PREFACE

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Thank you for purchasing the LogiTouch integrated development software, "LogiTouch Editor Ver. 1.0".

Please read this manual carefully in order to use this software properly, and be sure to keep this manual handy for future reference.

NOTES

(1) The copyrights to all programs and manuals included in the LogiTouch Editor Ver. 1.0 (hereinafter referred to as "this product") are reserved by the Digital Electronics Corporation. Digital grants the use of this product to its users as described in the "Software Operating Conditions" documentation, included with this product's CD-ROM. Any actions violating the above-mentioned conditions are prohibited by both Japanese and foreign regulations.

(2) The contents of this manual have been thoroughly inspected. However, if you should find any errors or omissions in this manual, please inform your local LT representative of your findings.

(3) Regardless of article (2), the Digital Electronics Corporation shall not be held responsible for any damages or third party claims resulting from the use of this product.

(4) Differences may occur between the descriptions found in this manual and the actual functioning of this product. Therefore, the latest information on this product is provided in data files (i.e. Readme.txt files, etc.) and in separate documents. Please consult these sources as well as this manual prior to using the product.

(5) Even though the information contained in and displayed by this product may be related to intangible or intellectual properties of the Digital Electronics Corporation or third parties, the Digital Electronics Corporation shall not warrant or grant the use of said properties to any users and/or other third parties.

(6) The specifications set out in this manual are for overseas products only. As a result, some differences may exist between the specifications given here and for those of the identical Japanese product.

For the rights to trademarks and trade names, see "TRADEMARK RIGHTS".

TRADEMARK RIGHTS

All company or product names used in this manual are the trade names, trademarks (including registered trademarks), or service marks of their respective companies.

This product omits individual descriptions of each of these rights.

Trademark / Trade Name	Right Holder
Microsoft, MS, MS-DOS, Windows, Windows 95, Windows 98, Windows Me, Windows NT, Windows 2000 Windows Explorer, Microsoft Excel 95	Microsoft Corporation, USA
Intel, Pentium	Intel Corporation, USA
Pro-face, Flex Network	Digital Electronics Corporation (in Japan and other countries)
Ethernet	Western Digital Electric Corporation, USA
IBM, VGA, PC/AT	International Business Machines Corporation (IBM), USA

The following terms differ from the above mentioned formal trade names and trademarks.

Term used in this manual	Formal Trade Name or Trademark
Windows 95	Microsoft® Windows®95 Operating System
Windows 98	Microsoft® Windows®98 Operating System
Windows Me	Microsoft® Windows®Me Operating System
Windows NT	Microsoft® Windows NT® Operating System
Windows 2000	Microsoft® Windows®2000 Operating System
MS-DOS	Microsoft® MS-DOS® Operating System

MANUAL SYMBOLS AND TERMINOLOGY

This manual uses the following symbols and terminology.

■ Safety Symbols and Terms

This manual uses the following symbols and terms to identify important information related to the correct and safe operation of this product.

Symbol	Description
⚠ **WARNING**	Indicates a potentially hazardous situation that could result in serious injury or death.
⚠ **CAUTION**	Indicates a potentially hazardous situation that could result in minor injury or equipment damage.
⚠ *Important*	Indicates a potentially damaging action or dangerous situation that could result in abnormal equipment operation or data loss.
Careful!	Indicates instructions or procedures that must be performed to ensure correct product use.
STOP	Indicates instructions or procedures that must not be performed.

■ General Information Symbols and Terms

This manual uses the following symbols and terms for general information.

Symbol	Description
Note:	Provides hints on correct product use, or supplementary information.
▼ *Reference* ▲	Indicates an item's related information (manual name, page number).
External Device	Indicates a peripheral device (temperature controller, inverter, etc.). This does not include devices connected via the Flex Network or DIO.
LT	Generic name for the "LogiTouch Series" Graphic Logic Controller made by Digital Electronics Corporation.
LT Editor	Indicates LogiTouch Editor Version 1.0 (hereinafter referred as "this product"), LogiTouch integrated development software made by Digital Electronics Corporation.

LOGITOUCH SERIES

The LT Editor supports the following LT models.

Series	Type	Product	Model
LogiTouch Series	Type-A1	GLC150B-XY32SK	GLC150-BG41-XY32SK-24V
	Type-A2	GLC150B-XY32SC	GLC150-BG41-XY32SC-24V
	Type-B	GLC150B-FLEX	GLC150-BG41-FLEX-24V
	Type-C	GLC150B-RSFL	GLC150-BG41-RSFL-24V

Note: **For the types of external devices supported by LT Editor, please refer to "External Device Connection Manual".**

▼◀Reference▶▲ *HOW TO USE THIS MANUAL*

HOW TO USE THIS MANUAL

■ Manual Structure

The "Parts List" is one in a series of manuals for this product and explains how to use the LT Editor. There are three other manuals in the series, as well as online help. Please refer to "Operation Manual - Screen Creation Guide Chapter 1 LT Editor Fundamentals" for an outline of this product.

▼*Reference*▲ *Operation Manual - Screen Creation Guide*
1.6 LT Editor Manuals and Help

In addition to these manuals, data files containing supplemental information on updated functions are also provided. To read these additional data files, click on the [Start] button in your Windows OS main screen and select the [Programs]®[LogiTouch] menu. Then, click on the [Read Me] selection.

For detailed information on LT series products, please refer to "***LogiTouch Series User's Manual***". (Optionally available)

Included on CD-ROM	**Operation Manual -Screen Creation Guide**	Describes the operating procedures for the LT Editor and all functions except for Logic Program development (provided as a PDF file).
	Operation Manual -Logic Programming Guide	Describes logic program development. This manual's "Programming" section uses a tutorial lesson to help users learn basic operation procedures, and a "Functions" section to explain the software settings required for the combination of the LT main unit and the LT Editor (provided as a PDF file).
	Parts List	Describes the LT Editor's pre-made Parts and symbols (provided as a PDF file).
	External Device Connection Manual (this manual)	Describes the methods for connecting the LT to external devices of various manufacturers (provided as a PDF file).
Available on LT Editor screen	**Online Help**	Describes the methods for setting the LT Editor's windows and dialog boxes, instructions and functions of logic programs, as well as how to set up individual drivers.

✎*Note:* • **Address settings described in these manuals are for explanatory purposes only. Appropriate addresses must be set according to your requirements.**

▼*Reference*▲ *External Device Connection Manual*

• **If you have any questions about the contents of this manual, please contact your local LT distributor. LT distributors will answer to your technical inquiries and provide you with technical support.**

▼*Reference*▲ *Operation Manual - Screen Creation Guide*
A-4 Software Trouble Report

If you have any question about your personal computer or Microsoft® Windows®, please contact your PC distributor or manufacturer.

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CHAPTER 1   Direct Access Communication

CHAPTER 2   Indicating Controllers

CHAPTER 3 Inverters

CHAPTER 4   Memory Link Communication

A1   Maximum Number of consecutive Addresses

1 ▸ Direct Access Communication

The *Direct Access* (Programless) format, which frees the External Device from running protocol programs, performs communication between the LT and an External Device. This chapter describes the Direct Access method of Communication.

1.1 ▸ Communication Method

Depending on the Parts used in your screen program, the LT can easily specify an External Device. By doing so, the LT automatically requests the data required for operation (System Data) and the screen display from the External Device. Then the LT, after receiving the External Device response, changes its screen display via its screen animation settings. Also, data can be sent to the External Device using LT touch key input.

With Direct Access communication, the LT is always the master in the communication link.

In Direct Access Communication, data required by the LT's screen display is automatically sent and received from the LT. Therefore, an External Device program for screen display operations is not required, thereby simplifying installation of the graphical control panel (LT).
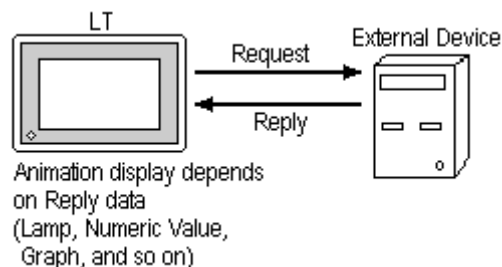
Caution **When an error occurs because data is read or written outside the External Device's device range, the read/write operation continues retrying until the error is restored. For this reason, the LT display screen may seem to be not operating. To fix this problem, check to make sure the devices designated by the LT's Parts are within the External Device's designated range.**

> **1.1.1 LS Area Structure**

The LS Area, located in LT memory, is the area used for the LT's operations. The LS Area structure is as follows.

```
LS0      ┌─────────────────┐
  :      │ System Data     │
LS19     │ Area            │
LS20     ├─────────────────┤
  :      │ Reading Area    │
  :      ├─────────────────┤
  :      │ User Area       │
LS2032   ├─────────────────┤
  :      │ Special Relays  │
LS2047   ├─────────────────┤
LS2048   │ Reserved        │
  :      │                 │
LS2095   ├─────────────────┤
LS2096   │ User Area       │
  :      │                 │
LS4095   └─────────────────┘
```
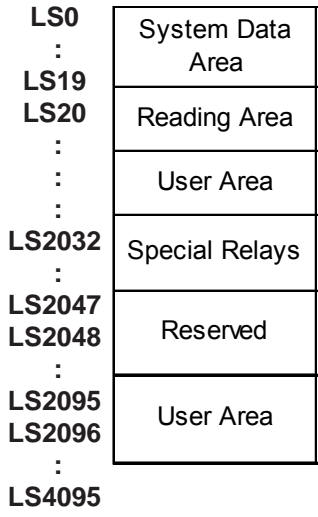
System Data Area This is the data write area for LT screen control data or error information necessary for LT operation.

Reading Area Stores data common to all screens and performs LS Area Refresh. Up to 256 words can be designated here. Up to 16 words can be set in LS Area Refresh.

User Area The devices which are only for the LT's internal use, and cannot be allocated as External Devices. This area is used to process Parts which can only be processed by the LT internally and cannot be controlled by as External Device.

Special Relays This area is where the various status information is setup during LT communications.

Note: **The following describes how to access the LS Area.**

• Word Address access

LS **** → **0000~4095**

• Bit Address access

LS **** ** → **Bit position 00~15**, **Word Address 0000~4095**

Reserved Please do not use this area. It is only for LT's internal use. If you use this area, the LT will not operate properly.

1.1.2 ▶ Address Settings

Up to 20 words can be set as the System Data Area and up to 256 words can be set as the Reading Area.[*1] The size of these areas determines each area's number of available addresses.

▲!▲
Important
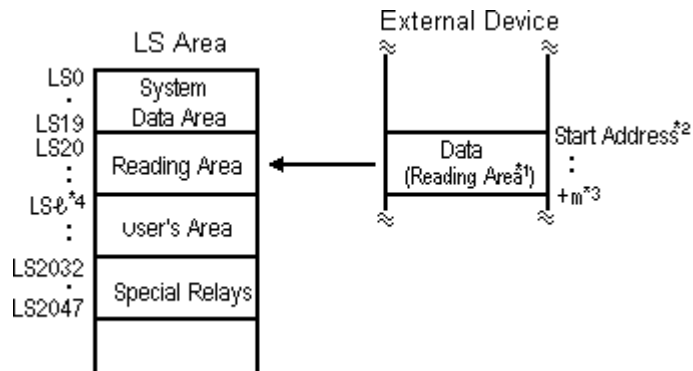
- **Part addresses cannot be set so that they include the System Area and the Reading Area, or the Reading Area and the User. Area.**

- **When designating Parts that are inside the System Data Area's addresses, specify their data length as 16 bits.**

1 If the device range of your External Device is less than 256 words, the size of the External Device's device range minus the size of System Data Area gives the maximum size for the Reading Area.

*2 The Start Address means the start address of System Data Area specified in the **INITIALIZE** menu.*

▼Reference◣ *For more information, refer to "**6.5 External Device SETUP**" in LogiTouch Series User Manual (sold separately)*

3 m = Reading Area Size

4 ℓ = Reading Area Start Address (20) + Reading Area Size

1.1.3   Contents and Range of System Data Area

The following table describes the data write contents of the System Area for each address.

■ For an External Device using 16-bit addressing

Important

• *When you wish to turn off the LT's display, use the display's ON/OFF bit (word address +9). Do not use the Control area's Backlight OFF bit (word address +14).*

• *Depending on the External Device, the device cannot be assigned to the System Data Area.*

Note:

• **The Word Address values assume that all the items have been selected for the System Data Area in the LT's INITIALIZE menu.**

• **Here, "item #" represents the item numbers shown in the System Environment Setup area's SYSTEM AREA SETUP; found in the LT OFFLINE mode's INITIALIZE area.**

	Item #	Word Addr	Contents	Bit	Detail
LT ↓ External Device Exclusive Writing Area	1	+0	Display Screen Number	1 to 8999 (However, 1 to 1999 when using BCD input)	
	2	+1	Error Status Each bit changes to reflect the LT error status. When an error occurs, the bit is set ON. A bit that has turned ON remains ON until the power is turned OFF and back ON, or until RUN mode is re-entered from OFFLINE mode. For Error Status data and processing notes, refer to the end of this section.	0,1	Not used
				2	System ROM/RAM
				3	Memory Checksum
				4	SIO Framing [1]
				5	SIO Parity [1]
				6	SIO Over-run [1]
				7,8	Not used
				9	Memory requires Initialization
				10	Timer Clock Error
				11	External Device Error [1]
				12 to 15	Not used
	3	+2	Current YEAR, BCD 2 digits	Last two digits	
		+3	Current MONTH, BCD 2 digits	01 to 12 (month)	
		+4	Current DAY, BCD 2 digits	01 to 31 (date)	
		+5	Current TIME, BCD 4 digits	00 to 23 hr, 00 to 59 min	
	4	+6	Status [3]	0 to 2	Reserved
				3	Writes a set value [2]
				4 to 8	Reserved
				9	Display 0: OFF, 1: ON [4]
				10	Backlight Alarm [5]
				11 to 15	Reserved
	5	+7	Reserved		

	Item #	Word Addr	Contents	Bit	Detail
External Device ↓ LT Exclusive Reading Area	6	+8	Change Screen Number	1 to 8999 (However, 1 to 1999 when using BCD input)	
	7	+9	Screen Display On/Off *9	FFFFh: Screen clears almost immediately. 0h: Screen turns ON. All other bits are reserved.	
	8	+10	Clock's YEAR set value, BCD 2 digits (+flag)	Last 2 digits (bit #15 is the clock's data write change flag *6)	
		+11	Clock's MONTH set value, BCD 2 digits	01 to 12	
		+12	Clock's DATE set value, BCD 2 digits	01 to 31	
		+13	Clock's TIME set value, BCD 4 digits	00 to 23 Hr: 00 to 59 Min	
	9	+14	Control *10	0	Backlight OFF *7
				1	Buzzer ON
				2, 3	Reserved
				4	Buzzer 0:Output 1:Non-output *8
				5 to 15	Reserved
	A	+15	Reserved	Reserved	
	B	+16	Reserved	Reserved	
	C	+17	Reserved	Reserved	
	D	+18	Reserved	Reserved	
		+19	Reserved	Reserved	

*1 LT Type-A1/A2/B cannot be used.

*2 When an alarm is setup in the middle of Keypad Input Display, and a value outside the alarm range is entered, the bit turns ON. When you enter a value within the alarm range, or a screen change takes place, the bit turns OFF.

*3 Monitor, in bit units, only the necessary bits. Since reserved bits may be used for LT system maintenance, etc., their ON/OFF status is not defined.

*4 Adding the screen display ON/OFF status

Adding the screen display ON/OFF bit to the system data area status allows you to detect the screen display OFF status based on the stand-by time period, on the External Device.Add the screen display ON/OFF status bit to the system data area's Bit 9.

This bit will change in the following cases:

(1) "FFFF" is written to the system data area's screen display ON/OFF bit (LS9 when using link type), to turn the screen display OFF. (Bit 9 = 1)

(2) After the stand-by time has been elapsed, the screen display OFF bit is turned ON automatically. (Bit 9 = 1)

(3) The screen display OFF status has been changed to the screen display ON status via screen switching, etc. (Bit 9 = 0)

(4) The screen display ON/OFF status bit will not change via turning ON/OFF the system data area backlight OFF bit (Bit 0).

<System Data Area Status>

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0:Screen Display ON
1:Screen Display OFF
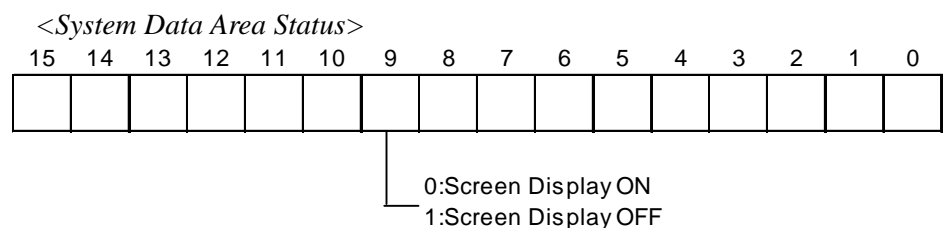
5 When the backlight burns out, the Status LED's orange light turns ON, and the Status Data Area's "Status"[3] bit 10 will turn ON.

*6 When the data write flag changes (OFF—>ON, or ON—>OFF), the clock data is rewritten.

    Ex.   October 16, 1995, 9:57 pm

    The current data in word address +10 is 0000.

    Month, Date, Time data is written as follows:

- *In word address +11   0010*
- *In word address +12   0016*
- *In word address +13   2157*

    When the YEAR's 15th bit is turned on, the data is written.

- *Inputting 8095 into word address +10 causes the clock data to be rewritten.*

*7 When the Backlight OFF bit (word address +14) turns ON, only the backlight will turn OFF, however, the LCD display will remain ON and all touch switches set up on the display can still be used. Use the Screen display ON/OFF bit (word address +9) to actually turn the screen display OFF.

*8 Control Bit 1(Buzzer On) is output as shown below.

    Buzzer output: When control bit 1 is ON, the LT internal buzzer is activated.

*9 After the screen display ON/OFF bit (word address +13) is set to OFF, simply touching the screen will turn the display ON again.

*10 Be sure to turn all reserved bits OFF since they may be used for LT system maintenance, etc.

Note: **When writing data to the Control Area (Address +14) be sure to use bit units. Writing data in Word units can cause values to change.**

■ Error Status Contents and Correction Process

Error	Origin	Solution
System ROM/RAM	Problem with the hardware	Run Self-Diagnosis.
Memory Checksum	Because the screen file is corrupted, the screen memory data checksum does not match.	After powering up, check the screen where the error developed. (For details, refer to the LogiTouch Series User Manual, "Error Message" section.)
SIO Framing	Framing error	Check the SIO Setup. (For details, refer to the LogiTouch Series User Manual, "Would Not Communicate" section.)
SIO Parity	Parity error	
SIO Over-run	Over-run error	
Memory requires Initialization	Internal Memory has not been initialized.	Initialize internal memory.
Timer clock Error	The LT internal clock has been interrupted.	The LT internal battery may be drained. Contact your local LT distributor for service.
External Device SIO Error (only for Direct Access type)	Either the SIO setup between the LT and External Device do not match, or an error has developed on the External Device side.	Check the SIO Setup. (For details, refer to the LogiTouch Series User Manual, "Would Not Communicate" section.)

1.1.4 Special Relays

The structure of the LT's Special Relays is as follows.

◆ **Reserved**

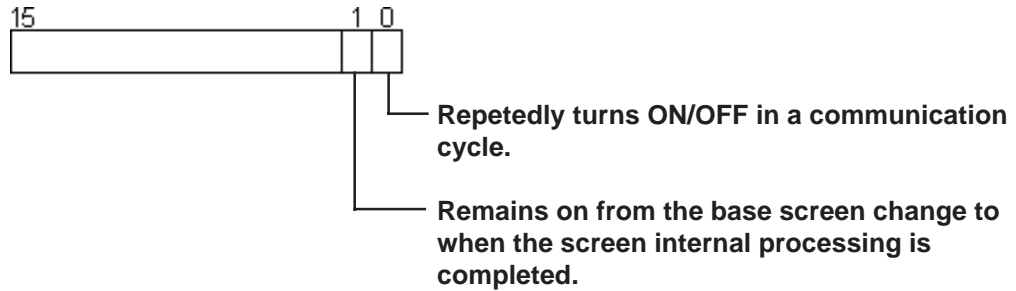The *Reserved* area value is indeterminate. Do not use this area.

LS2032	Common Relay Information
LS2033	Base Screen Information
LS2034	Reserved
LS2035	1 Second Binary Counter
LS2036	Parts Scan Time
LS2037	SIO Cycle Time
LS2038	Parts Scan Counter
LS2039	SIO Error Code
: : : LS2047	Reserved

◆ **Common Relay Information (LS2032)**

```
 15        12 11 10  9  8  7  6  5  4  3  2  1  0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Bit	Contents
0	Repeatedly turns ON/OFF in a communication cycle.
1	Remains ON when a screen change (base, window) occurs until the screen internal processing is completed.
2	ON only in the middle of an SIO error developing.
3	ON when displaying the Initial screen after powering up.
4	Always ON
5	Always OFF
6	Turns ON when backup SRAM data has been deleted.
7	Turns ON if a BCD error occurs while D script is being used.
8	Turns ON if a zero division error occurs while D script is being used.
9	Filing data. Turns ON if the data is not transferred to Backup SRAM.
10	Filing data transfer is triggered by the Control Word Address. Turns ON if the data can not be transferred from External Device to SRAM. Also data transfer between External Devices is triggered by the Filing Data Display. Turns ON if the data is not transferred from External Device to SRAM only when the transfer complete bit address is used.
11	Filing data. Via transfer data to and from SRAM to LS area, via Filing Data Display.
12	When using D-script, turns ON if a communication error occurs when the function memcpy () is used, or reading the data from designated Address Offset. Turns OFF when data read is normally completed.
13-15	Reserved

◆ **Base Screen Information (LS2033)**

