm 2 setting |
| 0B | A5 | Control loop break alarm setting |
| 0C | A6 | LBA deadband |
| 0D | G1 | Autotuning (AT) |
| 0E | G2 | Self-tuning (ST) |
| 0F | P1 | Heat-side proportional band |
| 10 | I1 | Integral time |
| 11 | D1 | Derivative time |
| 12 | W1 | Anti-reset windup |
| 13 | T0 | Heat-side proportional cycle |
| 14 | P2 | Cold-side proportional band |
| 15 | V1 | Deadband |
| 16 | T1 | Cold-side proportional cycle |
| 17 | PB | PV bias |
| 18 | LK | Set data lock function |
| 19 | RS | RUN/STOP function |
| 1A | ER | Error code |
| 1B | IO | Initialization mode selection |
| 1C | IP | Setting necessary code [Cod] |
| 1D | XI | Input type selection [SL1] |
| 1E | XQ | Engineering unit and cooling type selection [SL2] |
| 1F | LV | Heater break alarm (HBA), control loop break alarm (LBA),special specification, or control loop break alarm (LBA) output selection [SL3] |

| Address | Identifier | Description |
|---|---|---|
| 20 | XA | First alarm (ALM1) type or First alarm (ALM1) with hold action selection [SL4] |
| 21 | XB | Second alarm (ALM2) type or Second alarm (ALM2) with hold action selection [SL5] |
| 22 | CA | Control action type selection [SL6] |
| 23 | Z1 | Energized/de-energized alarm selection, special specification selection 1 [SL7] |
| 24 | Z2 | Special specification selection 2 [SL8] |
| 25 | Z3 | Special specification selection 3 [SL9] |
| 26 | DH | Option selection [SL10] |
| 27 | XC | SV alarm type selection [SL11] |
| 28 | XV | Setting limiter (high limit) [SLH] |
| 29 | XW | Setting limiter (low limit) [SLL] |
| 2A | XU | Setting the position of decimal point [PGdP] |
| 2B | MH | Differential gap setting of ON/OFF action [oH] |
| 2C | HA | Differential gap setting of first alarm (ALM1) [AH1] |
| 2D | HB | Differential gap setting of second alarm (ALM2) [AH2] |
| 2E | XR | CT ratio setting [CTr] |
| 2F | F1 | Digital filter setting [dF] |
| 30 | GH | Time factor assumed to be safe [STTM] |
| 31 | PU | Factor to calculate proportional band [STPK] |
| 32 | IU | Factor to calculate integral time [STIK] |
| 33 | IL | Integral time limiter [ILIM] |
| 34 | HP | Holding peak ambient temperature [TCJ] |
| 35 | UT | Operating time display unit (Upper digits) [WTH] |
| 36 | UU | Operating time display unit (Lower digits) [WTL] |

■ **Communication identifier list (REX-F Series)**

| Address | Identifier | Description |
|---|---|---|
| 00 | M1 | Measued-value (PV) input |
| 01 | AA | First alarm output |
| 02 | AB | Second alarm output |
| 03 | AC | Heater break alarm outut |
| 04 | O1 | Manipulated output (Heating-side) |
| 05 | O2 | Manipulated output (Cooling-side) |
| 06 | B1 | Burnout |
| 07 | B2 | Feedback resistance (FBR) input burnout |
| 08 | S2 | Remote setting value (RS) |
| 09 | M2 | Feedback resistance input value (POS) |
| 0A | M3 | Current transformer input value |
| 0B | MS | Set-value (SV) monitoring |
| 0C | J1 | Auto/manual transfer |
| 0D | C1 | Local/remote transfer |
| 0E | E1 | Local/external memory area transfer |
| 0F | ZA | Control area No. transfer |
| 10 | G1 | PID control/auto-tuning transfer |
| 11 | RA | Local mode/computer mode identification |
| 12 | SR | Operation execution (RUN)/STOP transfer |
| 13 | ON | Manipulated output value (MV) |
| 14 | S1 | Set-value (SV) |
| 15 | A1 | First alarm setting |
| 16 | A2 | Second alarm setting |
| 17 | P1 | Proportional band (Heating-side) |
| 18 | I1 | Integral time |
| 19 | D1 | Derivative time |
| 1A | CA | Control response designation parameter |
| 1B | P2 | Cooling-side proportional band |
| 1C | V1 | Deadband |
| 1D | HH | Setting change rate limit |
| 1E | PB | PV bias |
| 1F | F1 | PV digital filter |
| 20 | DP | PV low input cut-off |
| 21 | RR | RS ratio |
| 22 | RB | RS bias |
| 23 | F2 | RS digital filter |
| 24 | OH | Output limit (High limit) |
| 25 | OL | Output limit (Low limit) |
| 26 | OQ | Cooling output Min. ON time |
| 27 | PH | Increase in output change rate limit |
| 28 | PL | Decrease in output change rate limit |