```
15                    1 0
┌─────────────────────┬─┬─┐
│                     │ │ │
└─────────────────────┴─┴─┘
```

Repeatedly turns ON/OFF in a communication cycle.

Remains on from the base screen change to when the screen internal processing is completed.

◆ **1 Second Binary Counter (LS2035)**

Begins counting in 1 second units, after powering up. The data is in binary format.

◆ **Parts Scan Time (LS2036)**

The time it takes to scan the setup screen display parts. The data is stored in binary *ms* units. The data renews at the point when the management of all the object parts is complete. The initial data value is **0**. The measured time may differ by ± 10ms with the actual time.

◆ **SIO Cycle Time (LS2037)**

The time it takes in 1 cycle, from the beginning to the end, to scan the SIO object (External Device Internal System Area) and various devices. The data renews at the point when the management of the System Area and all the object devices is complete. The initial data value is 0. The unit is 10ms.

◆ **Parts Scan Counter (LS2038)**

Begins counting in binary units, roughly when the scan of the parts setup on the display screen is complete.

◆ **SIO Error Code (LS2039)**

When an SIO error arises, the SIO error code displayed last is stored in binary data.

Careful! • *If a problem occurs which causes an SIO error for an extended period of time, such as the unit's data transmission cable becomes loose or disconnected, etc., it may ultimately create a System Error. When this occurs, reset the LT.*

• *When using the 1 Second Binary Counter and Parts Scan Counter value as D script's trigger bit, and the SIO error condition continues, it may develop into a System Error. When this occurs, reset the LT.*

[STOP] Special Relays are not write protected. Be careful not to use a part to overwrite this data.

1.2   Efficient Data Communication

When using the External Device Direct Access Type, the LT unit communicates based on the device addresses set on each screen. As a result, the more parts set on a screen, the more data is transferred, reducing the communication speed. For this reason, to speed up the response times, make data communication as efficient as possible.

On the LT, in addition to the ordinary communication method, there are the *Block Transfer* and *LS Area Communication* methods, which upgrade data transfer efficiency.

1.2.1   Block Transfer

When displaying consecutive External Device's devices on the LT, the LT automatically groups the transmission data into a block, which increases the communication speed.

The addresses in the designated data range[*1] must be consecutive to use Data Block Transfer.

When parts are set up in consecutive addresses, the LT automatically reads the data as a single block. When you wish to transfer a block, design your part layout so that the addresses are consecutive.
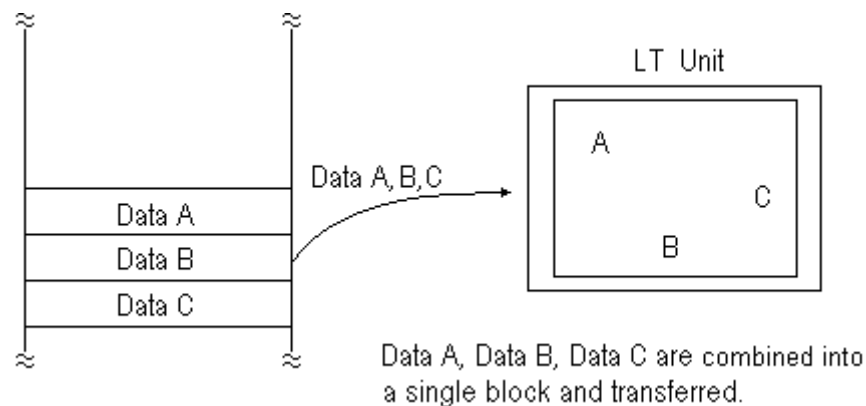
1 The maximum number of consecutive addresses is limited by the type of External Device used. Refer to the Appendix, "Maximum Number of Consecutive Addresses".

1.2.2 ▸ LS Area Communication

Use the LS area for communication in the following cases: when there is display data common to all screens, when there is Trend Graph block display data, or when a video window display is used.

To run LS Area communication, first set up the size of the Reading Area in LT's INITIALIZE setting. Then transfer the common display data or block display trend graph data to the Reading Area, allocated in the External Device's internal memory. (Transfer the data via the External Device ladder program.)

By doing so, the data transferred into the Reading Area *and* the System Data is sent to the LT unit at one time.

By using the LS Area Communication method, no matter what screen is displayed on the LT, the System Data is transmitted continually. Therefore, to change screens quicker, use LS Area Communication instead of Block Transfer.
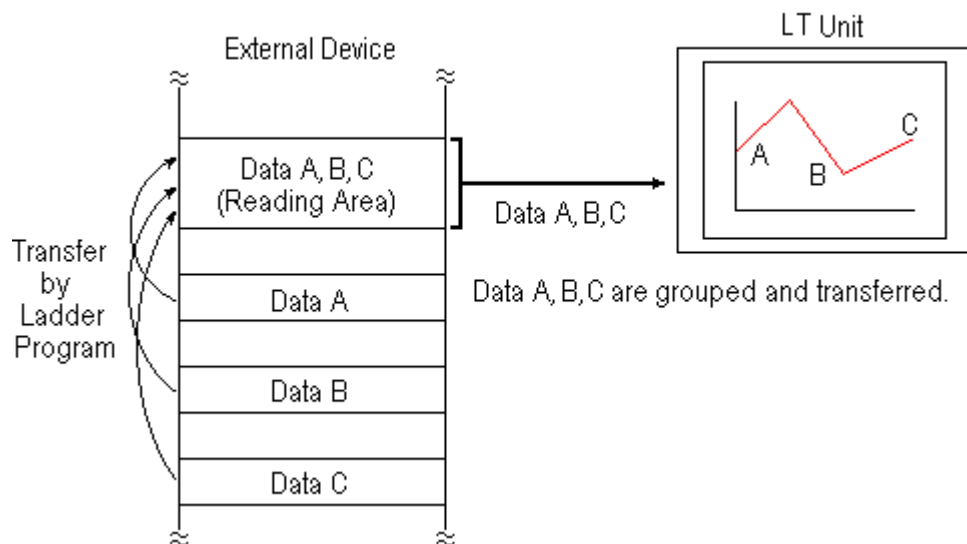
Important

- *Use LS Area transmission only when there is data common to all screens or when performing LS Area refresh. Otherwise, communication will not be efficient*

- *Setting up a Reading Area that is too large can cause the display of Parts that do not use the Reading Area, or can slow data communication speed.*

- *When there are many Parts on an LT screen, set all the Parts so that they use consecutive addresses. Block data transfer can be utilized as a result, speeding up transmission.*

1.2.3   Reset GP on Data Write Error

If a Write error occurs, you can cancel the error from the error display. You will need to set up this feature beforehand via the LT OFFLINE mode's INITIALIZE area.

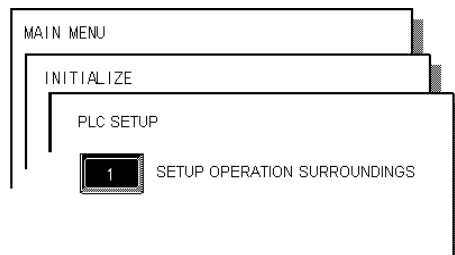*Reference*   *Refer to LogiTouch Series User Manual, Chapter 5 OFFLINE Mode*

Note: • **The default setting is OFF.**
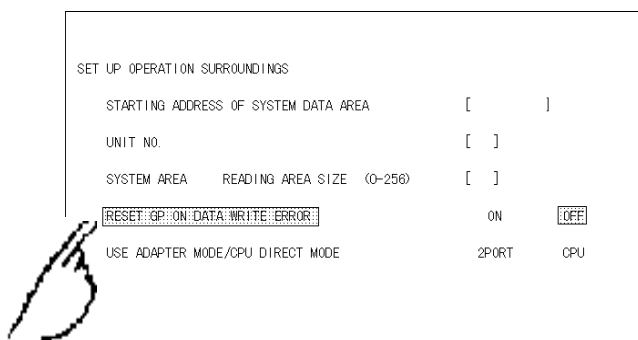• **"Memory Link SIO" does not have this function.**
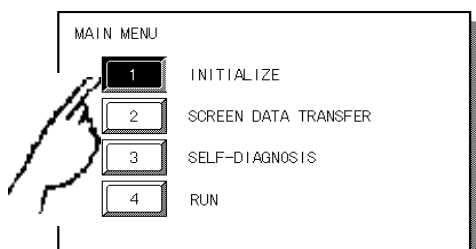
1) Touch item #1, INITIALIZE. The INITIALIZE menu will appear.
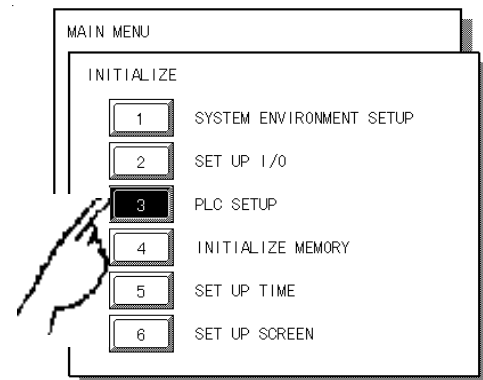
2) Touch item #3, PLC SETUP. The PLC SETUP menu appears.

3) Touch item #1, SET UP OPERATION SURROUNDINGS. The SET UP OPERATION SURROUNDINGS menu will appear.

4) Touch the "RESET GP ON DATA WRITE ERROR" selection. The selected item is then highlighted.

5) To prepare for when a DATA
   WRITE ERROR occurs, select
   ON to cancel the error.

■ When the LT is in RUN mode

When a DATA WRITE ERROR
occurs, the screen shown here will
be displayed.

*OFFLINE Mode ▽*Reference*△*
LogiTouch Series User Manual,
Chapter 5 OFFLINE Mode

PLC NOT RESPONDING(02:FE)

Please check the data transfer cable,

data transfer settings, device

addresses, etc.
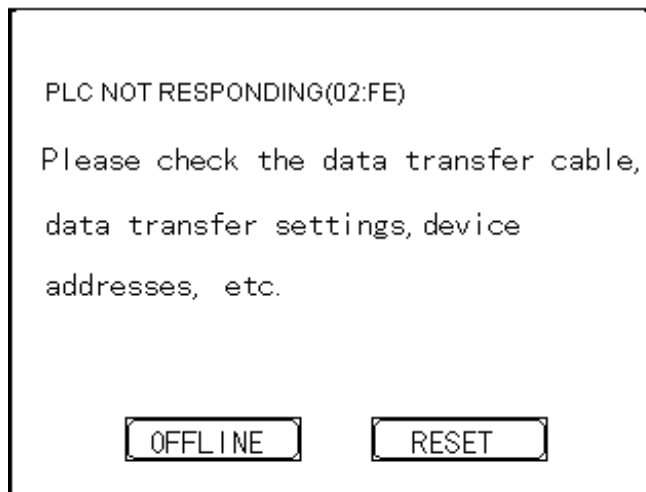
OFFLINE   RESET

• If you select "OFFLINE" : The LT unit's OFFLINE mode main menu will appear.
• If you select " RESET" : The LT will be reset, then change automatically to
   "OFFLINE" mode and a DATA WRITE ERROR will not occur.

Careful!   *Selecting [OFFLINE] or [RESET] will also cause the I/O to be reset.*

2 Indicating Controllers

2.1 Connectable Controllers

Company	Series	Controller [1]	Note	External Device name in LT Editor
Yokogawa Corp.	UT2000 Series	UT2400-□ UT2800-□		YOKOGAWA FACTORY ACE 1:1 Comm. or YOKOGAWA FACTORY ACE 1:n Comm.
Yokogawa M&C Corp.	GREEN SERIES	UT320-□1 UT350-□1 UT420-□7 UT450-□1 UT450-□2		
Yamatake Corp.	SDC	SDC20, SDC21 SDC30, SDC31 SDC40A, SDC40B SDC40G		YAMATAKE SDC SERIES
	DMC	DMC10		
RKC INSTRUMENT INC.	CB Series	CB100 Z-1021 CB400 Z-1021 CB500 Z-1021 CB700 Z-1021 CB900 Z-1021		RKC CB/SR-Mini Series
	SR-Mini	H-PCP-A Z-1021		
Omron Corporation	THERMAC NEO Electronic Temperature Controller	E5EN-□□□□□-FLK [2] E5CN-□□□□□-FLK E5GN-□□□□□-FLK E5AN-□□□□□-FLK		OMRON THERMAC NEO
Shinko Technos Corp.	C	CPT-20A	Optional unit is required when using muliple channels. [3]	SHINKO TECHNOS INDICATING
	FC	FCD-13A□□,C FCD-13A□□,C5 FCD-15A□□,C FCD-15A□□,C5 FCR-13A□□,C FCR-13A□□,C5 FCR-15A□□,C FCR-15A□□,C5	When using the Controller for the first time, select the serial communication option. (,C:RS-232C) (,C5:RS-485) [4]	
	FIR	FIR-201-M□□,C FIR-201-M□□,C5		
	GC	GCS-300□□,C5		
	FCL	FCL-13A□□,C5		
	PC-900	PC-935□□,C PC-935□□,C5 PC-955□□,C PC-955□□,C5		

Company	Series	Controller [1]	Note	External Device name in LT Editor
Fuji Electric Corporation	Micro-Controller X	PXR4□□□□-□□M00 [5] PXR4□□□□-□□V00		FUJI TEMPERATURE PXR
TOHO ELECTRONICS INC. [6]	TTM-004	TTM-004-□-A□□□		TOHO ELECTRONICS TTM SERIES
	TTM-X04	TTM-X04-□-□□□□		
	TTM-00B	TTM-00B-□-□□□□		
	TTM-10L	TTM-10L-□-□-□ [7]		
	TTM-100B	TTM-100B4□□-□□□□-□□□ TTM-100B8□□-□□□□-□□□		
	TTM-110 Series	TTM-114-□-□ □-□□□□□□□-□ TTM-115-□-□ □-□□□□□□□-□ TTM-117-□-□ □-□□□□□□□-□ TTM-119-□-□ □-□□□□□□□-□		
	TTM-110B	TTM-110B-□-□ □-□□□□□□□-□		
	TTM-120 Series	TTM-124-□-□ □-□□□□□□□-□ TTM-125-□-□ □-□□□□□□□-□ TTM-127-□-□ □-□□□□□□□-□ TTM-129-□-□ □-□□□□□□□-□		
	TTM-300 Series	TTM-304-□-□N-□□□□-□ TTM-305-□-□N-□□□□-□ TTM-309-□-□N-□□□□-□		
	TTM-300B	TTM-300B-□-□N-□□□□-□		
	TTM-1020 Series	TTM-1520-□ □-□ □-□□□-□ TTM-1521-□ □-□ □-□□□-□ TTM-1522-□ □-□ □-□□□-□ TTM-1523-□ □-□ □-□□□-□ TTM-1524-□ □-□ □-□□□-□ TTM-1525-□ □-□ □-□□□-□ TTM-1920-□ □-□ □-□□□-□ TTM-1921-□ □-□ □-□□□-□ TTM-1922-□ □-□ □-□□□-□ TTM-1923-□ □-□ □-□□□-□ TTM-1924-□ □-□ □-□□□-□ TTM-1925-□ □-□ □-□□□-□		

*1 *The Controller's model number "□" will vary depending on each controller's functional specifications.*

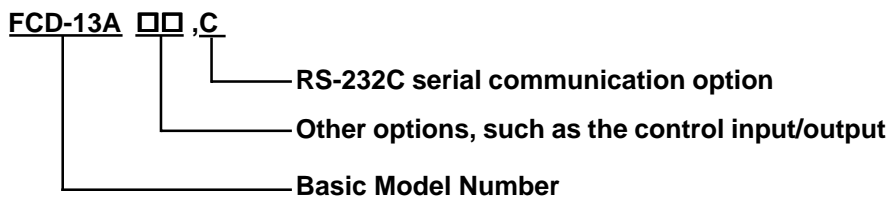*2 *The Omron Controller model number is designed as follows.*

Standard No.-□□□□□-□

Compoway/F Compatibility
None : Not compatible
FLK : Compatible
(Communication is possible only when this is "FLK")

Other Options
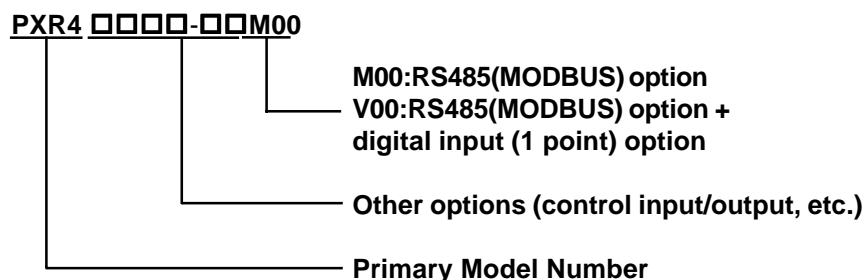**(Control Output, Alarm Output, etc.)**
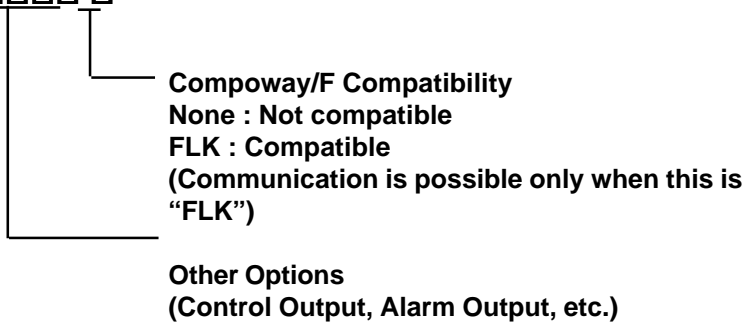
*3 When using multiple channels with a C Series unit, the 2 ch temperature control unit (CCT-235-2-*oo*) is required. For "□□" model number details, refer to the C Series catalog.

*4 Items with the serial communication option have a ",C" or ",C5" after the basic model number.

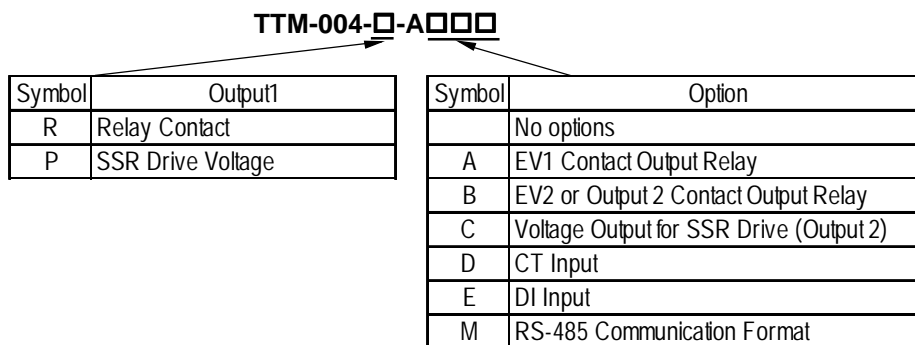Ex.) When specifying the RS-232C serial communication option for the FC Series.

FCD-13A □□ ,C

— **RS-232C serial communication option**

— **Other options, such as the control input/output**

— **Basic Model Number**

*5 When connecting the Controller to an LT, the RS485(MODBUS) option "M00" or "V00" is required.

PXR4 □□□□-□□M00

M00:RS485(MODBUS) option
V00:RS485(MODBUS) option +
digital input (1 point) option

— **Other options (control input/output, etc.)**

— **Primary Model Number**

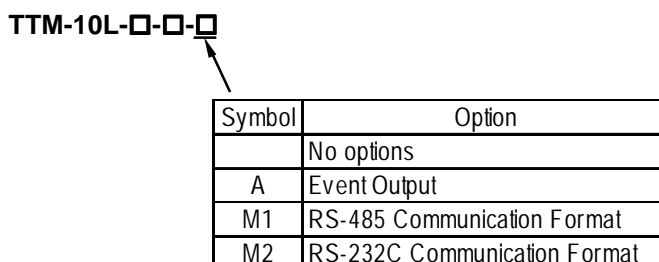*6 About Toho Electronic Inc. Controller's Model Number

The Controller model number is used to designate if a Controller is equipped with communication features or not. To check whether your Controller has communication features, refer to your Controller's User Manual or Catalog.

For example, the Controller model number of the TTM-004 Controller is shown below. Only Controllers with the character "M" in their model number's Option section (the three right-most "□" characters) are equipped with the communication feature.

TTM-004-□-A□□□

Symbol	Output1
R	Relay Contact
P	SSR Drive Voltage

Symbol	Option
	No options
A	EV1 Contact Output Relay
B	EV2 or Output 2 Contact Output Relay
C	Voltage Output for SSR Drive (Output 2)
D	CT Input
E	DI Input
M	RS-485 Communication Format

*7 TTM-10L Unit Communication Format

Depending on the unit's model number, the TTM-10L can use either the RS-485 or the RS-232C format. Select the Communication Format as shown below (Communication Format can be set to either RS-485 or RS-232C.).

TTM-10L-□-□-□

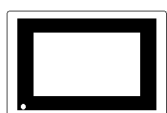| Symbol	Option
	No options
A	Event Output
M1	RS-485 Communication Format
M2	RS-232C Communication Format

MEMO

2.2   Yokogawa Electric/Yokogawa M&C Controllers

2.2.1   System Structure

This chapter describes the system configuration used when connecting this Controller to the LT.

■ Yokogawa UT2000 Series/Yokogawa M&C GREEN SERIES

(1:1 communication)

Controller [*1]	Cable Diagram	LT
UT2400-□ UT2800-□ UT320-□1 UT350-□1 UT420-□7 UT450-□1 UT450-□2	RS-422 (4 wires) <Cable Diagram 1>	LT Type-C

*1 The Controller's model number "□" will vary depending on each controller's functionality specifications.

(1:n (multi-drop) Communication)

Controller [*1]	Cable Diagram	LT
UT2400-□ UT2800-□ UT320-□1 UT350-□1 UT420-□7 UT450-□1 UT450-□2	RS-422 (4 wires) <Cable Diagram 2>	LT Type-C

*1 The Controller's model number "□" will vary depending on each controller functionality specifications.

2.2.2   Cable Diagrams

The cable diagrams shown below and those recommended by Yokogawa or Yokogawa M&C may differ, however, using these cable connections for your Controller's operations will not cause any problems.

Careful! • *Ground the Controller's FG terminal according to your country's applicable standard.*

Important • **When connecting the FG wire to the cable connector's hood, be sure that the hood material is conductive.**

   • **The maximum RS-422 cable length is 500 meters. When connecting this cable, be sure to connect the SG terminal.**

■ Terminal Numbers When Using an RS-422 Cable

Important • **The terminal numbers used will vary depending on the Controller model used. Since these terminal numbers are not shown in the cable diagram, please refer to the numbers shown below when performing cable wiring.**

◆ **Yokogawa UT2000 Series**

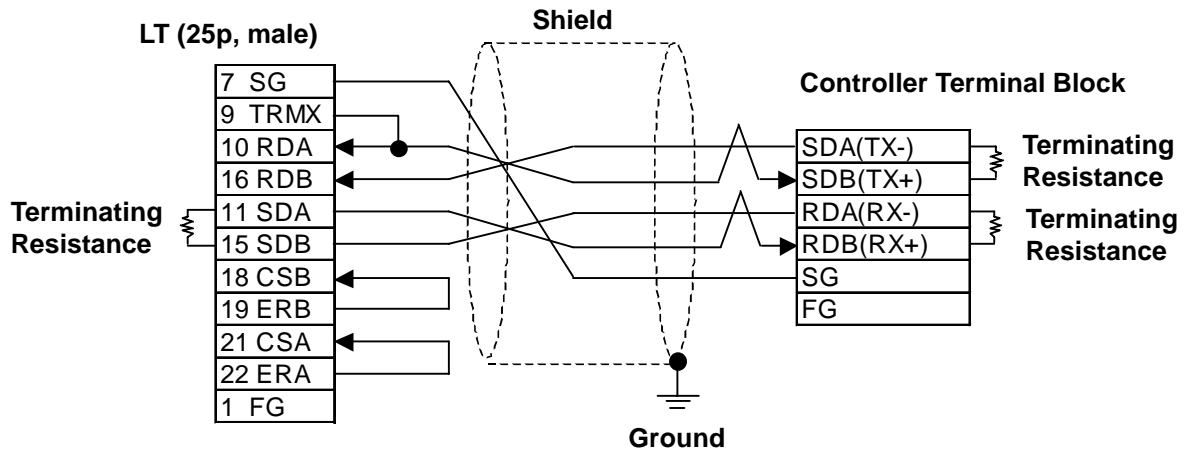| Signal Name	Terminal No.
TX+	4
TX-	6
RX+	3
RX-	5
SG	2
FG	1

◆ **Yokogawa M&C GREEN Series**

Signal Name	Terminal No.
SDA(-)	24
SDB(+)	23
RDA(-)	26
RDB(+)	25
SG	27

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

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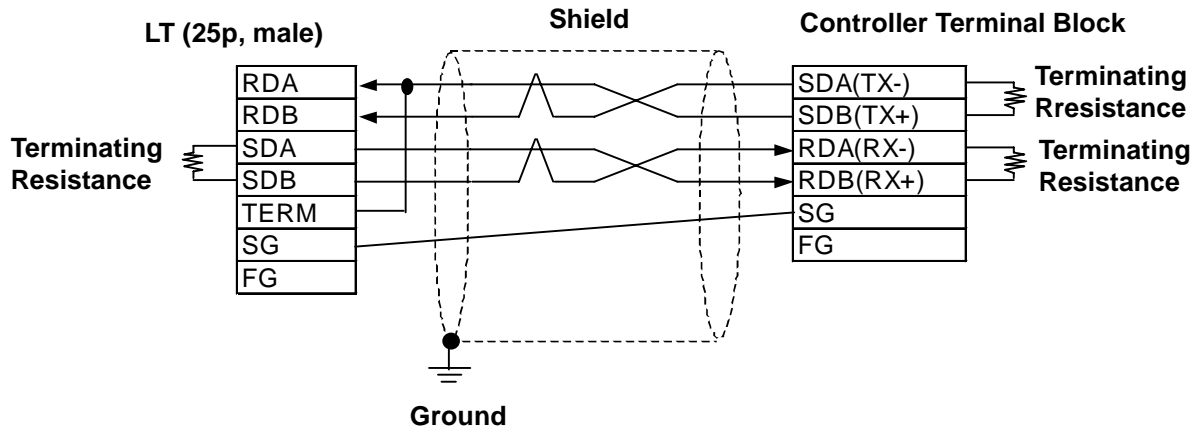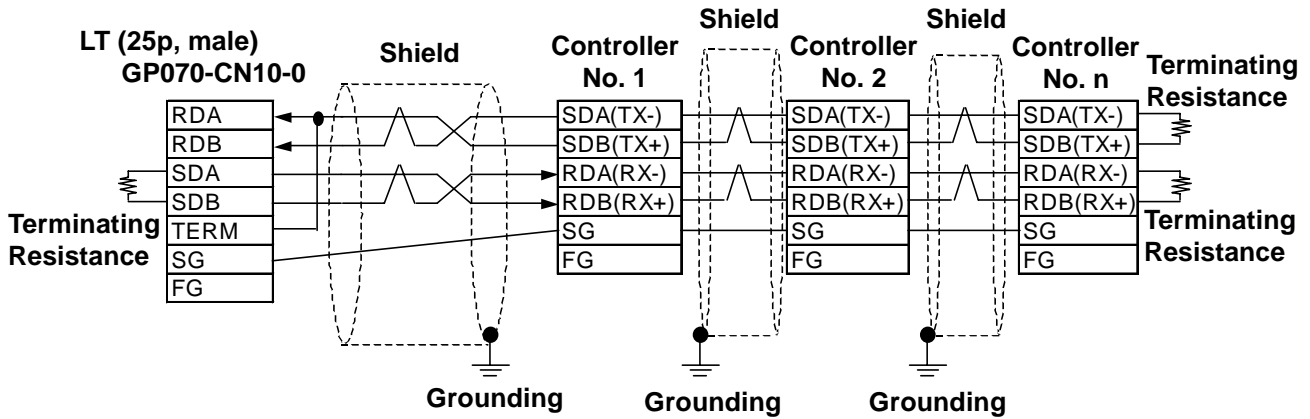

• When preparing your own cable

Note:
- **Hitachi Densen's CO-SPEV-SB(A)3P*0.5SQ cable is recommended.**
- **Certain controllers have no FG teminal.**
- **The GREEN SERIES' terminating resistance is 220W (1/4W) and the UT2000 Series' terminating resistance is 100W(1/2W) or more.**
- **Connecting the LT serial interface's Nos. 9 and 10 pins will insert 100W terminating resistance between RDA and RDB.**
- **The maximum RS-422 (4-wire) cable length is 500 meters.**

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

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

• When preparing your own cable
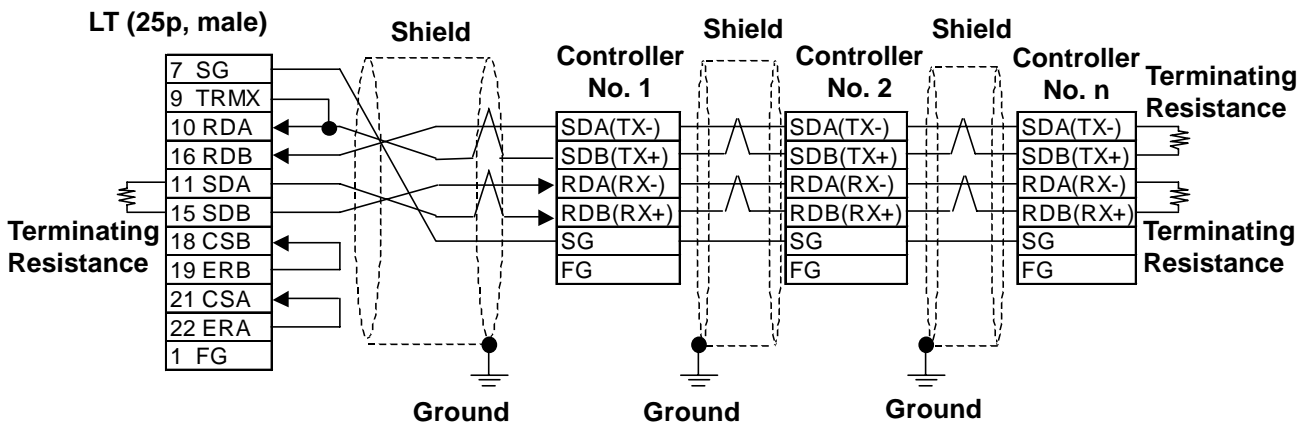
Note:
• **The maximum RS-422 (4 wire) cable length is 500 meters.**
• **Up to 31 Controllers (up to 16 for UT2000 Series) can be connected.**
• **Certain controllers have no FG terminal.**
• **The GREEN SERIES' terminating resistance is 220W(1/4W) and the UT2000   Series' terminating resistance is 100W(1/2W) or more.**

2.2.3   Supported Devices

The following lists show the ranges of devices supported by the LT.

■ Yokogawa UT2000 Series

Depending on the Controller model, prohibited areas may exist even within the following ranges.

▼*Reference* *Refer to Yokogawa's "UT2000 Detailed operation manual"*

Device	Bit Address	Word Address	Remarks	
I	I0001 ~ I1024	I0001 ~ I1009	$\div16+\rceil$	L/H
D	———————	D0001 ~ D1024	Bit $\rceil$ 5$\rceil$	

■ Yokogawa M&C GREEN SERIES

Depending on the Controller model,prohibited areas may exist even within the following ranges.

▼*Reference* *Refer to Yokogawa M&C's "UT350/UT320 Digital Indicated Controllers Operation Manual" and "GREEN SERIES further User's Manual".*

Device	Bit Address	Word Address	Remarks	
I	I0001 ~ I2048	I0001 ~ I2033	$\div16+\rceil$	H/L
D	———————	D0001 ~ D1274	Bit $\rceil$ 5$\rceil$	

⚠ **Important**

- **The system area (20 words) cannot be allocated to the Controller's own data area. Even though you can enter the system area settings via LT OFFLINE mode, it is impossible to actually allocate the system area to the Controller's data area.**

- **Device fields will differ depending on the type of Controller. Refer to the Controller's manual for the range allowed for the device address area.**

  After screen data is converted from a different type of Controller, be sure to check if the device addresses used are correct.

  Be sure to check the supported device addresses before using Trend graphs or Parts in your screens that use multiple words over continuous addresses.

Note: **With LT Editor Parts, the External Device Station number can be designated during address input. When a station number is not designated, the previously entered station number is automatically used. (The default value is 1.)**

Enter the selected Controller's Station No.

01/1D00201

Address
Controller's Station No.

> ### 2.2.4 Environment Setup

The following list shows the recommended Controller and LT communication settings.

■ Yokogawa UT2000 Series/Yokogawa M&C GREEN SERIES

LT Settings		Controller Settings		
Baud Rate	9600 bps	Baud Rate		9600 bps
Data Length	8 bit	Data Length		8 bit
Stop Bit	1 bit	Stop Bit		1 bit
Parity Bit	Even	Parity Bit		Even
Data Flow Control	ER	——		——
Communication Format (When using RS-422)	4-wire Type	——		——
——	——	For Dip Switch Communication Mode Selection	UT2000 Series	ON
		Protocol Selection (PSL)	GREEN SERIES	Personal computer link communication
Unit No.	UT2000 Series 1 ~ 16	Station No. (communication address)	UT2000 Series	1 ~ 16
	GREEN SERIES 1 ~ 31		GREEN SERIES	1 ~ 31

◆ Controller Communication Settings

<UT2000 Series>

Use the unit's rear face rotary switches:

(1) Use the communication condition setting rotary switch to enter the communication condition.

(2) Use the station number selection rotary switch to enter the unit number.

(3) Turn the communication mode selection dip switch ON.

<GREEN SERIES>

Use the unit's front keys:

(1) Hold down the Controller's [SET/ENT] key for 3 seconds or more to change the screen from [operation] to [operation parameter] .

(2) When "OP.PA" appears on the measurement value (PV) display, use either△or ▽key to display "STUP".

(3) For UT350/UT320, every time you press the [SET/ENT] key, the screen will change one by one, in the order of [Protocol Selection] --> [Baud Rate] --> [Parity] --> [Stop Bit] --> [Data Length] --> [Communication Address].

For UT450/UT420, press the [SET/ENT] key once, and the [Setup Parameter Settings] screen will appear. Use either△ or▽ key to select "r485", and then, press the [SET/ENT] key again. After this, use the same procedure used for UT350/UT320.

MEMO

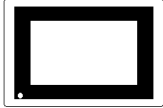## Yamatake Controllers

System Structure

This chapter describes the system configuration used when connecting this Controller to the LT.
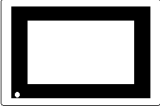

Important

LT's System Area (LS0 to LS19) Settings

The LT's system area (20 words) cannot be allocated to the Controller's own data area. Even though you can enter the system area settings via the LT OFFLINE mode, it is impossible to actually allocate the system area to the Controller's data area.
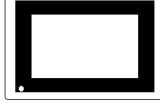
■ Yamatake SDC Series (1:1 communication)

Controller	Cable Diagram	LT
	⟷	
SDC 20 SDC 21 SDC 40A SDC 40B SDC 40G	RS-232C <Cable Diagram 1>	LT Type-C
SDC 20 SDC 21 SDC 30 SDC 31 SDC 40A SDC 40B SDC 40G	RS-422 (4 wires) <Cable Diagram 2> RS-422 (2 wires) <Cable Diagram 3>	

■ Yamatake SDC Series (1:n (multi-drop) communication)

CPU	Cable Diagram	LT
SDC 20 SDC 21 SDC 30 SDC 31 SDC 40A SDC 40B SDC 40G	RS-422 (4-wire) <Cable Diagram 4>	LT Type-C
	RS-422 (2-wire) <Cable Diagram 5>	

■ Yamatake DMC10 (1:1 communication)

CPU	Cable Diagram	LT
DMC10	RS-422 (2-wire) <Cable Diagram 6>	LT Type-C

■ Yamatake DMC10 (1:n (multi-drop) communication)

CPU	Cable Diagram	LT
DMC10	RS-422 (2-wire) <Cable Diagram 7>	LT Type-C

2.3.2 Cable Diagrams

The cable diagrams shown below and those recommended by Yamatake may differ, however, using these cables for Controller's operations will not cause any problems.

Important

- *When connecting the FG terminal to the connector cover, be sure that the connector cover material is conductive.*

- *Ground the 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 (LT or Controller) to connect. (The example below connects to the Controller's FG terminal.)*

- *The maximum RS-232C cable length is 15 meters. If a communication cable is used, be sure to connect its SG (signal ground) terminal.*

- *The maximum RS-422 cable length is 500 meters.*

- *The recommended RS-422 cables are as follows:*

| Company		Type
Fujikura Densen	2-wire	IPEV-S-0.9mm^2×1P
	3-wire	ITEV-S-0.9mm^2×1T
Hitachi Densen	2-wire	KPEV-S-0.9mm^2×1P
	3-wire	KTEV-S-0.9mm^2×1T

- *Since the Controller's terminal numbers will differ depending on the type of additional functions, check these numbers with the Controller's appropriate manual.*
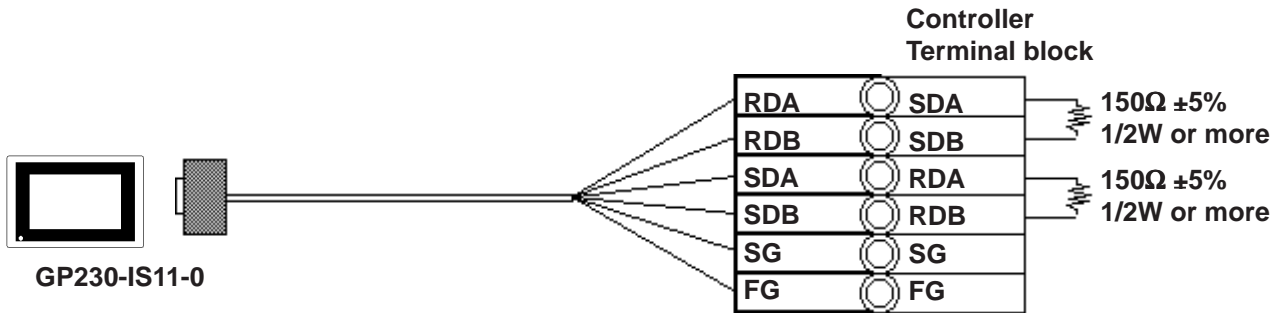
Cable Diagram 1   (1:1) (RS-232C)
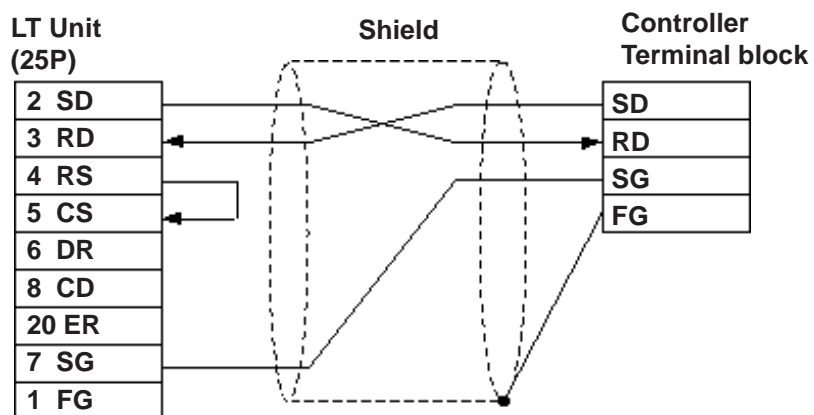
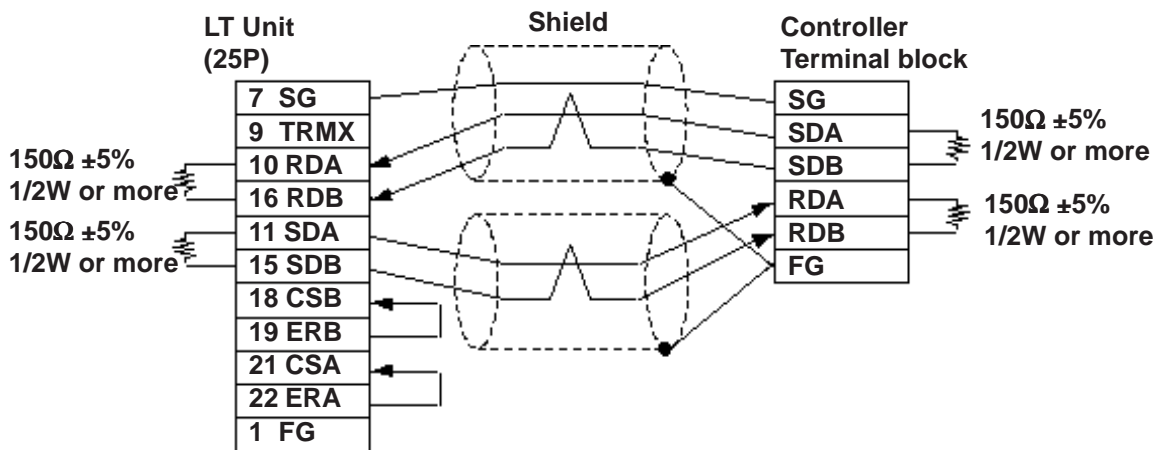### Cable Diagram 2   (1:1) RS-422 4-wire, RS-422 5-wire Cable

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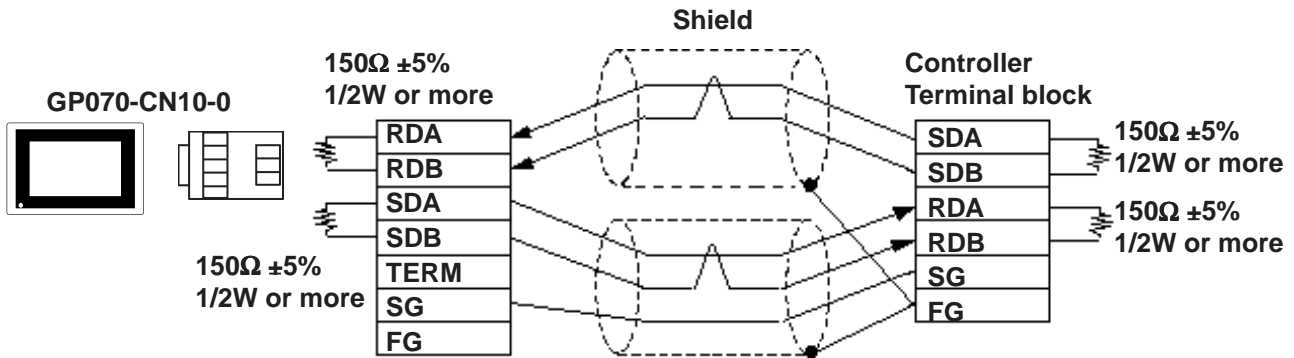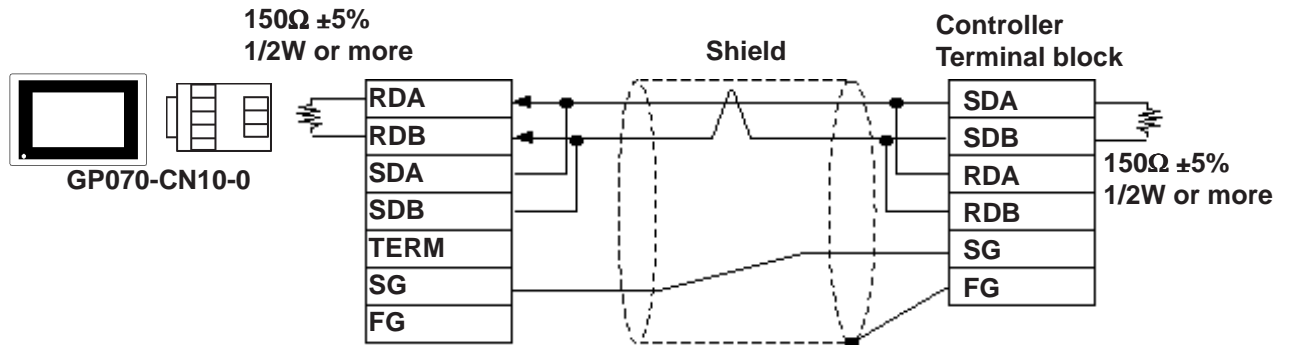

• When using Digital's RS-422 cable GP0230-IS11-0
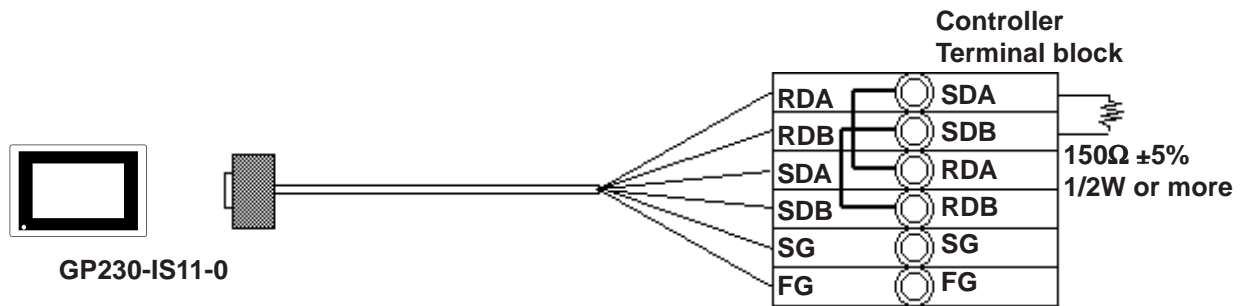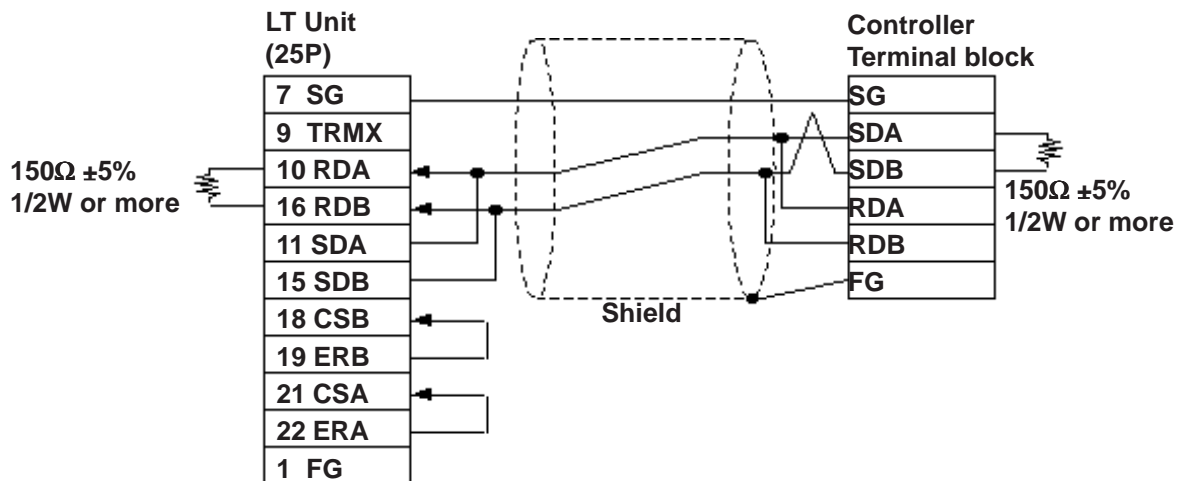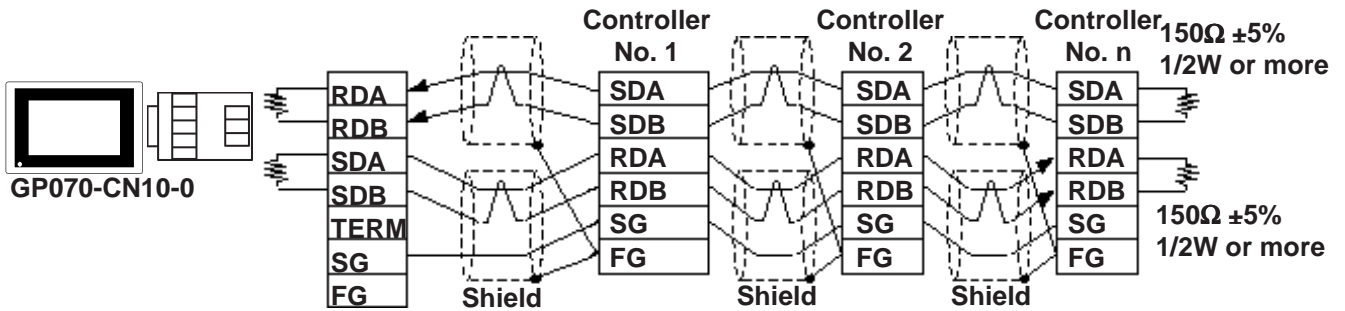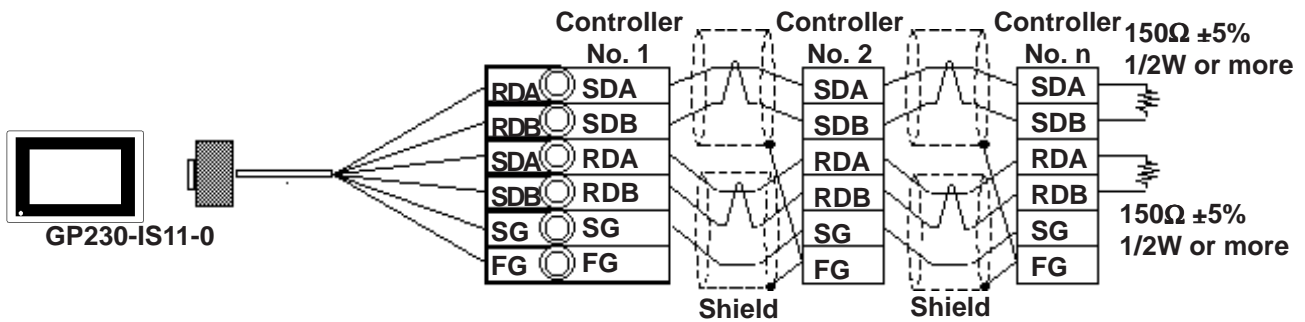

• When preparing your own cable

Cable Diagram 3 (1:1) RS-422 2-wire, RS-422 3-wire Cable

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

• When using Digital's RS-422 cable GP230-IS11-0

• When preparing your own cable

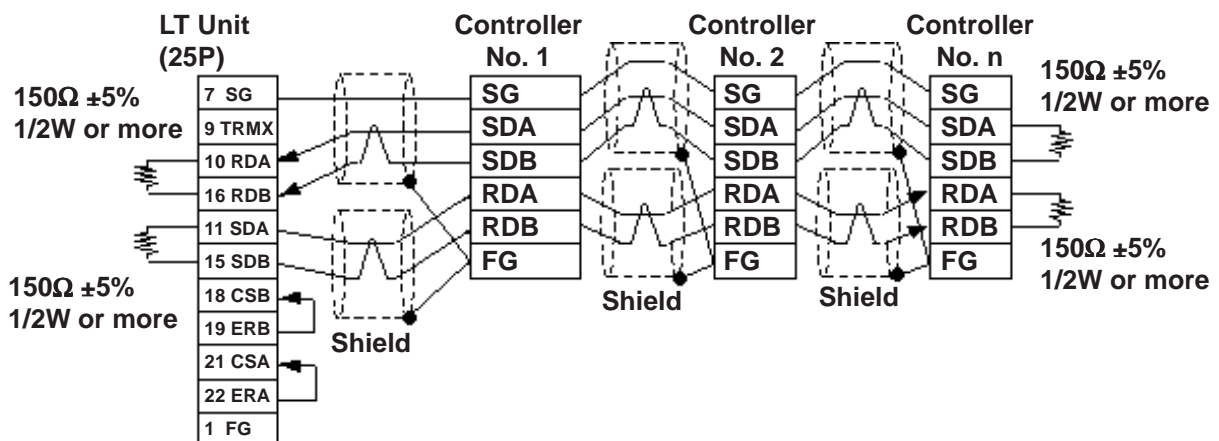**Cable Diagram 4   (1:n) RS-422 4-wire, RS-422 5-wire Cable**

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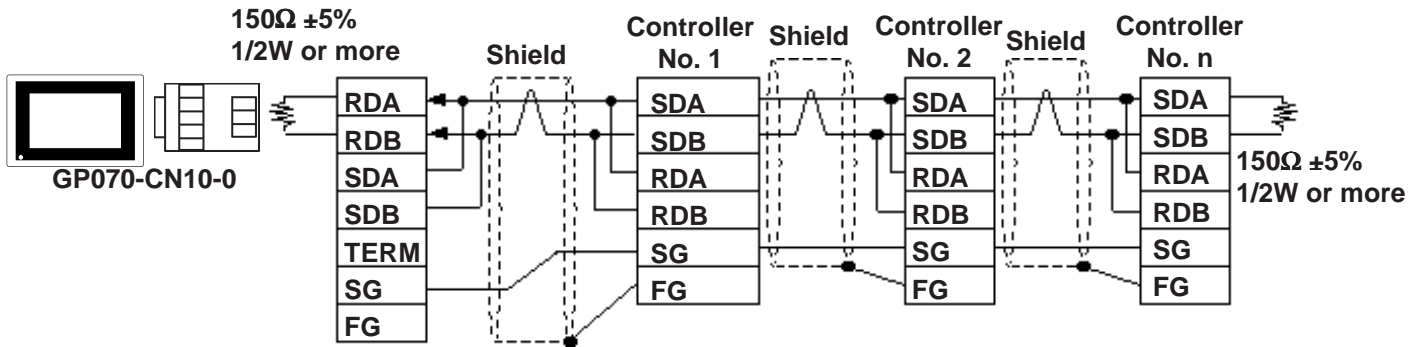

• When using Digital's RS-422 cable GP230-IS11-0

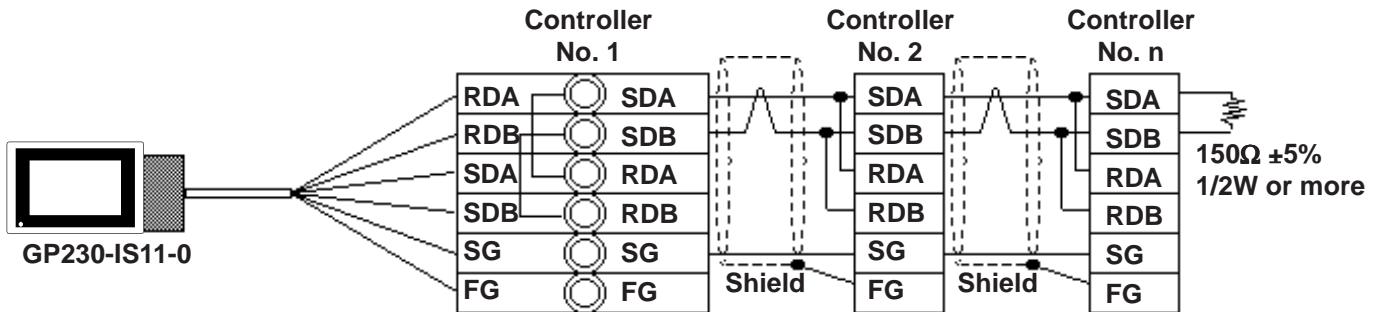• When preparing your own cable

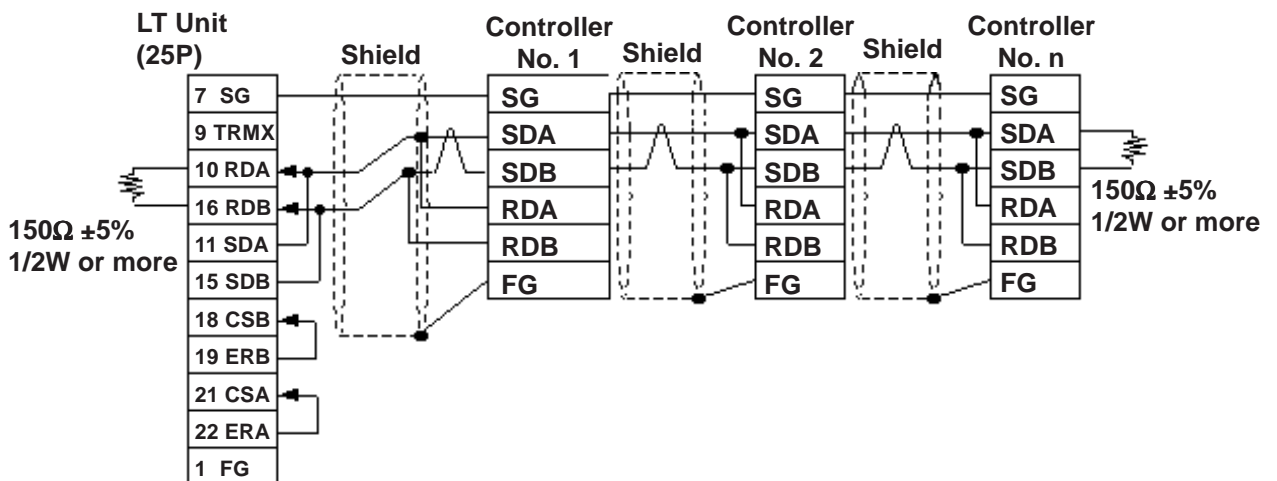### Cable Diagram 5   (1:n) RS-422 2-wire, RS-422 3-wire Cable

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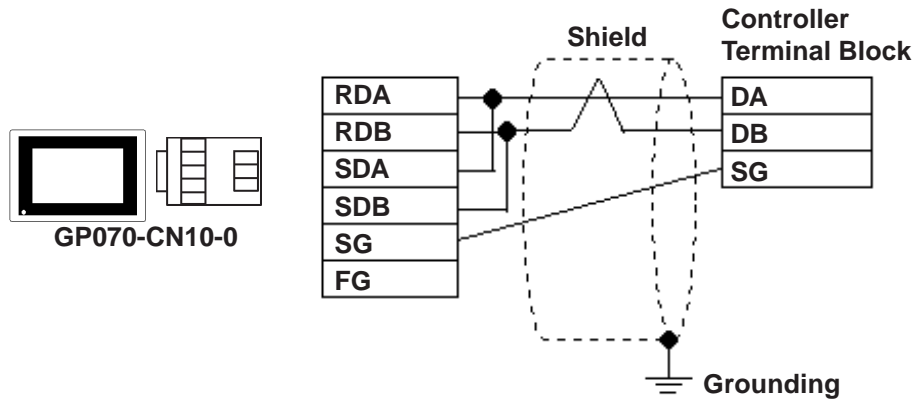

• When using Digital's RS-422 cable GP230-IS11-0
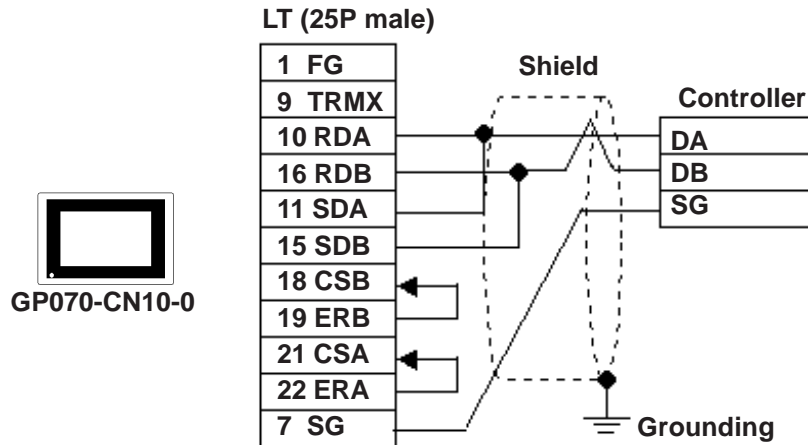

• When preparing your own cable

Cable Diagram 6   (1:1) RS-422 2-wire, RS-422 3-wire Cable

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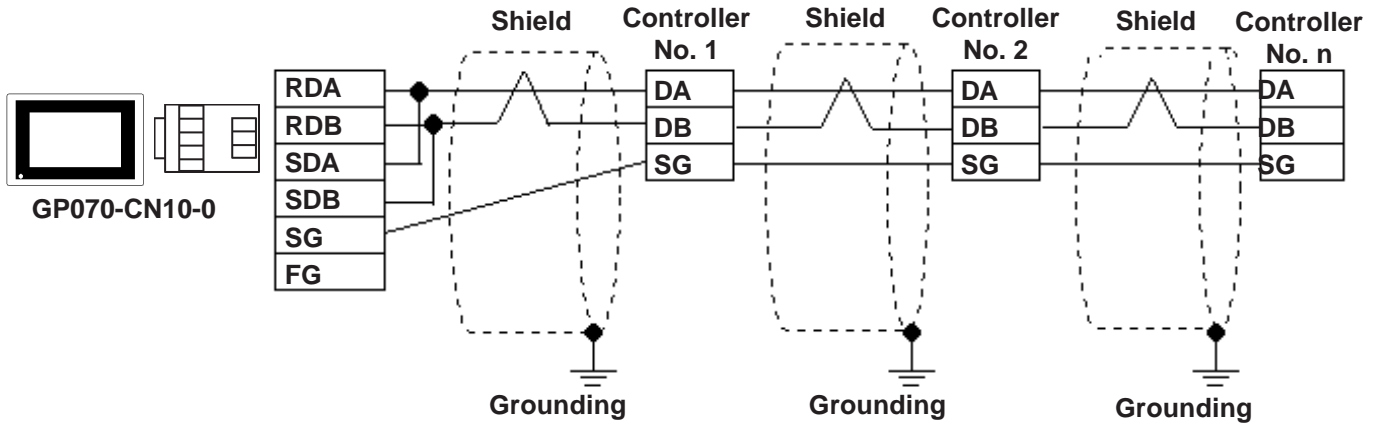

• When preparing your o

Since terminating resistance is provided inside the Controller, DO NOT connect additional terminating resistance.
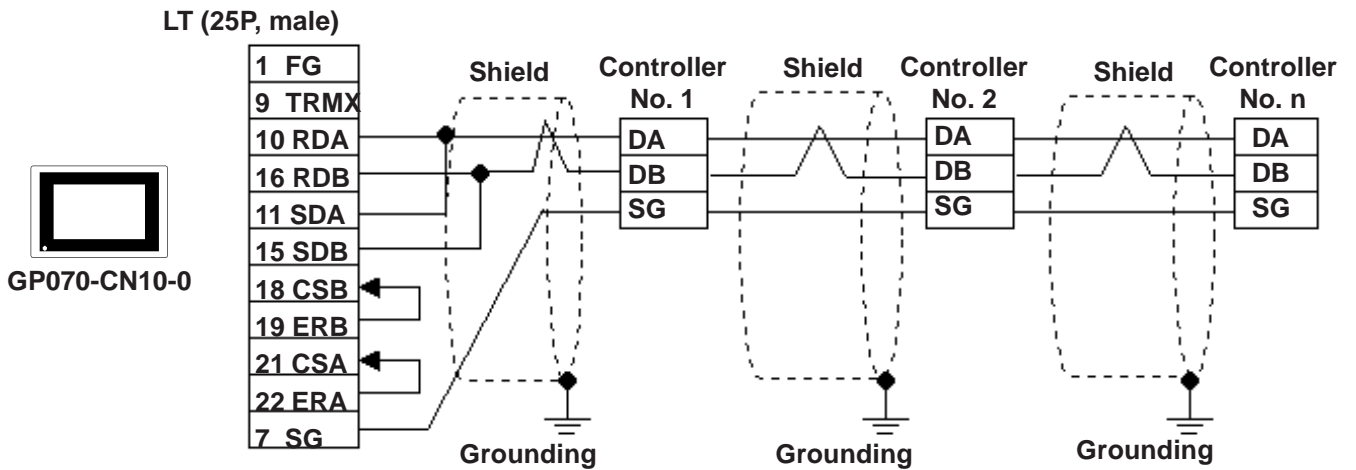
Important

Cable Diagram 7 (1:n) RS-422 2-wire, RS-422 3-wire Cable

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

GP070-CN10-0

RDA
RDB
SDA
SDB
SG
FG

Shield — Controller No. 1 (DA, DB, SG) — Shield — Controller No. 2 (DA, DB, SG) — Shield — Controller No. n (DA, DB, SG)

Grounding   Grounding   Grounding

• When preparing your own cable

LT (25P, male)

GP070-CN10-0

1 FG
9 TRMX
10 RDA
16 RDB
11 SDA
15 SDB
18 CSB
19 ERB
21 CSA
22 ERA
7 SG

Shield — Controller No. 1 (DA, DB, SG) — Shield — Controller No. 2 (DA, DB, SG) — Shield — Controller No. n (DA, DB, SG)

Grounding   Grounding   Grounding

⚠️ **Important**

Since terminating resistance is provided inside the Controller, DO NOT connect additional terminating resistance.

2.3.3　Supported Devices

The following lists show the ranges of devices supported by the LT.

■ Yamatake SDC Series

Device	Bit Address	Word Address	Remarks	
Data	00000 ~ 8999F	0000 ~ 8999		H/L

■ Yamatake DMC10[*1]

Device	Bit Address	Word Address	Remarks	
Data	10010 ~ 7804F	1001 ~ 7804		H/L

*1. Data cannot be written or read to certain Addresses. For more detailed information, refer to the Yamatake unit's appropriate Operation Manual.

Important

- *LT's System Data Area (LS0 to LS19) Settings*

  The LT's system area (20 words) cannot be allocated to the Controller's own data area. Even though you can enter the system area settings via the LT OFFLINE mode, it is impossible to actually allocate the system area to the Controller's data area.

- *Be careful that the Device fields differ depending on the type of Controller. Refer to the Controller's manual for the range allowed for the device address area.*

  After screen data is converted from a different type of Controller, be sure to check if the device addresses used are correct.
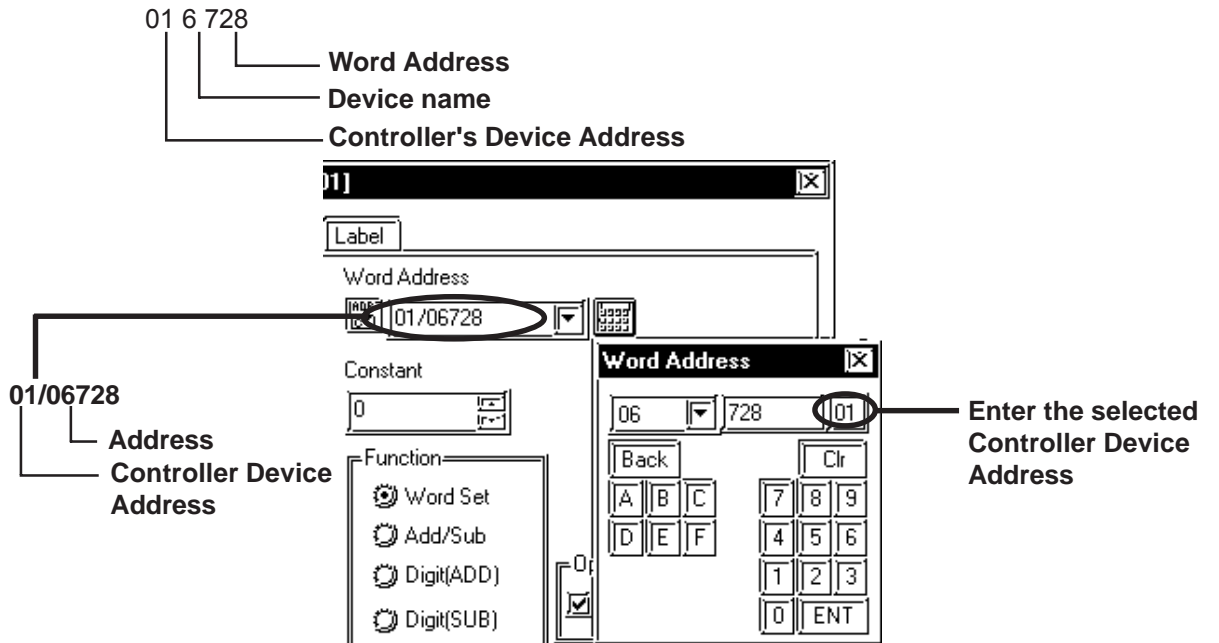
  Be sure to check the supported device addresses before using Trend graphs in your screens that use multiple words over continuous addresses.

Note:

- **When entering device addresses via the LT Editor, the top address (left-most digit) is used for the device name and remaining three digits (0 to 999) are used for the Controller data addresses.**

- **When settings Parts in LT Editor, the device address can be designated during address input. When a device number is not designated, the previously entered device number is automatically used. (The default value is 1.)**

Ex. When entering Device Address "6728":

Enter the device name "6", and then the Word Address "728".

01 6 728

—— **Word Address**

—— **Device name**

—— **Controller's Device Address**

01/06728

— **Address**

— **Controller Device Address**

Enter the selected Controller Device Address

> ### 2.3.4 Environment Setup

The following tables show Digital's recommended Controller and LT communication settings.

■ Yamatake SDC Series

LT Settings		Controller Settings	
Baud Rate	9600bps	Baud Rate	9600bps
Data Length	8bit	Data Length	8bit
Stop Bit	1bit	Stop Bit	1bit
Parity Bit	Even	Parity Bit	Even
Data Flow Control	ER	--------	--------
Communication Format (when using RS-232C *1)	RS-232C	--------	--------
Communication Format (when using RS-422)	4-wire	--------	--------
Communication Format (when using RS-422)	2-wire	--------	--------
Unit No.	Select a desired unit number from 1 to 32.	Device Address	Enter all different Controller device addresses.

*1 RS-232C communication can be performed with SDC20, SDC21, SDC40A, SDC40B, and SDC40G.

> **Important**
>
> - ***Although the Controller's device address input range is from 0 to 127, be sure to use only from 1 to 32 on the LT to match the Controller's device address to the LT's.***
>
> - ***When using 1:n communication, up to 31 Controllers can be connected.***
>
> - ***When the device address is designated as 0 (default value), communication cannot be performed.***

■ Yamatake DMC10

LT Settings		Controller Settings	
Baud Rate	19200bps	Baud Rate	19200bps
Data Length	8bit	Data Length	8bit
Stop Bit	1bit	Stop Bit	1bit
Parity Bit	Even	Parity Bit	Even
Data Flow Control	ER	--------	--------
Communication Format (when using RS-422	2-wire	--------	--------
Unit No. *2	Select a desired unit number from 1 to 15.	Device Address	Enter all different Controller device addresses (1 to F).

*2 Unit numbers entered on the LT are decimal numbers.

2.4 ▶ RKC INSTRUMENT INC. Controllers

2.4.1 ▶ System Structure

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

⚠ **Important**

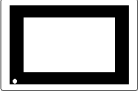**LT's System Area (LS0 to LS19) Settings**

The LT's system area (20 words) cannot be allocated to the Controller's own data area. Even though you can enter the system area settings via the LT OFFLINE mode, be careful that you do not use the Controller's own data area.

■ CB Series/SR-Mini Series (1:1 communication)

Controller	Cable Diagram	Cables	LT
	⟷	⟶	
H-PCP-A Z-1021	RS-232C (Cable Diagram 1)	RKC's W-BF-01- XXXX *1	
	RS-422 (4-wire) (Cable Diagram 2)		
CB100 Z-1021 CB400 Z-1021 CB500 Z-1021 CB700 Z-1021 CB900 Z-1021	RS-422 (2-wire) (Cable Diagram 3)		LT Type-C

1   XXXX indicates the cable length (mm).

■ CB Series/SR-Mini Series (1:n communication)

Controller	Cable Diagram	Cable	LT
H-PCP-A Z-1021	RS-422 (4-wire) (Cable Diagram 4)	RKC's W-BF-01-XXXX [1] W-BF-02-XXXX	LT Type-C
CB100 Z-1021 CB400 Z-1021 CB500 Z-1021 CB700 Z-1021 CB900 Z-1021	RS-422 (2-wire) (Cable Diagram 5)		

1   XXXX indicates the cable length (mm).

2.4.2	Cable Diagrams

The cable diagrams shown below and the cable diagrams recommended by the 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 (LT 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 LT.*

- *If a communications cable is used, be sure to connect its SG (signal ground) terminal.*

- *RS-422 (2-wire) cables, must be less than 500 meters or less.*

- *The following RS-422 cable is recommended.*

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

Important

- *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 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 a SR-Mini to a LT
RKC INSTRUMENT INC.	W-BF-02- XXXX [1]	Used when connecting a SR-Min to SR-Mini

1 XXXX indicates the cable length (mm).

Cable Diagram 1   (1:1) RS-232C
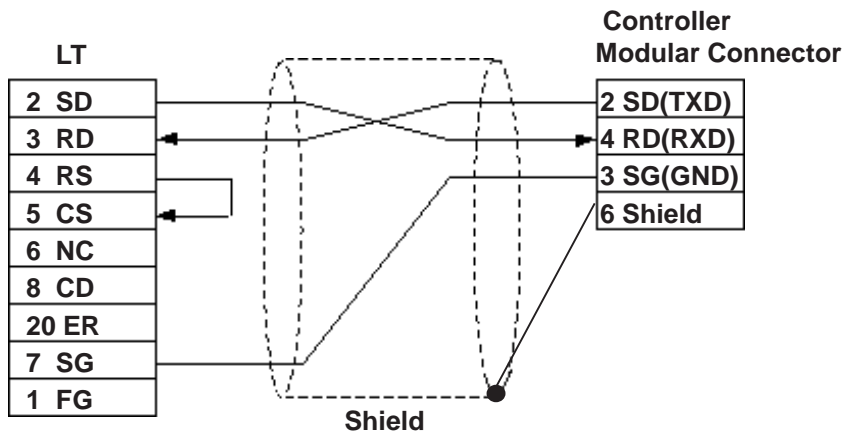
Cable Diagram 2   (1:1) RS-422 4-wire Cable

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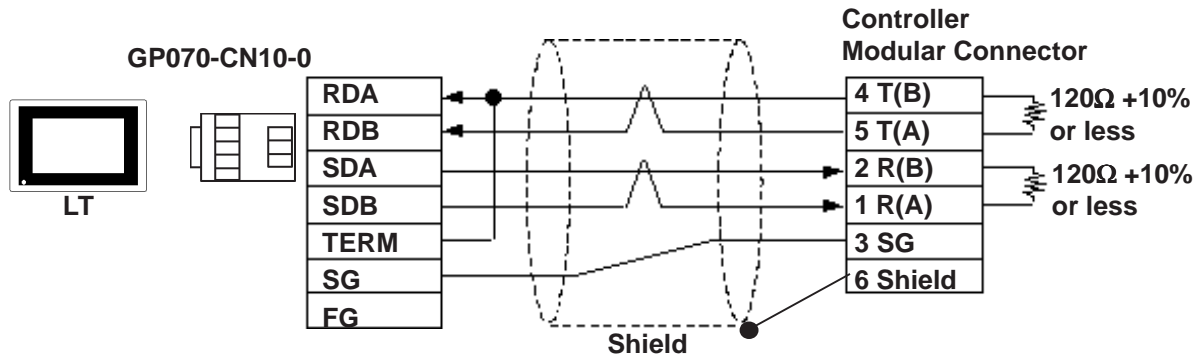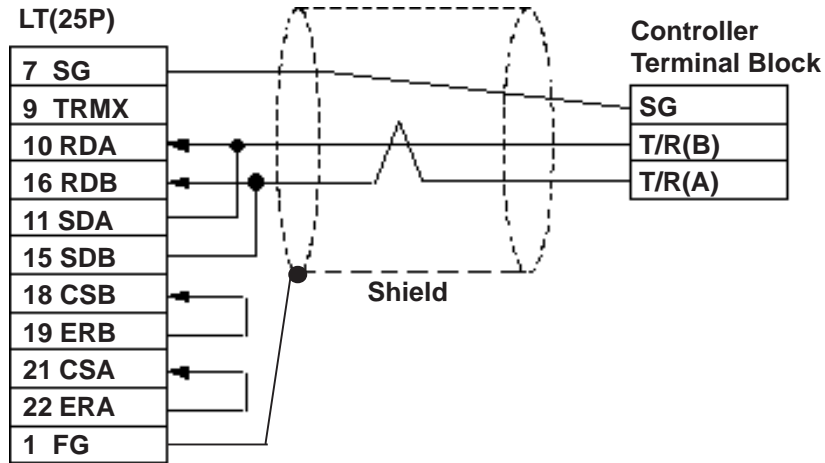

• When making your own cable
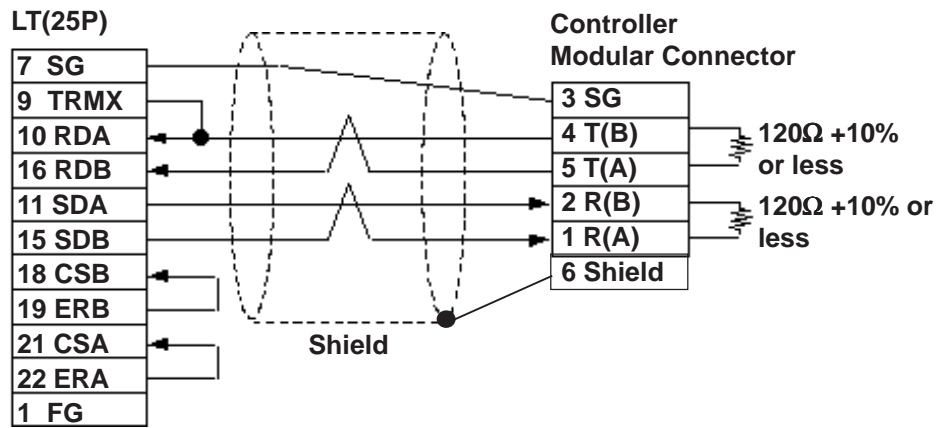
Cable Diagram 3 (1:1) RS-422 2-wire Cable

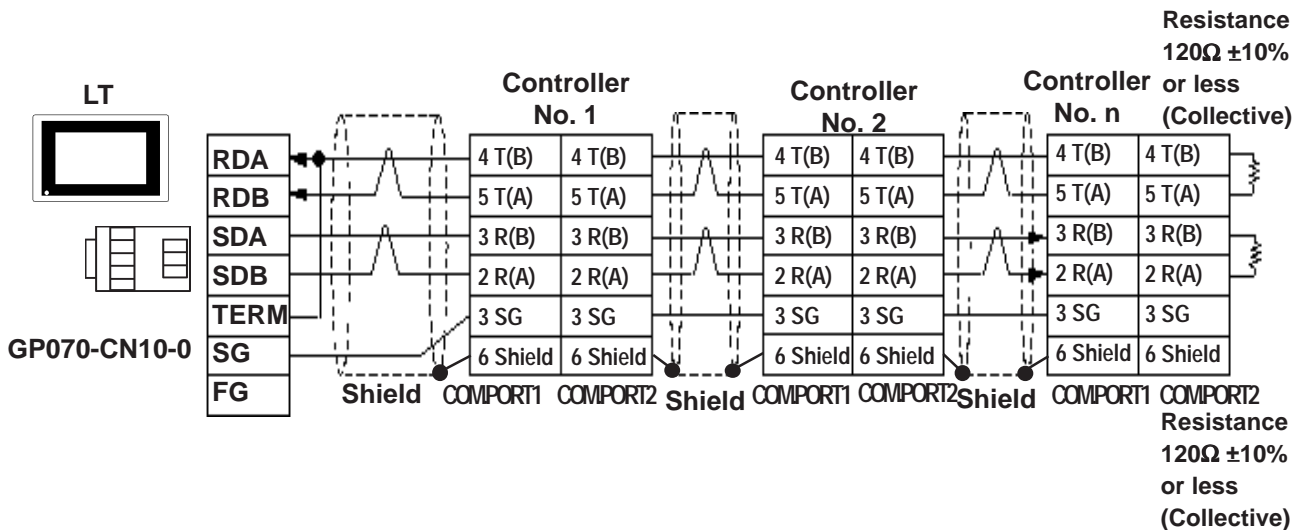• When using Digital's RS-422 connector terminal adapter GP070-CN10-0
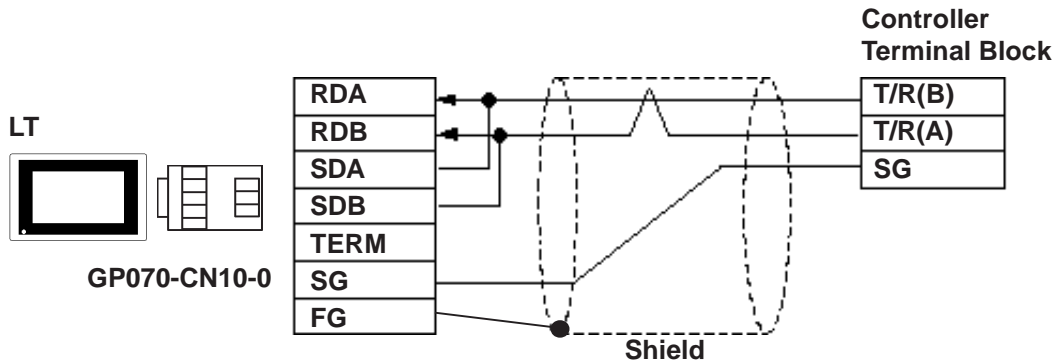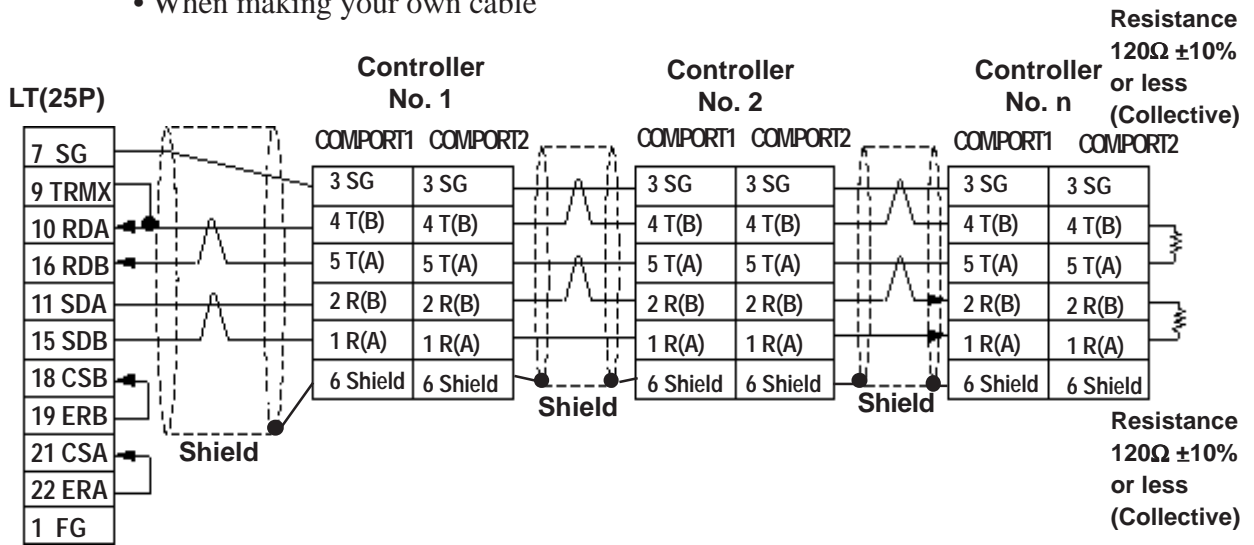

• When making your own cable

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

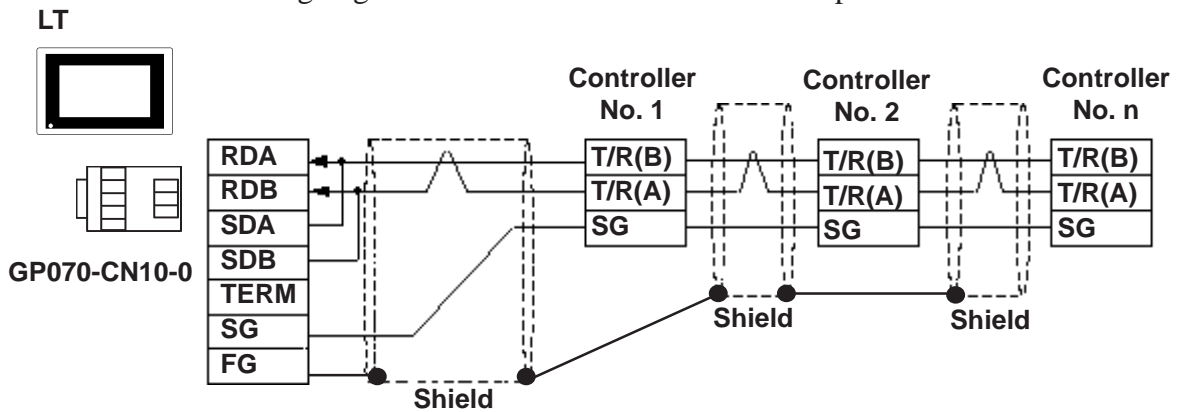• When using Digital's RS-422 connector terminal adapter GP070-CN10-0
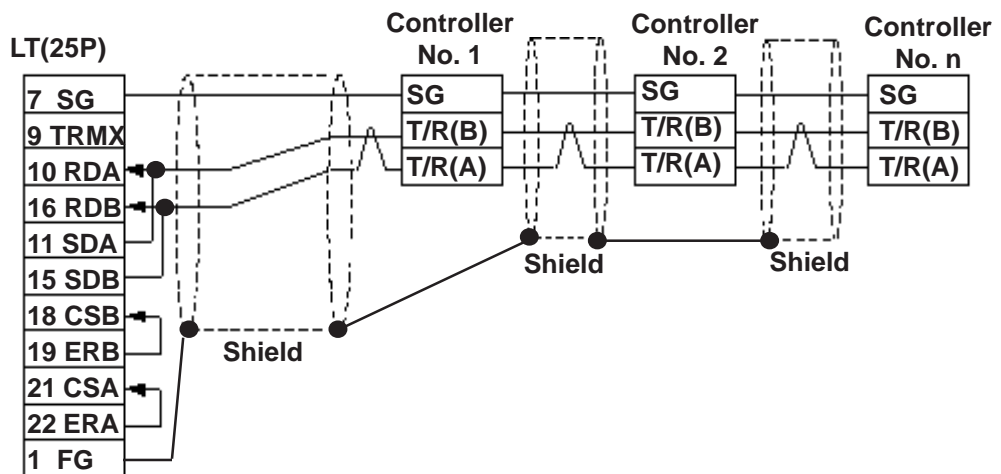
• When making your own cable

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

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

• When making your own cable

> ### 2.4.3 ▶ Supported Devices

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

■ CB Series

Device	Bit Address	Word Address	Comments	
Data	00000 ~ 02EEF	0000 ~ 02EE		H/L

⚠ **Important**

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

  The LT's system area (20 words) cannot be allocated to the Controller's own data area. Even though you can enter the system area settings via the LT OFFLINE mode, be careful that you do not use the Controller's own data area.
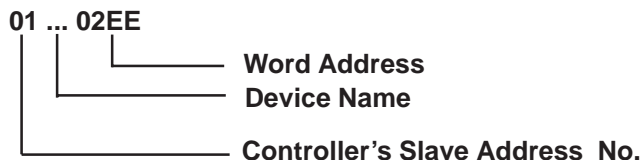
- *The data communication feature will not operate when the slave address No. is set to "0". (The default value is 0.)*

✎ *Note:*

When using parts in LT Editor, the External Device Station number can be specified during address Input. If a station number is not indicated, the previously entered station number is automatically used. (The default value is 1.)

Ex. 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.

01/02EE
- Address
- Controller's Slave Address No.

Enter the selected Controller Slave Address No.
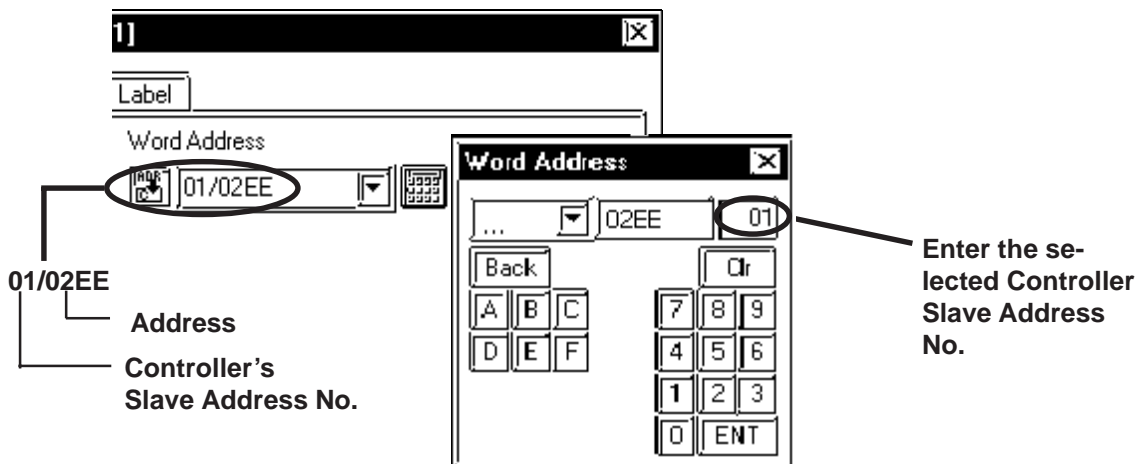
2.4.4   Environment Setup

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

LT Settings		Controller Settings	
Baud Rate	9600 bps	Baud Rate	9600 bps
Data Length	8 bits	Data Length	8 bits
Stop Bit	1 bit	Stop Bit	1 bit
Parity Bit	None	Parity Bit	None
Data Flow control	ER	--------	--------
Communication Format using RS-232C [1]	RS-232C	--------	--------
Communication Format using RS-422 (4-wire) [2]	4-wire type	--------	--------
Communication Format using RS-422 (2-wire)	2-wire type	--------	--------
Unit No.	Select any unit number from 1 to 32.	Slave Address No.	Select any unit number from 1 to 32.

*1 RS-232C can be used when the H-PCP-A (Z-1021) is used.

*2 Only the H-PCP-A (Z-1021) can use a 4 wire cable, and only CB series units can use
   a 2 wire cable.

⚠️
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".) and from 1 to 16 for the SR-Mini series units. Use only from 1 to 32 on the LT.**

- **With a 1:n connection, up to 31 CB series units, and up to 16 SR-Mini series units can be connected to a single LT.**

MEMO

2.5 Omron Corporation Controllers
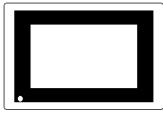
2.5.1 System Structure

The following describes the system configuration used when connecting the LT to this Controller.

⚠ **Important**

LT's System Area (LS0 to LS19) Settings

The LT's system area (20 words) cannot be allocated to the Controller area. Even though you can enter the system area settings via the LT OFFLINE mode, be careful that you do not actually use the Controller area.

■ **THERMAC NEO Electronic Temperature Controller (1:1 communication)**

Electronic *1 Temperature Controller	Cable Diagram	LT
	← →	
E5EN-□□□□□-FLK E5AN-□□□□□-FLK	RS-232C <Cable diagram 1>	
E5EN-□□□□□-FLK E5CN-□□□□□-FLK E5GN-□□□□□-FLK E5AN-□□□□□-FLK	RS-422 (2-wire type) <Cable diagram 2>	LT Type-C

*1 The Controller's model number "□" will vary, depending on each controller's functional specifications.

■ **THERMAC NEO Electronic Temperature Controller (1:n communication)**

Electronic *1 Temperature Controller	Cable Diagram	LT
E5EN-☐☐☐☐☐-FLK E5CN-☐☐☐☐☐-FLK E5GN-☐☐☐☐☐-FLK E5AN-☐☐☐☐☐-FLK	RS-422 (2-wire type) <Cable diagram 3>	LT Type-C

*1 The Controller's model number "☐" will vary, depending on each controller's functional specifications.

2.5.2 Cable Diagrams

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

Important
- *An RS-232C cable must be 15 meters or less. Also, be sure to connect its SG (signal ground) terminal.*
- *An RS-422 cable, use a cable length less than 500 meters or less.*
- *Digital recommends the following RS-422 cables.*

■ Recommended RS-422 Cable

No.	Model *1	Standard
1	E5EN-□□□□□-FLK E5CN-□□□□□-FLK E5AN-□□□□□-FLK	AWG28 or above
2	E5GN-□□□□□-FLK	AWG14 to AWG24

*1 The Controller's model number "□" will vary depending on each controller functionality specifications.

■ Recommended RS-232C Cable

No.	Model *1	Standard
1	E5EN-□□□□□-FLK E5AN-□□□□□-FLK	Twisted pair wire with shield, AWG28 or above

*1 The Controller's model number "□" will vary depending on each controller functionality specifications.

Cable Diagram 1 (1:1) RS-232C
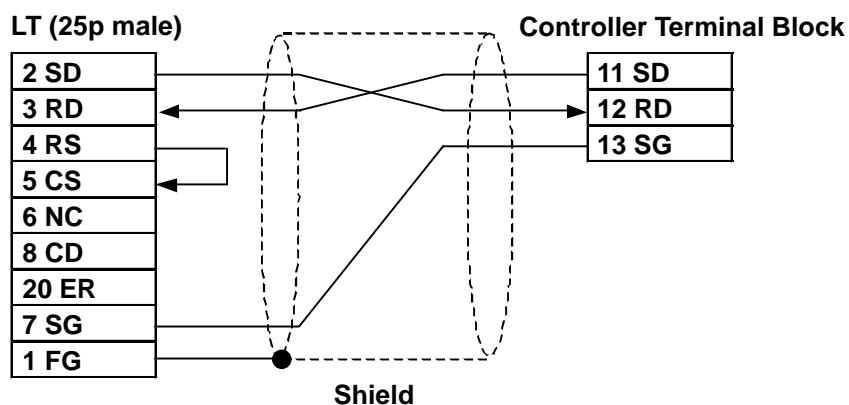
Cable Diagram 2 (1:1) RS-422

The Pin Nos. used with a RS-422 connection will vary depending on the type of controller used. The controller pin assignment diagrams are shown below. Terminal numbers are not shown in the following RS-422 cable diagrams. Refer to the following tables and diagrams when making all wiring connections.
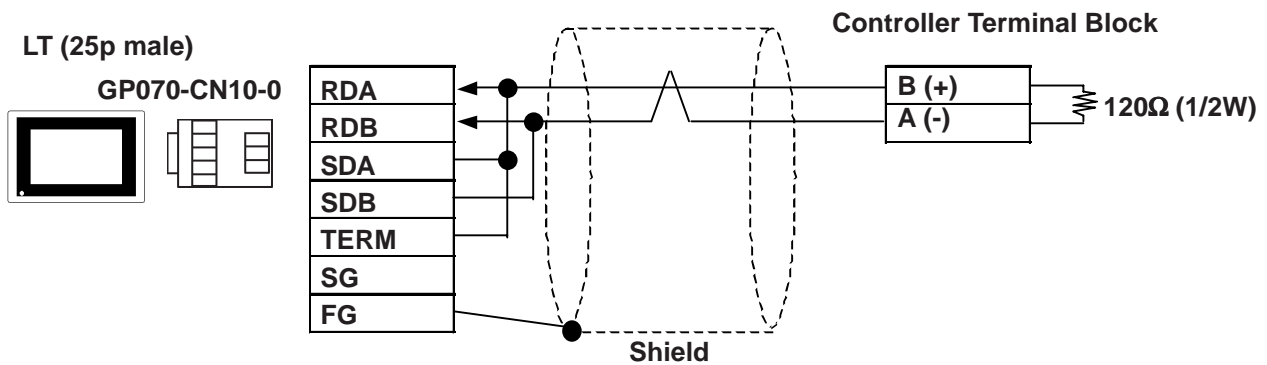
E5EN/E5CN/E5AN

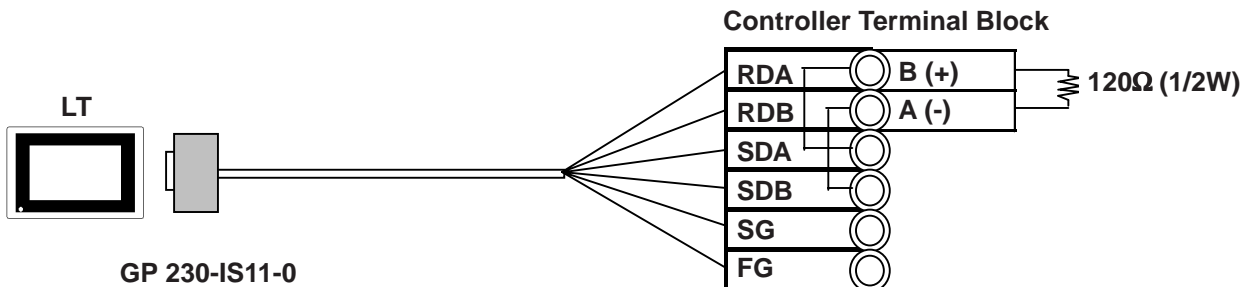| Abbreviation	Pin No.
A (-)	12
B (+)	11

E5GN

Abbreviation	Pin No.
A (-)	6
B (+)	5

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

• When using Digital's RS-422 cable, GP230-IS11-0
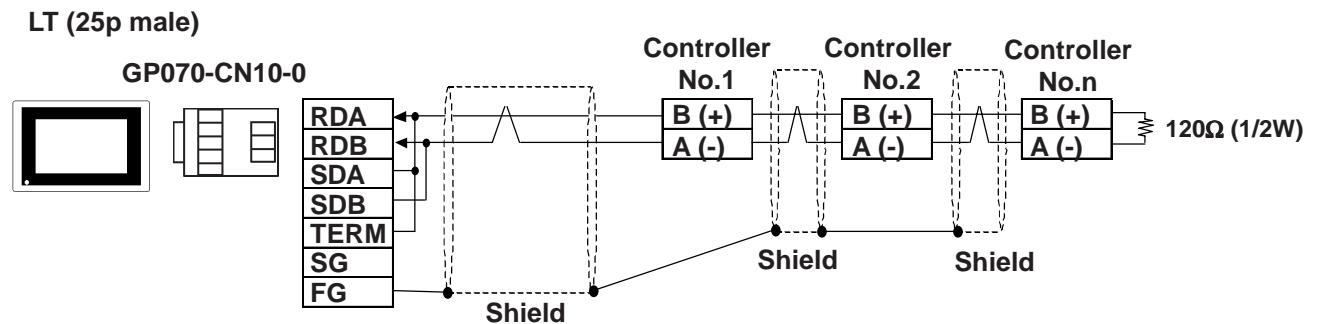
• When making your own cable

LT (25p male)

7 SG	
9 TRMX	
10 RDA	
16 RDB	
11 SDA	
15 SDB	
18 CSB	
19 ERB	
21 CSA	
22 ERA	
1 FG	

Shield

Controller terminal block

B (+)
A (-)
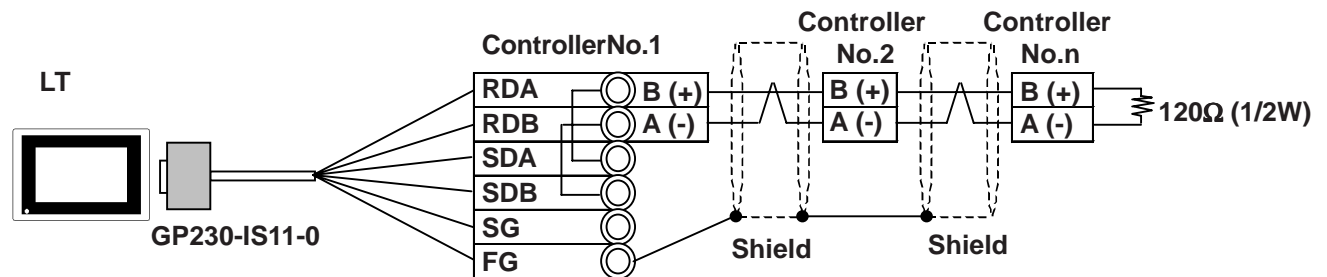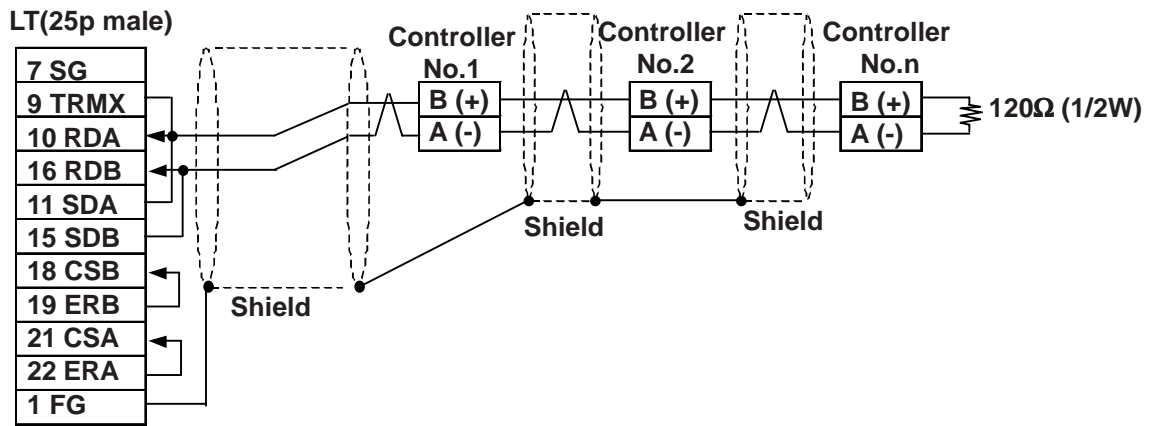
120Ω (1/2W)
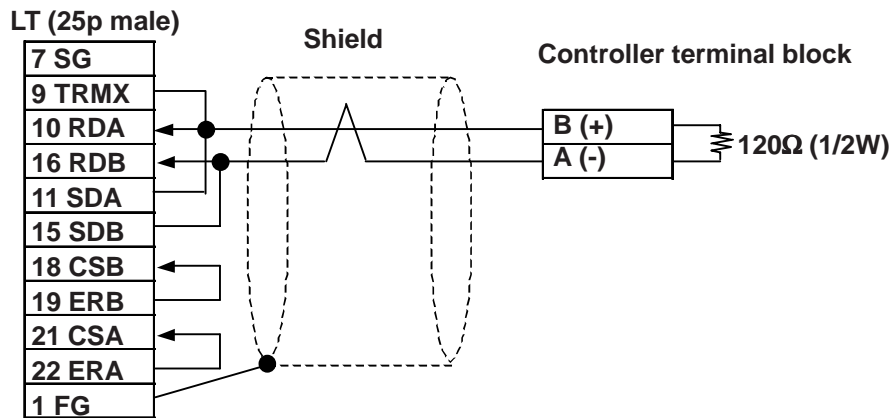
Cable Diagram 3   (1:n) RS-422 2-wires

Note: **For the shield wire grounding, be sure to use dispersion grounding, parallel grounding or series grounding (shown below), depending on your electrical equipment conditions.**

• When using Digital's RS-422 connector terminal adapter GP070-CN10-0
  (An example of series grounding)

LT (25p male)

GP070-CN10-0

RDA
RDB
SDA
SDB
TERM
SG
FG

Controller No.1

B (+)
A (-)

Controller No.2

B (+)
A (-)

Controller No.n

B (+)
A (-)

120Ω (1/2W)

Shield

Shield

Shield

• When using Digital's RS-422 cable, GP230-IS11-0
  (An example of series grounding)

LT

GP230-IS11-0

RDA
RDB
SDA
SDB
SG
FG

ControllerNo.1

B (+)
A (-)

Controller No.2

B (+)
A (-)

Controller No.n

B (+)
A (-)

120Ω (1/2W)

Shield

Shield

- When making your own cable
  (An example of series grounding)

2.5.3 Supported Devices

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

■ THERMAC NEO Electronic Temperature Controller

Device	Bit Addresses	Word Addresses	Remarks	
Variable Areas	C0000000 to C0000531	C00000 to C00005	Double word device (write disabled) *1	H/L
	C1000000 to C1001C31	C10000 to C1001C	Double word device	
	C3000000 to C3003531	C30000 to C30035	Double word device	
Operation Commands	A000000 to A000815	A0000 to A0008	Word device	

*1 Data write is not possible.

STOP LT Editor's Simulation feature is not available with this protocol. To avoid a possible LT malfunction, do not use this feature.

⚠ Important

- *The system area (20 words) of LT cannot be used. Although it is possible to set addresses for this area via the LT OFFLINE mode, it is impossible to actually allocate the system area to the controller's data area.*

- *Be careful as the Device fields differ depending on the type of Controller. Refer to the Controller's manual for the range allowed for the device address area.*

- *After screen data is converted from a different type of Controller, be sure to check if the device addresses used are correct.*

- *Be sure to check that the device addresses are supported before using. Trend graphs in your screens should use multiple words over continuous addresses.*

Note:
 • **This protocol's LS area uses a 32-bit device.**
 • **When setting parts in the LT Editor, the Controller communication unit No. can be specified during address input. If a communication unit No. is not indicated, the previously entered communication unit No. is automatically used. (The default value is 1.)**

Ex. When entering Device Address C00000

Enter the Device Name "C0", and the Word Address "0000".

01 C0 0000
 └─── **Word Address**
 └─── **Device Name**
 └─── **Controller Communication Unit**

01/C00000
 └─ **Address**
 Controller Communication Unit No.

Enter the selected Controller Communication Unit No. (Station No.)