| Address | Identifier | Description |
|---|---|---|
| 29 | IV | Upper ON/OFF action (A) differential gap |
| 2A | IW | Lower ON/OFF action (A) differential gap |
| 2B | OE | Manual output at abnormality |
| 2C | GB | AT bias |
| 2D | HA | First alarm differential gap |
| 2E | TD | First alarm timer setting |
| 2F | A3 | Heater break alarm |
| 30 | HB | Second alarm differential gap |
| 31 | TG | Second alarm timer setting |
| 32 | LA | Analog output (AO) Specification selection |
| 33 | HV | Analog output (AO) Scale high limit |
| 34 | HW | Analog output (AO) Scale low limit |
| 35 | V2 | Neutral zone |
| 36 | VH | Open/close output differential gap |
| 37 | SY | Action selection at feedback resistance (FBR) input break |
| 38 | DA | Bar-graph display selection |
| 39 | XI | PV input type selection |
| 3A | AV | Input abnormality determination point (High limit) |
| 3B | AW | Input abnormality determination point (Low limit) |
| 3C | WH | Action selection at input abnormality (High limit) |
| 3D | WL | Action selection at input abnormality (Low limit) |
| 3E | XV | Input programmable range (High limit) |
| 3F | XW | Input programmable range (Low limit) |
| 40 | XU | Decimal-point position selection |
| 41 | XH | Square root extraction selection |
| 42 | SH | Setting limit (High limit) |
| 43 | SL | Setting limit (Low limit) |
| 44 | XR | RS input type selection |
| 45 | XL | SV tracking selection |
| 46 | T0 | Proportioning cycle (Heating-side) |
| 47 | T1 | Cooling-side proportioning cycle |
| 48 | XE | Direct/reverse action selection |
| 49 | XN | Hot/cold start selection |
| 4A | SX | Start determination point |
| 4B | XA | First alarm Action selection |
| 4C | NA | First alarm Energized/de-energized selection |
| 4D | OA | First alarm Action selection at input abnormality |
| 4E | WA | First alarm Hold action selection |
| 4F | XB | Second alarm Action selection |

| Address | Identifier | Description |
|---|---|---|
| 50 | NB | Second alarm Energized/de-energized selection |
| 51 | OB | Second alarm Action selection at input abnormality |
| 52 | WB | Second alarm Hold action selection |
| 53 | LK | Set data lock level |
| 54 | LL | Area lock |
| 55 | DH | Operation RUN/STOP display lock |

■ **Communication identifier list (LE100 Series)**

| Address | Identifier | Description |
|---|---|---|
| 0 | M1 | Measured value (PV) |
| 1 | AA | Output 1 status |
| 2 | AB | Output 2 status |
| 3 | AC | Output 3 status |
| 4 | AD | Output 4 status |
| 5 | AE | Output 5 status |
| 6 | AF | Output 6 status |
| 7 | AG | Output 7 status |
| 8 | AH | Output 8 status |
| 9 | B1 | Burnout |
| 0A | ER | Error code |
| 0B~0D | ID | ID data |
| 0E | MS | Specific gravity monitor |
| 0F | ML | Scale low monitor |
| 10 | MH | Scale high monitor |
| 11 | HP | Peak hold monitor |
| 12 | HQ | Bottom hold monitor |
| 13 | MW | Number of water processing times monitor |
| 14 | MZ | Amount of emptiness correction monitor |
| 15 | A1 | Output 1 set value |
| 16 | A2 | Output 2 set value |
| 17 | A3 | Output 3 set value |
| 18 | A4 | Output 4 set value |
| 19 | A5 | Output 5 set value |
| 1A | A6 | Output 6 set value |
| 1B | A7 | Output 7 set value |
| 1C | A8 | Output 8 set value |
| 1D | A9 | Actual liquid output setting |
| 1E | AZ | Emptiness adjustment |
| 1F | WT | Number of water processing times |
| 20 | CW | Initializing the number of water processing times |
| 21 | HR | Hold reset |
| 22 | IR | Interlock release |
| 23 | LK | Set data lock |
| 24 | IS | Default setting |
| 25 | EC | Error release |
| 26 | LU | Decimal point position selection |
| 27 | LT | Number of linearizing table setting |

| Address | Identifier | Description |
|---|---|---|
| 28 | L0 | Linearizing table setting 0 |
| 29 | L1 | Linearizing table setting 1 |
| 2A | L2 | Linearizing table setting 2 |
| 2B | L3 | Linearizing table setting 3 |
| 2C | L4 | Linearizing table setting 4 |
| 2D | L5 | Linearizing table setting 5 |
| 2E | L6 | Linearizing table setting 6 |
| 2F | L7 | Linearizing table setting 7 |
| 30 | L8 | Linearizing table setting 8 |
| 31 | L9 | Linearizing table setting 9 |
| 32 | LA | Linearizing table setting 10 |
| 33 | F1 | Digital filter |
| 34 | XA | Output 1 type selection |
| 35 | DA | Output 1 deviation value setting |
| 36 | QA | Output 1 interlocking function selection |
| 37 | NA | Outut 1 a/b contact selection |
| 38 | HA | Output 1 defferential gap |
| 39 | TA | Output 1 timer setting |
| 3A | XB | Output 2 type selection |
| 3B | DB | Output 2 deviation value setting |
| 3C | QB | Output 2 interlocking function selection |
| 3D | NB | Output 2 a/b contact selection |
| 3E | HB | Output 2 differential gap |
| 3F | TB | Output 2 timer setting |
| 40 | XC | Output 3 type selection |
| 41 | DC | Output 3 deviation value setting |
| 42 | QC | Output 3 interlocking function selection |
| 43 | NC | Output 3 a/b contact selection |
| 44 | HC | Output 3 differential gap |
| 45 | TC | Output 3 timer setting |
| 46 | XD | Output 4 type selection |
| 47 | DD | Output 4 deviation value setting |
| 48 | QD | Output 4 interlocking function selection |
| 49 | ND | Output 4 a/b contact selection |
| 4A | HD | Output 4 differential gap |
| 4B | TD | Output 4 timer setting |
| 4C | XE | Output 5 type selection |
| 4D | DE | Output 5 deviation value setting |
| 4E | QE | Output 5 interlocking function selection |
| 4F | NE | Output 5 a/b contact selection |
| 50 | HE | Output 5 differential gap |
| 51 | TE | Output 5 timer setting |

| Address | Identifier | Description |
|---|---|---|
| 52 | XF | Output 6 type selection |
| 53 | DF | Output 6 deviation value setting |
| 54 | QF | Output 6 interlocking function selection |
| 55 | NF | Output 6 a/b contact selection |
| 56 | HF | Output 6 differential gap |
| 57 | TF | Output 6 timer setting |
| 58 | XG | Output 7 type selection |
| 59 | DG | Output 7 deviation value setting |
| 5A | QG | Output 7 interlocking function selection |
| 5B | NG | Output 7 a/b contact selection |
| 5C | HG | Output 7 differential gap |
| 5D | TG | Output 7 timer setting |
| 5E | XH | Output 8 type selection |
| 5F | DH | Output 8 deviation value setting |
| 60 | QH | Output 8 interlocking function selection |
| 61 | NH | Output 8 a/b contact selection |
| 62 | HH | Output 8 differential gap |
| 63 | TH | Output 8 timer setting |
| 64 | HV | Monitor output high |
| 65 | HW | Monitor output low |
| 66 | EG | End specific gravity setting |
| 67 | SW | Number of water processing times setting |
| 68 | XX | Scale low |
| 69 | SG | Specific gravity setting |
| 6A | J1 | Scale 1 actual liquid setting |
| 6B | J2 | Scale 2 actual liquid setting |
| 6C | J3 | Correction on the low limit side by actual liquid 2 |
| 6D | J4 | Correction on the high limit side by actual liquid 2 |
| 6E | UN | Unit setting |
| 6F | SP | Specific gravity setting transfer |
| 70 | SS | Specific gravity correction function selection |
| 71 | DS | DI function selection |
| 72 | MM | Volume/level display selection |