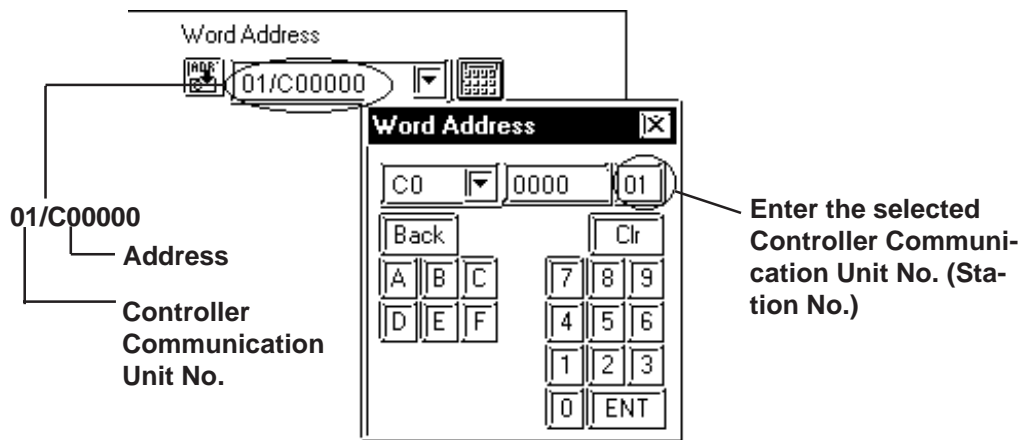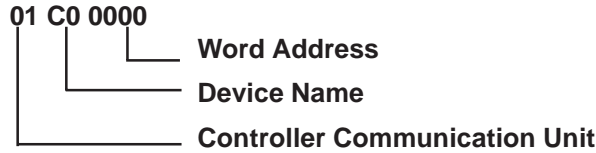
Note:
 After the Controller's power is turned ON, it may take a few seconds until the Controller starts. Therefore, if the LT and the Controller are turned ON at the same time, there may be a delay of several seconds until communication starts.

■ Operation Commands

Command codes 00 to 08 are used for operation command service (command) to provide a total of 9 write commands.

Certain command operations are identical, and the result (arbitrary value) is written to a variable area.

Device code	Word address	Command code	Meaning
	0000	00	Data Transfer Write
	0001	01	RUN / STOP
	0002	02	Multi-SP
	0003	03	AT RUN / STOP
A	0004	04	Write mode
	0005	05	Store RAM data
	0006	06	Software reset
	0007	07	Setting area shift 1
	0008	08	Protection level shift

Note:

- **When a write command is performed, the device code used in LT Editor is 'A', and that command code is entered instead of the device address.**

  Related data (2 bytes) is designated by each word switch part's setting value. Since this device is a write-only device, readout is disabled. If used for readout, i.e. an Numeric display, a host communication error (02:F0:) (** is set parts unit No.) will appear in the lower left corner of the LT screen.**

- **Device "C0, C1, C3"**
  C0, C1 and C3 devices are not used as device symbols. Instead they identify a variable area's data type.

  > ▽ *Reference* ▽ *User Manual (SGTD-706) for OMRON's E5AN/E5EN/E5CN/ E5GN Electronic Temperature Controller*

■ LT Error Codes

Error codes are indicated in the left lower corner of the LT screen.

Error codes consist of three types. When an error occurs, the corresponding error code and LT station number (where the error occurred) are saved either in LS2039 or LS2070. Since the method used will vary depending on the error type, refer to the following list for details. (Data saved in LS2039 or LS2070 is shown using hexa-decimal characters.)

1. Error Code (02:12) – 2 units

   Error Code   0x12

   Data saved in LS2039   0x12 (error code)

   Data saved in LS2070   0 (fixed as "0")

2. Error Code   (02:12:34) – 3 units

  Error Code   0x12. The LT station number where the error occurred is 34(0x22)

  Data saved in LS2039   0x1222 (The two digits shown here by "12" represent the error code, and the last two digits "22" represent the station no. Note that "0x" is not shown on the display.)

  Data saved in LS2070   0 (fixed as "0")

3. Error Code (02:12:34:56) – 4 units

  Error Code   0x1234. The LT unit number where the error occurred is 56(0x38)

  Data saved in LS2039   0x1234 (error code)

  Data saved in LS2070   0x38 (station no.)

2.5.4	Environment Setup

The following table lists the recommended Controller and LT communication settings.

■ THERMAC NEO Controller

LT Settings		Controller Settings	
Baud Rate	9600 bps	Baud Rate	9600 bps
Data Length	7 bits	Data Length	7 bits
Stop Bit	2 bit	Stop Bit	2 bit
Parity Bit	Even	Parity Bit	Even
Data Flow control	ER	--------	--------
Communication Format (using RS-232C) [*1]	RS-232C	--------	--------
Communication Format (using RS-422 - 4-line)	4-wire type	--------	--------
Communication Format (using RS-422 - 2-line)	2-wire type	--------	--------
Unit No. [*2]	1 to 32	Unit No.	1 to 32

*1 The E5EN and the E5AN use an RS-232C connection.

*2 It is possible to set a Controller communication unit No.from 0 to 99, however, the LT can only be set from 1 to 32.

   With a 1:n connection, up to 31 controllers can be connected to a single LT.

MEMO

2.6   Shinko Technos Corporation Controllers

2.6.1   System Structure

The following describes the system configuration used when connecting the LT to this Controller.

⚠ **Important**

- *Do not use the system area because the LT's system area (LS0 to LS19) cannot be allocated to the Controller area. (Deselect all system area selection items.)*
- *The Controller's read area can be used as normal.*

■ C Series

CPU	Control Unit[1]	Cable Diagram	Cables	LT
CPT-20A	CCT-235-2-□□	RS-422 <Cable Diagram 4>	CPM Shinko Technos Corporation	LT Type-C
		RS-422 (1:n) <Cable Diagram 5>	CPM and CPP Shinko Technos Corporation	

[1] The Controller's model number "□□" changes, according to the options selected.
For details about model numbers, refer to the C Series catalog.

■ FC Series

Controller [1]	Link I/F	Cable Diagram	LT
FCD-13A□□,C FCD-15A□□,C FCR-13A□□,C FCR-15A□□,C	Serial Communication Option:C	RS-232C <Cable Diagram 1>	LT Type-C
FCD-13A□□,C5 FCD-15A□□,C5 FCR-13A□□,C5 FCR-15A□□,C5	Serial Communication Option:C5	RS-422 <Cable Diagram 2> RS-422 (1:n) <Cable Diagram 3>	

[1] The Controller's model number "□□" changes, according to the options selected .
Items with the serial communication option have a ",C" or ",C5" after the basic model number.
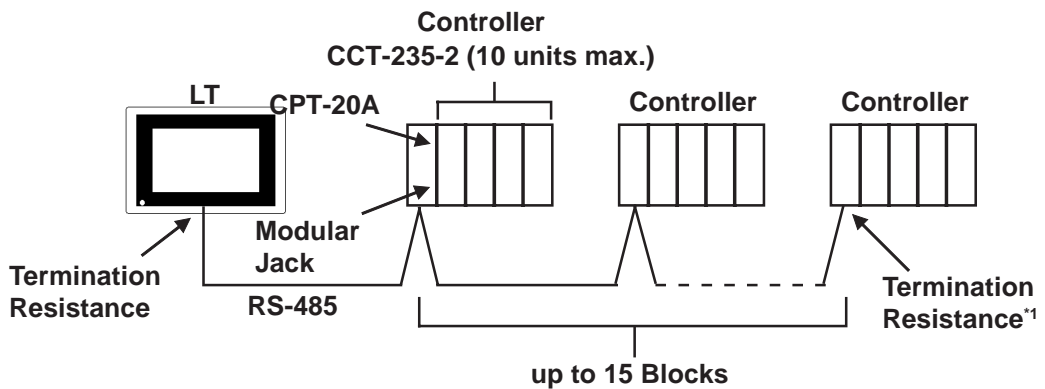*For details about model numbers, refer to each series catalog.*

■ **FIR Series**

Controller [*1]	Link I/F	Cable Diagram	LT
FIR-201-M□□,C FIR-201-M□□,C	Serial Communication Option:C	RS-232C <Cable Diagram 1>	LT Type-C
FIR-201-M□□,C5 FIR-201-M□□,C5	Serial Communication Option:C5	RS-422 <Cable Diagram 2>	
		RS-422 (1:n) <Cable Diagram 3>	

■ **GC Series**

Controller [*1]	Link I/F	Cable Diagram	LT
GCS-300□□,C5	Serial Communication Option:C5	RS-422 <Cable Diagram 2>	LT Type-C
		RS-422 (1:n Communication) <Cable Diagram 3>	

■ **FCL Series**

Controller [*1]	Link I/F	Cable Diagram	LT
FCL-13A□□,C5	Serial Communication Option:C5	RS-422 <Cable Diagram 2>	LT Type-C
		RS-422 (1:n Communication) <Cable Diagram 3>	

■ **PC-900 Series**

Controller [*1]	Link I/F	Cable Diagram	LT
PC-935□□,C PC-955□□,C	Serial Communication Option:C	RS-232C <Cable Diagram 1>	LT Type-C
PC-935□□,C5 PC-955□□,C5	Serial Communication Option:C5	RS-422 <Cable Diagram 2>	
		RS-422 (1:n Communication) <Cable Diagram 3>	

*1 The Controller's model number "□□" changes, according to the options selected .
Items with the serial communication option have a ",C" or ",C5" after the basic
model number.
For details about model numbers, refer to each series catalog.

◆ **When connecting an RS-232C cable (for RS-232C compatible Controllers)**

LT

Controller

RS-232C

**Communication
Option RS-232C**
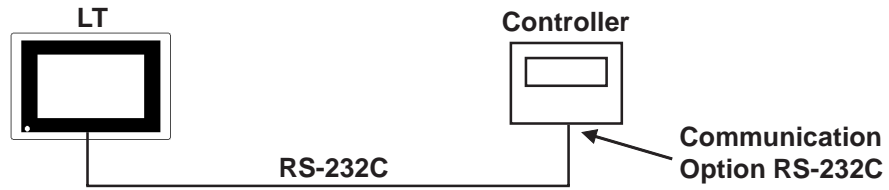
◆ **RS-485 cable (except the C Series Controller)**

LT

Controller   **Controller**   **Controller**

**Termination
Resistance**

RS-485

**Communication
Option RS-485**

**Termination
Resistance**

up to 31 Controllers
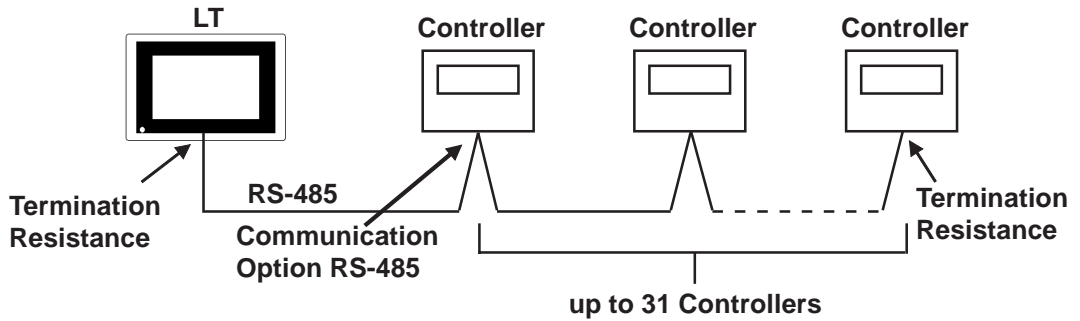
◆ **RS-485 cable (connecting with the C Series Controller)**

**Controller
CCT-235-2 (10 units max.)**

LT   **CPT-20A**   **Controller**   **Controller**

**Termination
Resistance**

**Modular
Jack**

RS-485

**Termination
Resistance**[1]

up to 15 Blocks

1 Turn Controller's termination resistance switch ON.

> ### 2.6.2 Cable Diagrams

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

Important

- *Ground your External Device's FG terminal according to your country's applicable standard.*

- *Since some Controllers do not have a GND signal (FG), be careful when selecting the side (LT or Indicating Controller) used for connecting the FG wire to the shield.*

- *When connecting the FG wire to the cable connector's cover, be sure it is made from a conductive material.*

- *For an RS-232C cable, use a cable length of 15 meters or less.*

- *For an RS-422 cable, use a cable length of 600 meters or less.*

- *Pro-face recommends the OTSC-2PVB-7/0.32TA cable, made by O-NAMBA Corporation.*

Cable Diagram 1
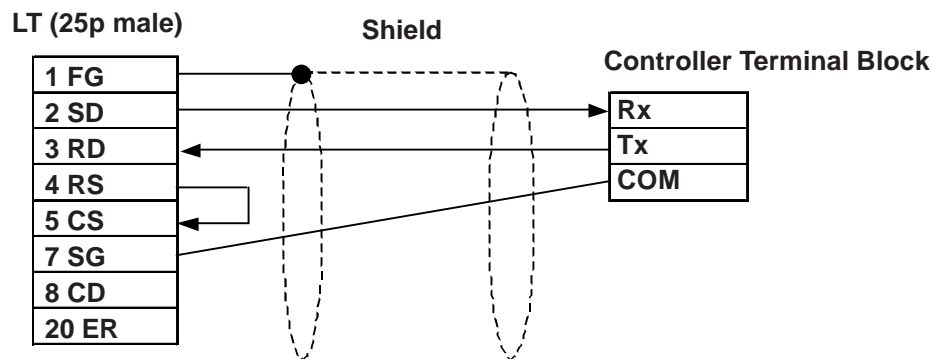
Cable Diagram 2

There are two ways of connecting the LT and the Controller. One is using the Shinko Technos' RS-232C ⟷ RS-485 Converter (IF-300-C5). The other is using an RS-485 cable.

• When using Shinko Technos's RS-232C ⟷ RS-485 Converter (IF-300-CS)

When using this converter, be sure the LT's communication setting is "RS-232C".Do not use any other manufacturer's converter.
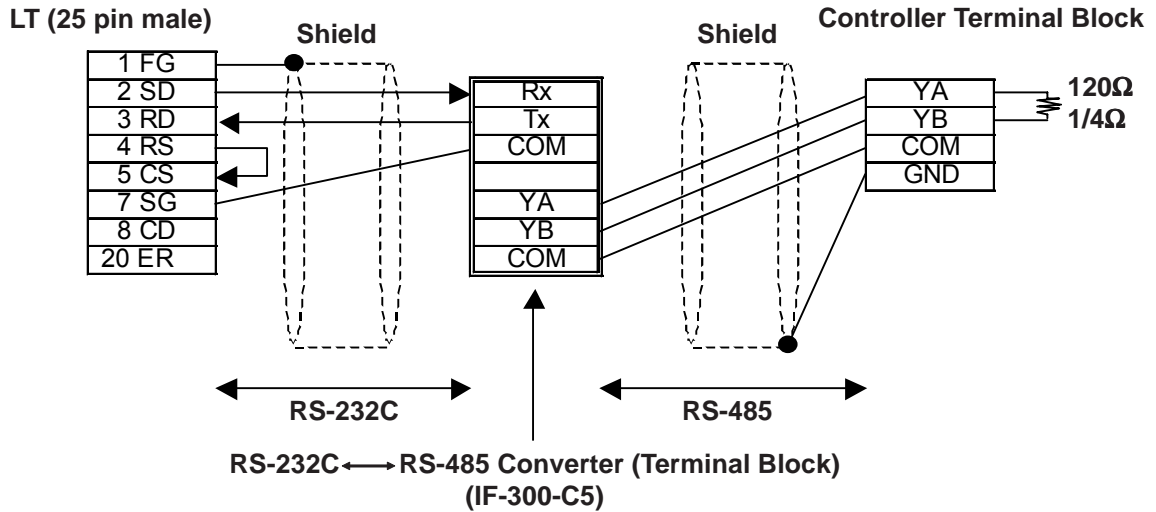
• When connecting the LT and the Controller via RS-485 cable
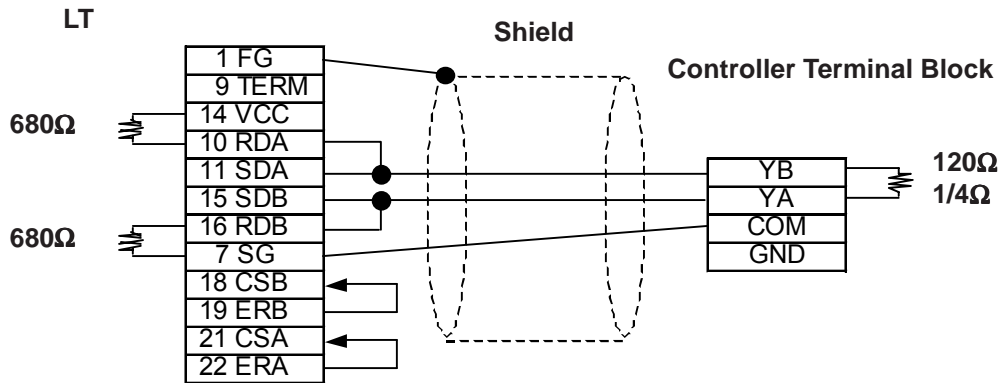
Cable Diagram 3

There are two ways of connecting the LT and the Controller. One is using the Shinko Technos' RS-232C ⟷ RS-485 Converter (IF-300-C5). The other is using an RS-485 cable.

• When using Shinko Technos's RS-232C ⟷ RS-485 Converter (IF-300-C5)
    When using this converter, be sure the LT's communication setting is "RS-232C".Do not use any other manufacturer's converter.
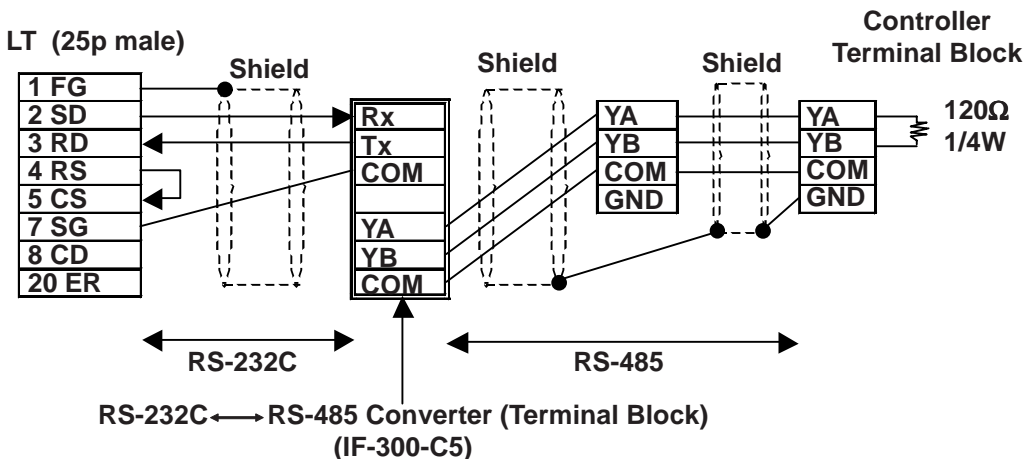
• When connecting the LT and the Controller via an RS-485 cable
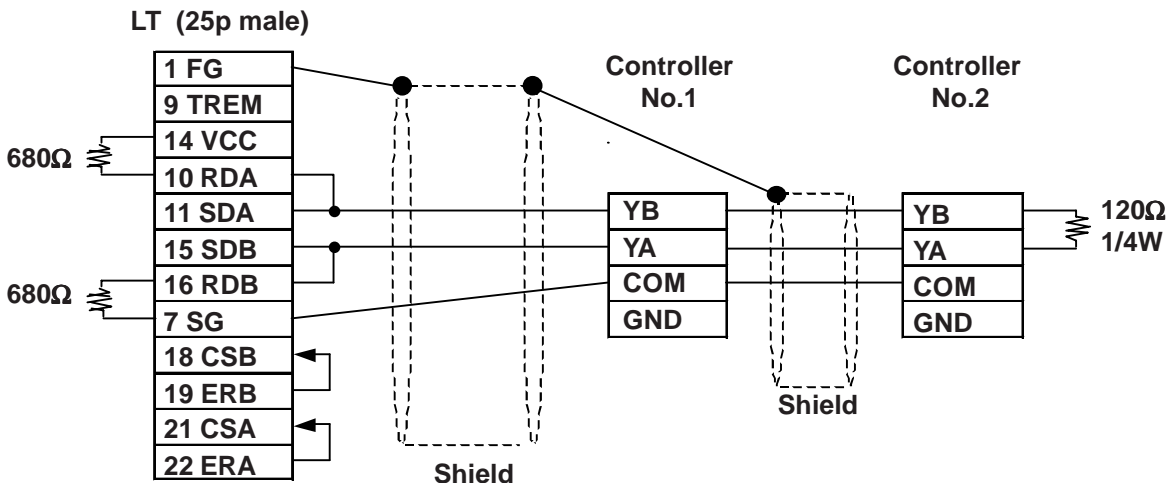
Cable Diagram 4 (RS-422)

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

(Terminal Block)

LT	TERM		Controller (Modular Jack)
	RDA	3 TXB	
	RDB	4 TXA	
100Ω (1/2Ω)	SDA	2 RXB	
GP070-CN10-0	SDB	5 RXA	
	SG	1 SG	Shinko Technos cable (Model Number : CPM)
		6 SG	
	FG		
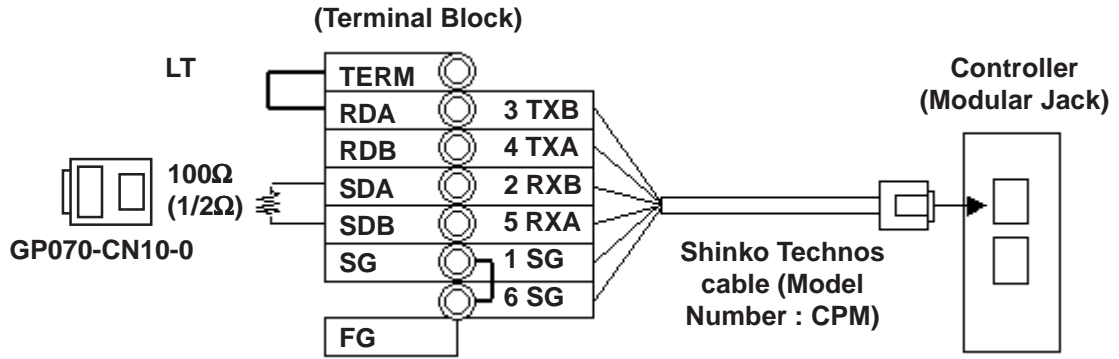
Note: **Be sure to use only the Shinko Technos Corporation "CPM" cable.**

Cable Diagram 5 (RS-422)

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

(Terminal Block)

	TERM		Controller (Modular Jack)	Controller (Modular Jack)
	RDA	3 TXB		
	RDB	4 TXA		
100Ω (1/2Ω)	SDA	2 RXB		
GP070-CN10-0	SDB	5 RXA		
	SG	1 SG		
		6 SG	Shinko Technos cable (Model Number : CPM)	Shinko Technos cable (Model Number : CPP)
	FG			
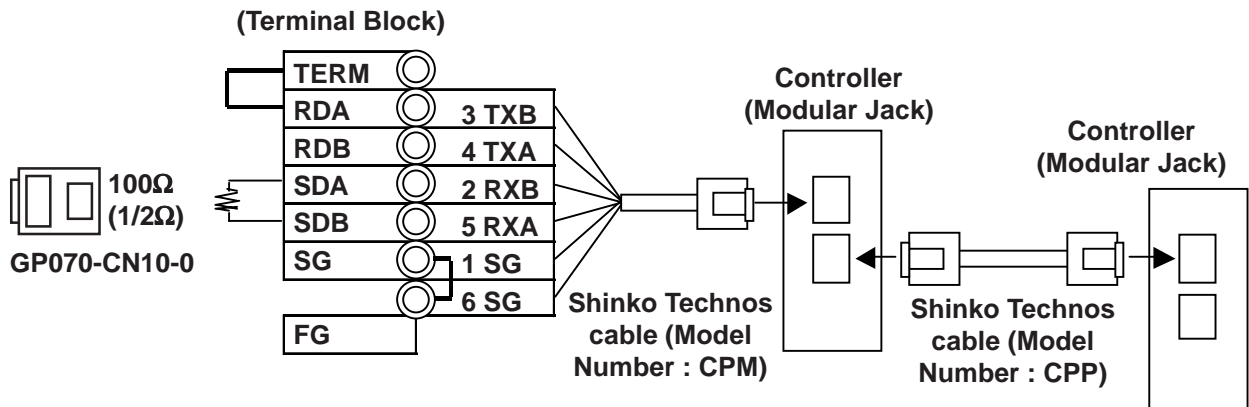
Note:
• **Be sure to use only the Shinko Technos Corporation "CPM" and "CPP" cables.**
• **Be aware that the A and B signals of the LT and External Device are reversed.**
• **To enable the Controller's termination resistance, turn dip switch No.2 ON.**

2.6.3	Supported Devices

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

■ C Series

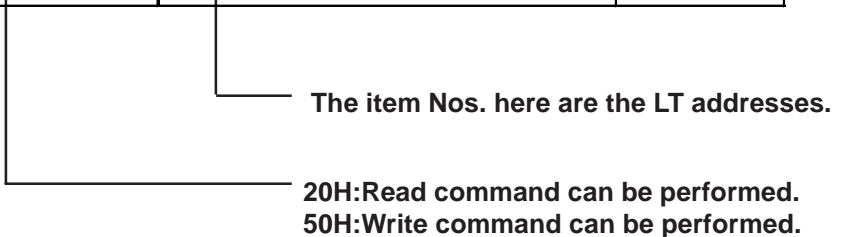| Device	Bit Addresses[*1]	Word Addresses[*1]	
Channel 1	1CH010 ~ 1CH84F	1CH01 ~ 1CH84	
Channel 2	2CH010 ~ 2CH84F	2CH01 ~ 2CH84	
Channel 3	3CH010 ~ 3CH84F	3CH01 ~ 3CH84	
Channel 4	4CH010 ~ 4CH84F	4CH01 ~ 4CH84	
Channel 5	5CH010 ~ 5CH84F	5CH01 ~ 5CH84	
Channel 6	6CH010 ~ 6CH84F	6CH01 ~ 6CH84	
Channel 7	7CH010 ~ 7CH84F	7CH01 ~ 7CH84	
Channel 8	8CH010 ~ 8CH84F	8CH01 ~ 8CH84	
Channel 9	9CH010 ~ 9CH84F	9CH01 ~ 9CH84	
Channel 10	10CH010 ~ 10CH84F	10CH01 ~ 10CH84	H/L
Channel 11	11CH010 ~ 11CH84F	11CH01 ~ 11CH84	
Channel 12	12CH010 ~ 12CH84F	12CH01 ~ 12CH84	
Channel 13	13CH010 ~ 13CH84F	13CH01 ~ 13CH84	
Channel 14	14CH010 ~ 14CH84F	14CH01 ~ 14CH84	
Channel 15	15CH010 ~ 15CH84F	15CH01 ~ 15CH84	
Channel 16	16CH010 ~ 16CH84F	16CH01 ~ 16CH84	
Channel 17	17CH010 ~ 17CH84F	17CH01 ~ 17CH84	
Channel 18	18CH010 ~ 18CH84F	18CH01 ~ 18CH84	
Channel 19	19CH010 ~ 19CH84F	19CH01 ~ 19CH84	
Channel 20	20CH010 ~ 20CH84F	20CH01 ~ 20CH84	

*1 Input all addresses in hexadecimal characters.

Note:

• **The LT processes all Controller data items in the same way.**

• **Designating an address means that the data item number specifies the address.**

• **For information about data item types and numbers, refer to the Multi Point Temperature Control Unit C Series Guide "Communication Command List", made by Shinko Technos Corporation.**

The following data item list is mentioned in the C Series communication guide for each channel. The C Series supports up to 20 channels.

Command Type	Data Item	Data
20H/50H	0001H : Main setting value (SV) setting	Setting Value
20H/50H	0002H : Main proportional band setting	Setting Value
20H/50H	0003H : Integral time setting	Setting Value
20H/50H	0004H : Derivative time setting	Setting Value
:	:	:

The item Nos. here are the LT addresses.

20H:Read command can be performed.
50H:Write command can be performed.
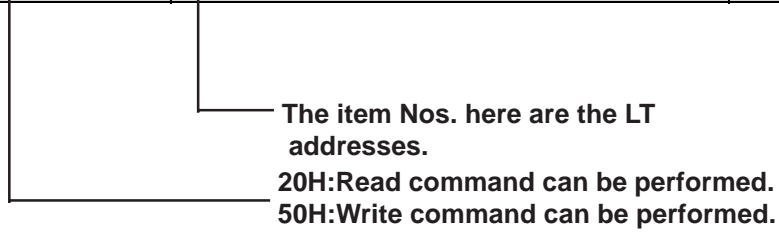
- When the channel 1 data item is "the setting of main setting value (SV)", the item No. is "0001H", and the LT's address is the following:

1 CH 0001

     Address (Data Item)
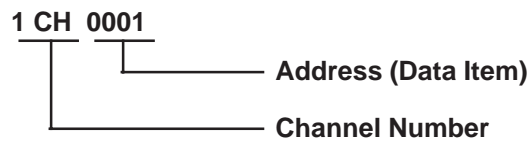
     Channel Number

- The channel 1 data item "the integrated time setting", has an item number of "0003H", and the LT address is "1CH0003".
- The channel 2 data item "the integrated time setting" has an item number of "0003H", and the LT address is "2CH0003".
- When the command type is 20H, data read can be performed. When it is 50H, data write can be performed. (20H/50H are used to perform read and write.)

■ FC Series

Device	Bit Addresses[1]	Word Addresses[1]	
Data Item	00010 ~ 0086F	0001 ~ 0086	
Setting Value Memory 1	1S010 ~ 1S86F	1S01 ~ 1S86	
Setting Value Memory 2	2S010 ~ 2S86F	2S01 ~ 2S86	
Setting Value Memory 3	3S010 ~ 3S86F	3S01 ~ 3S86	H/L
Setting Value Memory 4	4S010 ~ 4S86F	4S01 ~ 4S86	
Setting Value Memory 5	5S010 ~ 5S86F	5S01 ~ 5S86	
Setting Value Memory 6	6S010 ~ 6S86F	6S01 ~ 6S86	
Setting Value Memory 7	7S010 ~ 7S86F	7S01 ~ 7S86	

[1] Input all addresses in hexadecimal characters.

Note:
- **The LT processes all Controller data items in the same way.**
- **Designating an address means that the data item number specifies the address.**
- **For information about data item types and numbers, refer to the FC Series Communication (Option : C,C5) Guide "Communication Command List", made by Shinko Technos Corporation.**

The following data item list is mentioned in the FC Series communication guide for each channel. When the command type is 20H, data read can be performed. When it is 50H, data write can be performed.

(20H/50H are used to perform read and write.)

Contents	Sub Addresses	Command Classification	Data Items
Main setting value or step temperature setting value	1 to 7	20H/50H	0001H
Setting value memory number or step number selection	0	20H/50H	0002H
PID auto-tuning Performance / Cancellation	0	20H/50H	0003H
Proportional band setting	1 to 7	20H/50H	0004H
:	:	:	:

Sub Addresses (Setting Memory No.) ———

The item No. here is the LT addresses ———
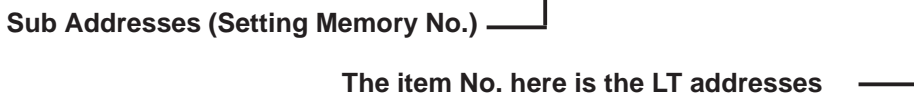
When using the FC Series, the sub addresses must be selected. Here, "sub addresses" mean "the setting value memory No.". For example, "sub address 1" means "setting value memory No.1". The data items that the sub addresses need to be set to, therefore, specify the device of "setting value memory *".

Data items with the sub addresses that do not need to be set (when the sub address is 0), can specify only the number of data items.

Ex. Data items with the sub addresses that do not need to be set.

When setting value memory No.1, LT address data items (the main setting value, "step temperature setting value") are as follows:

1S 0001

——— **Address (Data Item)**

——— **Setting Value Memory No. (Sub Address)**
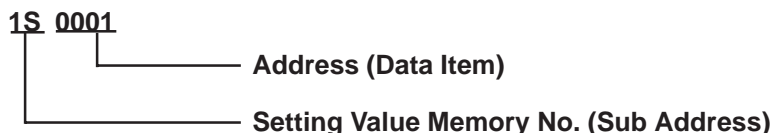
Ex. Data items with the sub addresses that do not need to be set.

LT address data items (the setting value memory number selection,
"step numbers") are as follows:

0002

———————————— **Address (Data Item)**

■ FIR/GC/FCL Series

Device	Bit Addresses[*1]	Word Addresses[*1]	
Data Item	00010 ~ 00A3F	0001 ~ 00A3	H/L

*1 Input all addresses in hexadecimal characters.

Note:
- **The LT processes all Controller data items in the same way.**
- **Designating an address means that the data item number specifies the address.**
- **For information about data item types and numbers, refer to the FIR-201-M Communication Guide "Communication Command List", GCS-300 Communication Guide "Communication Command List", and FCL-13A Communication Guide "Communication Command List", made by Shinko Technos Corporation.**

The following data item list is mentioned in the FIR Series communication guide for each channel. When the command type is 20H, data read can be performed. When it is 50H, data write can be performed.
(20H/50H allow read and write to be performed.)

Command Type	Data Item	Data
20H/50H	0001H : Alarm 1 (A1) Setting	Setting Value
20H/50H	0002H : Alarm 2 (A2) Setting	Setting Value
20H/50H	0003H : Alarm 3 (A3) Setting	Setting Value
20H/50H	0004H : Setting Value Lock Designation	Setting Value
:	:	:

The item Nos. here are the LT addresses.

20H:Read command can be performed.
50H:Write command can be performed.

• For the data item "Alarm 1 (A1) Setting", the item number is 0001H. As a result, the LT address is as follows:

0001

———————————— **Address (Data Item)**

• For the data item "Alarm 2 (A2) Setting", the item number is 0002H. As a result, the LT address is "0002".

■ **PC-900 Series**

Device	Bit Addresses	Word Addresses	Remarks	
Data Items	00010 ~ 0400F	0001 ~ 0400		
	04010 ~ 0800F	0401 ~ 0800		
	08010 ~ 0C00F	0801 ~ 0C00		
	0C010 ~ 1000F	0C01 ~ 1000		
	10010 ~ 1400F	1001 ~ 1400		
	14010 ~ 1800F	1401 ~ 1800		
	18010 ~ 1C00F	1801 ~ 1C00		
	1C010 ~ 2000C	1C01 ~ 2000		
	20010 ~ 2400F	2001 ~ 2400		
	24010 ~ 2800F	2401 ~ 2800		
	28010 ~ 2C00F	2801 ~ 2C00		
	2C010 ~ 3000F	2C01 ~ 3000		
	30010 ~ 3400F	3001 ~ 3400		
	34010 ~ 3800F	3401 ~ 3800		
	38010 ~ 3C00F	3801 ~ 3C00		
	3C010 ~ 4000F	3C01 ~ 4000	*2	H/L
	40010 ~ 4400F	4001 ~ 4400		
	44010 ~ 4800F	4401 ~ 4800		
	48010 ~ 4C00F	4801 ~ 4C00		
	4C010 ~ 5000F	4C01 ~ 5000		
	50010 ~ 5400F	5001 ~ 5400		
	54010 ~ 5800F	5401 ~ 5800		
	58010 ~ 5C00F	5801 ~ 5C00		
	5C010 ~ 6000C	5C01 ~ 6000		
	60010 ~ 6400F	6001 ~ 6400		
	64010 ~ 6800F	6401 ~ 6800		
	68010 ~ 6C00F	6801 ~ 6C00		
	6C010 ~ 7000C	6C01 ~ 7000		
	70010 ~ 7400F	7001 ~ 7400		
	74010 ~ 7800F	7401 ~ 7800		
	78010 ~ 7C00F	7801 ~ 7C00		
	7C010 ~ 7991F	7C01 ~ 7991		

*1 Input all addresses in hexadecimal characters.

*2 The data items are internally processed, with each "block" being divided into 1024 words (0x400). Therefore, be aware of that the following functions cannot be used with settings that cross a block (1024 words). Be sure to set the data items within one block when using this type of unit.

   1) Alarm setting
    (alarms will not displayed)

Note:
- **The LT processes all Controller data items in the same way.**
- **Designating an address means that the data item number specifies the address.**
- **For information about data item types and numbers, refer to the PC-935, PC-955 communication (option : C, C5, SVTC) guide "Communication Command List", made by Shinko Technos Corporation.**

The following data item list is mentioned in the PC-900 Series communication guide for each channel. When the command type is 20H, data read can be performed. When it is 50H, data write can be performed.

(20H/50H are used to perform read and write.)

Command Classification	Data Item	Data
20H/50H	0001H : Fixed value control / Main setting value setting	Setting Value
20H/50H	0002H : Fixed value control / Control output (OUT 1) proportional band setting	Setting Value
20H/50H	0003H : Fixed value control / Integral time setting	Setting Value
20H/50H	0004H : Fixed value control / Derivative time setting	Setting Value
:	:	:

The item Nos. here are the LT addresses.

20H:Read command can be performed.
50H:Write command can be performed.

For data item "The setting of the main setting value (SV) for the stationary position control", the item number is 0001H. As a result, the LT address is as follows.

0002

Address (Data Item)

For data item "The setting of the integrated time for the stationary position control", the item number is 0003H. As a result, the LT address is "0003".

For data item details, refer to the following Shinko Technos Corporation communication guides.

Series	Models	Guides
C	CPT-20A	Multi-Point Temperature Control Unit C Series Guide
FC	FCD-130	FC Series Communication (Option:C,C5) Guide
	FCD-150	
	FCR-130	
	FCR-150	
	FCS-200	
FIR	FIR-200	FIR Communication Guide
GC	GCS-300	GCS Communication Guide
FCL	FCL-100	FCL Communication Guide
PC-900	PC-935	PC-935, PC-955 Communication (Option:C,C5,SVTC) Guide
	PC-955	

Note: • **When the data item's setting value uses a decimal point items, the LT displays a value 10 times larger than the setting value. Also, when writing, be sure to write a value 10 times larger than the setting value.**

   Ex. In case of the PC-900 Series' control output (OUT1) proportional zone

   Indication of Controllers / Setting Value : 2.5%

   Indication of the LT : 25

   Also, refer to each model's communication guide for details (with/without a decimal point) about data item setting value ranges.

• **When setting parts in LT Editor, the Controller communication unit No. can be specified during address input. If a communication unit No. is not indicated, the previously entered communication unit No. is automatically used. (The default value is 1.)**

Word Address

01/0001

Selecting Addresses

Word Address

.... 0001 01

Back   Clr

A B C   7 8 9
D E F   4 5 6
1 2 3
0 ENT

Selecting Devices
Data Items : ...
Channel 1 : 1CH
Setting Value
  Memory 1 : 1S
    and so on

Enter the selected Controller Communica-tion Unit No. (Station No.)

01/0001

Address (No. of Data Items)
(For the C Series : 1ch01, for the FC Series : 1S0001)

Controller Communication Unit No.

⚠ *Important*
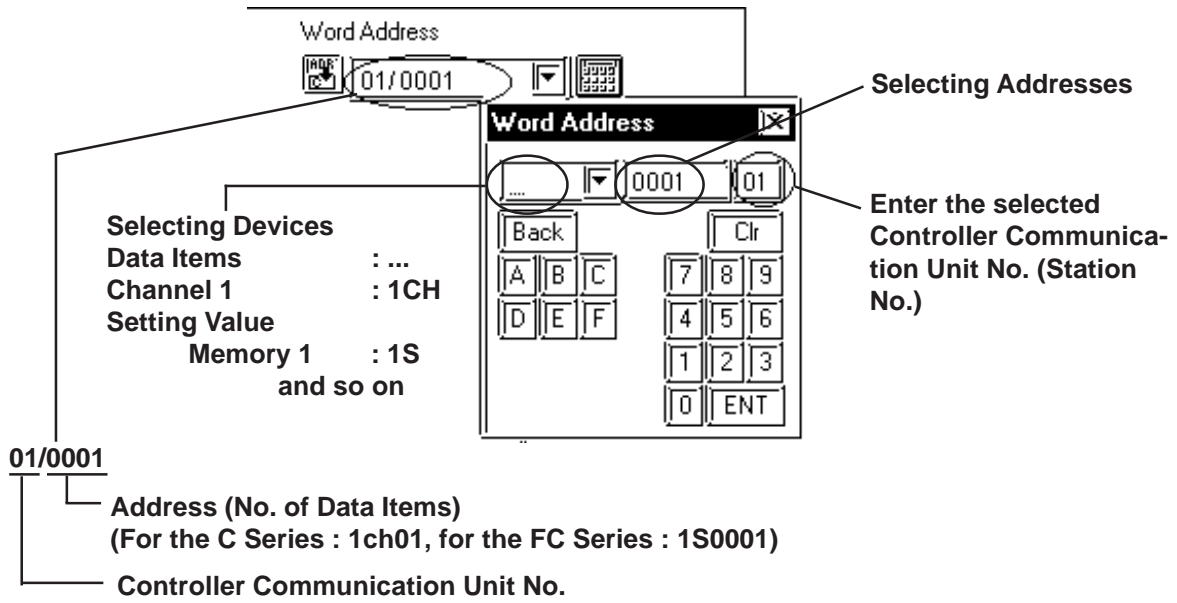
Do not use the system area because the LT's system area (LS0 to LS19) cannot be allocated to the Controller area. (Do not select all the system area.) The Controller's read area can be used as normal.

2.6.4	Environment Setup

The following table lists the recommended Controller and LT communication settings.

■ C Series

LT Settings		Controller Settings	
Baud Rate	9600 bps	Baud Rate	9600 bps
Data Length	7 bits	--------	--------
Stop Bit	1 bit	-------	-------
Parity Bit	Even	-------	-------
Data Flow control	ER	-------	-------
Communication Format	4 Wires	-------	-------
Unit No.	1	Unit No.[*1]	1

*1 It is possible to set a Controller communication unit No.from 0 to 15, however, the LT can only be set from 1 to 15.

■ FC/FIR/GC/FCL/PC-900 Series

LT Settings		Controller Settings	
Baud Rate	9600 bps	Baud Rate	9600 bps
Data Length	7 bits	--------	--------
Stop Bit	1 bit	--------	--------
Parity Bit	Even	--------	--------
Data Flow control	ER	--------	--------
Communication Format (using RS-232C)	RS-232C	Communication Format [*1]	Serial Communication
Communication Format (using RS-422)	2 wire type	Communication Format [*1]	Serial Communication
Unit No.	1	Unit No.[*2]	1

*1 PC-900 series only

*2 It is possible to set a Controller communication unit No.from 0 to 95, however, the LT can only be set from 1 to 32.

2.6.5   Error Code

Controller error codes are represented by the "Host communication error (02:**:##)", and indicated in the left lower corner of the LT screen.

Error Codes	Meaning
01	Command does not exist
03	Exceeds setting value range
04	Unable to set (during AT execution)
05	Key operation has activated Setting Mode

For more details about the error codes, see

▼ *Reference* ▲   *"The Controller Manual : Communication Guide for each series made by Shinko Technos Corporation"*

MEMO
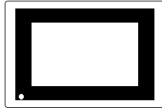
2.7   Fuji Electronic Corporation Controllers

2.7.1   System Structure

The following describes the system configuration used when connecting the LT to this Controller.

■ Micro-Controller X Series (Model:PXR)

Controller [1]	Cable Diagram	LT
PXR4□□□□-□□M00 PXR4□□□□-□□V00	RS-422 <Cable diagram 1>	LT Type-C
	RS-422 (1:n) <Cable diagram 2>	

1 The Controller's model number "□" will change, according to the options selected. For model number details, refer to the PXR4 Series catalog. When connecting the Controller to an LT, the RS-485 (MODBUS) option "M00" or "V00" is required.
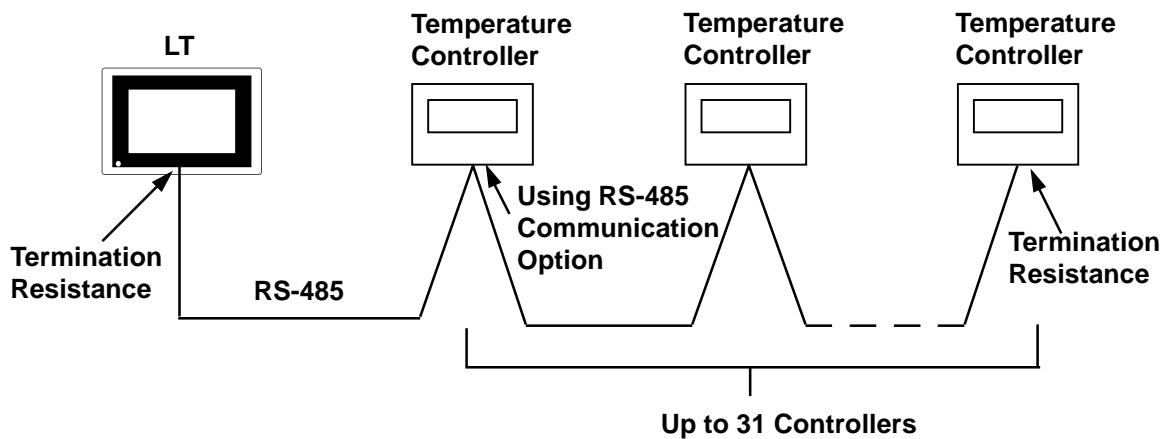
> ### 2.7.2 Cable Diagrams

The cable diagrams shown below and the cable diagrams recommended by Fuji Electric Co., Ltd. differ, however, using these cables for your Controller's operations will not cause any problems.

Important
- *Ground your External Device's FG terminal according to your country's applicable standard.*
- *All RS-422 cables must be 500 meters long or less.*

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

- Using Digital's RS-422 connector terminal adapter GP070-CN10-0

- Using Digital's RS-422 Cable GP230-IS11-0

Note: Be sure that RDA - SDA and RDB - SDB are both connected to the Controller terminal block.

Important *Since the SG and FG lines cannot be connected to the controller terminal block, be sure to cover them with insulating tape.*

• When making your own cables

LT

1 FG	
7 SG	
9 TERM	
10 RDA	
16 RDB	
11 SDA	
15 SDB	
18 CSB	
19 ERB	
21 CSA	
22 ERA	

Shield

Controller terminal block

| 7 + | 100Ω |
| 8 - | 1/2W |
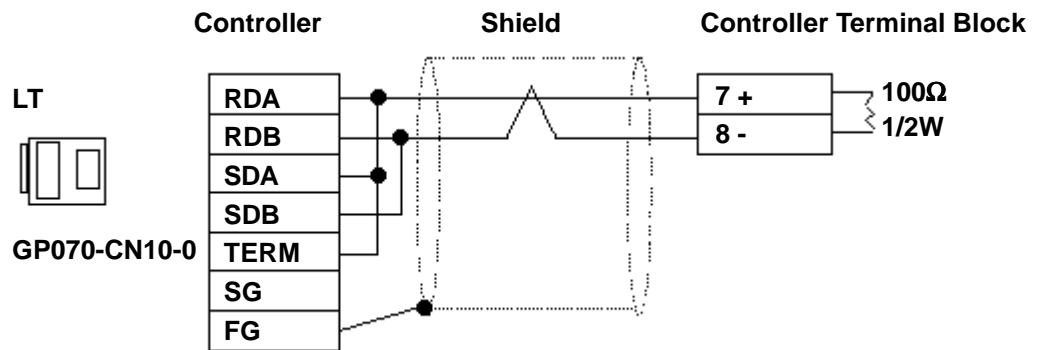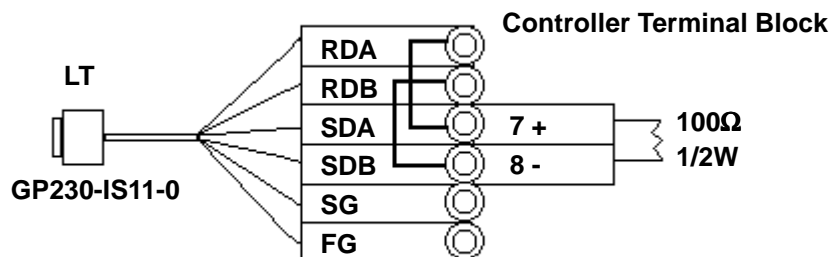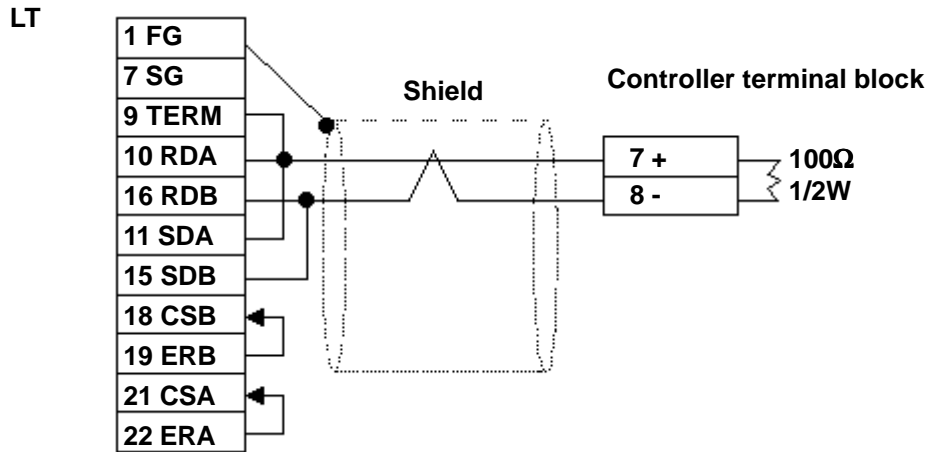
■ Cable Diagram 2 (1:n) RS-422

• Using Digital's RS-422 connector terminal adapter GP070-CN10-0
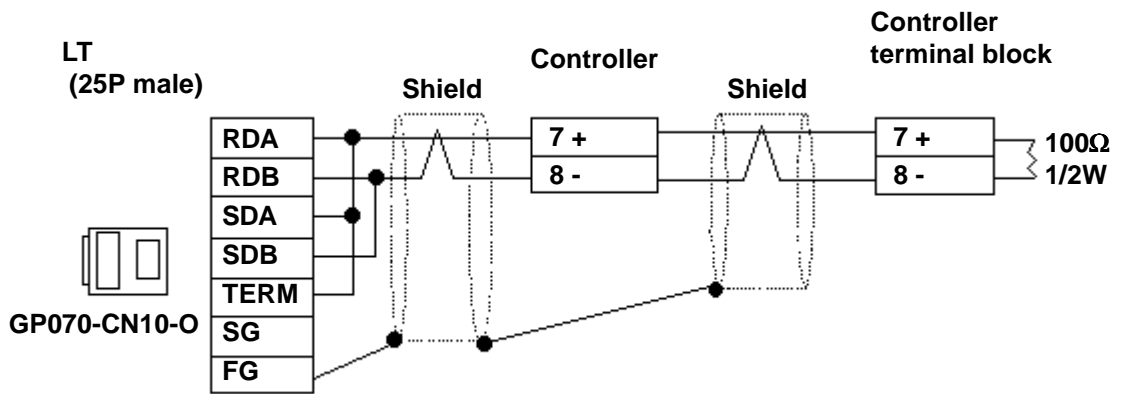
LT
(25P male)

GP070-CN10-O

Shield   **Controller**   **Shield**   **Controller terminal block**

| RDA |
| RDB |
| SDA |
| SDB |
| TERM |
| SG |
| FG |

| 7 + | | 7 + | 100Ω |
| 8 - | | 8 - | 1/2W |

• Using Digital's RS-422 cable, GP230-IS11-0
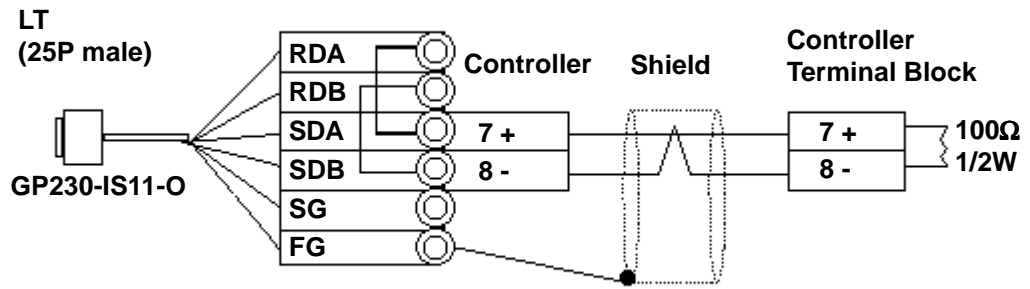
Note: **Be sure that RDA - SDA and RDB - SDB are both connected to the Controller terminal block.**

Important *Since the SG line cannot be connected to the controller terminal block, be sure to cover them with insulating tape.*

• When making your own cable connections
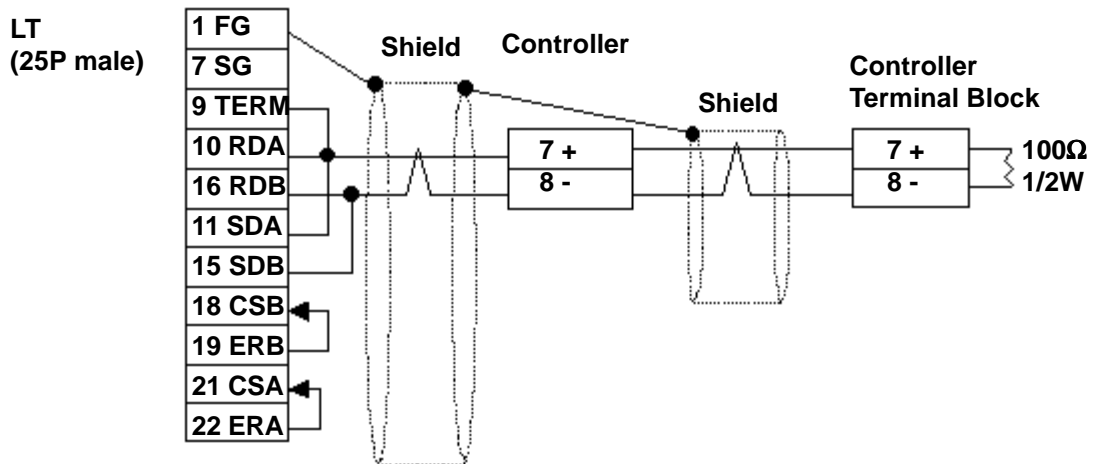
2.7.3	Supported Devices

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

■ Micro-Controller X Series (Model:PXR)

Device	Bit Address	Word Address	Comments	
Parameter	00001	———————	*1	H/L
	10001 ~ 10016	10001	*2	
	3000100 ~ 3001515	30001 ~ 30015	Internal Calculation Value *2	
	4000100 ~ 4011315	40001 ~ 40113	Internal Calculation Value *1	
	3100100 ~ 3101515	31001 ~ 31015	Engineering Unit *2	
	4100100 ~ 4111315	41001 ~ 41113	Engineering Unit *1	

*1 Addresses 00001, 40001 and 41001 are used to store write commands (FIX Processing) in non-volatile memory. The non-volatile memory's write is performed via the writing of "Write Value 1". FIX processing lasts approximately 5 seconds. The Display Communication cannot be performed for 5 seconds if there are any Read-out function setting on the same screen.

▼Reference◣ *Instruction Manual for Fuji Electric Corporation's MICRO CONTROLLER X COMMUNICATION FUNCTION (RS-485 MODBUS), "FIX Processing"*

STOP **During the writing of data to non-volatile memory, do not turn off the Controller's power. If the Controller's power is cut, the data in non-volatile memory will be destroyed, thereby disabling the Controller.**

*2 Data write is not possible.

Note:
- **In the LT, the Controller's parameters are set via the Coil No. and Register No. For each Coil No. (00001~, 10001~) the last digit is recognized as the device. For Register No.s (30001~, 40001~, 31001~, 41001~) the last two digits are recognized as the device.**
- **For information about data item types and numbers, refer to the Instruction Manual for Fuji Electric Co., Ltd.'s MICRO CONTROLLER X COMMUNICATION FUNCTION (RS-485 MODBUS), "CHAPTER 7 ADDRESS MAP AND DATA FORMAT"**
- **The LT supports two types of Address Maps, the "Engineering Unit Address Map" and the "Internal Calculation Value Address Map".**

The following data shows the memory maps for each parameter.

• When using Bit Data

Bit Data (Read Only) : Function [02H]

Relative Address	Coil No.	Type	Memory Contents	Read-out Data
0000H	10001	Bit	Alarm1 ON/OFF	0:Alarm1 OFF, 1:Alarm1 ON
0001H	10002		(Reserved)	
0002H	10003		(Reserved)	
0003H	10004		(Reserved)	
0004H	10005	Bit	Alarm2 ON/OFF	0:Alarm2 OFF, 1:Alarm2 ON
0005H	10006		(Reserved)	
:	:	:	:	:

The item Nos. here are the LT addresses.

Ex. For the parameter "Alarm1 ON/OFF" of Coil No. 10001, the LT's designated address is as follows. Use the first digit of the Coil No. (00001~, 10001~) to designate the device.

1 0001

Address (The last four digits of the Coil No.)

Device (The first digit of the Coil No.)
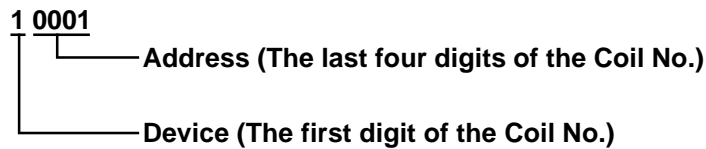
Ex. For the parameter "front surface control SV data" of Register No. 41003, the LT's designated address is as follows. Use the first two digits of the Register No.s 30001~, 40001~, 31001~ and 41001~ to designate the device.

41 003

Address (The last three digits of the Coil No.)

Device (The first two digits of the Coil No.)
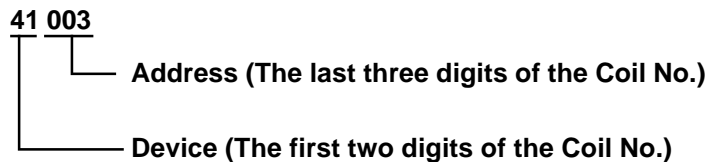
Note: **The Controller's parameter data, when data transfer is performed, will have no decimal places. Thus, in the LT, processing must be performed to correct the data. For example, if a numeric display is used that in includes decimal places, the "Data Type" and "No. of Decimals" settings must be used. Also, when writing data to a Controller, it is necessary to write decimal values as integers.**

Ex. Register No. 41025's "Output 1 Lower Limit"

Controller Display/Setting Value : 3.00%

LT value/setting : 300

Reference *Also, refer to "Instruction Manual for Fuji Electric Co., Ltd.'s MICRO CONTROLLER X COMMUNICATION FUNCTIONS (RS-485 MODBUS)" for details (with/without a decimal point) about data item setting value ranges.*

Note: When setting parts in LT Editor, the Controller communication unit No. can be specified during address input. If a communication unit No. is not indicated, the previously entered communication unit No. is automatically used. (The default value is 1)

01/10001

Address (Parameter No.)

Controller's Station No.

Word Address

01/10001

Enter the desired
Controller Unit No.

Word Address

Constant

1   0001   01

0

Function

Back   Clr

Word Set   A B C   7 8 9

Add/Sub   D E F   4 5 6

Digit(ADD)   1 2 3

Digit(SUB)   0 ENT

Important *The LT's system area (LS0 to LS19) cannot be allocated for the Controller and should not be used. (De-select all system area selection.) The Controller's read area can be used as normal.*

2.7.4　Environment Setup

The following table lists the recommended Controller and LT communication settings.

■ Micro-Controller X Series (Model:PXR)

LT Settings		Controller Settings	
Baud Rate	9600 bps (Fixed)	--------	--------
Data Length	8 bits (Fixed)	--------	--------
Stop Bit	1 bit (Fixed)	--------	--------
Parity Bit	Odd	**Parity Settings (CoM)**	0 : Odd
Data Flow control	ER	--------	--------
Communication Format (using RS-422)	2-wire type	--------	--------
Unit No. [1]	1	**Unit Station No. (Stno)**	1

1 It is possible to set a Controller communication unit No. from 0 to 255, however, the LT can only be set from 1 to 32. Zero cannot be used because it means "Communication function stop". The Read-in area can be used in the Controller that has set the Unit No. here.

2.7.5   **Error Code**

Controller error codes are displayed by the "Host Communication Error (02:**:##)", and indicated in the left lower corner of the LT screen ** indicates the Controller's error code, and ## indicates the number of the Controller unit. However, when "the PLC is not correctly connected (02:FF)", the unit number will not be shown.

Error Code	Meaning
01	Illegal function
02	Illegal data address
03	Illegal data value

For more details about error codes, see

▼ **Reference** ◄   *Instruction Manual for Fuji Electric Co,. Ltd.'s MICRO CONTROLLER X COMMUNICATION FUNCTION (RS485 MODBUS)*

MEMO

2.8   Toho Electronics Inc. Controllers

2.8.1   System Structure

The following describes the system configuration used when connecting the LT to this Controller.
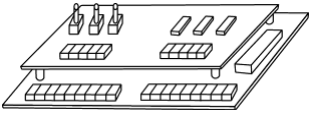
⚠️ **Important**

- *After the Controller's power is turned ON, no communication is performed for about four seconds. As a result, note that it may take several seconds to start communication when the LT and the Controller are turned ON at the same time.*

- **When a save request command is sent to the Controller (STR write command), it can take up to six seconds for the controller to respond. At this time, note that the communication speed may slow significantly, which is indicated by the slowing of the update frequency of the LT display, as the LT enters the standby state.**
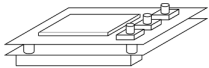
■ TTM-004/X04

Temperature Controller	Cable Diagram	LT
TTM-004-□-A□□□ TTM-X04-□-□□□□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	
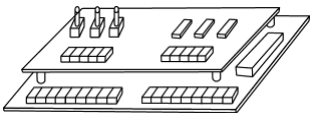
■ TTM-00B

Temperature Controller	Cable Diagram	LT
TTM-00B-□-□□□□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	
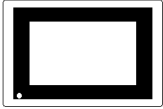
■ **TTM-10L**

Temperature Controller	Cable Diagram	LT
TTM-10L-□-□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-232C <Cable diagram 2>	
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

■ **TTM-100B**
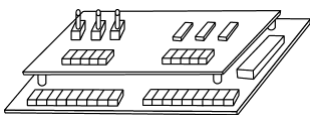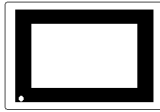
Temperature Controller	Cable Diagram	LT
TTM-100B4-□ □-□ □ □ □ □-□□□ TTM-100B8-□ □-□ □ □ □ □-□□□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

■ **TTM-110 Series**

Temperature Controller	Cable Diagram	LT
TTM-114-□-□ □-□□□□□□-□ TTM-115-□-□ □-□□□□□□-□ TTM-117-□-□ □-□□□□□□-□ TTM-119-□-□ □-□□□□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

■ **TTM-110B Series**

Temperature Controller	Cable Diagram	LT
TTM-110B-□-□ □-□□□□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	
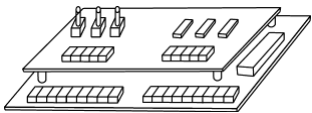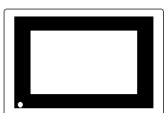
■ **TTM-120 Series**

Temperature Controller	Cable Diagram	LT
TTM-124-□-□ □-□□□□□□-□ TTM-125-□-□ □-□□□□□□-□ TTM-127-□-□ □-□□□□□□-□ TTM-129-□-□ □-□□□□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	
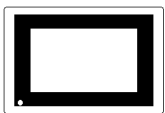
■ **TTM-300 Series**

Temperature Controller	Cable Diagram	LT
TTM-304-□-□N-□□□□-□ TTM-305-□-□N-□□□□-□ TTM-309-□-□N-□□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

■ **TTM-300B**

Temperature Controller	Cable Diagram	LT
TTM-300B-□-□N-□□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

■ **TTM-1020 Series**

Temperature Controller	Cable Diagram	LT
TTM-1520-□ □-□ □-□□□-□ TTM-1521-□ □-□ □-□□□-□ TTM-1522-□ □-□ □-□□□-□	RS-422 (2-wire type) <Cable diagram 1>	LT Type-C
TTM-1523-□ □-□ □-□□□-□ TTM-1524-□ □-□ □-□□□-□ TTM-1525-□ □-□ □-□□□-□ TTM-1920-□ □-□ □-□□□-□ TTM-1921-□ □-□ □-□□□-□ TTM-1922-□ □-□ □-□□□-□ TTM-1923-□ □-□ □-□□□-□ TTM-1924-□ □-□ □-□□□-□ TTM-1925-□ □-□ □-□□□-□	RS-422 (2-wire type, 1:n) <Cable diagram 3>	

2.8.2	Cable Diagrams

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

Important

- **RS-422 connector terminal numbers will differ depending on the controller model. Prior to performing wiring, refer to your controller's User Manual.**

- **When using RS-232C format, all cables must be 15 meters or less. With RS-422 format, all cables must be 50 meters long or less.**

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

• Using Digital's RS-422 connector terminal adapter GP070-CN10-0

• **Using Digital's RS-422 Cable GP230-IS11-0**

Note:

Be sure that RDA - SDA and RDB - SDB are both connected to the Controller terminal block.

Important

Since the SG and FG lines cannot be connected to the controller terminal block, be sure to cover them with insulating tape.

• When making your own cables

LT
(25P male)

1 FG	
7 SG	
9 TRMX	
10 RDA	
16 RDB	
11 SDA	
15 SDB	
18 CSB	
19 ERB	
21 CSA	
22 ERA	

Shield

Controller Terminal Block

T/R(A)
T/R(B)

75Ω
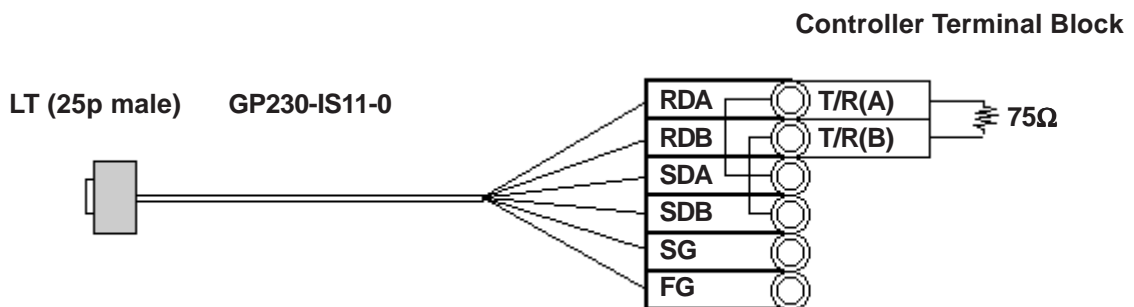
Note: **When connecting the No.9 pin and No.10 pin in the LT Serial I/F, a termination resistance of 100W is added between RDA and RDB.**

■ **Cable Diagram 2 RS-232C**

LT
(25P male)

Shield

Controller Terminal Block

1 FG	
2 SD	
3 RD	
4 RS	
5 CS	
6 NC	
7 SG	
8 CD	
20 ER	

9 T
8 R
7 SG
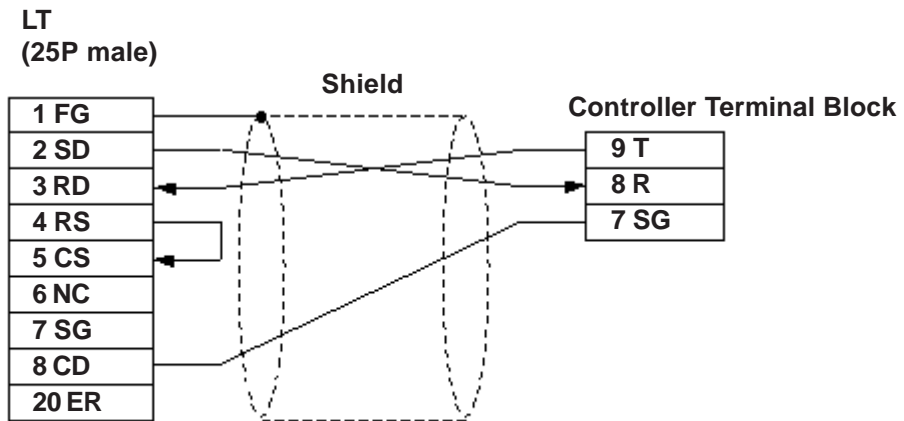
■ Cable Diagram 3 (1:n) RS-422

⚠ Important ***Ground a shielded cable in accordance with the electrical requirements of your system, using one of the following three methods.***

> ***(1) Distributed grounding (as shown below)***
> ***(2) Parallel grounding, or***
> ***(3) Serial grounding.***

• Using Digital's RS-422 connector terminal adapter GP070-CN10-0
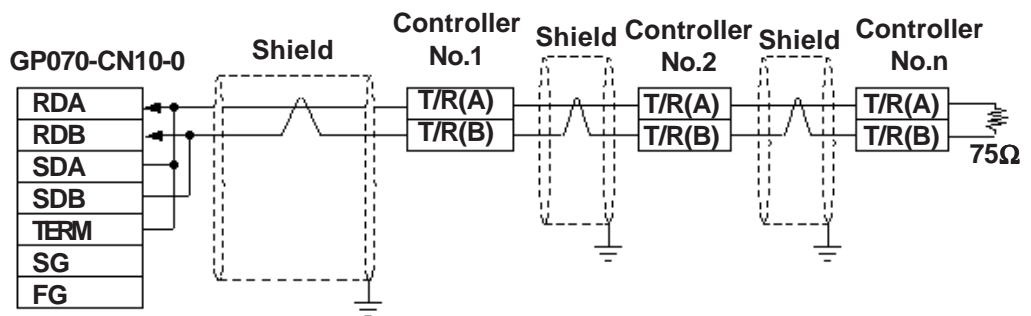
• Using Digital's RS-422 cable, GP230-IS11-0
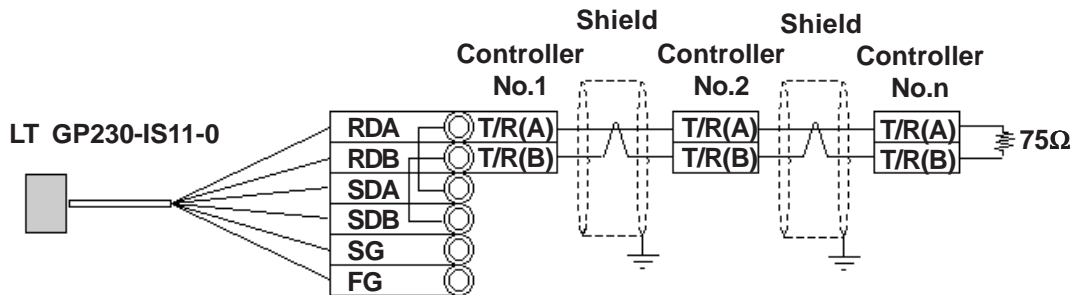
📝 Note: **Be sure that RDA - SDA and RDB - SDB are both connected to the Controller terminal block.**

⚠ Important ***Since the SG and FG lines cannot be connected to the controller terminal block, be sure to cover them with insulating tape.***

• When making your own cable connections
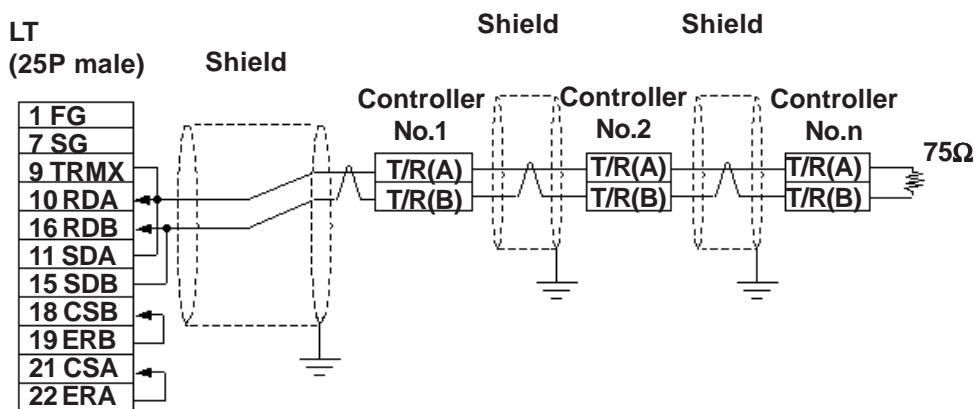
Note: **When connecting the No.9 pin and No.10 pin in the LT Serial I/F, a termination resistance of 100W is added between RDA and RDB.**

2.8.3	Supported Devices

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

⚠ **Important**

- *The Controller identifiers "1" and "2" (refer to your Controller's User Manual) are assigned to predefined addresses and devices. As a result, when you enter devices on the LT Editor, do so as shown below.*

Device Selection
(Select from 00_, 10_, 100_,
110_, 120_, 300_ or1020_)

Address Selection
(Refer to Supported
Devices List on
following pages.)