**Note:** **When you register an identifier as a symbol, you can then select that identifier when setting up addresses. In this additional manual's CD-ROM is a sample symbol file of addresses registered for Unit No. 0. This sample file can be imported using the Symbol Editor. For information on how to use the Import feature, please refer to your screen editor's Operation Manual.**

**- Symbol File : RKCsymbol.lbe**

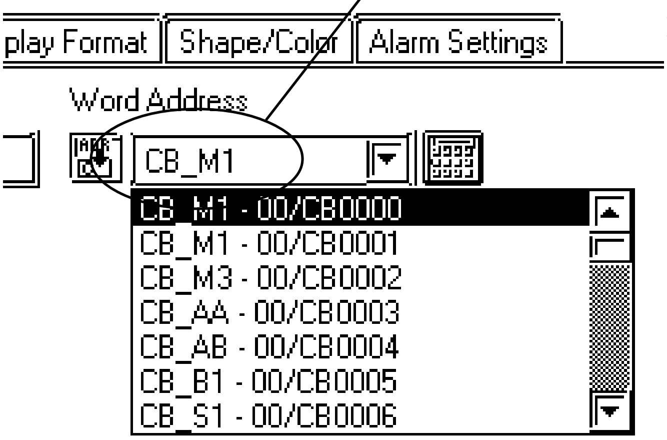
**After importing the symbol file, a pull-down list of registered symbols (identifiers) will appear when you click on the black triangle. (see below)**

**CB_M1**

**Identifier**

**Temperature Controller Series Name**

| | |
|---|---|
| **CB** | **:CB Series** |
| **REX** | **:REX-F Series** |
| **LE** | **:LE100 Series** |




* *When using Sta. No. other than the sample file's Sta. No. 0, be sure to change the sample file's Sta. No. data.*

## 12.4.4 Environment Setup

The following table lists Digital's recommended RKC INSTRUMENT INC. Controller and GP/GLC/LT communication settings.

### ■ CB Series (Modbus protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 7bits | Data Length | 7bits |
| Stop Bit | 2bits | Stop Bit | 2bits |
| Parity Bit | odd | Parity Bit | odd |
| Data Flow Control | ER(Fixed) | ——— | ——— |
| Communication Format When using RS-422 | RS-422(2-wire) | ——— | ——— |
| Unit No. | 1~32 | Slave Address | 1~32 |

Important

- ***The Controller's slave address number range is from 0 to 99 for the CB Series units. ( the data communication feature does not operate when it is set to "0".) Use only from 1 to 32 on the GP/GLC/LT.***

### ■ SR-Mini Series (Modbus protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 8bits | Data Length | 8bits |
| Stop Bit | 1bit | Stop Bit | 1bit |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER(fixed) | ——— | ——— |
| Communication Format When using RS-232C | RS-232C | ——— | ——— |
| Communication Format When using RS-422 | RS-422(4-wire) | ——— | ——— |
| Unit No. | 1~16 | Slave Address | 1~16 |

Important

- ***The Controller's slave address number range is from 1 to 16 for the SR-Mini Series units. ( the data communication feature does not operate when it is set to "0".) Use only from 1 to 16 on the GP/GLC/LT.***

## ■ SRX/SRV Series (Modbus protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 8bits | Data Length | 8bits (fixed) |
| Stop Bit | 1bits | ——— | ——— |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER(Fixed) | ——— | ——— |
| Communication Format | 2-wire | ——— | ——— |
| Unit No. | 1 | Address Setting | 1 *1 |
| ——— | ——— | Driver Slection | MODBUS |
| ——— | ——— | Communication Switchover Time | 6ms (Factory Setting) |
| ——— | ——— | Data Interval delay time | 0ms (Factory Setting) *2 |

**1 When designating the controller's address, the actual address will be:*
*actual address = address designated by the rotary switch + [1].*
**2 When using the Baud Rate 38400bps, set the Data Intervel delay time to 1ms or higher.*

Important

- ***The Controller's slave address number range is from 0 to 100 for the CB Series units. ( the data communication feature does not operate when it is set to "0".) Use only from 1 to 32 on the GP/GLC/LT.***