```
Word Address        ☒
 110_  ▼  0012   01
 Back            Clr
 A  B  C    7  8  9
 D  E  F    4  5  6
            1  2  3
            0  ENT
```

Enter the Controller's
Communication Unit No.
(Station No.)

- *Each identifier has read and write limitations detailed information, refer to your Controller's Instruction Manual. For details about precautions when using identifier "2" with LT Editor, refer to TTM-300 Series Supported Device's *1 or *2.*

- *When using a LT and a Controller, no area is available for assigning the LT's System Area (LS0 to LS19) in the LT. Therefore, DO NOT use the System Area (deselect the System Area for all devices). You can use the Read Area as usual.*

- *When you save data to your Controller's EEPROM (send a Save request), write it in the device address corresponding to symbol STR or identifier STR. For the TTM-300 series, this procedure is not needed since it saves data directly to the EEPROM.*

- *When saving data to the EEPROM, write the data to the device address that corresponds to your Controller's STR identifier.*

- *In the Read Area, only the devices "00_","10_","100_", "110_", "120_ ,"300_" and "1020_" can be set. All other devices, "SSV" ,"END", "STI", "SOK", "SWZ", "SWT", "SON", "SOF", "SRN" and "SEO" cannot be used.*

Important

• *Depending on the Controller's setting conditions, the LT's pre-set setting values may be used. Refer to the table as shown below.*

Model	Address	Identifier	Controller Condition	Decimal marked values using on LT
TTM-004/X04/00B (00_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
	2 ~ 10	PR1 ~ PR9	When an arbitrary identifier has been assigned to the priority screen. (When the display of PR1 to PR9 on the temperature controller is not OFF.)	0011 ~ 0077 [*1]
			In the case where no setting has been assigned to the priority screen. (When the display of PR1 to PR9 on the temperature controller is OFF.)	-32768(0x8000)
			In the case where the identifier COM has been assigned to the priority screen.	32767(0x7FFF) [*2]
			In the case where the identifier BPS has been assigned to the priority screen.	32766(0x7FFE) [*2]
			In the case where the identifier ADR has been assigned to the priority screen.	32765(0x7FFD) [*2]
			In the case where the identifier AWT has been assigned to the priority screen.	32764(0x7FFC) [*2]
			In the case where the identifier MOD has been assigned to the priority screen.	32763(0x7FFB) [*2]
TTM-10L (10_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
	23	□CJ	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
	24	PV2	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
TTM-100B (100_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
TTM-110/110B (110_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
TTM-120 (120_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
TTM-300/300B (300_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)
	4	□TI	When the Operation has finished	-32768(0x8000)
TTM-1020 (1020_)	0	PV1	Over Scale	32767(0x7FFF)
			Under Scale	-32768(0x8000)

*1 Addresses allocated to each identifier.

▽ **Reference** △ *2.8.3 Supported Devices n TTM-004/X04/00B*

*2 This identifier cannot be registered as the priority screen function setting (PR1 to PR9) via a LT Write command. To register this function, use the front panel of the temperature controller.

• **This device cannot be used as a 32-bit device, since each identifier's addresses are not consecutive.**

■ TTM-004/X04/00B

Device	Bit Address	Word Address	Controller Setting item	Identifiers	Others
00_	000000 ~ 000015	0000	Process value PV	PV1	
	000100 ~ 000115	0001	Setting value SV	SV1	
	000200 ~ 000215	0002	Priority display set 1	PR1	
	000300 ~ 000315	0003	Priority display set 2	PR2	
	000400 ~ 000415	0004	Priority display set 3	PR3	
	000500 ~ 000515	0005	Priority display set 4	PR4	
	000600 ~ 000615	0006	Priority display set 5	PR5	
	000700 ~ 000715	0007	Priority display set 6	PR6	
	000800 ~ 000815	0008	Priority display set 7	PR7	
	000900 ~ 000915	0009	Priority display set 8	PR8	
	001000 ~ 001015	0010	Priority display set 9	PR9	
	001100 ~ 001115	0011	Set/select of input	INP	
	001200 ~ 001215	0012	Gain for PV correction	PVG	
	001300 ~ 001315	0013	Zero point for PV correction	PVS	
	001400 ~ 001415	0014	Filter input	PDF	
	001500 ~ 001515	0015	Decimal position	□DP	
	001600 ~ 001615	0016	Function by FUNC Key	□FU	
	001700 ~ 001715	0017	Lock	LOC	
	001800 ~ 001815	0018	SV H limit	SLH	
	001900 ~ 001915	0019	SV L limit	SLL	
	002000 ~ 002015	0020	Control mode	□MD	
	002100 ~ 002115	0021	Control type	CNT	
	002200 ~ 002215	0022	Set/select of normal or reverse	DIR	
	002300 ~ 002315	0023	Output1, manipulated value	MV1	
	002400 ~ 002415	0024	Tuning type	TUN	
	002500 ~ 002515	0025	AT coefficient	ATG	
	002600 ~ 002615	0026	AT sensitivity	ATC	
	002700 ~ 002715	0027	Output 1, proportional band	□P1	
	002800 ~ 002815	0028	Integral time	□I1	
	002900 ~ 002915	0029	Derivative time	□D1	
	003000 ~ 003015	0030	Output 1, proportional cycle	□T1	
	003100 ~ 003115	0031	Anti reset wind-up	ARW	
	003200 ~ 003215	0032	Setting of H limit for Output 2 MV limitter	MH1	
	003300 ~ 003315	0033	Setting of L limit for Output 2 MV limitter	ML1	
	003400 ~ 003415	0034	Output 1, control sensitivity	□C1	
	003500 ~ 003515	0035	Output 1, OFF position	CP1	
	003600 ~ 003615	0036	Output 2, manipulated value	MV2	
	003700 ~ 003715	0037	Output 2, proportional band	□P2	
	003800 ~ 003815	0038	Output 2, proportional cycle	□T2	
	003900 ~ 003915	0039	Setting of H limit for Output 2 MV limitter	MH2	
	004000 ~ 004015	0040	Setting of L limit for Output 2 MV limitter	ML2	
	004100 ~ 004115	0041	Manual reset	PBB	
	004200 ~ 004215	0042	Output 2, control sensitivity	□C2	
	004300 ~ 004315	0043	Output 2, OFF position	CP2	
	004400 ~ 004415	0044	Dead band	□DB	
	004500 ~ 004515	0045	EV 1, function	E1F	
	004600 ~ 004615	0046	EV 1, H limit	E1H	
	004700 ~ 004715	0047	EV 1, L limit	E1L	
	004800 ~ 004815	0048	EV 1, sensitivity	E1C	
	004900 ~ 004915	0049	EV 1, delay timer	E1T	

Device	Bit Address	Word Address	Controller Setting item	Identifier	other
00_	005000 ~ 005015	0050	Abnormal SV/heater function	E1B	
	005100 ~ 005115	0051	EV 1, polarity	E1P	
	005200 ~ 005215	0052	CT input	CM1	
	005300 ~ 005315	0053	EV 1, abnormal current of heater	CT1	
	005400 ~ 005415	0054	EV 2, function	E2F	
	005500 ~ 005515	0055	EV 2, H limit	E2H	
	005600 ~ 005615	0056	EV 2, L limit	E2L	
	005700 ~ 005715	0057	EV 2, sensitivity	E2C	
	005800 ~ 005815	0058	EV 2, delay timer	E2T	
	005900 ~ 005915	0059	EV 2, abnormal SV/ heater function	E2B	
	006000 ~ 006015	0060	EV 2, polarity	E2P	
	006100 ~ 006115	0061	CT input	CM2	
	006200 ~ 006215	0062	EV 2, abnormal current of heater	CT2	
	006300 ~ 006315	0063	DI input	DIF	
	006400 ~ 006415	0064	Polarity of DI	DIP	
	006500 ~ 006515	0065	Control setting 2	SV2	
	006600 ~ 006615	0066	Timer output	TMO	
	006700 ~ 006715	0067	Timer function	TMF	
	006800 ~ 006815	0068	Timer unit switch	H/M	
	006900 ~ 006915	0069	Allowable width for timer SV start	TSV	
	007000 ~ 007015	0070	Time setting	TIM	
	007100 ~ 007115	0071	Monitor of remaining time	TIA	
	————	0072	Timer start/stop	TST	Bit 15
	007300 ~ 007315	0073	Output monitor	OM1	
	007400 ~ 007415	0074	AT start/stop	□AT	
	————	0075	Data store	STR	Bit 15

■ **TTM-10L**

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
10_	000000 ~ 000015	0000	Process Variable (PV)	PV1	
	000100 ~ 000115	0001	Control Setting Value (SV)	□SV	
	000200 ~ 000215	0002	EV L. Limit Set	1L1	
	000300 ~ 000315	0003	EV H. Limit Set	1H1	
	000400 ~ 000415	0004	Auto-Tuning Start/Release	□AT	
	000500 ~ 000515	0005	Proportional Band	□P1	
	000600 ~ 000615	0006	Integral Time	□I1	
	000700 ~ 000715	0007	Derivative Time	□D1	
	000800 ~ 000815	0008	P-cycle Time	□T1	
	000900 ~ 000915	0009	Control Sensitivity	□C1	
	001000 ~ 001015	0010	Set/Select of Input/Output	□IO	
	001100 ~ 001115	0011	L. Limit of SV Limiter	SLL	
	001200 ~ 001215	0012	H. Limit of SV Limiter	SLH	
	001300 ~ 001315	0013	Control Type	CNT	
	001400 ~ 001415	0014	PV Correction	PVS	
	001500 ~ 001515	0015	Manual Reset	PBB	
	001600 ~ 001615	0016	OFF Position	□CP	
	001700 ~ 001715	0017	EV Function	A1F	
	001800 ~ 001815	0018	EV Sensitivity	ALC	
	001900 ~ 001915	0019	Decimal Point Position	□DP	
	002000 ~ 002015	0020	Selection of C/F	□CF	
	002100 ~ 002115	0021	Setting of Lock Function	LOC	
	002200 ~ 002215	0022	Temperature of cooling contact compensation	□CJ	
	002300 ~ 002315	0023	Process Variable (PV) with decimal point	PV2	
	002400 ~ 002415	0024	Output state monitor	OM1	
	————	0025	Data store	STR	Bit 15

■ **TTM-100B Series**

Device	Bit Address	Word Address	Controller Setting Item	PV	Other
100_	000000 ~ 000015	0000	Process value (PV)	PV1	
	000100 ~ 000115	0001	Control set value (SV)	□SV	
	000200 ~ 000215	0002	Main control MV (OUT1)	MV1	
	000300 ~ 000315	0003	Main control MV (OUT2)	MV2	
	000400 ~ 000415	0004	Auto-tuning start/release	□AT	
	000500 ~ 000515	0005	Alarm 1 L limit set	1L1	
	000600 ~ 000615	0006	Alarm 1 H limit set	1H1	
	000700 ~ 000715	0007	Main control P-band	□P1	
	000800 ~ 000815	0008	Integral time	□I1	
	000900 ~ 000915	0009	Derivative time	□D1	
	001000 ~ 001015	0010	Output 1 P-cycle time	□T1	
	001100 ~ 001115	0011	Output 1 sensitivity	□C1	
	001200 ~ 001215	0012	Output 2 P-band	PC1	
	001300 ~ 001315	0013	Output 2 P-cycle time	TC1	
	001400 ~ 001415	0014	Output 2 sensitivity	CC1	
	001500 ~ 001515	0015	Dead Band	DB1	
	001600 ~ 001615	0016	Cooling Point of Contact Compensation	□CJ	
	001700 ~ 001715	0017	Set/Select of Input/Output	□IO	
	001800 ~ 001815	0018	Setting of L limit for OUT1 MV Limiter	MLL	
	001900 ~ 001915	0019	Setting of H limit for OUT1 MV Limiter	MLH	
	002000 ~ 002015	0020	Setting of L limit of SV Limiter	SLL	
	002100 ~ 002115	0021	Setting of H limit of SV Limiter	SLH	
	002200 ~ 002215	0022	Control action select	CNT	
	002300 ~ 002315	0023	Setting of sensor value correction	PVS	
	002400 ~ 002415	0024	Manual reset value	PBB	
	002500 ~ 002515	0025	Alarm 1 function	A1F	
	002600 ~ 002615	0026	AL output sensitivity	ALC	
	002700 ~ 002715	0027	Heater abnormal current	□CT	
	002800 ~ 002815	0028	Selection of data transmission function	TR1	
	002900 ~ 002915	0029	Selection of C/F	□CF	
	003000 ~ 003015	0030	Output state monitor	OM1	
	003100 ~ 003115	0031	Response Delay Speed	AWT	
	————	0032	Data store	STR	Bit 15

■ TTM-110 Series(TTM-114, 115, 117, 119)/110B

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
110_	000000 ~ 000015	0000	Process Value (PV)	PV1	
	000100 ~ 000115	0001	Control Set Value (SV)	□SV	
	000200 ~ 000215	0002	Main Control MV (OUT 1)	MV1	
	000300 ~ 000315	0003	Sub-Control MV (OUT 2)	MV2	
	000400 ~ 000415	0004	Timer Remainder Time	TIA	
	000500 ~ 000515	0005	Auto-Tuning Start/Release	□AT	
	000600 ~ 000615	0006	Time Setting On Timer	TIM	
	000700 ~ 000715	0007	Alarm 1 L. Limit Set	1L1	
	000800 ~ 000815	0008	Alarm 1 H. Limit Set	1H1	
	000900 ~ 000915	0009	Alarm 2 L. Limit Set	2L1	
	001000 ~ 001015	0010	Alarm 2 H. Limit Set	2H1	
	001100 ~ 001115	0011	Main Control P-band	□P1	
	001200 ~ 001215	0012	Integral Time	□I1	
	001300 ~ 001315	0013	Derivative Time	□D1	
	001400 ~ 001415	0014	Output 1 P-cycle Time	□T1	
	001500 ~ 001515	0015	Output 1 Sensitivity	□C1	
	001600 ~ 001615	0016	Output 2 P-band	PC1	
	001700 ~ 001715	0017	Output 2 P-cycle Time	TC1	
	001800 ~ 001815	0018	Output 2 Sensitivity	CC1	
	001900 ~ 001915	0019	Dead Band	DB1	
	002000 ~ 002015	0020	Set/Select of Input/Output Type	□IO	
	002100 ~ 002115	0021	Setting of L. Limit For Out 1 MV Limiter	MLL	
	002200 ~ 002215	0022	Setting of H. Limit For Out 1 MV Limiter	MLH	
	002300 ~ 002315	0023	Setting of H. Limit of SV Limiter	SLL	
	002400 ~ 002415	0024	Setting of L. Limit of SV Limiter	SLH	
	002500 ~ 002515	0025	Control Action Select	CNT	
	002600 ~ 002615	0026	Setting of Sensor Value Correction	PVS	
	002700 ~ 002715	0027	Manual Reset Value	PBB	
	002800 ~ 002815	0028	Timer Operation Mode	TMM	
	002900 ~ 002915	0029	Alarm 1 Function	A1F	
	003000 ~ 003015	0030	Alarm 2 Function	A2F	
	003100 ~ 003115	0031	AL Output Sensitivity	ALC	
	003200 ~ 003215	0032	Heater Abnormal Current	□CT	
	003300 ~ 003315	0033	Selection of Data Transmission Function	TR1	
	003400 ~ 003415	0034	Decimal Point Position	□DP	
	003500 ~ 003515	0035	Selection of C/F	□CF	
	003600 ~ 003615	0036	Buzzer Sound Setting	□BU	
	003700 ~ 003715	0037	Setting of Lock Function	LOC	
	003800 ~ 003815	0038	Output State Monitor	OM1	
	————	0039	Timer Reset	TMS	Bit15
	004000 ~ 004015	0040	Run/Ready Status	RUN	
	————	0041	Data Store	STR	Bit15

■ TTM-120 Series (TTM-124, 125, 127, 129)

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
120_	000000 ~ 000015	0000	Process Value (PV)	PV1	
	000100 ~ 000115	0001	Control Set Value (SV)	□AV	
	000200 ~ 000215	0002	Control Mode	MD1	
	000300 ~ 000315	0003	Main Control MV (OUT1)	MV1	
	000400 ~ 000415	0004	Sub-Control MV (OUT2)	MV2	
	000500 ~ 000515	0005	Auto-Tuning Start/Release	□AT	
	000600 ~ 000615	0006	Alarm 1L Limit Set	1L1	
	000700 ~ 000715	0007	Alarm 1H Limit Set	1H1	
	000800 ~ 000815	0008	Alarm 2L Limit Set	2L1	
	000900 ~ 000915	0009	Alarm 2H Limit Set	2H1	
	001000 ~ 001015	0010	Output 1 P-band	□P1	
	001100 ~ 001115	0011	Integral Time	□I1	
	001200 ~ 001215	0012	Derivative Time	□D1	
	001300 ~ 001315	0013	Output 1 P-cycle Time	□T1	
	001400 ~ 001415	0014	Output 1 Senstivity	□C1	
	001500 ~ 001515	0015	Main Control OFF Position	□CP	
	001600 ~ 001615	0016	Output 2 P-band	PC1	
	001700 ~ 001715	0017	Output 2 P-cycle Time	TC1	
	001800 ~ 001815	0018	Output 2 Sensitivity	CC1	
	001900 ~ 001915	0019	Output 2 OFF Position	CCP	
	002000 ~ 002015	0020	Dead Band	DB1	
	002100 ~ 002115	0021	Set/Select of Input/Output Type	□I0	
	002200 ~ 002215	0022	Setting of L. Limit for Out1 MV Limiter	MLL	
	002300 ~ 002315	0023	Setting of H. Limit for Out1 MV Limiter	MLH	
	002400 ~ 002415	0024	Setting of L. Limit of SV Limiter	SLL	
	002500 ~ 002515	0025	Setting of H. Limit of SV Limiter	SLH	
	002600 ~ 002615	0026	Control Action Select	CNT	
	002700 ~ 002715	0027	Rump Time of SV1	RP1	
	002800 ~ 002815	0028	Setting of Sensor Value correction	PVS	
	002900 ~ 002915	0029	Digital PV Filter	PDF	
	003000 ~ 003015	0030	Manual Reset Value	PBB	
	003100 ~ 003115	0031	Swiching for Balanceless Bumpless	□BB	
	003200 ~ 003215	0032	Alarm 1 Function	A1F	
	003300 ~ 003315	0033	Alarm 2 Function	A2F	
	003400 ~ 003415	0034	AL Output Sensitivity	ALC	
	003500 ~ 003515	0035	Heater Abnormal Current	□CT	
	003600 ~ 003615	0036	Selection of Data Transmission Function	TR1	
	003700 ~ 003715	0037	DI Function	□DI	
	003800 ~ 003815	0038	Decimal Point Position	□DP	
	003900 ~ 003915	0039	Selection of C/F	□CF	
	004000 ~ 004015	0040	Buzzer Sound Setting	□BU	
	004100 ~ 004115	0041	Setting of Lock	LOC	
	004200 ~ 004215	0042	Output State Monitor	OM1	
	————	0043	Data Store	STR	Bit15

■ **TTM-300 Series (TTM-304, 305, 309)/300B**

| Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
300_	000000 ~ 000015	0000	Process Value (PV)	PV1	
	000100 ~ 000115	0001	Mode change	□MD	
	000200 ~ 000215	0002	Control Setting Value (SV)	□SV	
	000300 ~ 000315	0003	Run Step Setting Value (SV)	OSV	
	000400 ~ 000415	0004	The time elapsed	□TI	
	000500 ~ 000515	0005	Run step setting time	OTI	
	000600 ~ 000615	0006	Count numbers of time executed	SRR	
	——————	0007	Step forward function execution	ADV	Bit15
	000800 ~ 000815	0008	Pattern number	□PT	
	000900 ~ 000915	0009	Step number	□ST	
SSV	000000 ~ 204715	0000 ~ 2047 *1	Step temperature setting	SSV	
END	000000 ~ 204715	0000 ~ 2047 *1	Final step setting	END	
STI	000000 ~ 204715	0000 ~ 2047 *1.	Step time setting	STI	
SOK	000000 ~ 204715	0000 ~ 2047 *1	Final step finish condition setting	SOK	
SWZ	000000 ~ 204715	0000 ~ 2047 *1	Step wait zone	SWZ	
SWT	000000 ~ 204715	0000 ~ 2047 *1	Step wait time	SWT	
SON	000000 ~ 204715	0000 ~ 2047 *1	Time signal ON time	SON	
SOF	000000 ~ 204715	0000 ~ 2047 *1	Time signal OFF time	SOF	
SRN	000000 ~ 200015	0000 ~ 2000 *2	Execution time	SRN	
SEO	000000 ~ 200015	0000 ~ 2000 *2	End signal ON time	SEO	
300_	001000 ~ 001015	0010	Pattern numbers	PAT	
	001100 ~ 001115	0011	Step numbers	STP	
	001200 ~ 001215	0012	PV correction	PVS	
	001300 ~ 001315	0013	Change C/ F	□CF	
	001400 ~ 001415	0014	Type of Control	CNT	
	001500 ~ 001515	0015	Type of Input/Output	□IO	
	001600 ~ 001615	0016	Select decimal position	□DP	
	001700 ~ 001715	0017	Mainipulated value limiter Low	MLL	
	001800 ~ 001815	0018	Manipulated value limiter High	MLH	
	001900 ~ 001915	0019	Setting of L. limit of SV limiter	SLL	
	002000 ~ 002015	0020	Setting of H. limit of SV limiter	SLH	
	002100 ~ 002115	0021	Select PV start or SV start	PSV	
	002200 ~ 002215	0022	SV start setting value	SVS	
	002300 ~ 002315	0023	Select Start at Power ON	PON	
	002400 ~ 002415	0024	Event Output 1 function	DO1	
	002500 ~ 002515	0025	PV Event Output 1 function	A1F	
	002600 ~ 002615	0026	Event Output 1 Low limit	A1L	
	002700 ~ 002715	0027	Event Output 1 High limit	A1H	
	002800 ~ 002815	0028	Event Output 1 sensitivity	A1C	
	002900 ~ 002915	0029	Time signal 1 Output mode	TF1	
	003000 ~ 003015	0030	Time signal 1 ON time	ON1	
	003100 ~ 003115	0031	Time signal 1 OFF time	OF1	
	003200 ~ 003215	0032	Event output 1 unusual looping time	LT1	
	003300 ~ 003315	0033	Event Output 2 function	DO2	
	003400 ~ 003415	0034	PV Event Output 2 function	A2F	
	003500 ~ 003515	0035	Event Output 2 Low limit	A2L	

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
	003600 ~ 003615	0036	Event Output 2 High limit	A2H	
	003700 ~ 003715	0037	Event Output 2 sensitivity	A2C	
	003800 ~ 003815	0038	Time signal 2 Output mode	TF2	
	003900 ~ 003915	0039	Time signal 2 ON time	ON2	
	004000 ~ 004015	0040	Time signal 2 OFF time	OF2	
	004100 ~ 004115	0041	Event output 2 unusual looping time	LT2	
	004200 ~ 004215	0042	Key lock function	LOC	
	004300 ~ 004315	0043	Output condition monitor	OM1	
	004400 ~ 004415	0044	[Low temperature] Proportional	□P1	
	004500 ~ 004515	0045	[Low temperature] Integrated time	□I1	
	004600 ~ 004615	0046	[Low temperature] Differential time	□D1	
	004700 ~ 004715	0047	Middle point 1 setting	PM1	
	004800 ~ 004815	0048	[Middle temperature] Proportional	□P2	
	004900 ~ 004915	0049	[Middle temperature] Integrated	□I2	
	005000 ~ 005015	0050	[Middle temperature] Differential	□D2	
	005100 ~ 005115	0051	Middle point 2 setting	PM2	
	005200 ~ 005215	0052	[High temperature] Proportional	□P3	
	005300 ~ 005315	0053	[High temperature] Integrated time	□I3	
	005400 ~ 005415	0054	[High temperature] Differential time	□D3	
	005500 ~ 005515	0055	Proportional Cycle	□□T	
300-	005600 ~ 005615	0056	Fuzzy constant	FUZ	
	005700 ~ 005715	0057	Control sensitivity to [Low temperature]	□C1	
	005800 ~ 005815	0058	Control sensitivity to [Middle temperature]	□C2	
	005900 ~ 005915	0059	Control sensitivity to [High temperature]	□C3	
	006000 ~ 006015	0060	Auto-tuning setting value of [High temperature]	AT1	
	006100 ~ 006115	0061	Auto-tuning setting value of [Middle temperature]	AT2	
	006200 ~ 006215	0062	Auto-tuning setting value of [High temperature]	AT3	
	———————	0063	Auto-tuning execution of [Low temperature]	AP1	Bit15
	———————	0064	Auto-tuning execution of [Middle temperature]	AP2	Bit15
	———————	0065	Auto-tuning execution of [High temperature]	AP3	Bit15
	———————	0066	Auto-tuning execution of [Low]->[Middle]->[High] temperature	AP4	Bit15
	006700 ~ 006715	0067	Auto-tuning under execution	ATR	

*1 When using identifiers from SSV to SOF with a TTM-300 series unit, use the Device Name as the identifier, and the Step No. and Pattern No. as the address. The maximum values available for the pattern number and the step number that can be set on a LT are 20 and 47, respectively. Specify them as shown below.

Ex.

Device	Bit Address	Word Address	Control Setting Item	Identifier
SSV	000000 ~ 204715	0000 ~ 2047	Step Temperature Setting	SSV

01/SSV0000

    └─ **Step No.**

    └─── **Pattern No.**

    └───── **Controller's Station No.**
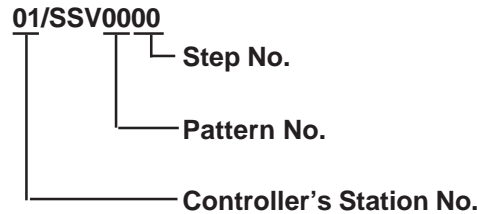
*2 When using identifier SRN or SEO with the TTM-300 series unit, use the Device Name as the identifier, and the Step No. and Pattern No. as the address. The maximum values available for the pattern number and the step number that can be set on a LT is 20, respectively. Specify them as shown below.

Ex.

Device	Bit Address	Word Address	Controller Setting Item	Identifier
SRN	000000 ~ 200015	0000 ~ 2000	Execution Time	SRN

01/SRN0000

    └─ **0 (Fixed)**

    └─── **Pattern No.**
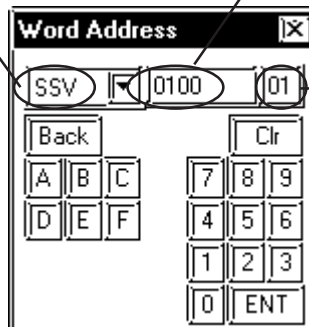
    └───── **Controller's Station No.**

Careful!
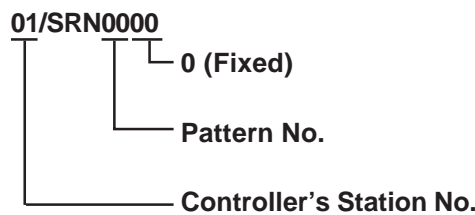
When entering addresses for identifiers SSV to SEO with a TTM-300 series unit, be sure to refer *1 or *2 above.

**Device Selection
(Select from SSV, END, STI, SOK, SWZ, SWT, SON, SOF, SRN or SEO)**

**Address Selection
(Step No. or Pattern No.)**

Enter the Controller's Station No.

■ **TTM-1020 Series(TTM-1520, 1521, 1522, 1523, 1524, 1525, 1920, 1921, 1922, 1923, 1924, 1925)**

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
	000000 ~ 000015	0000	Process Value (PV)	PV1	
	000100 ~ 000115	0001	CH No.	□CH	
	000200 ~ 000215	0002	Control Setting Value (SV)	□SV	
	000300 ~ 000315	0003	SV1	SV1	
	000400 ~ 000415	0004	Set/Select of Auto/Manual	MD1	
	000500 ~ 000515	0005	Set/Select of Remote/Local	REM	
	000600 ~ 000615	0006	Main Control MV (Out 1)	MV1	
	000700 ~ 000715	0007	Main Control MV (Out 2)	MV2	
	000800 ~ 000815	0008	Auto-Tuning Start/Release	□AT	
	000900 ~ 000915	0009	SV2	SV2	
	001000 ~ 001015	0010	SV3	SV3	
	001100 ~ 001115	0011	SV4	SV4	
	001200 ~ 001215	0012	SV5	SV5	
	001300 ~ 001315	0013	SV6	SV6	
	001400 ~ 001415	0014	SV7	SV7	
	001500 ~ 001515	0015	SV8	SV8	
	001600 ~ 001615	0016	Set/Select of Input/Output Type	□IO	
	001700 ~ 001715	0017	Setting of Sensor Value Correction	PVS	
	001800 ~ 001815	0018	Decimal Point Position	□DP	
	001900 ~ 001915	0019	Selection of C/F	□CF	
1020_	002000 ~ 002015	0020	Setting of L. Limit of SV Limiter	SLL	
	002100 ~ 002115	0021	Setting of H.Limit of SV Limiter	SLH	
	002200 ~ 002215	0022	Setting of Lock Function	LOC	
	002300 ~ 002315	0023	Control Action Select	CNT	
	002400 ~ 002415	0024	Proportional band	□P1	
	002500 ~ 002515	0025	Integrated time	□I1	
	002600 ~ 002615	0026	Differential time	□D1	
	002700 ~ 002715	0027	Output 1 P-cycle Time	□T1	
	002800 ~ 002815	0028	Control sensitivity	□C1	
	002900 ~ 002915	0029	Manual Reset Value	PBB	
	003000 ~ 003015	0030	Setting of L. Limit for Out 1 MV Limiter	MLL	
	003100 ~ 003115	0031	Setting of H. Limit for Out 1 MV Limiter	MLH	
	003200 ~ 003215	0032	Setting for unusual	FAL	
	003300 ~ 003315	0033	Cooling P-band	PC1	
	003400 ~ 003415	0034	Cooling P-cycle time	TC1	
	003500 ~ 003515	0035	Cooling Sensitivity	CC1	
	003600 ~ 003615	0036	Dead Band	DB1	
	003700 ~ 003715	0037	Setting of L limit of cooling output	MCL	
	003800 ~ 003815	0038	Setting of H limit of cooling output	MCH	
	003900 ~ 003915	0039	L limit of cascade scaling	CSL	

Device	Bit Address	Word Address	Controller Setting Item	Identifier	Other
	004000 ~ 004015	0040	H limit of cascade scalling	CSH	
	004100 ~ 004115	0041	Event 1 Function	EV1	
	004200 ~ 004215	0042	PV Event 1 Function	P1F	
	004300 ~ 004315	0043	PV Event 1 Low Limit	P1L	
	004400 ~ 004415	0044	PV Event 1 High Limit	P1H	
	004500 ~ 004500	0045	DI 1 Function	D1F	
	004600 ~ 004615	0046	Event 2 Function	EV2	
	004700 ~ 004715	0047	PV Event 2 Function	P2F	
	004800 ~ 004815	0048	PV Event 2 Low Limit	P2L	
	004900 ~ 004915	0049	PV Event 2 High Limit	P2H	
	005000 ~ 005015	0050	DI2 Function	D2F	
	005100 ~ 005115	0051	Event 3 Function	EV3	
	005200 ~ 005215	0052	PV Event 3 function	P3F	
	005300 ~ 005315	0053	PV Event 3 Low Limit	P3L	
	005400 ~ 005415	0054	PV Event 3 High Limit	P3H	
	005500 ~ 005515	0055	DI3 Function	D3F	
	005600 ~ 005615	0056	Event 4 Function	EV4	
	005700 ~ 005715	0057	PV Event 4 Function	P4F	
	005800 ~ 005815	0058	PV Event 4 Low Limit	P4L	
	005900 ~ 005915	0059	PV Event 4 High Limit	P4H	
	006000 ~ 006015	0060	DI4 Function	D4F	
	006100 ~ 006115	0061	Event 5 Function	EV5	
1020_	006200 ~ 006215	0062	PV Event 5 Function	P5F	
	006300 ~ 006315	0063	PV Event 5 Low Limit	P5L	
	006400 ~ 006415	0064	PV Event 5 High Limit	P5H	
	006500 ~ 006515	0065	DI5 Function	D5F	
	006600 ~ 006615	0066	Selection of Data Transmission 1 Function	TR1	
	006700 ~ 006715	0067	L limit of transmission 1 scaling	T1L	
	006800 ~ 006815	0068	H limit of transmission 2 scaling	T1H	
	006900 ~ 006915	0069	Selection of Data Transmission 2 Function	TR2	
	007000 ~ 007015	0070	L limit of transmission 2 scaling	T2L	
	007100 ~ 007115	0071	H limit of transmission 2 scaling	T2H	
	007200 ~ 007215	0072	Close feedback resistance control	CLS	
	007300 ~ 007315	0073	Open feedback resistance control	OPN	
	007400 ~ 007415	0074	quota of function	FNC	
	007500 ~ 007515	0075	Output State Monitor	OM1	
	007600 ~ 007615	0076	Event condition monitor	EM1	
	———————	0077	Data Store	STR	Bit 15

2.8.4 ▸ Environment Setup

The following table lists the recommended Controller and LT communication settings.

LT Settings		Controller Settings	
Baud Rate	9600 bps	Baud Rate	9600 bps
Data Length	8 bit	Data Length	8 bit
Stop Bit	2 bit	Stop Bit	2 bit
Parity Bit	None	Parity Bit	None
Data Flow Control	ER	————	————
Communication Format (using RS-422) *1	RS-422 (2-wire)	————	————
Communication Format (using RS-232C) *1	RS-232C	————	————
Unit No. *2	1 to 32	Communication Unit No.	1 to 32
————	————	Mode Setting *3	Communication Mode
————	————	Mode Setting *4	Read/Write

*1 Controller cannot switch the Communication Format. When purchasing the Controller, select either an RS-422 or RS-232C.

*2 Although the settable range for a machine number on the temperature controllers is 1 to 99, the range for the LT is 1 to 32.

*3 This setting is required for models other than the TTM-004/X04 series. When you perform communication between the Controller and the LT, be sure to set your Controller to Data Transfer mode.

*4 This setting is required only for the TTM-004/X04 series. When the Controller is set to read-only, rewritable devices will become read-only.

2.8.5	Error Code

Controller error codes are displayed by the " Host Communication Error (02:**:##)", and indicated in the left lower corner of the LT screen ** indicates the Controller's error code, and ## indicates the number of the Controller unit.

Error Code	Error Message	Meaning
00	Flat of the instrument (Memory error or A/D conversion error)	————————
01	Numeric data out of "the setting range respectively specified in each of setting items".	Data written to an arbitrary device is out of the range for writing.
02	Change of an item prohibited, or no item to be read out.	No device exists in the address specified for the temperature controller connected to LT. Or, data was written to the specified device, even though that device is write protected.
03	An ASCII code other than the numeric data is specified in the place. Or, an ASCII code other than "0" or "-" is specified in the place for the sign.	————————
04	Format error	The format of the command from the LT is incorrect due to noise, etc.
05	BCC error	The format of commands sent from LT is erroneous due to noise or the like.
06	Overrun error	————————
07	Framing error	Machine Numbers for temperature controllers are overlapping. Or, the format of commands sent from LT is erroneous due to noise or the like.
08	Parity error	The current Data Transfer Parity setting is incorrect. Or, the format of commands sent from LT is erroneous due to noise or the like.
09	Trouble has happened on PV in process of AT. Or, AT does not be finalized in 3 hours.	————————

Careful! *Depending on the specification of the Controller, if two errors occur at the same time, the larger error number will be displayed.*

▽ **Reference** △ *For more details about error codes, refer to the TOHO ELEC-TRONICS INC.'s COMMUNICATIONS FUNCTION Instructon Manual.*

MEMO

3 ▶ Inverters

This chapter shows examples of system configuration, supported devices and environment setup used when connecting the inverters to the LT.

⚠️ **Important**   **If communication is halted due to signal cable breakage, LT fault etc., the inverter will not recognize it.**

3.1 ▶ List of Connectable Inverters

The following inverters can be connected to the LT.

Company	Series	Inverter *1	Link I/F or CPU direct connection	External Device Name in LT Editor
Mitsubishi Electric Corp.	FREQROL-A500	FR-A520-□K FR-A540-□K		MITSUBISHI FREQROL SERIES
	FREQROL-A500L	FR-A520L-□K FR-A540L-□K		
	FREQROL-E500	FR-E520-□K FR-E540-□K FR-E520S-□K FR-E510W-□K		
	FREQROL-F500	FR-F520-□K FR-F540-□K		
	FREQROL-F500L	FR-F520L-□K FR-F540L-□K		
	FREQROL-S500	FR-S510W-□K-R FR-S520-□K-R FR-S520S-□K-R		
	FREQROL-B,B3	FR-B-□K FR-B3-□□□K		
Fuji Electric Co., Ltd.	FRENICS5000G11S	FRN□□G11S-2		FUJI INVERTER
		FRN□□G11S-4		
	FRENICS5000P11S	FRN□□P11S-2		
		FRN□□P11S-4		
	FVR-E11S	FVR□□□E11S-2		
		FVR□□□E11S-7		
	FVR-C11S	FVR□□□C11S-2	Option OPC-C11S-RS□ *2	
		FVR□□□C11S-6		
		FVR□□□C11S-7		

*1 The "□□□" characters in the inverter model codes reflect applicable standard generator capacities.

*2 The "□" character in the option card model code reflects the classification of the card type (either A, B, or C) according to this series inverter capacities.

The model codes' last numbers 2, 4, 6, and 7 indicate 3 phase 200V, 3 phase 400V, single phase 100V, and single phase 200V, respectively.

MEMO

3.2   Mitsubishi Electric Inverters
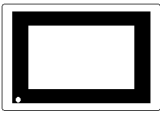
3.2.1   System Structure

The following table describes the system structure for connecting the Mitsubishi Electric inverters to the LT.

> ⚠️ **Important**
>
> *If communication is halted due to signal cable breakage, LT fault etc., the inverter will not recognize it. Use its Communication retry or Communication check to diagnose the problem and prevent an accident.*

■ FREQROL-A500 Series

Inverter [1]	Cable Diagram	LT
FR-A520-□K FR-A540-□K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	
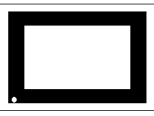
[1] "□" indicates the capacity of each inverter.

■ FREQROL-A500L Series

Inverter [1]	Cable Diagram	LT
FR-A520L-□K FR-A540L-□K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	
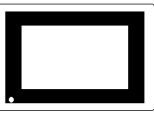
[1] "□" indicates the capacity of each inverter.

■ FREQROL-E500 Series

Inverter [*1]	Cable Diagram	LT
FR-E520-□K FR-E540-□K FR-E520S-□K FR-E510W-□K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	
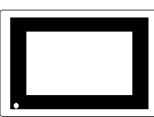
*1 "□" indicates the capacity of each inverter.

■ FREQROL-F500 Series

Inverter [*1]	Cable Diagram	LT
FR-F520-□K FR-F540-□K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	
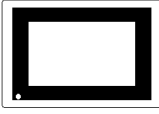
*1 "□" indicates the capacity of each inverter.

■ FREQROL-F500L Series

Inverter [*1]	Cable Diagram	LT
FR-F520L-□K FR-F540L-□K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	

*1 "□" indicates the capacity of each inverter.

■ FREQROL-S500 Series

Inverter [1]	Cable Diagram	LT
FR-S520-☐K FR-S520S-☐K FR-S510W-☐K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	

1 "☐" indicates the capacity of each inverter.

■ FREQROL-B/B3 Series

Inverter [1]	Cable Diagram	LT
FR-B-☐K FR-B3-☐☐☐K	RS-422 (4-wire) (Cable Diagram 1)	LT Type-C
	RS-422 (4-wire, 1:n communication) (Cable Diagram 2)	

1 "☐" indicates the capacity of each inverter.

3.2.2   Cable Diagrams

Recommended Cables

For connection of the LT and Mitsubishi Electric inverters, the following cables and cable manufcturers are recommended:

No.	Item	Model Code	Company	Remark
1	Cable (available on the market)	FR-CB201 (1m)	Mitsubishi Electric Corporation	Used for 1:n connection
2		FR-CB203 (3m)	Mitsubishi Electric Corporation	Used for 1:n connection
3		FR-CB205 (5m)	Mitsubishi Electric Corporation	Used for 1:n connection
4	Wires	SGLPEV 0.5mm×4P	Mitsubishi Electric Corporation	10BASE-T wires
5	RJ45 connector	5-554720-3	Tyco Electronics AMP K.K.	
6	RS-485 distributor (commercial type)	MBJ-8	Hakko Electric Machine Works Co., Ltd.	Used for 1:n connection End Terminal Resistance OFF
		MBJ-8P		Used for 1:n connection End Terminal Resistance ON

Cable Diagram 1

• When using Digital's RS-422 connector terminal adapter GP070-CN10-0
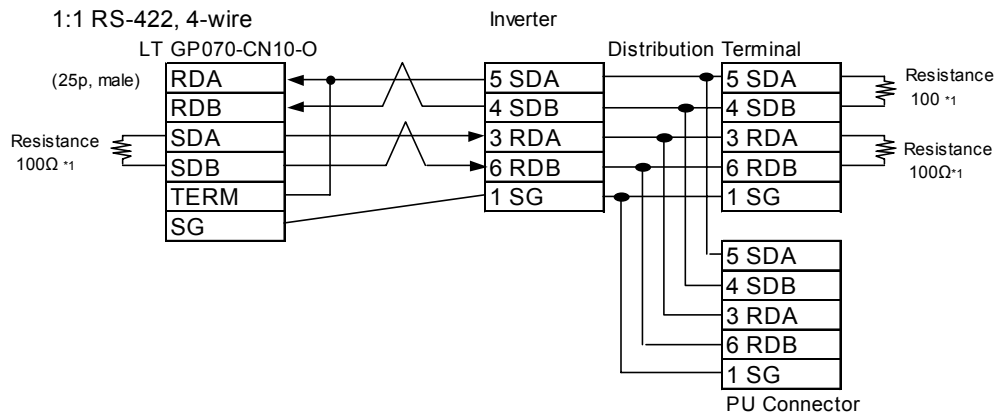
• When making your own cable
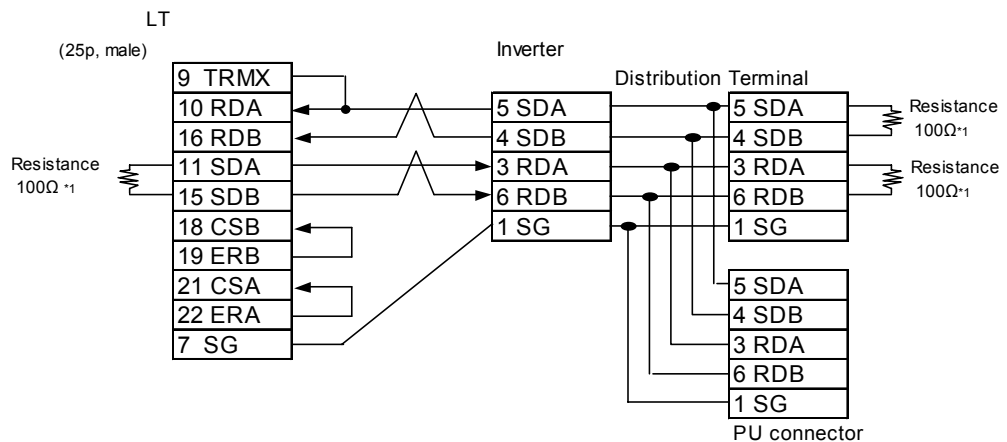
*1 Since a modular connector has been used, be sure to use a distributor when using a terminating resistor.

Cable Diagram 2

• When using Digital's RS-422 connector terminal adapter GP070-CN10-0
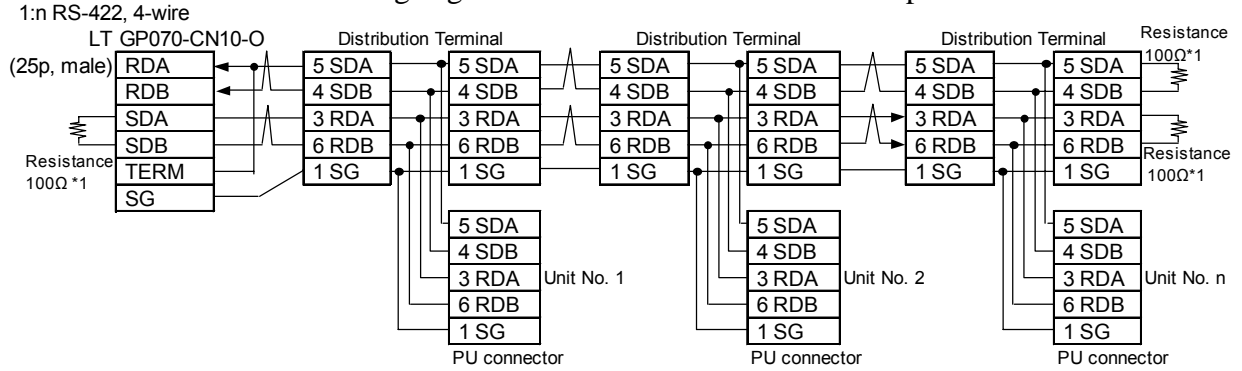
• When making your own cable
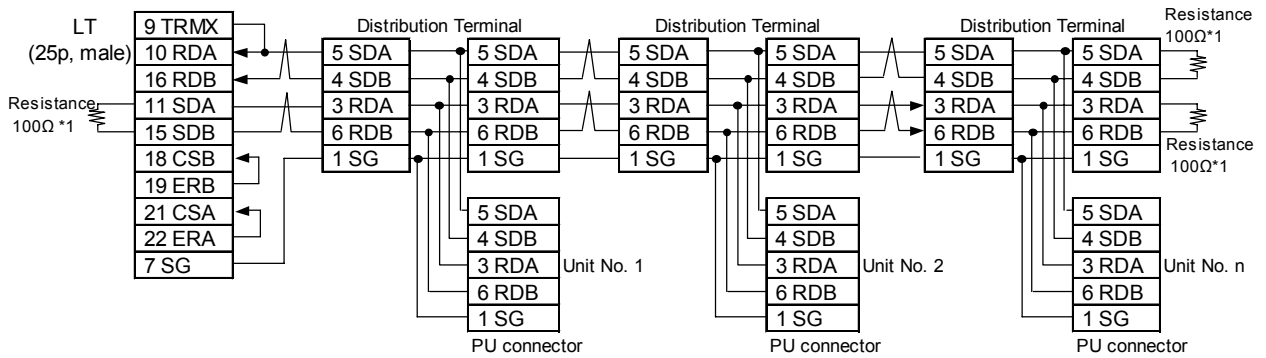
*1 Since a modular connector has been used, be sure to use a distributor when using a terminating resistor.

3.2.3   **Supported Devices**

Device	Bit Addresses	Word Addresses	Remarks	
Parameter (except for Pr.37 of FREQROL-S500 and FREQUROL-E500)	000000 ~ 99315	0000 ~ 0993	*1	*3
Parameter (Pr.37 of FREQROL-S500 and FREQUROL-E500)	P0037002 ~ P003731	P0037	*2 *4	H/L
Operation mode	OPE000 ~ OPE015	OPE0		*3
Output frequency (rpm)	OUTF000 ~ OUTF015	OUTF0		H/L
Output current	OUTC000 ~ OUTC015	OUTC0		
Output voltage	OUTV000 ~ OUTV015	OUTV0		
Special monitor	SPM000 ~ SPM015	SPM0		
Special monitor selection no.	SSEL000 ~ SSEL015	SSEL		
Output frequency	SOF000 ~ SOF015	SOF0		
Output current	SOC000 ~ SOC015	SOC0		
Output voltage	SOV000 ~ SOV015	SOV0		
Set frequency value	FSET000 ~ FSET015	FSET0		
Run speed	RUNS000 ~ RUNS015	RUNS0		
Motor torque	MOT000 ~ MOT015	MOT0		
Regenerative brake	RBRK000 ~ RBRK015	RBRK0		
Electronic thermal load factor	ELOF000 ~ ELOF015	ELOF0		
Output current peak value	OCPV000 ~ OCPV015	OCPV0		
Converter output voltage peak value	COPK000 ~ COPK015	COPK0		
Input power	IPOW000 ~ IPOW015	IPOW0		
Output power	OPOW000 ~ OPOW015	OPOW0		
Alarm (latest Nos. 1 & 2)	A12D000 ~ A12D015	A12D0		
Alarm (latest Nos. 3 & 4)	A34D000 ~ A34D015	A34D0		*3
Alarm (latest Nos. 5 & 6)	A56D000 ~ A56D015	A56D0		
Alarm (latest Nos. 7 & 8)	A78D000 ~ A78D015	A78D0		
Run command	RUNC000 ~ RUNC015	RUNC0		
Inverter status monitor	INVS000 ~ INVS015	INVS0		
Run frequency write (E²PROM)	RWRT000 ~ RWRT015	RWRT0		
Set frequency write (RAM and E²PROM)	SFWE000 ~ SFWE015	SFWE0		
Set frequency write (only RAM)	SFWR000 ~ SFWR015	SFWR0		
Set frequency read (E²PROM)	SFRE000 ~ SFRE015	SFRE0		
Set frequency read (RAM)	SFRR000 ~ SFRR015	SFRR0		
Error all clear	ERCL000 ~ ERCL015	ERCL0		
Inverter reset	RSET000 ~ RSET015	RSET0		
Parameter all clear	ALLC000 ~ ALLC015	ALLC0		
User clear	ALLC000 ~ ALLC015	ALLC0	Write data H9669	
Link parameter extended settings	LNKP000 ~ LNKP015	LNKP0		
No. 2 parameter change	SECP000 ~ SECP015	SECP0		

*1 For detailed parameter information, refer to Mitsubishi Electric's multi-purpose inverter manuals.

*2 For the FREQROL-S500 parameter, designate "SP" as the device name and enter the parameter number as the address.

*3 This device cannot be used for 32 bit data.

*4 The supported devices and their corresponding items described in an inverter manuals are as follows:

[Parameter read/write]

Address

Function	Parameter Number	Name	Data Code		
			Read	Write	Link Parameter Extension Setting Value (Data Code: 7F/FF)
Basic Functions	0	Torque boost	00	80	0
	1	Maximum frequency	01	81	0
	2	Minimum frequency	02	82	0
	3	Base frequency	03	83	0

:

Excerpted from Mitsubishi transistorized Inverter FREQROL-A500 Operation Manual; Appendix 1. Data Code List

[Devices other than the parameters]

Select an applicable device from the supported device list.

No.	Item		Command Code	Data	Number of Data Digits
1	Operation mode	Read	H7B	H0000: Communication option operation H0001: External operation H0002: Communication operation (PU connector)	4 digits
		Write	HFB	H0000: Communication option operation H0001: External operation H0002: Communication operation (PU connector)	
2	Monitoring	Output frequency [speed]	H6F	H0000 to HFFFF: Output frequency (hexadecimal) in 0.01Hz increments	4 digits

:

Excerpted from Mitsubishi Transistorized Inverter FREQROL-A500 Operation Manual; Computer Link Operation <Setting Items and Set Data>

*5 How to Enter a Device Name

Enter device names in the LT Editor software as follows:

Address
Fixed to "0" except when reading/ writing a parameter.

Inverter unit number

Device
When reading/writing a parameter, select either "...." or "SP".

6 Depending on the parameter type, "9999" (indicates parameter settings are ineffective) or other values may be entered. In such a case, data write/read from the LT will become as follows:

Parameter Set Value Read/Write Data List

No.	Inverter Model	Inverter Set Value	Written Data	Read Data	Remark
1	Except for FR-S500	9999	-1 (0xFFFF)	-1 (0xFFFF)	
2		8888	-16 (0xFFF0)	-16 (0xFFF0)	
3	FR-S500	— — —	-1 (0xFFFF)	-1 (0xFFFF)	
4		888	-16 (0xFFF0)	-16 (0xFFF0)	

7 The system area (20 words) cannot be used.

In the LT OFFLINE mode and LT Editor's System Area selection screen, the protocol and operation procedure screens will be the same as those that appear when the system area can be used. However, even if you select the system area on these screens, it will automatically be designated as not selected.

3.2.4   Environment Setup

The following tables show Pro-face's recommended Mitsubishi Electric inverter communication settings and their corresponding settings on the LT.

LT Settings		Inverter Settings	
Baud Rate	19200bps	Baud Rate	19200bps
Data Length	8bit	Data Length	8bit
Stop Bit	2bit	Stop Bit	2bit
Parity Bit	Even	Parity Bit	Even
Data Flow Control	ER	————	————
Communication Format When using RS-422	RS-422 (4-wire)	————	————
Unit No.*1	0 ~ 31	Unit No.	0 ~ 31

◆ Setting Method

Use the inverter's front keys to enter communication settings.

Use the following parameters 117 to 124 for the inverter communication settings.

No.	Parameter No.	Name	Setting Range
1	117	Station number	0 ~ 31
2	118	Communication Speed	48...4800bps 96...9600bps 192...19200bps
3	119	Stop bit length/Data length	0...8/1 1...8/2 10...7/1 11...7/2
4	120	Parity check Presence/Absence	0: OFF 1: Even 2: Odd
5	121	Number of communication retries	0 ~ 10,9999 or ---
6	122	Communication check time internal	0 ~ 999.8,9999 or ---
7	123	Waiting time settings	0 ~ 150,9999 or ---
8	124	CR, LF Presence/Absence selection	0: CR and LF OFF 1: CR ON 2: CR and LF ON

3.2.5 ▸ **Error Codes**

■ **Inverter Specific Error Codes**

The following error numbers are supported by the inverters. Each error number (format = 02:OO: △△) will be displayed on the left bottom of the LT screens. (The "OO" characters reflect an error number displayed on the LT (shown in the table below) and the "△△" characters reflect an inverter unit number where the error occurs.)

▽**Reference**△ *Mitsubishi Electric Corporation; Each inverter series' Operation Manual*

Error No.	Error Name	Causes
00	Computer NAK error	――――
01	Parity error	The LT parity settings are incorrect.
02	Sum check error	An error occurred on communication data due to noise, etc.
03	Protocol error	――――
04	Flaming error	An error occurred on communication data due to noise, etc., or the stop bit settings are incorrect.
05	Overrun error	――――
06	――――	――――
07	Character error	――――
08	――――	――――
09	――――	――――
0A	Mode error	Parameter write was attempted when the mode is not the computer link operation mode or while the inverter is operating.
0B	Instruction code error	A non-existent address has been designated during screen creation.
0C	Data range error	When parameter or operation frequency data was written, the designated data was exceeded the correct setting range.
0D	――――	――――
0E	――――	――――
0F	――――	――――

Depending on the inverter specifications, when multiple errors occurred simultaneously, the larger error number will be displayed.

3.3   Fuji Electric Inverters
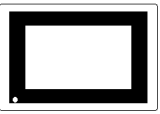
3.3.1   System Structure

The following describes the system configuration used when connecting Fuji Electric inverters to the LT.

⚠️ **Important**

• *If a communication error occurs while the unit is operating, a stop command may not be recognized via RS-485. To prevent accidents, be sure to use the inverter external signal terminal's forced stop function so that emergency stop will always be enabled.*

• *If an alarm is reset with a run command sent via RS-485, the unit will suddenly restart. To prevent accidents, be sure to confirm that the run command is not being sent.*

■ FRENICS5000G11S Series
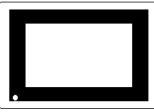
Inverter [1]	Cable Diagram	LT
FRN□□G11S-2 FRN□□G11S-4	RS-485 (1:1) (Cable Diagram 1) RS-485(1:n) (Cable Diagram 2)	LT Type-C

■ FRENICS5000P11S Series

Inverter [1]	Cable Diagram	LT
FRN□□P11S-2 FRN□□P11S-4	RS-485 (1:1) (Cable Diagram 1) RS-485(1:n) (Cable Diagram 2)	LT Type-C

[1] The "□□□" characters in the inverter model codes reflect standard applicable generator capacities.

■ FVR-E11S Series

Inverter [1]	Cable Diagram	LT
FVR□□□E11S-2 FVR□□□E11S-7	RS-485 (1:1) (Cable Diagram 3) RS-485(1:n) (Cable Diagram 4)	LT Type-C

■ FVR-C11S Series (Optional for Communication)

Inverter [1]	Communication I/F	Cable Diagram	LT
FVR□□□C11S-2 FVR□□□C11S-6 FVR□□□C11S-7	Option: OPC-C11S-RS□ [2]	RS-485 (1:1) (Cable Diagram 1) RS-485(1:n) (Cable Diagram 2)	LT Type-C

1 The "□□□" characters in the inverter model codes reflect standard applicable generator capacities.

2 The "□" character in the option card model code reflects the classification of the card type (either A, B, or C) according to this series inverter capacities.

3.3.2   Cable Diagrams

! **Important**

- **The following cables are recommended:**

  <For G11S, P11S, C11S>

  Furukawa Electric UL AWM2789 1/0.65 mm² long distance braided shield cable

  < For E11S>

  Cable conforming to EIA568 standard (for 10BASE-T), as well as RJ45 connector

- **The maximum length of a cable (transmission distance) is 500m.**

- **Depending on the usage environment, a unit may malfunction due to noise generated from the inverter. In such a case, connect a ferrite core or condenser to the cable.**
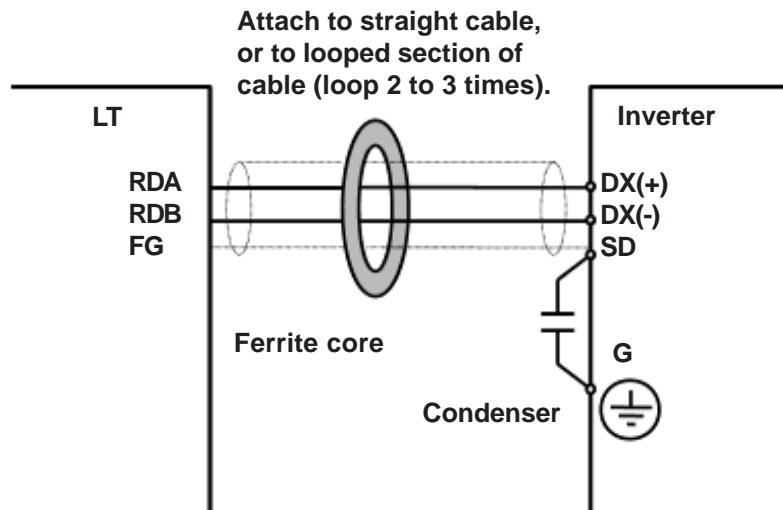
- **A terminating resistor (100W) has been embedded in the E11S. When connecting the inverter to the end of the cable, turn ON SW2 located below the connector.**

Cable Diagram 1 (1:1)

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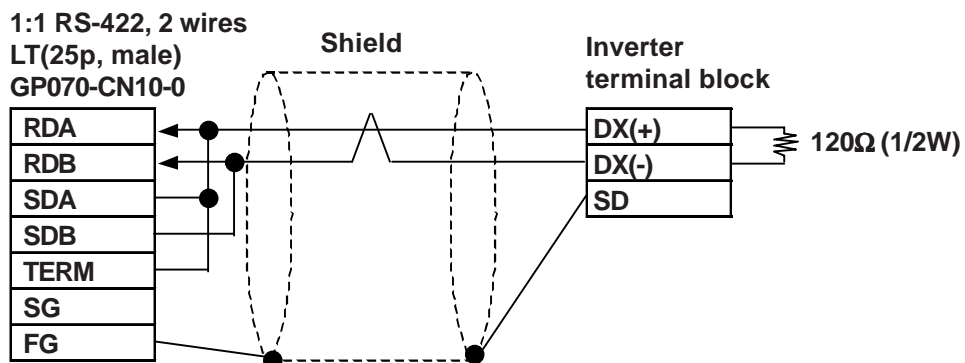
• When using Digital's RS-422 connector terminal adapter GP070-CN10-0

LT GP230-IS11-0

Inverter terminal block

RDA	DX(+)
RDB	DX(-)
SDA	
SDB	
SG	
FG	SD

120Ω (1/2W)

• When making your own cable

LT (25p, male)
GP070-CN10-0

| 7 SG |
| 9 TRMX |
| 10 RDA |
| 16 RDB |
| 11 SDA |
| 15 SDB |
| 18 CSB |
| 19 ERB |
| 21 CSA |
| 22 ERA |
| 1 FG |

Inverter terminal block

| DX(+) |
| DX(-) |
| SD |

120Ω (1/2W)

Shield
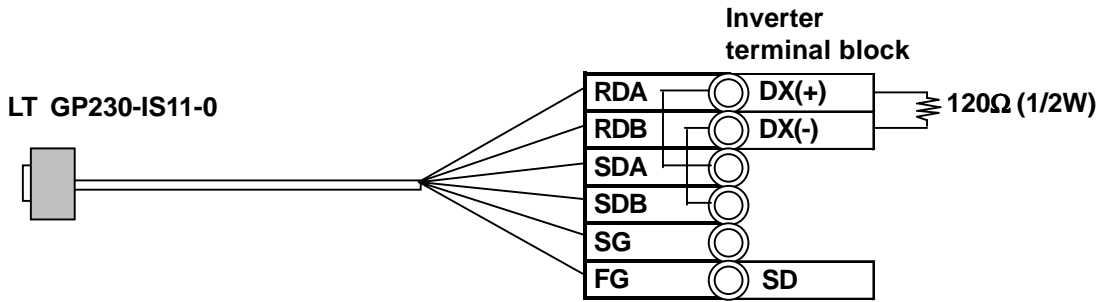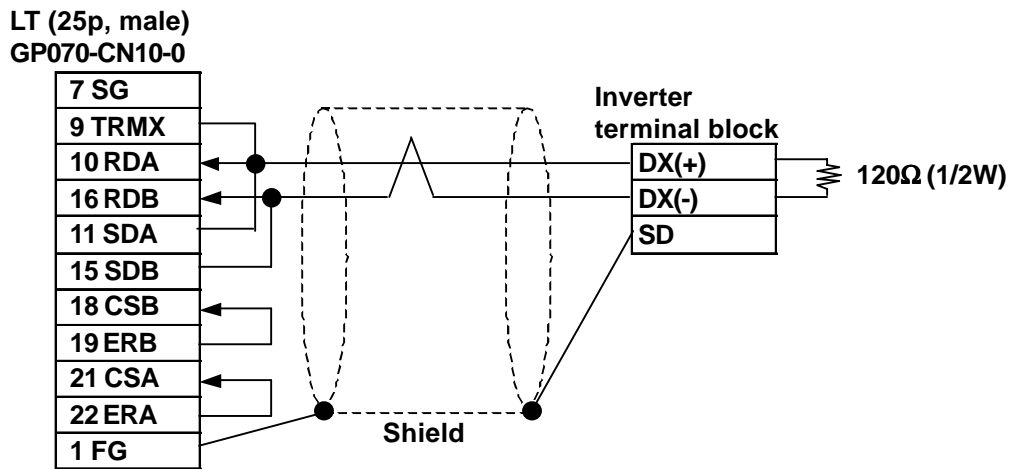
Cable Diagram 2 (1:n)

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

1:n RS-422, 2-wires
LT (25p, male)
GP070-CN10-0

| RDA |
| RDB |
| SDA |
| SDB |
| TERM |
| SG |
| FG |

Inverter 1

| DX(+) |
| DX(-) |
| SD |

Inverter 2

| DX(+) |
| DX(-) |
| SD |

Inverter n

| DX(+) |
| DX(-) |
| SD |

120Ω (1/2W)

Shield   Shield   Shield

• When making your own cable

Shield   Shield

LT GP230-IS11-0

Inverter 1

RDA	DX(+)
RDB	DX(-)
SDA	
SDB	
SG	
FG	SD

Inverter 2

| DX(+) |
| DX(-) |
| SD |

Inverter n

| DX(+) |
| DX(-) |
| SD |

120Ω (1/2W)

• When making your own cable

LT (25p, male)
GP070-CN10-0

7 SG	
9 TRMX	
10 RDA	
16 RDB	
11 SDA	
15 SDB	
18 CSB	
19 ERB	
21 CSA	
22 ERA	
1 FG	

Inverter 1 DX(+) DX(-) SD

Inverter 2 DX(+) DX(-) SD

Inverter n DX(+) DX(-) SD

120Ω (1/2W)

Shield
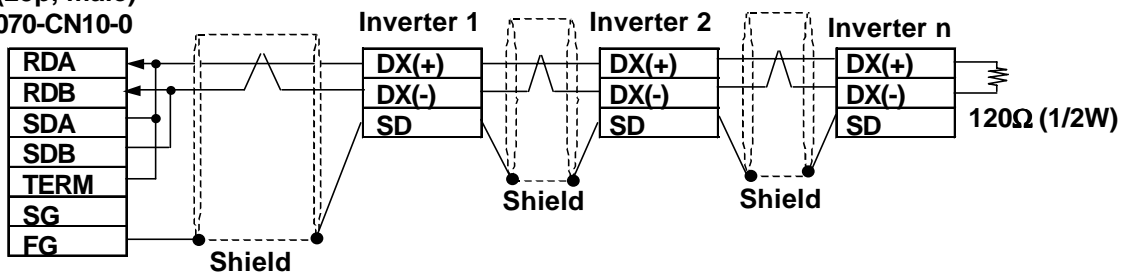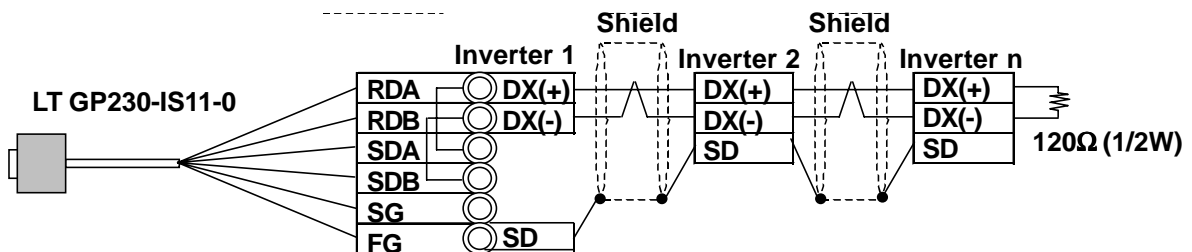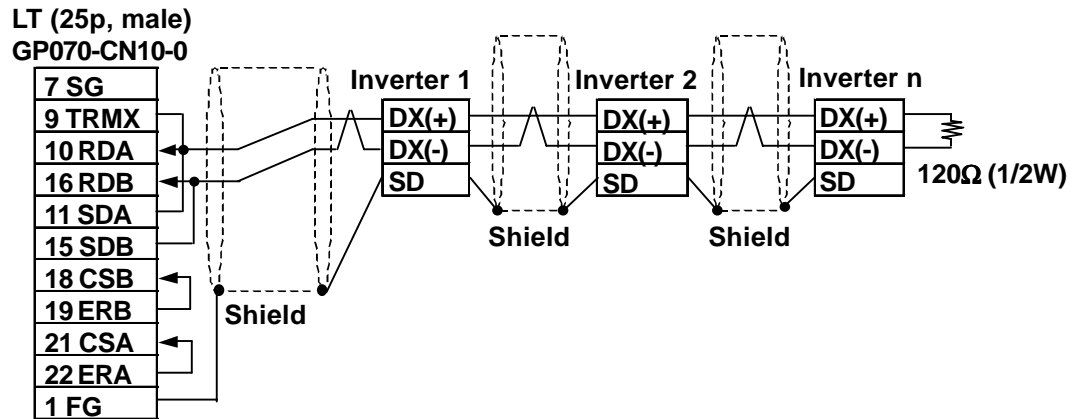
Cable Diagram 3 (1:1)

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

1:1 RS-422, 2-wire
LT (25p, male)
GP070-CN10-0

RDA
RDB
SDA
SDB
TERM
SG
FG

Inverter
RJ45 connector

4 DX(+)
3 DX(-)

• When making your own cable

LT (25p, male)
GP070-CN10-0

7 SG
9 TRMX
10 RDA
16 RDB
11 SDA
15 SDB
18 CSB
19 ERB
21 CSA
22 ERA
1 FG

Inverter
RJ45 connector

4 DX(+)
3 DX(-)
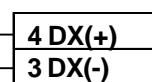
Cable Diagram 4 (1:n)

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

1:n RS-422, 2-wire
LT (25p, male)
GP070-CN10-0

		Inverter 1	Inverter 2	Inverter n
RDA		3 DX(-)	4 DX(+)	4 DX(+)
RDB		4 DX(+)	3 DX(-)	3 DX(-)
SDA				
SDB				
TERM				
SG				
FG				

• When making your own cable

LT (25p, male)
GP070-CN10-0

		Inverter 1	Inverter 2	Inverter n
7 SG		4 DX(+)	4 DX(+)	4 DX(+)
9 TRMX		3 DX(-)	3 DX(-)	3 DX(-)
10 RDA				
16 RDB				
11 SDA				
15 SDB				
18 CSB				
19 ERB				
21 CSA				
22 ERA				
1 FG				
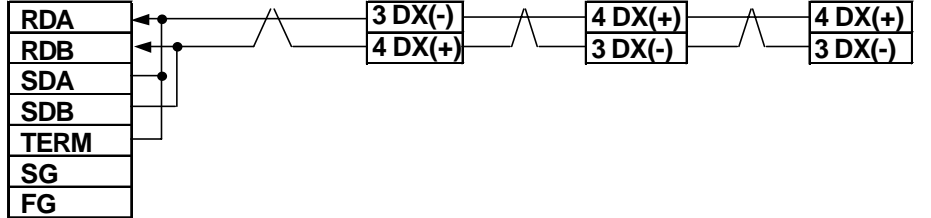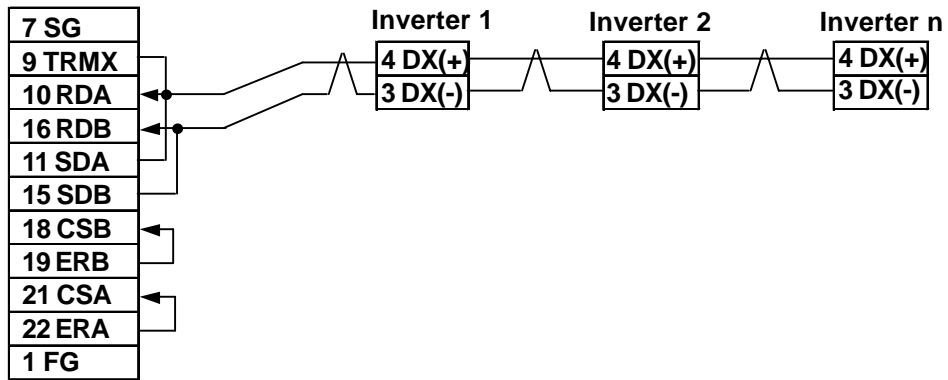
3.3.3   Supported Devices

■ FRENICS5000G11S/FRENICS5000P11S Series

Device	Bit Addresses	Word Addresses	Remarks	
Basic function	F0000 ~ F4215	F00 ~ F42		
Terminal function	E0100 ~ E4715	E01 ~ E47		
Controlling function	C0100 ~ C3315	C01 ~ C33		
Motor 1	P0100 ~ P0915	P01 ~ P09		
High level function	H0300 ~ H3915	H03 ~ H39		L/H
Motor 2	A0100 ~ A1815	A01 ~ A18		
Option	o0000 ~ o2915	o00 ~ o29		
Command data	S0100 ~ S1115	S01 ~ S11		
Monitor data	M0100 ~ M4815	M01 ~ M48	*1	
Alarm reset	—————	m00	*2	—————

*1 Data write cannot be performed.

*2 "m00" is a virtual device and is used to reset the history of alarms occurred on
   the inverter.

   Writing any data to "m00" will reset the alarm. However, data read cannot be
   performed.

■ FRENICS5000E11S Series

Device	Bit Addresses	Word Addresses	Remarks	
Basic function	F0000 ~ F4215	F00 ~ F42		
Terminal function	E0100 ~ E4215	E01 ~ E42		
Controlling function	C0100 ~ C3315	C01 ~ C33		
Motor 1	P0100 ~ P1015	P01 ~ P10		L/H
High level function	H0100 ~ H4615	H01 ~ H46		
Motor 2	A0100 ~ A1915	A01 ~ A19		
Command data	S0100 ~ S1115	S01 ~ S11		
Monitor data	M0100 ~ M4815	M01 ~ M48	*1	
Alarm reset	—————	m00	*2	—————

*1 Data write cannot be performed.

*2 "m00" is a virtual device and is used to reset the history of alarms occurred on
   the inverter.

   Writing any data to "m00" will reset the alarm. However, data read cannot be
   performed.

■ **FRENICS5000G11S/FRENICS5000P11S Series**

Device	Bit Addresses	Word Addresses	Remarks	
Basic function	F0000 ~ F3615	F00 ~ F36		
Terminal function	E0100 ~ E0315	E01 ~ E03		
Controlling function	C0100 ~ C0715	C01 ~ C07		
Motor 1	P0000 ~ P0015	P00		L/H
High level function	H0100 ~ H2515	H01 ~ H25		
Option	O0000 ~ O1115	o00 ~ o11	*1	
Command data	S05 ~ S06	S05 ~ S06		
Monitor data	M0100 ~ M4815	M01 ~ M48	*1	
Alarm reset	————	m00	*2	————

*1 Data write cannot be performed.

*2 "m00" is a virtual device and is used to reset the history of alarms occurred on the inverter.

Writing any data to "m00" will reset the alarm. However, data read cannot be performed.

⚠ **Caution**

• **The system area (20 words) cannot be used. Also, on the LT OFFLINE mode, the protocol display and operation will be the same as that which appears when the system area can be used. Even if the system area is selected on these screens, however, it will automatically be designated as not selected.**

• **Depending on the inverter series, supported functions and ranges will vary. For more detailed information, refer to each inverter series' operation manual.**

• **In the LT Editor, enter the device address and station address as follows:**

Device name ——— [Bit Address]
Address (decimal number) (Decimal bit position number)
Station address (decimal number)
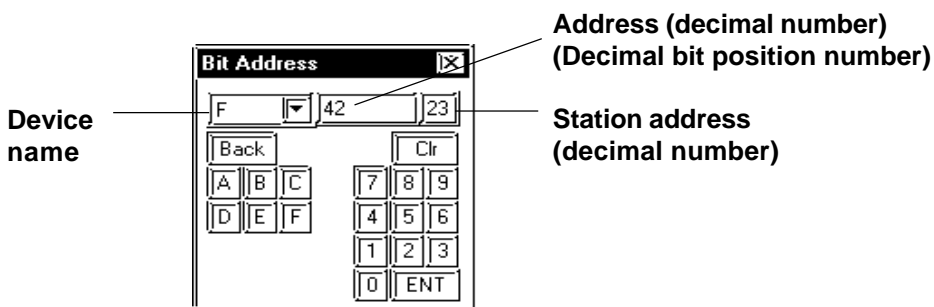
3.3.4　Environment Setup

■ FRENICS5000G11S/FRENICS5000P11S Series

LT Settings		Inverter Settings		Setting Function
Baud Rate	9600bps	Baud rate	9600bps	H34
Data Length	8bit	Data Length	8bit	H35
Stop Bit	2bit	Stop Bit	2bit	H37
Parity Bit	None	Parity Bit	None	H36
Data Flow Control	ER	———	———	———
Communication Format	2-wire type	———	———	———
Station Address	1 ~ 31	Station Address	1 ~ 31	H31

■ FVR-E11S Series

LT Settings		Inverter Settings		Setting Function
Baud Rate	9600bps	Baud rate	9600bps	H34
Data Length	8bit	Data Length	8bit	H35
Stop Bit	1bit	Stop Bit	1bit	H37
Parity Bit	None	Parity Bit	None	H36
Data Flow Control	ER	———	———	———
Communication Format	2-wire type	———	———	———
Unit No.	1 ~ 31	Station Address	1 ~ 31	H31

■ FVR-C11S Series

LT Settings		Inverter Settings		Setting Function
Baud Rate	9600bps	Baud rate	9600bps	o04
Data Length	8bit	Data Length	8bit	o05
Stop Bit	2bit	Stop Bit	2bit	o07
Parity Bit	None	Parity Bit	None	o06
Data Flow Control	ER	———	———	———
Communication Format	2-wire type	———	———	———
Unit No.	1 ~ 31	Station Address	1 ~ 31	o01
———	———	Optional selection	1	o00

⚠ **Caution** **The FVR-C11S Series requires a communication card (Model: OPC-C11S-RS*). Be sure to set "o00" to 1 to enable the RS-485 communication option.**

3.3.5   Error Codes

■ Inverter Specific Error Codes

The error codes specific to the inverters will appear on the LT screen's left bottom, as "Host Communication Error (02:**:##)". (The "**" characters indicate an error code specific to the inverter, and the "##" characters indicate the station address of the inverter on which an error occurred.)

Error Codes

Error Code	Error Name	Description
4AH	Format error	• Data transmission request statement characters are incorrect. • The last character of the request statement is not in the correct position.
4BH	Command error	• A non-existent command has been sent.
4CH	Link priority error	• It was attempted to write command or operation command data, with the link option installed. (When the link option has been installed, the command and operation command data cannot be written via RS-485.)
4DH	No write authorization error	• It was attempted to write new function data during data write from the link option.
4EH	Function code error	• A non-existent function code has been requested.
4FH	Write inhibit error	• It was attempted to write an operation inhibit function or write inhibit during run function while the unit was operating.
50H	Data error	• Data that has been written has exceeded an effective range.
51H	Write error	• It was attempted to write new function data during writing another function.

Note:
- **The latest communication error code has been stored in M26.**
- **Alarms occurred on the inverter will have either code numbers M16, M17, M18, or M19.**

    M16: Latest alarm

    M17: Previous alarm

    M18: Alarm before the previous alarm

    M19: Alarm before the two old alarms

For more detailed information, refer to your inverter's operation manual.

4 ▶ Memory Link Communication

Read this chapter if you are using the LT unit with the memory link communications.

This chapter explains one-to-one communication between the LT unit and equipment such as a personal computer or a one-board microcomputer which do not have their own protocols.

▼*Reference*▲ *For information about the extended mode, refer to the GP70 Series Memory Link Communication Protocol Manual.*

4.1 ▶ Setting Up Memory Link Communication

Data transmission between the LT and Host (External Device) are run according to the host's ladder logic program.

The LT runs its screen display relying on the host's data write commands, which are based on the screen display's data send restrictions. And, the LT, following the host's Reading command, passes stored data over to the host. Communication occurs between the LT and host in this way, and normally, the initiative is held on the host side. Data transmission between the LT and External Device is aided by the memory area (System Area) prepared internally in the LT.

<div style="border:1px solid black;">
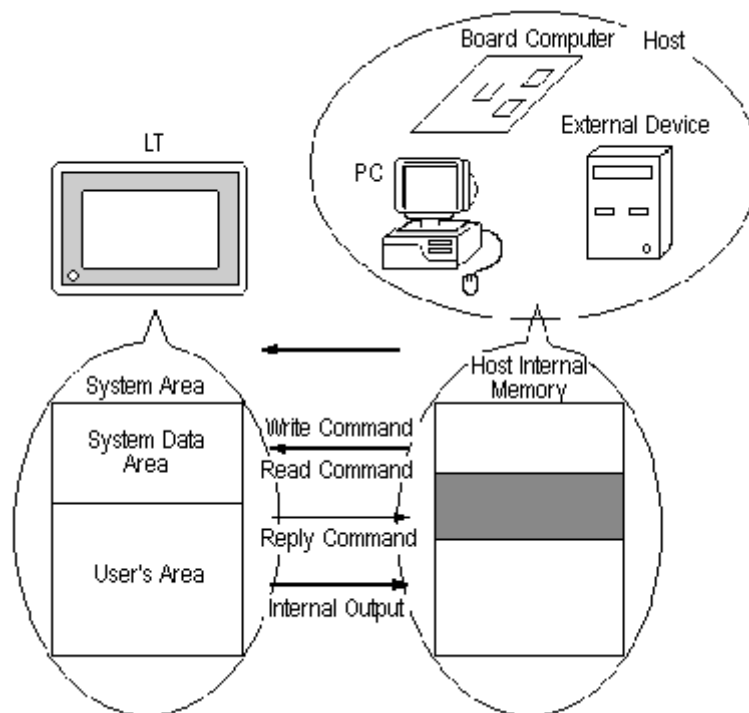
4.1.1   **System Area**

</div>

The System Area is the medium that allows data transmission between the LT and host. The System area is prepared internally in the LT; the LT runs the screen display based on the System Area data.

The System Area is 4096 words in size, organized as follows.

LS0 : LS19	System Data Area
LS20 : : :	Reading Area
	User Area
LS2032 : LS2047	Special Relays
LS2048 : LS2095	Reserved
LS2096 : LS4095	User Area

◆ **System Data Area**

This is the write area for data necessary to operate the LT screen control data and error information. The data write contents of each address is predetermined.

> *Reference*   *For more information, refer to 4-1-2 "Contents and Range of System Data Area"*

◆ **User Area**

This area is used for LT-Host data transmissions. On the host side, determine which LT address the data will be written to, and create a program to perform the data write operation. Plus, to display the written data on the LT side, another setup must be performed Parts Setup.

For the host to read data written with keypad input and touch panel input (i.e. switch), a program must be made on the host side that reads data from the LT.

⚠ *Important*   ***When using the Device Monitor feature, the User's Area (LS2096 to LS4095) will be reserved and cannot be used.***

◆ **Special Relays**

This area is for setting up LT's various status information.

Note:

• **Writing to System Address 13, using a swich, or similar method, causes an *interrupt* output to the host. On the host, read this one byte using a command like the BASIC INPUT$ instruction, to call various subroutines which depend on the value, thus greatly simplifying the program.**

• **When specifying an address bit, enter the bit position (00~15) after the word device.**

Ex. When specifying bit 02 of User's Area address 20:
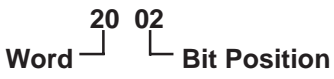
20 02

Word ⌐   └ **Bit Position**

◆ **Reserved**

Please do not use this area. It is only for LT's internal use. If you use this area, the LT will not operate properly.

4.1.2 ▶ Contents and Range of System Data Area

⚠️
Important

When you wish to turn the LT's display OFF, use the Screen Display ON/OFF bit. Do not use the Control area's Backlight OFF bit. Be aware that this feature's system Data Area settings and range used during Memory Link Communication will differ from the settings used with Direct Access Communication.

Address	Detail	Function	Bit	Particulars
1	Status *1		0 to 2	Reserved
			3	Writes a set value *2
			4 to 9	Reserved
			10	Backlight Alarm *3
			11 to 15	Reserved
2	Error Status		0, 1	Unused
	Each bit changes according to the LT		2	System ROM/RAM
	error function. When an error occurs, the		3	Screen Memory Checksum
	corresponding bit will turn on.		4	SIO Framing *4
	* A bit that has turned on remains on until		5	SIO Parity *4
	the power is turned off and back on, or		6	SIO Overrun *4
3	until RUN mode is re-entered from		7, 8	Unused
	OFFLINE mode. or details and the		9	Initialization of Internal Memory Checksum Necessary
	handling process about the Error Status		10	Timer Lock Error
	contents, refer to the Section 1.1.3.		11 to 15	Unused
4	Clock Data (Year)	"Year / Month / Day / Hour / Minute " Data is	0 to 7	Stores the last 2 digits of the Calendar year as 2 BCD digits
			8 to 15	Unused
5	Clock Data (Month)	stored in BCD's 2digits.	0 to 7	Stores 01 to 12 (Month) as 2 BCD digits
		(E.g.) 98/02/01 17:15	8 to 15	Unused
6	Clock Data (Day)		0 to 7	Stores 00 to 31 (Day) as 2 BCD digits
			8 to 15	Unused
7	Clock Data (Hour)		0 to 7	Stores 00 to 23 (Hour) as 2 BCD digits
			8 to 15	Unused
8	Clock Data (Minute)		0 to 7	Stores 00 to 59 (Minute) as 2 BCD digits
			8 to 15	Unused
10	Interrupt Output (Touch OFF)	If you Write in word data, the bottom 8 bits will be output as an interuput code after touching OFF.However FFh will not be output.		
11	Control *5		0	Backlight *6
			1	Buzzer ON
			2, 3	Reserved
			4	Buzzer 0:Output, 1:No Output *7
			5	Reserved
			6	Interrupt Output when touching panel to turn the display ON. (Interrupt Code:FFh) 0: Disabled 1: Enabled *8
			7 to 15	Reserved

Address	Detail	Function	Bit	Particulars
12	Screen Display *9 ON/OFF	FFFFh : Screen clears almost immediately 0h: Screen turns ON		
13	Interrupt Output *10	Using a switch or other method to write absolute value data from LT causes an output of the interrupt code using the contents of the bottom 8 bits (Will not out put FFh)		
15	Screen Display No.	Write the Screen No. in binary to change	0 to 14	Screen change number, 1 to 8999.(1 to 1999 when using BCD input)
16	Reserved	Reserved		
17	Reserved	Reserved		
18	Reserved	Reserved		
19	Reserved	Reserved		

*1 Monitor, in bit units, only the necessary bits.

 Since reserved bits may be used for LT system maintenance, etc., their ON/OFF status is not defined.

*2 Every time a value is written with the Keypad Input Display, the bit is reversed.

*3 When the backlight burns out, the Status LED's orange light turns ON, and the Status Data Area's "Status"*1 bit 10 will turnON.

*4 LT Type-A1/A2/B cannot be used.

*5 Be sure to turn all reserved bits OFF since they may be used for LT system mainte- nance, etc.

*6 With the LT series, the backlight turns OFF when this bit is ON(LCD display does not change) and turns ON when the bit is OFF.

 When the Control area's Backlight OFF bit turns ON, only the backlight will turn OFF, however, the LCD display will remain ON and all touch switches set up on the display can still be used. Use the Screen display ON/OFF bit to actually turn the screen display OFF.

*7 Control Bit 1 (Buzzer On) outputs as shown below.

 Buzzer Sound   While Control Bit1 is on, the LT internal buzzer is activated.

*8 Do not write control codes 00 to 1F to word address 13. It may terminate data communication.

*9 After the System Data Area's "Screen Display ON/OFF" bit is set to turn the display OFF, simply touching the screen will turn the display ON again.

*10 Interrupt output when touching the panel to turn the display OFF to ON.

   • Only when the display is turned ON by touching the panel, interrupt output will be operated.

STOP   • Addresses 0, 2, 9, 10, 14, 16, 17, 18, 19 are reserved areas. Do not write data to these addresses.

   • When addresses 3, 12, 13, 15 are utilized for System Control, displays that depend on parts do not function.

   • When addresses 12, 13, 15 are used to control word units, bit write cannot be performed.

   • Writing FFFFh to address 12 causes the screen display to erase within moments. When you wish to erase the screen using the STANDBY MODE TIME entered in LT's INITIALIZE setup, write 0000h in address 12.

   • Do not write control codes 00~1F in address 13. Data transmission may become impos- sible.

4.1.3 Special Relays

The structure of the Special Relays is as follows:

◆ **Reserved**

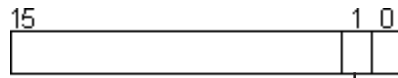The Reserved address value is undefined. Do not use this area.

2032	Common relay information
2033 2034	Reserved
2035	1 Second Binary Counter
2036	Parts Scan Time
2037	Reserved
2038	Parts Scan Counter
2039 : : 2047	Reserved

◆**Common Relay Information (2032)**