## ■ CB Series (RKC protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 8bits | Data Length | 8bits |
| Stop Bit | 1bit | Stop Bit | 1bit |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER(fixed) | ——— | ——— |
| Communication Format When using RS-422 | RS-422(2-wire) | ——— | ——— |
| Unit No. | 0~31 | Device Address | 0~31 |

Important

- ***The Controller's device address number range is from 0 to 99 for the CB Series units. Use only from 0 to 31 on the GP/GLC/LT.***

## ■ **REX-F Series** (RKC protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 7bits | DataLength | 7bits |
| Stop Bit | 2bits | Stop Bit | 2bits |
| Parity Bit | odd | Parity Bit | odd |
| Data Flow Control | ER(Fixed) | ——— | ——— |
| Communication Format When using RS-232C | RS-232C | ——— | ——— |
| Communication Format When using RS-422 | RS-422(4-wire) | ——— | ——— |
| | RS-422(2-wire) | ——— | ——— |
| Unit No. | 0~31 | Device Address | 0~31 |

*Important*

- ***The Controller's device address number range is from 0 to 99 for the REX-F Series units. Use only from 0 to 31 on the GP/GLC/LT.***

## ■ **LE100 Series** (RKC protocol)

| GP/GLC/LT Settings | | Controller Settings | |
|---|---|---|---|
| Baud Rate | 9600bps | Baud Rate | 9600bps |
| Data Length | 8bits | Data Length | 8bits |
| Stop Bit | 1bit | Stop Bit | 1bit |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER(fixed) | ——— | ——— |
| Communication Format When using RS-422 | RS-422(2-wire) | ——— | ——— |
| Unit No. | 0~31 | Device Address | 0~31 |

*Important*

- ***The Controller's device address number range is from 0 to 99 for the LE100 Series units. Use only from 0 to 31 on the GP/GLC/LT.***

## 12.4.5 Error Codes

### ■Controller Error Codes

Error messages (Ex. Host communication error (02:**:##) ) are displayed in the lower left corner of the GP/GLC/LT screen (** stands for an error code specific to the Controller).

Host Communication Error (02:**:##)

**Device Address of Controller that has caused the error**

**Controller Error Code**

| Error Code | Description |
|---|---|
| 04 | Occurs when a read out is performed from an address that cannot be read from. |
| 15 | Occurs when writing setting values that are outside of the allowed range. |

# A1 Maximum Number of Consecutive PLC Addresses

The following lists the maximum number of consecutive addresses that can be read by each PLC. Refer to these tables to utilize *Block Transfer*.

### CB/REX-F/LE100 Series (RKC protocol)

| Device | Max No. of Consecutive Addresses |
|---|---|
| CB | 1 Word |
| REX | |
| LE | |

# A2 Device Codes and Address Codes

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

## CB Series (RKC protocol)

| Device | Word Address | Device Code | Address Code |
|---|---|---|---|
| CB | CB0000~ | 8000 | Word Address |
| | CB1000~ | 8200 | Save as word address value minus 0x100 |
| | CB2000~ | 8400 | Save as word address value minus 0x200 |
| | CB3000~ | 8600 | Save as word address value minus 0x300 |

## REX-F Series (RKC protocol)

| Device | Word Address | Device Code | Address Code |
|---|---|---|---|
| REX | REX0000~ | 9000 | Word Address |
| | REX1000~ | 9200 | Save as word address value minus 0x100 |
| | REX2000~ | 9400 | Save as word address value minus 0x200 |
| | REX3000~ | 9600 | Save as word address value minus 0x300 |

## LE100 Series (RKC protocol)

| Device | Word Address | Device Code | Address Code |
|---|---|---|---|
| LE | LE0000~ | A000 | Word Address |
| | LE1000~ | A200 | Save as word address value minus 0x100 |
| | LE2000~ | A400 | Save as word address value minus 0x200 |
| | LE3000~ | A600 | Save as word address value minus 0x300 |

# A3 Address Conversion Table

Refer to the following Address Conversion Table to convert addresses correctly.

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

| | | After Conversion | | | |
|---|---|---|---|---|---|
| | | CB | REX | LE | LS |
| Before Conversion | CB | ❍ | ❍ | ❍ | ❍ |
| | REX | ❍ | ❍ | ❍ | ❍ |
| | LE | ❍ | ❍ | ❍ | ❍ |
| | LS | ❍ | ❍ | ❍ | ❍ |