```
15      12 11 10  9  8  7  6  5      0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

1	Remains ON after when a screen change (base, window)occurs until the screen's internal processing is complete.
2	ON only in the middle of an SIO error developing.
3	ON when displaying the Initial screen after powering up.
4	Always ON
5	Always OFF
6	Turns ON when backup SRAM data has been delated
7	Turns ON if a BCD error occurs while D script is being used.
8	Turns ON if a zero division error occurs while D script is being used.
9	Filing data. Turns ON if the data is not transferred to Backup SRAM.
10	Filing data transfer is triggered by the Control Word Address. Turns ON if the data can not be transferred from External Device to SRAM. Also data transfer between External Devices is triggered by the Filing Data Display. Turns ON if the data is not trans
11	Filing data. Via transfer data to and from SRAM to LS area, via Filing Data Display.
12	When using D-script, turns ON if a communication error occurs when the function memcpy () is used, or reading the data from designated Address Offset. Turns OFF when data read is normally completed.
13-15	Reserved

◆ **Base Screen Information (2033)**

Remains on from the base screen change to when the screen's internal processing is completed.

◆ **1 Second Binary Counter (2035)**

Begins counting in one second intervals after the LT's power is turned ON. The data is binary.

◆ **Parts Scan Time (2036)**

The time it takes to prepare all the parts setup on the display screen. The data is stored as binary, millisecond units. The data renews itself at the point when preparation for all the object parts is complete. The data's default value is 0. It is accurate within + 10ms.

◆ **Parts Scan Counter (2038)**

Counts until all the Parts used in a display screen have completed their preparation. The data is binary.

(STOP) The Special Relay is not write protected. Do not turn this Relay's data ON or OFF by using parts or other method.

4.2 ▶ Cable Diagrams

Explains the connection between the LT and host.

4.2.1 ▶ RS-232C Communication

When using an RS-232C cable, there are two types of control formats: DTR (ER) Control and XON/XOFF Control. The LT-Host connection for each type is illustrated below.

■ DTR (ER) Control
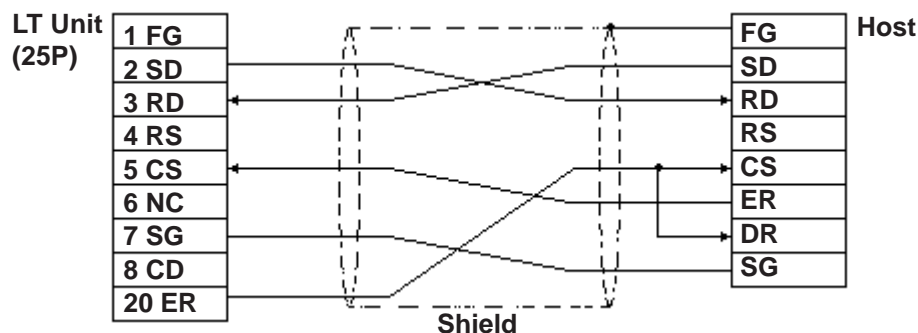
STOP Set the host's control software so that the host will not transmit data to the LT when the LT's ER is turned OFF.

■ XON/XOFF Control

Important
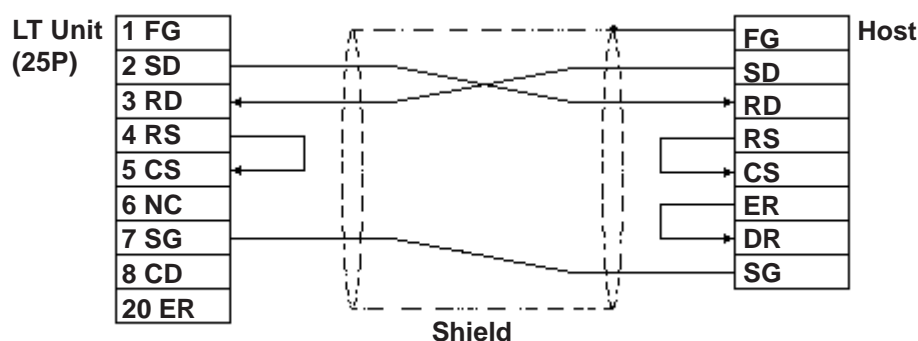
• *Depending on the host, the RS-232C connector's shape, pin numbers and corresponding signal names may differ. Be sure to follow the host interface specifications.*

• *The maximum cable length is 15m.*

4.2.2   RS-422 Communication

When using an RS-422 cable, there is only the XON/XOFF Control. The various LT-Host connections are illustrated below.

Careful!
- *Insert a termination resistor between RDA-RDB.*
- *For a 24AWG line, use a twist pair cable with a static electrical capacity of 50pF/m, and a standard characteristic impedance of 100W*

Important
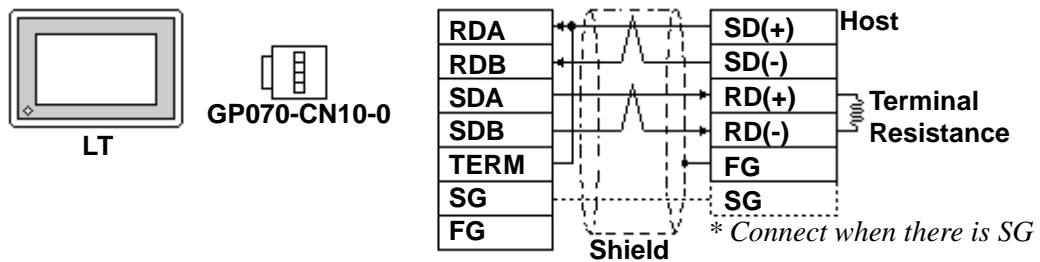- ***The maximum length of the cable is 600m. However, depending on the External Device, the maximum length of the cable is limited. When connecting, refer to the External Device's User's Manual.***
- ***Depending on the connected Host, the connection method and termination resistance differs.***

• When using Digital's RS-422 connector terminal adapter, GP070-CN10-0

Note: As a result of connecting GP070-CN10-0's RDA and TERM, a 100W termination resistance is inserted between RDA—RDB on the LT.

• When using Digital's RS-422 Cable, GP230-IS11-0
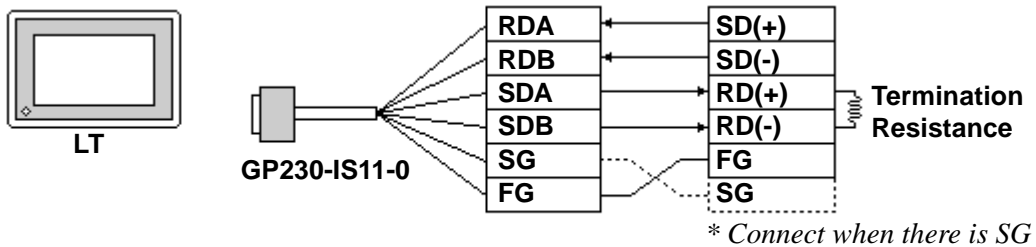
Note: When connecting the #9 and #10 pins in the LT Serial I/F, a termination resistance of 100W is added between RDA and RDB.

• When making your own cable connections
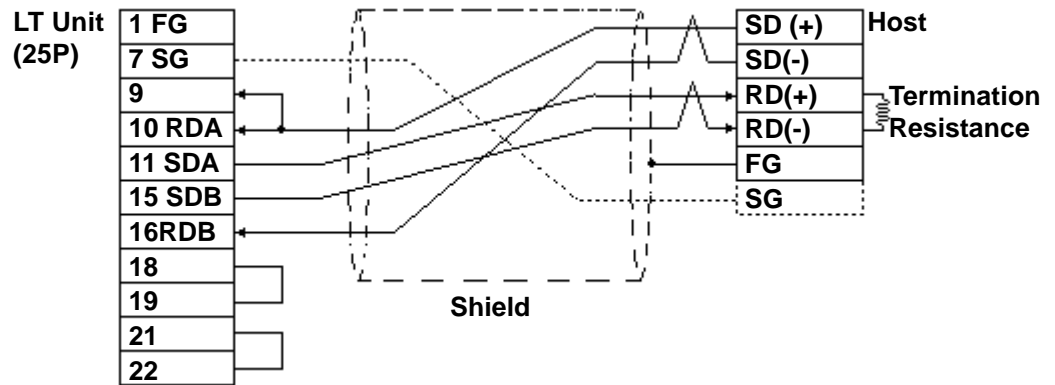
LT Unit (25P)

1 FG	
7 SG	
9	
10 RDA	
11 SDA	
15 SDB	
16RDB	
18	
19	
21	
22	

Host

SD (+)
SD(-)
RD(+) — Termination
RD(-) — Resistance
FG
SG

Shield

Note: **When connecting the #9 and #10 pins in the LT Serial I/F, a termination resistance of 100W is added between RDA and RDB.**

MEMO

4.3 ▷ Memory Link Commands

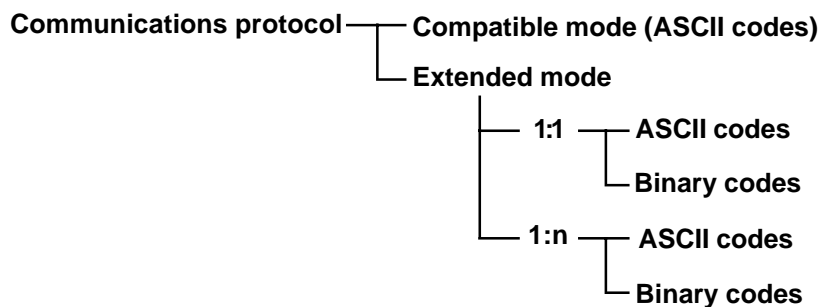The communications protocol shows the format of data transferred between the host computer and the LT and the procedure for this data transfer. The communications protocol for the LT is classified into the following modes according to the application and the data processing capability of the host computer.

```
Communications protocol ──┬── Compatible mode (ASCII codes)
                          └── Extended mode
                                    ├── 1:1 ──┬── ASCII codes
                                    │         └── Binary codes
                                    └── 1:n ──┬── ASCII codes
                                              └── Binary codes
```

■ Compatible mode

In this mode, only writing to the system area (Esc W) and reading from the system area (Esc R) commands are performed using communications protocol. The compatible mode is basically a teletype protocol using ASCII codes. Therefore, the load for controlling the communications on the host computer is decreased. In contrast, the reliability of the transmitted and received data is relatively low.

■ Extended mode

This mode is a protocol which supports not only commands for writing to and reading from the system area, but also drawing commands. The extended mode is a communications protocol compatible with the multi-drop connection between the host computer and the LT. To improve the reliability of communications data, you may specify whether sum check codes are used or not and whether ACK and NCK are used or not. The ASCII codes and the binary codes are dependent on the development of the software environment. Select whichever codes are appropriate.

Note: **Only the commands in the compatible mode are covered in this manual.**

⟨*Reference*⟩ *For the extended mode, Refer to The Memory Link Communications Manual for the GP70 Series (sold separately).*

LT-Host data transmissions are run as described for each command below.

Read command   This command reads data from the setup System Area address.

Reply command   This command responds to the Read command and passes this data from the LT to the Host.

Write command   This command writes the data to the setup System Area address.

Interrupt output Using a touch tag or other method to write data to System Data Area address 13 causes an interrupt code in the contents of the bottom 8 bits, which is then output to the Host side.

Note: **When using double-words (32-bit data), the upper and lower data are set up as follows:**

0	**H (High)**	(Upper)
1	**L (Low)**	(Lower)

Careful! **Send the read command from the Host after receiving the reply command.**

Ex. Data communication between the Host computer and the LT

Send the read command (2) after receiving the reply command (1).

When the read command is sent continuously without waiting for the reply command, a system error may be generated two or three hours later.
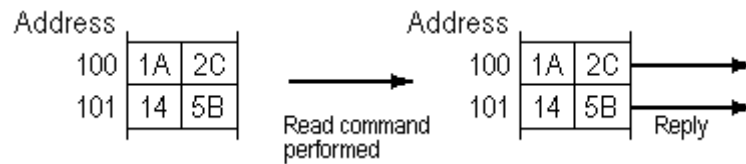
4.3.1   **Read Command**

The contents of the Read command are as follows:

ESC (1Bh)	Start Code
R (52h)	Read command
Address (4 bytes)	
Read Word Number (4 bytes)	
CR (0Dh)	Return

Ex. Reads 2 words of hexadecimal data from System Area address 100.

```
Address                          Address
100  1A  2C                      100  1A  2C  ──────▶
101  14  5B        ──────▶       101  14  5B  ──────▶
               Read command                  Reply
               performed
```
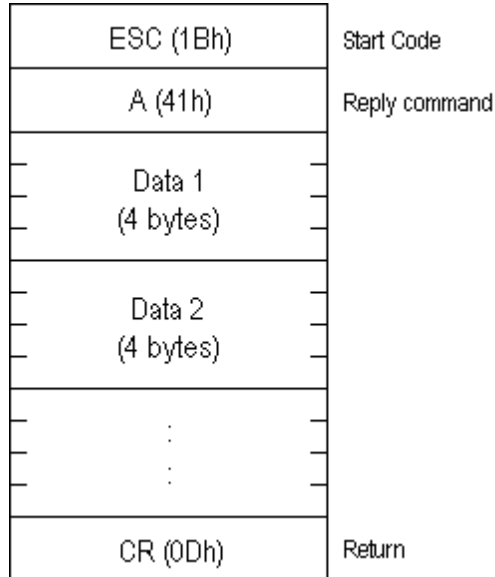
Read Command

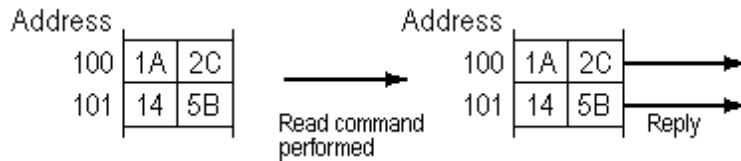| Esc	R	0 0 6 4	0 0 0 2	CR
Start Code	Read Command	Address 100	Read Word Number 2	Return

Note: **The *Address* and *Read Word Number* can be entered in ASCII Code.**
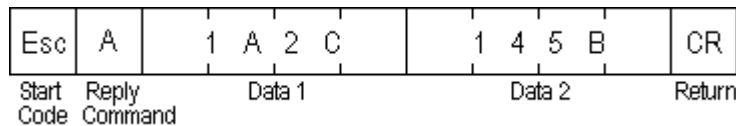
4.3.2 **Reply Command**

The contents of the Reply command are as follows:

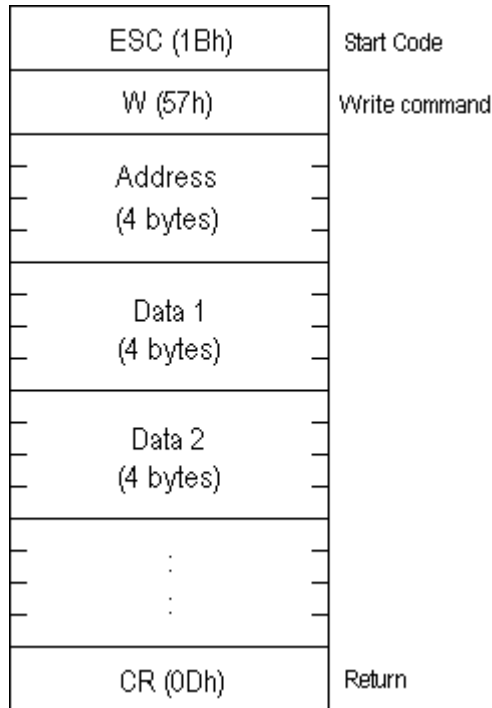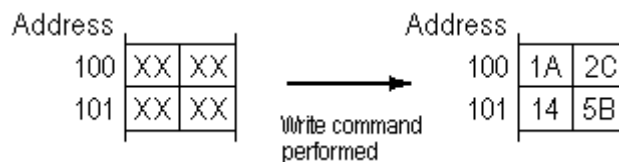Ex. Read 2 words of hexadecimal data from System Area address 100.

Reply Command

Note:
- **The response command is output automatically from the LT in answer to the read command received.**
- **The Address and Data can be entered in ASCII Code.**
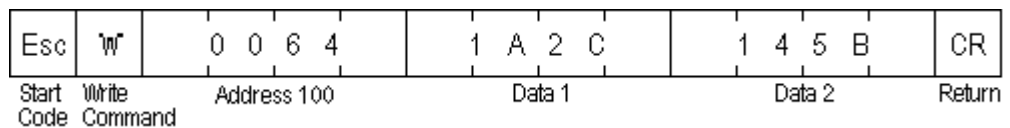- **Data is read, in order, from the setup address.**

> ### 4.3.3   Write Command

The contents of the Write command are as follows:

ESC (1Bh)	Start Code
W (57h)	Write command
Address (4 bytes)	
Data 1 (4 bytes)	
Data 2 (4 bytes)	
⋮	
CR (0Dh)	Return

Ex. Writes hexadecimal data 1A2C and 145B from System Area address 100.

Address		
100	XX	XX
101	XX	XX

Write command performed →

Address		
100	1A	2C
101	14	5B

Write Command

Esc	W	0 0 6 4	1 A 2 C	1 4 5 B	CR
Start Code	Write Command	Address 100	Data 1	Data 2	Return

Note:
- **The *Address* and *Data* can be entered in ASCII Code.**
- **Data is written, in order, from the setup (start) address.**
- **In Compatible mode, the Reply command does not return.**
- **If you keep sending the Write command to LT constantly, be aware that LT might fail to update the screen data.**

MEMO

A1 ▶ Maximum Number of consecutive Addresses

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

Note: **When the device is setup using the methods below, the Data Communication Speed declines by the number of times the device is read.**
- **When consecutive addresses exceed the maximum data number range**
- **When an address is designated for *division***
- **When device types are different**

   To speed up data communication, plan the Parts layout in screen units, using consecutive devices. (Includes the Alarm.)

A.1.1 ▶ Maximum number of Consecutive External Device Addresses

With Electronic Temperature Controllers

■ Yokogawa/Yokogawa M&C Controllers

Device	Max. No. of Consecutive Addresses
D	63 Words
I	63 Words

■ Yamatake Controllers

Device	Max. No. of Consecutive Addresses
Data	5 Words

■ RKC INSTRUMENT INC. Controllers

Device	Max. No. of Consecutive Addresses
_____	125 Words

■ Omron Corporation Controllers

Device	Max. No. of Consecutive Addresses
C0	
C1	2 Double Words
C3	
A	1 Word

■ Shinko Technos Corporation Controllers

C/FC/FIR/GC/FCL/PC-900 Series

Device	Max.No.of Consecutive Addresses
DataItems	1 Word
Setting Value Memory 1 to 7	1 Word
Channel 1 to 20	1 Word *1

*1 Although only a single word can be read at a time from a single controller, up to 20 channels can be read simulataneously.

■ Fuji Electric Corporation Controller

Micro-Controller X Series (Model:PXR)

Device Address	Max. No. of Consecutive Address
00001 ~	1 bit
10001 ~	8 bit
30001 ~	15 words
40001 ~	60 words
31001 ~	15 words
41001 ~	60 words

■ TOHO ELECTORICS INC.

TTM Series

Device	Max. No. of Consecutive Addresses
00_	
10_	
100_	
110_	
120_	
300_	
1020_	
Step Temperature Setting SSV	
Final Step Setting END	
Step time Setting STI	
Final Step Finish Condition Setting SOK	1 word
Step Wait Zone SWZ	
Step Wait Time SWT	
Time Signal ON Time SON	
Time Signal OFF Time SOF	
Execution Time SRN	
End Signal ON Time SEO	

Using Inverter

■ Mitsubishi Electric

Device	Max. No. of Consecutive Address
————	1 Word
P	1 Double Word
OPE	1 Word
OUTF	1 Double Word
OUTC	1 Word
OUTV	
SPM	
SSEL	
SOF	
SOC	
SOV	
FSET	
RUNS	
MOT	
RBRK	
ELOF	
OCPV	
COPK	
IPOW	
OPOW	
A12D	
A34D	
A56D	
A78D	
RUNC	
INVS	
RWRT	
SFWE	
SFWR	
SFRE	
SFRR	
ERCL	
RSET	
ALLC	
LNKP	
SECP	

■ Fuji Electric

Device	Max. No. of consecutive Address
Basic Function	1 Word
Terminal Function	
Control Function	
Motor 1	
High Level Function	
Motor 2	
Option	
Order Data	
Monitor Data	